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PART-5

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FAUNA OF WEST BENGAL

PART - 5
(INSECTA : HEMIPTERA)

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FAUNA OF WEST BENGAL

PART - 5

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INSECTA : HEMIPTERA : HOMOPTERA : CERCOPIDAE

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INTRODUCTION

The Cercopidae commonly known as frog hopper or 'Cuckoo spit' is one of the interesting and economically important family of the Insect Order Hemiptera. As the name implies the nymph of the most of the genera of this family are in habit of becoming envolped in a forthy substances expelled from the anus of the female, commonly termed as "Cuckoo spit" These are the representatives of the Sub Order Homoptera.

The family Cercopidae consists of four subfamilies, viz., Cercopinae, Aphrophorinae, Machaerotinae and Clastopterinae containing nearly 2368 species under 326 genera.

In the present paper specimens belonging to the sub-families Aphrophorinae, Cercopinae and Machaerotinae representing 33 species under 15 genera are being dealt with as against 40 species under 15 genera so far known from the State of West Bengal since material of some species were not available for study though recorded earlier from the State. Four species under four genera are also newly recorded from the State. In India about 190 species under 37 genera are so far known.

As the specimens representing the other sub-family viz., Clastopterinae could not be collected during mopping survey, even not being represented in National Zoological Collection the name of the species under that family recorded from the state of West Bengal is included in the annotated list of Cercopidae from the State.

The commandable works on this group was done only by Distant (1908) in his fauna volume of British India. B. Dutta and L.K. Ghosh (1976) attributed to the knowledge of this group from West Bengal. Since then practically no work has been done on this important group of insects. The present work is the consolidated account on this group for the first time from West Bengal after Distant's work.

MATERIAL AND METHOD

Cercopids like most hemipteran insects are phytophagous in nature and feed on agricultural fields, vegetable gardens, crop field etc. These specimens also like most of the other hemipteran insects are being collected by sweeping the said habitat of these insects with insect nest or by 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 napthelene. The specimens are kept in the insect envelops 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. For detailed specific identification, the genetalia structures are dissected out and mounted on slides for further study.

List of species included in the present study and their Systematic Account

Family : CERCOPIDAE Crestwood 1838

Subfamily : CERCOPINAE Metcalf 1938

Tribe : CALITETTIXIN Metcalf & Horton 1934

Genus : ***Calitettix*** Stal, 1865

1. *Calitettix varsicolor* (Fabricius)

Genus : ***Abidama*** Distant, 1908

2. *Abidama producta* (Walker)
3. *Abidama rufula* (Distant)

Genus : ***Paphnutius*** Distant, 1916

4. *Paphnutius ostentus* Distant

Genus : ***Eoscarta*** Bredd, 1902

5. *Eoscarta fuscata* Distant

Genus : ***Phymatostha*** Stal, 1870

6. *Phymatostetha basiclava* (Walker)

Tribe : COSMOSCARTINI Schmidt, 1920

Genus : ***Cosmoscarta*** Stal, 1869

7. *Cosmoscarta decisa* (Walker)
8. *Cosmoscarta dimidiata* var *tripunctata* Atkinson
9. *Cosmoscarta dorsmiaculata* (Walker)
10. *Cosmoscarta egens* (Walker)
11. *Cosmoscarta macgillivrayi* Distant
12. *Cosmoscarta metallica* Distant

13. *Cosmoscarta minor* Atkinson
14. *Cosmoscarta septapunctata* (Walker)
15. *Cosmoscarta thoracica* Distant
16. *Cosmoscarta trigona* (Walker)

Genus : ***Leptataspis*** Schmidt ,1911

17. *Leptataspis fulviceps* (Walker)

Genus : ***Poophilus*** Stal, 1866

18. *Poophilus costalis* (Walker)

Genus : ***Ptyelus*** Lepeletier & Serville, 1825

19. *Ptyelus affinis* Distant
20. *Ptyelus hirsutus* (Kirby)
21. *Ptyelus nebulosus* (Fabricius)
22. *Ptyelus praefractus* (Distant)

Tribe : CLOVINI Semidt, 1920

Genus : ***Clovia*** Stal, 1869

23. *Clovia bipunctata* Kirby
24. *Clovia conifer* (Walker)
25. *Clovia puncta* (Walker)

Tribe : APHROPHORINI Lallemand, 1924

Genus : ***Aphrophora*** Germar, 1811

26. *Aphrophora nancyae* Distant
27. *Aphrophora permutata* Uhler

Genus : ***Jembrana*** Distant, 1908

28. *Jembrana costalis* Distant
29. *Jembrana obesa* Distant

Genus : ***Philagra*** Walker, 1851

30. *Philagra fusiformis* Distant

Genus : ***Hindoloides*** Distant

31. *Hindoloides indicana* Distant

Subfamily : MACHAEROTINAE Baker, 1927

Tribe : MACHAEROTINI Lallemand, 1912

Genus : ***Machaerota*** Burmeister, 1835

32. *Machaerota assamensis* Distant

33. *Machaerota planitiae* Distant

Key to Subfamilies of the family Cercopidae

1(2) Anterior margin of pronotum rounded or angulate; eyes moderately transverse..... 3

2(1) Anterior margin of pronotum straight; eyes equally long as broad..... Cercopinae

3(4) Scutellum strongly elevated, posteriorly compressed, armed with a long apical spine..... ..... Machaerotinae

4(3) Scutellum flat, triangular..... Aphrophorinae

Key to the genera of the Subfamily Cercopinae

1(2) Anterior legs elongate, anterior femora longly passing the lateral margins of the body, anterior femora distinctly longer than the intermediate femora..... 3

2(1) Anterior legs of moderate length, the anterior femora only slightly passing the lateral margins of body and only slightly or not longer than the intermediate femora..... 7

3(4) Head in male longly and acutely produced in front of eyes..... ***Abidama***

4(3) Head not elongately produced in front of eyes..... 5

5(6) Face compressed; scutellum a little longer than broad; posterior tibiae with one spine; vertex of the head transversely depressed before apex.....***Callitettix***

6(5) Face moderately globose; scutellum about as long as broad; posterior tibiae with two spines; vertex strongly and centrally carinate..... ***Paphnutius***

7(8) Face with a longitudinal furrow..... ***Eoscarta***

8(7) Face without any furrow..... 9

9(10) Posterior margin of the pronotum foliaceous and without any protuberance..... ***Leptataspis***

10(9) Posterior margin of the pronotum not foliaceous..... 11

11(12) Pronotum with the posterior lateral margins straight and sinuate, it's greatest breadth a little more than half of its length..... ***Phymatostetha***

12(11) Pronotum with the posterior lateral margins straight and sinuate, its greatest breadth is about two third of its length..... ***Cosmoscarta***

Sub-Family CERCOPINAE

Genus ***Callitettix*** Stal, 1865

1865. *Callitettix* Stal, *Ofv. Vet. Ak. Forth* : 152.

1. ***Callitettix varsicolor*** (Fabricius)

1974. *Cercopis versicolor* Fabricius, *Rynchotas, Ent. Syst.*, **4** : 50.
1869. *Callitettix versicolor* Stal, *Hem. Fabr.*, **2** : 11.
1908. *Callitettix versicolor* : Distant, *Fauna, Brit,, India*, **4** : 113.
1953. *Callitettix versicolor* : Mathur, *Indian Forest Leaflet* (Ent.), **121**(3) : 11.

Material examined : 5 exs., Bishnupur, Bankura, Sericulture nursery, 26.X.1985, Coll. *M. Dutta & Party.*

Diagnostic characters : Shining black, pubescent; tegmina with a comparatively larger spot at the outer and before middle of the clavas and subtransverse spot at the middle of the claval and costal margin.

Genitalia : Style : Abruptly narrowed at base with blunt and hook shaped projection at apex.

Distribution : India : West Bengal (Bankura), Bihar, Kashmir, Maharashtra, Sikkim, Tamil Nadu, Uttar Pradesh. Elsewhere : Burma, China, Malaya, Siam, South Eastern Asia.

Key to species of the genus ***Abidama***

1(2) Apices of the tegmina rather broadly black; face laterally, longitudinally obliquely striated; apex of the scutellum and tegmina rufotestaceous..... *producta*

2(1) Apecies of the tegmina pale purplish red; face anteriorly subacutely prominent; apex of the scutellum and tegmina testaceous..... *rufula*

Genus ***Abidama*** Distant, 1908

1908. *Abidama* Distant, *Fauna Brit India*, 4 : 144.

2. *Abidama producta* (Walker)

1851. *Sphenorthina producta* Walker, List of the specimens of Homopteran insects in the collection of *Brit. Mus.*, **3** : 896.
1908. *Abidama producta* : Distant, *Fauna Brit. India* , 4 : 114.
1976. *Abidama producta* : Dutta & Ghosh, EOS, *Revista Espainola De Entomologia (Tomol, ano)* : 54.

Material examined : 1 ex., Eastern Himalayas, Sukna, 26.VII.1908, Coll. *N. A.*

Diagnostic characters : Head, scutellum, pronotum black; matasternum and legs dark blood red; apices of the tibiae and tarsi black with a reddish tinge; body beneath black; apex of the scutellum and tegmina brownish yellow; the apical margin of the latter rather broadly black; wings dull hyaline with veins rather darker.

Genitalia : Style : Apically foot-shapped, lateral margin concave.

Distribution : India : West Bengal (Darjiling), Assam, Bihar, Uttar Pradesh. Elsewhere : Burma, Cochin, China, Nepal.

3. *Abidama rufula* Distant

1908. *Abidama rufula* Distant, *Fauna Brit. India*, **4** : 14.
1949. *Abidama rufula* : Lallemand, *Belgique Inst. Roy. Sci. Nat. Mem.*, (2) **32** : 18.

Material examined : 3 exs., Siripur, Saran, North Bengal, 26.IX.1910 Coll. *Indian Mus.*

Diagnostic characters : Head, pronotum, black and greyishly tomentose; scutellum black at its apex; body beneath and legs pale testaceous; face anteriorly subacutely prominent, apcies of the tegmina purplish red.

Distribution : India : West Bengal (North Bengal), Assam, Bihar. Elsewhere : Burma, Bhamo, China.

Genus *Paphnutius* Distant, 1916

1916. *Paphnutius* Distant, *Fauna Brit. India*, **4** : 200.

4. *Paphnutius ostentus* Distant

1916. *Paphnutius ostentus* Distant, *Fauna, Brit. India*, **4** : 200.

Material examined : 3exs., Darjiling, 1.VI.1917, Coll. *F.H. Gravely*

Diagnostic characters : Balck face and vertex of the head with black spot before each eye; metasternum sanguineous; pronotum thickly wrinkled and moderately foveate near each lateral margins;

scutellum centrally roundly foveate.

Distribution : India : West Bengal (Darjiling).

Genus ***Eoscarta*** Bredd. 1902

1902. *Eoscarta* Bredd., *Soc. Ent.*, XVII : 58.

5. ***Eoscarta fuscta*** Distant

1916. *Eoscarta fuscata* Distant, *Fauna Brit. India*, **6** : 202.
1949. *Eoscarta fuscata* : Lallemand, *Belgique Inst. Roy, Sci. Nat. Mem.*, **2**(32):43.

Material examined : 1 ex., Pashok, Darjilling, 26.II,14.VI,1916, Coll. *F.H. Gravely.*

Diagnostic characters : Head, face, scutellum and pronotum blackish; face longly centrally forward; pronotum finely punctate and pilose with the anterior area more or less distinctly furrowed; scutellum centrally foveate; posterior tibiae spined beyond middle, anterior and intermediate legs black, posterior legs reddish.

Distribution : West Bengal (Darjiling); Tamil Nadu

Genus ***Phymatostetha*** Stal, 1870

1870. *Phymatostetha* Stal, *ofv. vet. Ak Forh.*, : 721.

6. ***Phymatostetha basiclava*** (Walker)

1858. *Cercopis basiclava* Walker, *List Hom. Suppl.*, : 172.
1870. *Phymatostetha basiclava* : Stal, *Ofv. Vet-Ak. Forth.*, : 721.
1908. *Phymatostetha basiclava* : Distant, *Fauna Brit, India.* **4** : 127

Material examined : 2 exs., Kalimpong, Darjiling IX. 1906, Coll. *Dr. Mann.*

Diagnostic characters : Pronotum with two large spots near anterior margin and two very small spots between them; the apex of the scutellum black.

Distribution : West Bengal (Darjiling); Sikkim

Genus ***Cosmoscarta*** Stal, 1869

1869. *Cosmoscarta* Stal, *Hem. Fabr.*, ii : 11.

Key to the species of the genus ***Cosmoscarta***

1(2) Tegmina with the pale transverse fasciae 3

2(1) Tegmina not transversely fasciated, apical area black, basal area generally more of less spotted 17

3(4) Pronotum balck with a pale transverse fascia or with pale discal spots..... 5

4(3) Pronotum balck, bluish black or castaneous but without any discal spot 7

5(6) Scutellum, legs, abdomen beneath black; tegmina with two transverse fasciae, first one obliterated, second one bronken into three spots, tegmina about two and half times as long as broad; mesosternum with two flattened subtriangular tubercles ..... *dimidiata* var *tripunctata*

6(5) Scutellum, legs, abdomen beneath ochraceous; tegmina with three transverse fasciae, one at base, one at about one third from base and the third one before apical area; mesosternal tubercles compressed and obscure..... *thoracica*

7(8) Tegmina with three transverse pale ochraceous fasciae, and more than twice as long as broad.... 9

8(7) Tegmina with two transverse fasciae..... 11

9(10) Head, pronotum, scutellum shining bluish, the first tegminal fascia irregular and basaly connected at the anterior margin with the second which is straight and sinuate before middle and third before apical area..... *decisa*

10(9) Head, pronotum and scutellum metallic bluish black; tegmina with a basal streak giving off a short subscostal branch and two transverse branch one at base and the other at the apex of the middle third red..... *minor*

11(12) Abdominal segmental margins sanguineous..... 13

12(11) Abdominal segmental margins dull reddish, body dark indigo blue; femora coral red; tegmina with the two irregularly shaped and angulate saguineous transverse fasciae, the first one at about one third from base, the other before apical area; tegmina about two and half times as long as broad ..... *metallica*

13(14) Tegmina about three times as long as broad; scutellum with an elongate tstaceous spot on each lateral margins; rostrum, reaching the intermediate coxae.....*macgillivrayi*

14(13) Tegmina about two and half times as long as broad; rostrum not quite reaching the intermediate coxae..... 15

15(16) Tegmina black, a short slender basal longitudinal streak; mesonotum with two short but acutely pointed tubercles; pronotum strongly foveate on each side near anterior margin and more slenderly and obliquely so near each lateral angle..... *egens*

16(15) Tegmina piceous; mesonotum with two broad compresed tubercles; pronotum transversely impressed..... *trigona*

17(18) Tegmina usually with six spots arranged in two irregular transverse series sometimes with a seventh subapical and subcostal black spot and about two and half times as long as broad; wings pale fuliginous; pronotum sometimes with two small black spots near anterior margin..... ..... *septapunctata*

18(17) Wings pale bronzy; pronotum with four spots; tegmina about twice as long as broad and with seven large black spots, six in two irregular transverse series the seventh subapical and subcostal..... ..... *dorsimaculata*

7. *Cosmoscarta decisa* (Walker)

1858. *Cercopis decisa* Walker, *List Hom. Suppl. Brit,. Mus.*, 175.
1908. *Cosmoscarta decisa* : Distant, *Fauna Brit. India*, **4** : 130.
1974. *Cosmoscrata decisa* : Butler, *Ocst. Ent.*, : 258.
1976. *Cosmoscarta decisa* : Dutta and Ghosh, *Eos Revisata Espanolade Entomologia (Tomol ano) Madrid* : 57.

Material examined : 35 exs., Darjiling, Kurseong, 7-13. VII. 1908, Coll. *Mus*; 1 ex., Darjiling, 5.VIII.1909, Coll. *C. Paiva.*

Diagnostic characters : Pronotum, head, scutellum shingingly bluish black; head transversely impressed before eyes; pronotum very finely longitudinally carinate on its anterior margin; rostrum about reaching the intermediate coxae; tegmina black nearly twice as long as broad, strongly arched at base of costal margin; thickly and minutely puctate with three transverse pale ochraceous fasciae the first irregular and basal, angularly produced in costal area, connected at inner margin with the second which is striaght and sinuate before middle, the third is before apical area.

Genitalia : Stylar shaft at one third curved and narrowed, directed laterally, apex with a nodule.

Distribution: India: West Bengal (Darjiling); Assam, Nagaland. Elsewhere: Bhutan, China, Tibet.

8. *Cosmoscarta dimidiata* var *tripunctata* Atkinson

1889. *Cosmoscarta undata tripunctata* Atkinson, *Asiatic Soc. Bengal Jour.*, **57** : 334.
1908. *Cosmoscarta dimidata* var *tripunctata* : Distant, *Fauna Brit. India*, **4** : 137.

Material examined : 1 ex. : Jalpaiguri, Bani Forest, Chilapata, 14.X.1987, Coll. *S.K. Tandon.*

Diagnostic character: Head, pronotum, scutellum, sternum and legs black; tegmina with two basal pale area, first transverse pale fascia obliterated and the second fascia broken into three spots.

Genitalia : Style : at apex feebly beak shaped.

Distribution : India : West Bengal (Jalpaiguri); Assam, Meghalaya, Nagaland, Sikkim. Elsewhere: Bhutan, China, Java, Siam, Singapore, Sumatra.

9. *Cosmoscarta dorsimaculata* (Walker)

1851. *Cercopis dorsimaculata* Walker, List *Hom. TUI*, : 658.
1908. *Cosmoscarta dorsimaculata* : Distant, *Fauna Brit. India*, **4** : 147.
1976. *Cosmoscarta dorsimculata* : Dutta and Ghosh, *EOS, Revista Espanda De Entomologia (Tomol ano)* : 57.

Material examined : 1 ex., Jalpaiguri, Jaldapara sanctuary, 23.III. 1986. Coll. *A.K. Hazra.*

Diagnostic characters : Body and legs testaceous red; pronotum thickly, finely, obscurely punctate, two foveate impressions near anterior margin at the location of the two smaller black spots and an oblique foveaton in each of the larger black spots; six in two irregular transverse series, the seventh apical and subcostal, mesosternal tubercles transverse compressed and subprominant, posterior tibiae with a short spine near base and a strong spine beyond middle.

Genitalia : Stylar shaft beak shaped, narrowed apically with apical three fourth part elliptical.

Distribution : India : West Bengal : (Darjilling, Jalpaiguri); Assam; Punjab; Sikkim; Uttar Pradesh. Elsewhere : Borneo, China, Malay Peninsula.

10. *Cosmoscarta egens* (Walker)

1858. *Cercopis egens* Walker, *List Hom. Suppl.*, 171.
1885. *Cosmoscarta egens* : Butler, *Cist, Ent.*, : 255.
1908. *Costmoscarta egens* : Distant, *Fauna Brit. India*, **4** : 135.
1976. *Cosmoscarta egens* : Dutta and Ghosh, EOS, Revista Espanola De entomologia (Tomol ano) Madrid : 59.

Material examined : 4 exs., West Bengal, Darjiling, Ghumti, VII.1911, Coll. *F.H. Gravely*; 2 exs., Darjiling, Kurseong, 14. VIII. 1909, Coll. *C. Paiva.*

Diagnostic characters : Body, pronotum black; pronotum strongly foveate on each side near anterior margin and more slenderly and obliquely so near each lateral angle; tegmina black with a short slender basal longitudinal streak, a broader curved fascia at base of clavus, and a transverse fascia before apical area; mesosternum with two short , acutely pointed tubercles; posterior tibiae with a single strong spine beyond middle.

Genitalia : Style basal three fourth broad, swollen, styler shaft short abruptly narrowed, obliquely elliptical.

Distribution : India : West Bengal (Darjiling); Assam; Nagaland; Sikkim. Elsewhere : Burma, China, Oriental region.

11. *Cosmoscarta macgillivrayi* Distant

1900. *Cosmoscarta macgillivrayi* Distant, *Tr. E.S.* : 674.
1953. *Cosmoscarta macgillivrayi* : Mathur, *Indian Forest Leaflet* (Ent.) **121**(3) : 147.

Material examined : 2exs., Kurseong, Darjiling, 13-16. VIII.1907, Coll. *Mus.*; 4 exs. Ghumti, Darjiling, VIII. 1911, Coll. *F.H. Gravely*

Diagnostic characters : Head, pronotum, scutellum, sternum bluish black; abdomen and legs testaceous; scutellum with an elongate testaceous spot on each lateral margins; segmental margins of abdomen sanguineous; tegmina with two large spots beneath costal area and a claval spot piceous with two transverse fasciae; wings with costal margin sanguineous; rostrum reaching intermediate coxae; tegmina about three times as long as broad.

Distribution : India : West Bengal (Darjiling); Sikkim.. Elsewhere: China, Hong Kong.

12. *Cosmoscarta metallica* Distant

1900. *Cosmoscarta metallica* Distant, *Tr. E.S.* : 679.
1934. *Cosmoscarta metallica* : Metcalf and Horton, *Lingan Sci, Jour.*, **13**:134

Material examined : 1 ex., Mongpu, Darjiling, IV. V.1917, Coll. *R.W. Kemp* .; 2 exs.,Lebong, Darjiling 13.VI.1914, Coll. *F.H. Gravely.*

Diagnostic characters : Body dark indigo blue; lateral margins of abdomen, coxae and femora coral red; segmental margin of abodmen beneath dull reddish; tegmina black with two irregularly shaped and angulate sanguineous transverse fasciae; wings pale fuliginous; pronotum strongly foveate on each side near anterior margin; mesosternum with two moderate size tubercles; rostrum reaching the intermediate coxae; posterior tibiae with a single moderate sized spine beyiond middle; tegmina about two and half times as long as broad.

Distribution : India : West Bengal (Darjiling). Elsewhere : Burma.

13. *Cosmoscrta minor* Atkins

1888. *Cosmoscarta minor* Atkins, *J.A.S.B.* Vii.335.
1912. *Cosmoscarta minor* : Lallemand, *Gen. Insects*, **143** : 135.

Material examined : 1 ex., Pashok, Darjiling, 26.V.1914, Coll. *F.H. Gravely.*

Diagnostic characters : Head and thorax metallic bluish black; base and apex of the abdomen reddish with a broad, transverse ,median brownish black band; tegmina blackish with a basal streak giving off a short subscostal branch and two transverse bands, one at the apex and the other at the middle third; legs brown with the posterior coxae and femora often coreaceous reddish.

Distribution : India : West Bengal (Darjiling); Sikkim. Elsewhere : Burma.

14. *Cosmoscarta setapunctata* (Walker)

1851. *Cercopis septapunctata* Walker, *List. Hom.*iii. 659.
1896. *Cosmoscarta septapunctata* : Nanalhier, Note Sirles Hanip, Paris Mus. O'*Hist. Nat. bul.*, **10** :257.
1908. *Cosmoscarta septapunctata* : Distant, *Fauna Brit. India*, **4** : 148.
1976. *Cosmoscarta bipunctata* : Dutta and Ghosh, EOS, *Revista Esanola DE Entomologia (Tomol ano) maddid* : 62.

Material examined: 4exs., Darjiling, Ghumti, VII. 1911, Coll. *F.H. Gravely.*, 1 ex., Darjiling, Tista, 27.V.1919.Coll. *H.L. Hoara.*

Diagnostic characters : Body and legs testaceous red; a double series of large spots on each side of the the abdomen beneath and sometimes with two small spots near anterior margin of pronotum; pronotum thickly, finely and indistinctly puntate, tranversely foveate on each side behind anterior margin and longitudinally near each side behind anterior margin and longitudinally near each lateral angle; mososternal tubercles broad, compressed, subprominent; tegmina testaceous red with six black spots arranged in two irregular transverse series,sometime with a seventh subapical and subcostal spot; posterior tibiae with a short spine near base and a strong spine beyond middle.

Genitalia : Style : Shaft at apex, beak shaped directed laterally, tip dark, heavily chitinished with tuff of hairs laterobasally.

Distribution : India : West Bengal (Darjiling); Assam, Meghalaya, Sikkim, Uttar Pradesh. Elsewhere : Burma, Java, Siam.

15. *Cosmoscarta thoracica* Distant

1900. *Cosmoscarta thoracica* Distant, *Tr. E.S.*, : 680.
1912. *Cosmoscarta thoracica* : Lallemand, *Gen. Insects*, 143 : 137.

Material examined : 1 ex., Kurseong, Darjiling, 13-16. VIII. 1967, *Mus.* Coll.

Diagnostic characters : Head black ; pronotum ochraceous and a very broad fascia between the lateral angles of pronotum; scutellum ochraceous, black at base; tegmina black with three transverse ochraceous fascia, one at the base, one about one third from the base and the other before apical area; face with a broad central impunctate impression; posterior tibiae with very short spine near base and long spine before middle; tegmina a little more than twice as long as broad.

Distribution : India : West Bengal (Darjiling); Kerala, Tamil Nadu.

16. *Cosmoscarta trigona* (Walker)

1851. *Cercopis trigona* Walker, *List of specimens of Homopterous insects in the collection if British Museum* **3**: 660.
1874. *Cosmoscarta trigona* : Butler, *Cist. Ent.*, **1** : 257.
1908. *Cosmoscarta trigona* : Distant, *Fauna Brit. India*, **4** : 131.
1974. *Cosmoscarta trigona* : Dutta and Ghosh, *EOS. Revista, Entomologia (Tomol ano) Madrid* : 64.

Material examined : 3exs. Darjiling, Kurseong, Coll. *C. Lynch.*

Diagnostic characters : Head, pronotum and body beneath black; tibiae and tarsi brown; scutellum and legs brownish yellow; pronotum yellowish brown, tomentose and transversely impressed; face globose; rostrum not reaching the intermediate coxae; tegmina piceous, crossed by two dark brown transverse angulate fasciae; posterior tibiae with a single short spine beyond middle.

Genitalia : Style : robust, elliptical, abruptly narrowed and twisted near apex.

Distribution : India : West Bengal (Darjiling); Assam, Kerala, Meghalaya, Nagaland and Sikkim. Elsewhere : China, Hong Kong, Tibet.

Genus ***Leptataspis*** Schmidt, 1911

1911. *Leptataspis Schmidt,* Stett. *Ent. Zeit.* **72** : 81.

17. ***Leptataspis fulviceps*** (Dallas)

1850. *Cercopis fulviceps* Dallas, *Ent. Soc. London Trand,* (2) **1** : 10.
1908. *Cosmoscarta fulviceps* : Distant, *Fauna Brit. India,* **4** : 152.
1911. *Leptataspis fulviceps* : Schemidt, *Stett. Ent. Etz.*, **72** : 83.
1974. *Leptataspis (=Cosmoscarta) fulviceps*: Dutta and Ghosh, *EOS Revista Entomologia (Tomol ano) Madrid*: 64.

Material examined : 1 ex., Darjiling, Sarcil, 11-31.X. 1917, Coll. *N.A. & F.G.*

Diagnostic characters : Head, pronotum and lateral margins of prosternum luteous; scutellum and legs pitchy black; tegmina black with a blood reddish basal streak to clavus; pronotum very finely and thickly punctate with three transverse fovcation before anterior margin, one central and others behind it on each side.

Genitalia : Style : Foot shaped stylar shaft rod like and its apex beak shaped.

Distribution : India : West Bengal (Darjiling); Assam, Meghalaya, Nagaland and Sikkim. Elsewhere : Burma, China, Hong Kong, Java, Laos, Malaya, Siam.

Subfamily APHROPHORINAE Licent, 1987

Key to the genera of the subfamily Aphrophorinae

1(2) Vartex of the head broader than long, convexly rounded anteriorly..... 3

2(1) Vertex of head as long as or longer than broad, strongly prolonged infront 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..... 11

5(6) Ocelli about equally or further removed from each other than from eyes..... 7

6(5) Ocelli further removed from eyes than from each other; face globose; tegmina short but apically broad; posterior tibiae with two spines..... ***Hindoloides***

7(8) Face more or less convexly produced..... 9

8(7) Face more or less flattened, not convexly produced..... ***Clovia***

9(10) Clypeus slightly passing the apices of the anterior coxae..... ***Poophilus***

10(9) Clypeus reaching but not extending beyond the apices of anterior coxae..... ***Ptyelus***

11(12) Head and pronotum with a single central carination..... ***Aphrophora***

12(11)Pronotum tricarinate..... ***Jembrana***

Subfamily APHROPHORINAE

Genus ***Poophilus*** Stal, 1866

1866. *Poophilus* Stal, *Hem. Afr.* iv, : 72.

18. ***Poophilus costalis*** (Walker)

1851. *Ptyelus costalis* Walker, *List of specimens of Homopterous ins. in the Coll. of the Brit. Mus.*, **3** : 707.
1885. *Poophilus costalis* : Atkinson, *Asiatic Soc. Bengal Jour.*, **54** : 144.
1908. *Poophilus costalis* : Distant, *Fauna Brit. India*, **4** : 86.

Material examined : 6exs. Bardhaman, Durgapur, 3. IX.1986,Coll. *K.K. Roy & party.*, 12 exs., Bahadurpura, Nadia, 15.VII.1985, Coll. *B.N. Das*; 4 exs., Sankarpur forest, Medinipur, 25.XI.1985, Coll. *A.K. Hazra.*

Diagnostic characters : Brownish yellow; central and apical margin of vertex with five very small black spots; disc of the sternum, anterior and the intermediate legs brownish black to black with a reddish tinge, but apices of the femora pale; tegmina with costal margin pale which become broader on apical area.

Genitalia : Style : Stylar shaft stout, truncate, its apex feebly pointed and curved laterally.

Distribution : India : West Bengal (Bardhaman, Calcutta, Darjiling, Medinipur, Nadia) ; Gujarat, Maharashtra, Mysore Elsewhere : Africa, China, Japan, Malaya, Philippine, Siam, Singapore.

Genus ***Ptyelus*** St. Farg and Serville, 1825

1825. *Ptyelus* St. Farg and Serville, *Enc. Mith.*, **X** : 608.

Key to the species of ***Ptyelus***

1(2) Vertex of the head distinctly shorter than central length of pronotum..... 2

2(1) Vertex of the head slightly shorter or as long as the medial length of the pronoutm 5

3(4) Head with an enclosed rectangular space at the anterior margin, face broad, globose but without any spot, an irregular transverse fascia crossing tegmen at middle and an oblique subapical costal spot greyish white ..... *praefractus*

4(3) Head without such rectangular space, face with two black spots at anterior margin; two costal spots and a large irregular inner marginal fascia ochraceous..... *affinis*

5(6) Tegmina pointed with a pale oblique fascia on the costa before the tip, a black spot at the tip and another in a pale ring on the inner margin; pronotum has two small but distinct foveate spots near the anterior margin ..... *hirsutus*

6(5) Tegmina with an oblique anterior fascia, a somewhat large spot at the commissures, an oblique transverse spot beyond the middle of the costal margin and a minute costal spot towards the apex, yellowish grey; pronoutm without foveate spot..... *nebulosus*

19. ***Pytelus affinis*** Distant

1906. *Ptyelus affinis* Distant, *Fauna Brit. India*, **4** : 88.

Material examined : 1 ex., Calcutta ?.

Diagnostic characters : Head and pronotum dark fuscous brown; face with two black spots at anterior margin; tegmina with two costal spots, a large irregular inner marginal fascia; vertex of the head shorter than length of pronotum, tegmina two and half times as long as broad.

Distribution : India : West Bengal (Calcutta); Bihar, Karnataka, Maharashtra, Tamil Nadu. Elsewhere : Burma

20. ***Ptyelus hirsutus*** (Kirby)

1891. *Philaenus hirsutus* Kirby, *J. Linn. Soc. Zool.* **24** : 160.
1903. *Ptyelus hirsutus* : Melich, *Hom. Faun. Ceylon,* : 134.

Material examined : 1 ex., Tribeni, Hughli, 31.VII. 1909 ? Coll.

Diagnostic Characters : Head and pronotum brownish testaceous; tegmina pointed with a pale oblique fascia on the costa before the tip, a black spot at the tip and another in a pale ring; vertex of the head with an enclosed rectangular space at anterior margin which is much shorter than pronotum.

Distribution : India : West Bengal (Hughli). Elsewhere : Sri Lanka.

21. ***Ptyelus nebulosus*** (Fabricius)

1794. *Cercopis nebulosus* Fabricius, *Entomologia Systematica emendata et acuta*, **4** : 50.
1851. *Ptyelus nebulosus* : Walker, *List of the specimens of Homopterous insects in the collection of Brit. Mus.* **3** : 705.
1908. *Ptyelus nebulosus* : Distant, *Fauna Brit. India*, **4** : 88.

Material examined : 6exs., Nadia, Bahadurpura Forest, 15.XII. 1985, Coll. *B.N. Das & party.*

Diagnostic characters : Body pale yellowish grey; head with two small black spots on its anterior margin; tegmina with a oblique anterior fascia, a somewhat large spot at the commissure, an oblique transverse spot beyond the middle of the costal margin and a minute costal spot towards the apex; pronotum has two small but distinct foveate spots near its anterior margin; face is distinctly transversely striate on its lateral area.

Genetalia : Stylar shaft cylindrical, laterally curved and bilobed apically, lateral one shorter and broader than inner one.

Distribution : India : West Bengal (Nadia); Bihar, Maharashtra, Mysore, Tamil Nadu. Elsewhere: Sri Lanka, Java.

22. ***Ptyelus praefractus*** (Distant)

1908. *Ptyelus praefractus* Distant, *Fauna Brit. India*, **4** : 89.
1946. *Ptyelinellus praefractus* : Lallemund, *Soc. Ent.de. Belg. bul.et.*
1953. *Ptyelus praefrdactus* : Mathur, *Indian Forest Leaftler (Ent.)* **121**(3) : 138-187.

Material examined : 1 ex. ; Eastern Himalayas, Darjiling, VII. 1919, Coll. *F.H. Gravely.*

Diagnostic characters : Head and pronotum yellowish with slight brown tinge; an irregular transverse fascia crossing tegmina at middle and an oblique, subequal costal spot greyish white ; vertex with an enclosed rectangular space at anterior margin; pronotum wooly hairy with a transverse series of fine irregular fovcations on its anterior area.

Genitalia : Style : Constricted medially, gradually widened, and apically bilobd, lateral margin with a row of short hairs.

Distribution : India : West Bengal (Darjiling); Kerala, Tamil Nadu. Elsewhere : Burma, Java, Malaya.

Genus *Clovia* Stal , 1866

1866. *Clovia* Stal, *Hem. Afr.* iv. : 75.

Key to the species of genus *Clovia*

1(2) Head subtriangularly rounded, its length almost as long as the centre of the pronotum; body flavescent to testaceous; tegmina with a large median and larger apical costal hyaline or subhyaline spots..... *conifera*

2(1) Head anteriorly rounded; body towny brown; tegmina with a small black spot at posterior angle of inner margin..... 3

3(4) Head a little shorter than the medial length of the pronotum; anterior central area with three pale longitudinal lines; tegmina without any fasciae..... *puncta*

4(3) Head as long as the medial length of the pronotum; apical area of the tegmina subhyaline and corssed by two irregularly bent oblique tawny fasciae.....*bipunctata*

23. *Clovia bipunctata* Kirby

1981. *Clovia bipunctatus* Kirby, *Lnn.Soc. London Jour. Zool.*, **24** : 163.
1908. *Clovia bipunctata* : Distant, *Fauna Brit. India*, **4** : 94.

Material examined : 1 ex. : Hugli, Sheorafully, 29.XII.1964,Coll. *K.K. Rao* ., 1 ex.; South 24 Paganas, Diamond Harbour, 19.XII. 1961, Coll. *R.K. Varshney* ; ex. : Nadia, Bethuadihiri, 18.XII. 1985, Coll. *B.N. Das.*

Diagnostic characters : Pale yellowish brown; thickly, shortly and finely pilose with apical area of the tegmina subhyaline and crossed by two iregularly bent oblique tawny fasciae; a black spot at posterior angle of inner margin; head as long as the medial length of pornotum.

Genitalia : Style : Apex of the shaft concave and with a sharp projection.

Distribution : India : West Bengal (Hugli, Nadia, South 24 Parganas); Taml Nadu. Elsewhere : Sri Lanka, Japan, Java.

24. *Clovia conifer* (Walker)

1851. *Ptyelus conifer* Walker, *List of the specimens of Homopterous Ins. in the collection of the Brit. Mus.*, **3** : 711
1885. *Clovia conifera* : Atkinson, *Asiatic Soc. Bengal Jour.*, No. **2**, 54 : 19.
1908. *Clovia conifer* : Distant, *Fauna Brit. India*, **4** : 93.
1934. *Clovia conifer* : Metcalf & Hoston, *Lingan Sci. Jour.*, **13**:421.

Material examined : 1 ex. ; Hugli, Tarakeshwar, 5.XI.1964, Coll. *A.N.T. Joseph & party.*, ex. ; Sukna, 1.VII.1908, Coll. *N. Annandale.*

Diagnostic characters : Fuscous or testaceous; head between the eyes subtriangularly rounded, its length almost as long as centre of the pronotum which is posteriorly, angularly sinuate; vertex and pronotum in some specimen with distinct darker longitudinal lines; tegmina with a large median and larger apical costal, hyaline or subhyaline spot; legs ochraceous annunlated with dark castaneous to wholly castaneous and the tarsi ocharceous.

Senitalia : Style : Stylar shaft rod like with tuft of britsles on its apical part,

Distribution : India : West Bengal (Darjiling, Hugli); Assam, Kerala. Elsewhere : Burma, China, Java, Malaya, Singapore, Sumatra.

25. *Clovia puncta* (Walker)

1851. *Ptyelus punctum* Walker, *List of specimens of Homopterous Ins. in the Coll. of Brit. Mus.*, **3** : 718.
1908. *Clovia puncta* : Distant, *Fauna of Brit India*, **4** : 94.

Material examined : 5 exs. ; Jhalda, Purulia, 7.IX.1986, Coll. *R.S. Burman* & paty, 2 exs. ; Durgapur, Bardhaman, 3.IX.1986, Coll. *K.K. Ray* & party.

Diagnostic characters : Pale yellowish brown, thickly, shortly finely pilose; face with a black spot on each side; disc piceous, its lateral margin and lateral margin of sternum greyish with piceous spot behind each anterior central area of the head with three pale longitudinal lines; pronotum with some very distinct longitudinal lines; tegmina with a small black spot at posterior angle of the inner margin.

Genitalia : Style shaft bilobed, apically pointed with tuft of bristles, inner lobe pointed laterally and outer lobe bidented.

Distribution : India : West Bengal (Bardhaman, Purulia); Bihar, Gujarat, Maharashtra. Elsewhere: China, Hong Kong, Japan, Java.

Genus *Aphrophora* Germ, 1831

1831. *Aphrophora* Germ, *Mag. Ent.* iv : 48.

Key to the species of the genus *Aphrophora*

1(2) Tegmina crossed by two oblique black fasciae, one near base, the other near middle and a large spot of the same colour at apex; vertex about one third of the length of the pronotum..... *nancyae*

2(1) Tegmina crossed with two obliquue testaceous fasciae near the middle and without any spot; vertex almost as broad as pronotum..... *permutata*

26. *Aphrophora nancyae* Distant

1908. *Aphrophora nancyae* Distant, *Fauna Brit. India*, **4** : 101.

Material examined : 2exs., (Damaged), Eastern Himalayas, Darjiling, V.1910, Coll. *R.B. Horsfall*

Diagnostic characters : Head, pronotum, pale ochraceous, thickly and darkly punctate, central, anterior margin of vertex black; tegmina crossed by two oblique fasciae, vertex of the head about one third the length of the pronotum, a cluster of black punctures on each side near eyes and a similar central cluster; pronotum with a transverse series of four subfoveate spots on anterior area.

Distribution : India : West Bengal (Darjiling); Uttar Pradesh. Elsewhere : West Indies.

27. *Aphrophora permutata* Uhler

1872. *Aphrophora permutata* Uhler, *U.S. Geol. Surv. Prelim. Rebt.* : 472.

Material examined : 3xs., Calcutta, 6.V.1930, Coll. *E.R. Leach*

Diagnostic characters : Head and pronotum ochraceous; thickly and darkly punctate; head almost as broad as pronotum; ocelli purplish red; body beneath and legs testaceous; vertex with a central longitudinal foveation; tegmina with two oblique testaceous fasciae near the middle.

Genitalia : Style : Robust, flattened, laterally bifurcated and beak shaped.

Distribution : India : West Bengal (Calcutta). Elsewhere : New Mexico, United States.

Genus *Jembrana* Distant, 1904

1904. *Jembrana* Distant, *Fauna Brit., India,* **4** : 104.

Key to the species of the genus *Jembrana*

1(2) Posterior tibiae with one spine; face ochraceous; pronotum tricarinate, the lateral carination somwhat obscure; tegmina with the costal area broadly pale, dull ochraceous..... *costalis*

2(1) Posterior tibae with two spines; face purplish brown, with a central pale ochraceous spot and a similar spot on each cheek at anterior margin; pronotum with a centrally and two roundly oblique carinations; tegmina with the costal area pale fuscous brown..... *obesa*

28. *Jembrana costalis* Distant

1916. *Jembrana costalis* Distant, *Fauna Brit. India* **4** : 192.

Material Examined : 1 ex.,Kurseong, Darjiling, 13. VIII. 1909, Coll. *C. Lynch*

Diagnostic characters : Head, pronotum, body ochraceous; tegmina with costal area more or less pale dull ochraceous beyond base, from base to middle narrowly pale ochraceous, spotted with black, near centre of tegmen an oblique broken greyish line, vertex of the head centrally broadly ridged; rostrum

passing the posterior coxae; face ochraceous; pronotoum coarsely punctate and tricarinate.

Distribution : India : West Bengal (Darjilling); Tamil Nadu. Elsewhere : Burma, Sri Lanka, Nepal.

29. ***Jembrana obesa*** Distant

1916. *Jembrana (?) obesa* Distant, *Fauna, Brit. India*, **6** : 193.

Material examined : 1 ex., Eastern Himalayas, Darjiling, Kurseong, 15.V.1910, Coll. *E.A.D.*

Diagnostic characters : Head, pronotum & body brownish yellow, more or less shaded with purplish brown; tegmina blackish brown, the costal area paler marked with irregular dark spots; head & pronotum punctate, centrally & longitudinally carinate; pronotum with two oblique submarginal foveations; face purplish brown with a central pale yellowish brown spot and a similar spot over each cheek at anterior margin; posterior tibiae with two spines.

Genetalia : Style : basally broad, gradually tapering apically with hook shaped tip.

Distribution : West Bengal (Darjiling); Tamil Nadu.

Genus ***Philagra*** Walker, 1851

1851. *Philagra* Walker, *List of specimens of homopterous ins. in the Coll. of Brit. Mus.*, **3** : 731.

30. ***Philagra fusiformis*** Distant

1858. *Philagra fusiformis* Walker, *List. Hom. Suppl.*, : 47.

Material examined : 2 exs., Peshok, Darjiling, 26.V. & 14.IV.1916, Coll. *F. H. Gravely.*

Diagnostic chaacters : Body, legs, abdomen, ochraceous, head above strongly tricarinate, about half as long as pronotum, its apex slightly upwardly curved, rostrum almost reaching the posterior coxae; tegmina strongly, centrally carinate.

Distribution :India : West Bengal (Darjiling); Arunachal Pradesh, Assam, Sikkim. Elsewhere : Burma, China.

Genus ***Hindoloides*** Distant, 1915

1915. *Hindoloides* Distant, *A.M.N.H. (8) XV* : 506.

31. ***Hindoloides indicians*** Distant

1916. *Hindioloides indicans* Distant, *A.M.N.H. (8)XV :* 507.

Material examined : 2exs., Calcutta, 27.IX.1915,Coll. *F.H. Gravely* ; 1 ex., Calcutta, 3.IV. 1915, Coll. *F.H. Gravely.*

Diagnostic characters : Head pronotum body beneath, scutellum ochraceous; eyes black with two large black spots on face between them; tegmina with basal two third ochraceous, remaining dull subhyaline.

Distribution : West Bengal (Calcutta).

Subfamily MACHAEROTINAE Baker, 1927

Genus ***Machaerota*** Brumeister, 1835

1835. *Machaerota* Burmeister, *Handb. Ent.*, II **1** : 128.

Key to the species of the genus ***Machaeorta***

1(2) Pronotum with three longitudinal series of small dots on each side and a spot at the apex of the vertex; scutellar process pale testaceous, a lateral longitudinal spot on each side of base; posterior tibiae light pale ochraceous..... *assamensis*

2(1) Pronotum and vertex of the head without any spot; scutellar process castaneous with an elognated ochraceous spot at the base; posterior tibiae straminеous..... ..... *planitiae*

32. ***Machaerota assamensis*** Distant

1916. *Machaeorta assamemsis* Distant, *Fauna Brit. India.* **4** : 183.

Material Examined : 1 ex., : Peshok , Darjiling, 26.V. 1916, Coll. *F.H. Gravely*

Diagnostic characters : Head, pronotum dark testaceous the anterior apex of the latter black and centrally divided by the testaceous carination; lateral area of the face ochraceous with the blackish striations; scutellar process pale testaceous, a lateral longitudinal spot on each side of the base; the posterior margin of the basal process pale ochraceous; anterior and intermediate tibiae piceous; posterior scutellar process strongly convexly depressed and reaching the tegminal apices.

Distribution : West Bengal (Darjiling); Assam.

33. ***Machaerota planitiae*** Distant

1906. *Machaerota planitiae* Distant, *Fauna Brit. India*, **4** : 84.

Material examined : 2 exs.,Purneah, North Bengal 3.X.1908 and 2.X.1908, Coll. *C.A. Paiva* ; 1 ex., Calcutta maidan, 24.VI. 1912, Coll. *F.H. Gravely.*

Diagnostic characters : Head, pronotum towny brown; a spot at the apex of the vertex and three longitudinal series of small dots on each side of the pronotum; a central carination and the posterior lateral margins of pronotum ochraceous; scutellum ochraceous, its apcal area and posterior spine castaneous, the latter with an elongated ochraceous spot at base; scutellar spine about reaching apex of tegmina, elevated, passing the apex of tegmina and strongly curved downward; posterior tibiae stramineous.

Distribution : West Bengal (Calcutta, North Bengal); Bihar; Punjab; Tamil Nadu.

List of species under the Family Cercopidae so far recorded

From the State of West Bengal

1. *Abidama producta* walker
2. *Abidama rufula* Distant
3. *Aphrophora nancyae* Distant
4. *Aphrophora permutata* Uhler*
5. *Aphrophora sigillifera* Walker*
6. *Callitettix varsicolor* (Fabricius)**
7. *Clovia bipunctata* Kirby
8. *Clovia conifer* (Walker)
9. *Clovia puncta* (Walker)
10. *Cosmoscarta decisa* (Walker)
11. *Cosmoscarta dimidiata* var *tripunctata* Atkinson**
12. *Cosmoscarta dorsimaculata* (Walker)
13. *Cosmoscarta egens* (Walker)
14. *Cosmoscarta fumosa* Distant*
15. *Cosmoscarta hyalinipennis**
16. *Cosmoscarta macgillivrayi* Distant
17. *Cosmoscarta metallica* Distant
18. *Cosmoscarta minor* Atkinson
19. *Cosmoscarta septapunctata* (Walker)
20. *Cosmoscarta thoracica* Distant

21. *Cosmoscarta trigona* (Walker)
22. *Eoscarta fuscata* Distant
23. *Hindoloides indicans* Distant
24. *Jembrana costalis* Distant
25. *Jembrana bipartita* Distnat*
26. *Jembrana obesa* Distnat
27. *Leptataspis fulviceps* (Dallas)
28. *Machaerota assamensis* Distant
29. *Machaerota planitiae* Distant
30. *Paphnutius ostentus* Distant
31. *Philagra fusiformis* Walker
32. *Phymatostetha pudens* Walker
34. *Phymatostetha signifera* Walker*
35. *Poophilus affinis* Distant *
36. *Poophilus costalis* (Walker)
37. *Ptyelus hirsutus* Kirby
39. *Ptyelus nebulosus* (Fabricius)
40. *Ptyelus praefractus* (Distant)

* Not available for study recorded from the literature

** New records from the State of West Bengal.

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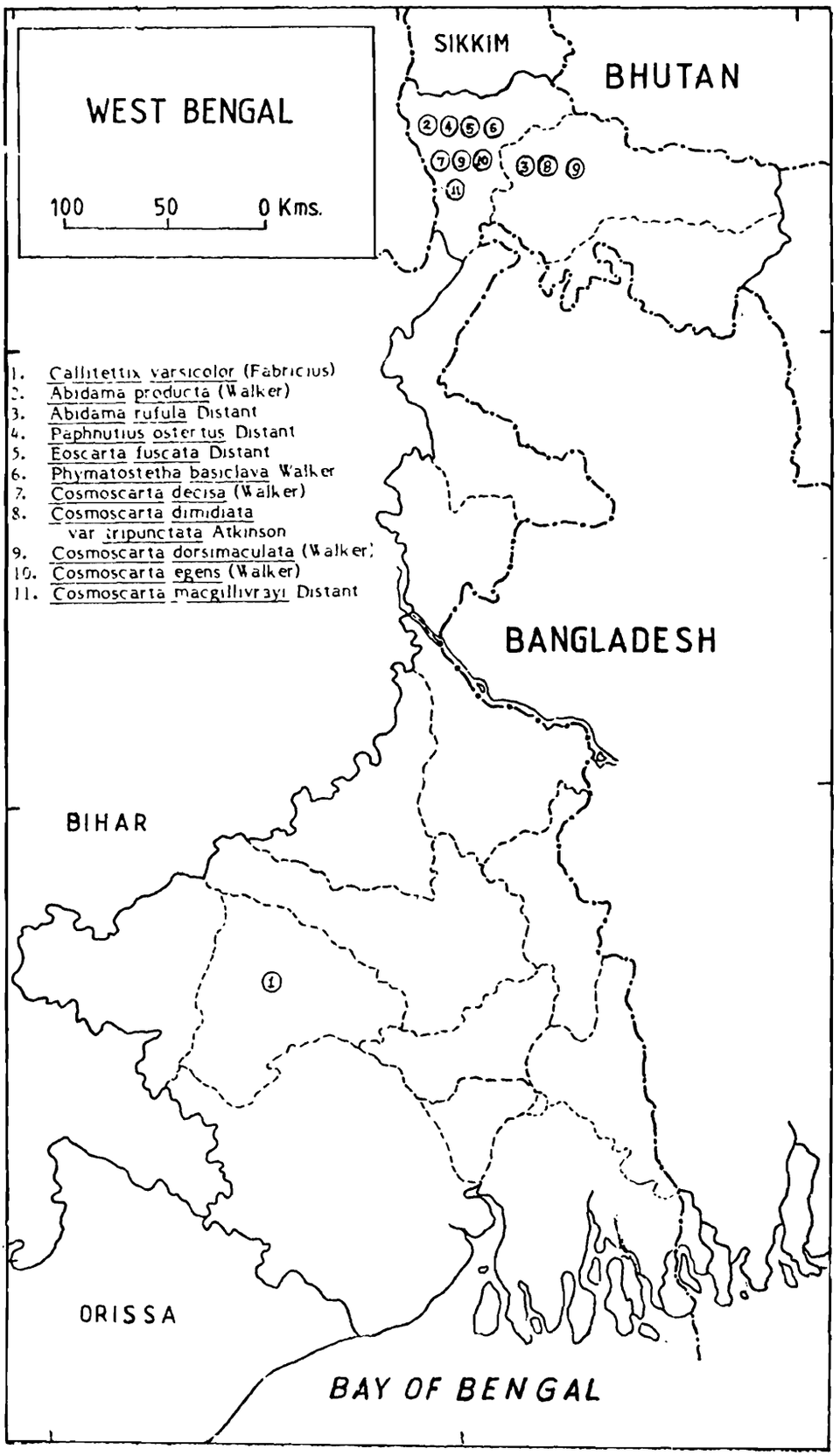
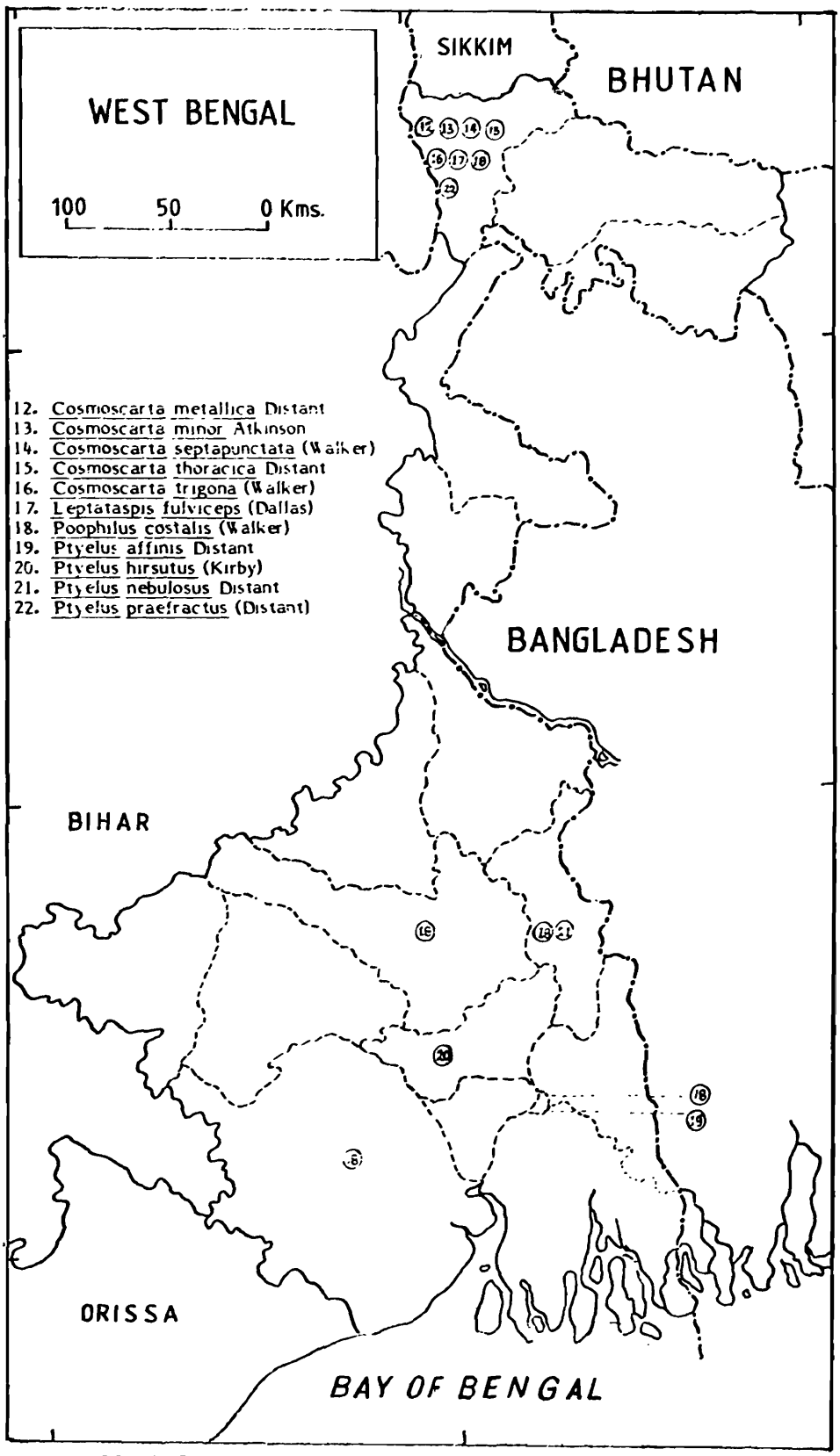
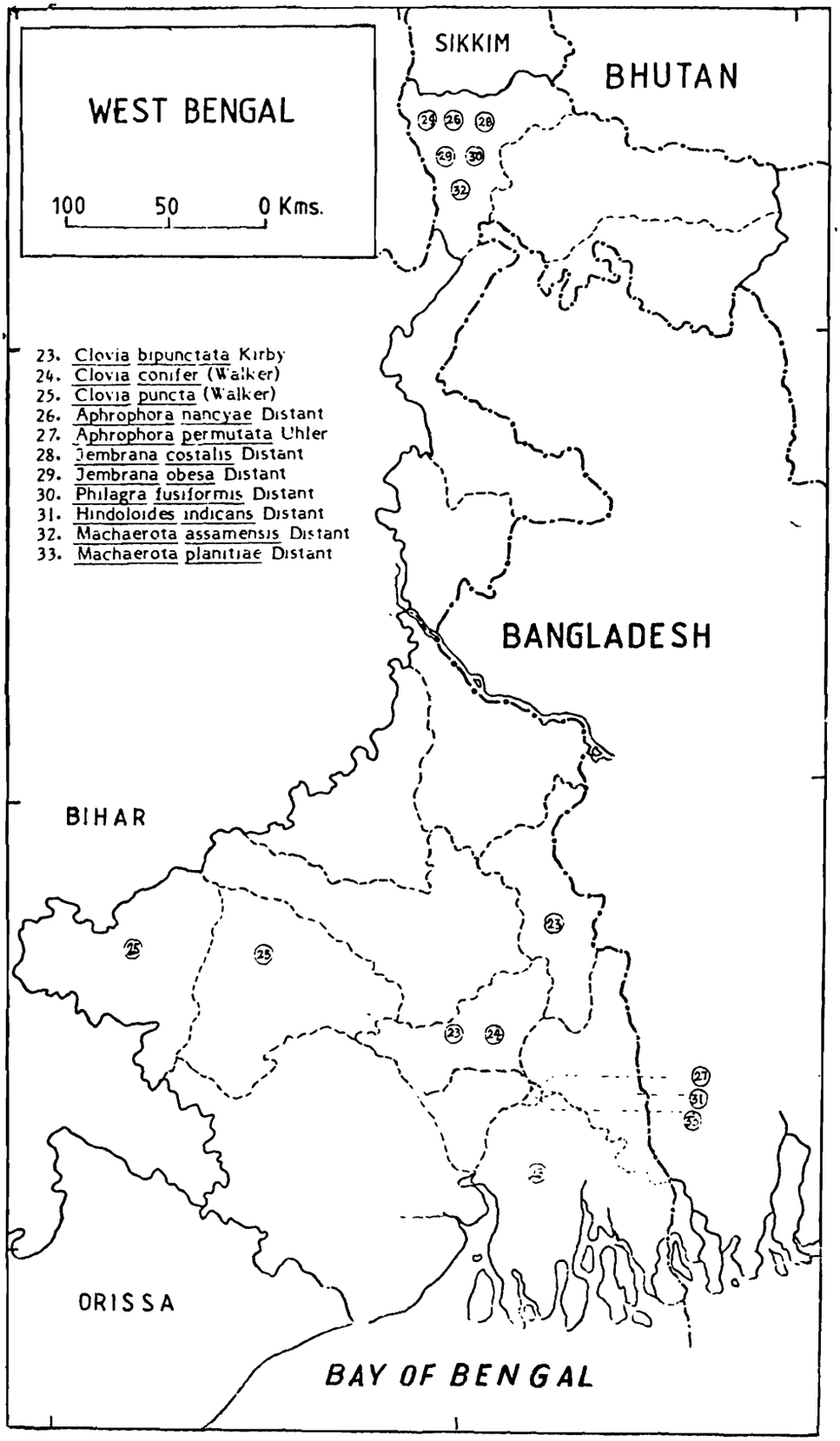


Map 1. Showing the distribution of Cercopidae species as indicated.



Map 2. Showing the distribution of Cercopidae species as indicated.



Map 3. Showing the distribution of Cercopidae species as indicated.

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INSECTA : HEMIPTERA : CICADELLIDAE

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The Cicdellids have been considered insects of economic importance and are comon seasonal insects of rice fields in West Bengal. These homopterans (Cicadellidae) enjoy comfortable nitche in the agro-ecosystems of West Bengal due top the favourable rainfal and availability of wide host range. They damage the rice plant by sucking the sap from the vascular tissues and transmitting virus diseases besides reducing the vitality, vigour and fruit bearing capacity and also forming malformations. In all, 115 species of Cicadellids have been reported to transmit 86 planbt Pathogens (Ishihara 1969). Despite their dmage caused to the crop plants, very little attentions has been paid to explore their abundance and distribution in the Country.

EARLIER INVESTIGATION

The Indian Cicadellidae are known through the works by Atkinson (1885), Distant (1908, 1918), Pruthi (1930-40), Ghauri (1963, 1967, 1974), Singh (1969), bindra (1973), Bindra et al. (1970), sohi (1972) Ramakrishna and menon (1971 1974), Rao (1967, 1969, 1974), malhotra and Sharma (1974, 1977) Datta (1971 '88), Ghosh (1974), Datta and Dhar (1984), Dworakowaska (1969 '81) Sohi and Dworakoska (1983), Dworakoska and Viramtamath (1975-79)

However, no consolidated account of cicadellia fauna of West Bengal is available excepting a recent work by Nath et. al. (1986).

The present contribution is an attempt to provide a comprehensive account of the family Cicadellidae from West Bengal. It is based on the recent as well as the old collections made by different Survey party members of the Zoological Survey of India. The account deals with a brief note on earlier investigations, keys to taxa, geographical distribution of each species, new locality records of 3 species (marked **), literature and references. The species (marked *) which are recorded from the literature and are not available for study have been included in the paper. maps showing the distribution of 20 species examined from various districts of West Bengal have also been included in the paper.

The clasification of the family has been mainly adopted after Distant (1908, 1916, 1918), Young (1952) and ghauri (1963, 1967, 1971, 1974).

CLASSIFIED LIST OF CICADELLIDAE OF WEST BENGAL

Subfamily CICADELLINAE

Genus 1. ***Cicadella*** Melichar

1. *Cicadella spectra* (Distant)

Genus 2. ***Cofana*** Melichar

2. *Cofana mimica* (distant)

Genus 3. ***Kolla*** Distant

3. *Kolla ganesha* Distant **

4. *K. opponens* Walker

5. *K. raja* Distantr

6. *K. unimaculata* Signoret

Subfamily DELTOCEPHALINAE

Genus 4. ***Cicadula*** Zetterstedt

7. *Cicadula indica* Pruthi *

Genus 5. ***Deltocephalus*** Burmeister

8. *Deltocephalus notatus* Pruthi*

Genus 6. ***Eugnathodus*** Baker

9. *Eugnathodus indica* Pruthi*

10. *E. ocellatus* Pruthi *

11. *E. (Nesosteles) sanguinescens* (Kirkaldy) *

Genus V7. ***Eutettix*** van Duzee

12. *Eutettix phycitis* Distant

Genus 8. ***Exitianus*** Ball

13. *Exitianus atkinsoni* (Distant)

14. *E. indicus* (Distant)

15. *E. nanus* (Distant)

Genus 9. ***Goniagnathus*** Fieber

16. *Goniagnathus punctifer* Walker

Genus 10. ***Nephotettix*** Matsumura

17. *Nephotettix malayanus* Ishihara & Kuwase

18. *N. nigropicta* (Stal)

19. *N. parvus* Ishihara & Kuwase *

20. *N. virescens* Fabricius

Genus 11. ***Recilia*** Edwards

21. *Recilia dorsalis* (Motschulsky) *

Genus 12. ***Thamnotettix*** Zetterstedt

22. *Thamnotettix bicolor* Pruthi *

23. *Thamnotetix chhota* Pruthi *

Subfamily EVACANTHINAE

Genus 13. ***Evacanthus*** (Lep.)

24. *Evacanthus repexus* (Distant)

Subfamily HECALINAE

Genus 14. ***Thomsoniella*** Signoret

25. *Thomsoniella porrecta* (Walker)

26. *Thomseniella (Paraboloratus) concentralis* (Matsumura) *

Subfamily IASSINAE

Genus 15. ***Iassus*** Fabricius

27. *Iassus indicus* (Walker) **

Subfamily IDIOCERINAE

Genus 16. ***Amritodus*** Anufriev

28. *Amritodus atkinsoni* (Lethierry)

Genus 17. ***Idioscopus*** Baker

29. *Idioscopus bimaculatus* (Distant) **

30. *I. clypealis* (Lethierry)

Subfamily KRISNINAE

Genus 18. ***Krisna*** Kirkaldy

31. *Krisna strigicollis* (Spinola)

Subfamily TYPHLOCYBINAE

Genus 19. ***Empoasca*** Walsh

32. *Empoasca* sp. *

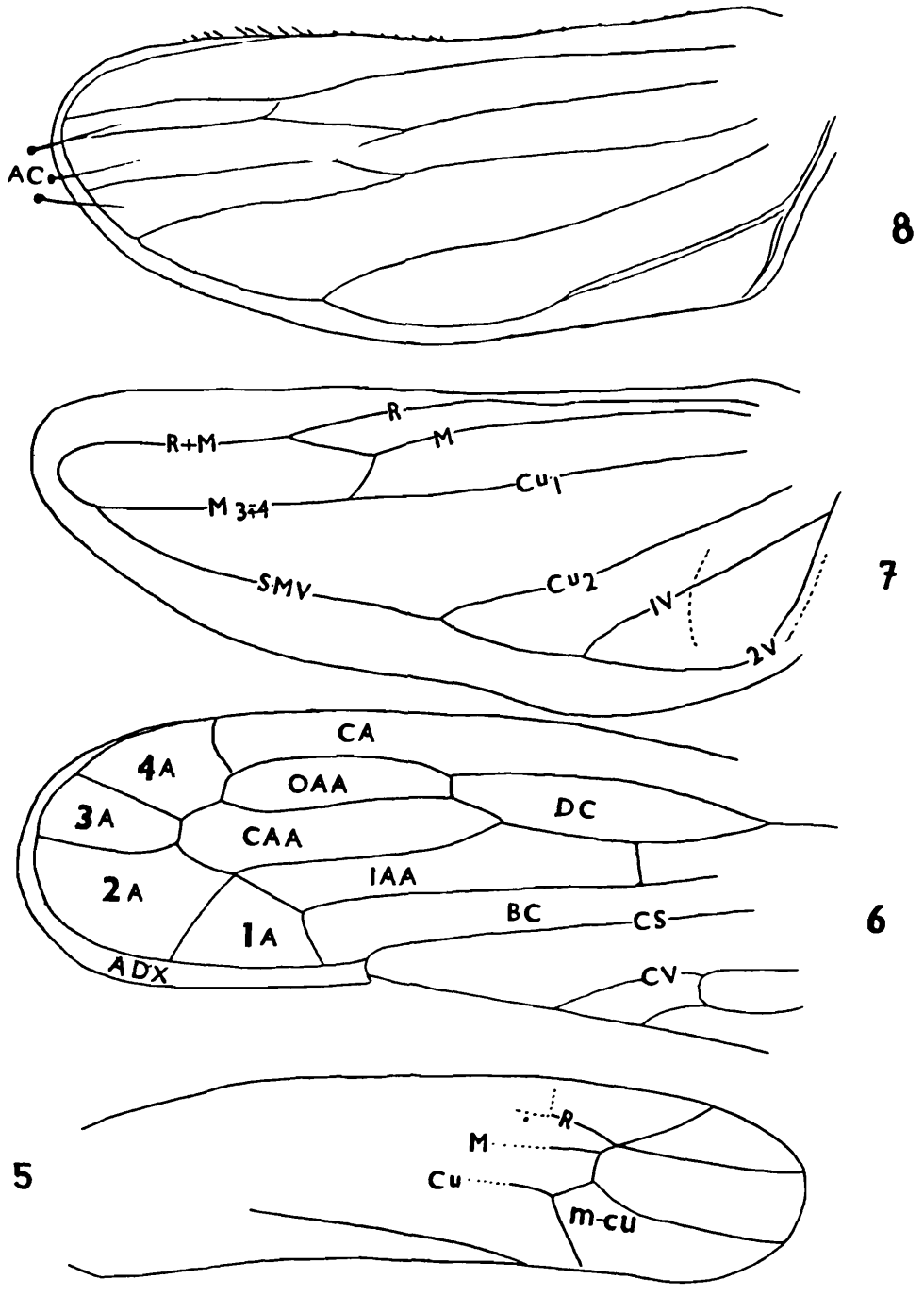
Genus 20. ***Hardiana*** Mahmood

33. *Hardiana thaiosimilis* Ramakrishnan and Menon *

Genus 21. ***Zygina*** Fieber

34. *Zygina (=Vietnara) maculifrons* (Motschulsky)

* Not available for study (recorded from Literature)
** New record from West Bengal



Figs 1-8. Structural features of a generalised adult Leafhopper 1 : a, pronotum; b, Scutellum; t. antenna; u, vertex of head; v, eye; w, tegmen; x, tibia; y, tarsus; 2 :d , Crown; e, compound eye; f, Ocellocular area; g, Clypeus; h, Lorum; 3 : e, Clypellus; j, Connective; k, style; 1, Connective shaft; m, Aedeagal base; n, Aedeagal shaft; O, Male plate; 4 : p, VIIth sternum; q, VIIth sternum; r, Pygofer; s, Ovipositor; 5-8 : AC, Apical cells; SMV, Submarginal Vein; IA-4A - 4A : 1st - 4th apical cells; ADX, Appendix; BC, Brachial cell; CAA Central anteapical; CA, Costal area; DC, Discal cell; OAA, Outer anteapical; CS, Claval suture; IAA, Inner anteapical; CV, Claval vein.

SYSTEMATIC ACCOUNT

Key to the subfamilies of Cicadellidae

1(2) Veins at base of tegmina indistinct, not forked on corium .....Typhlocybinae

2(1) Veins at base of tegmina distinct, on corium more or less branched and connected by transverse veins 3

3(6) Face tumid; Ocelli situated on vertex 4

4(5) Face centrally carinate; anterior margin of pronotum not produced between eyes ....Evacanthinae

5(4) Face neither centrally carinate nor foveate .....Cicadellinae

6(3) Face not tumid; Ocelli may or may not be on vertex 7

7(8) Large insects, rather dorsoventrally flattened, ocelli at anterior margin of head 9

8(7) Smaller insects, usually not dorsoventrally flattened 11

9(10) Submarginal vein in hind wing continued over the jugum .....Krisninae

10(9) Submarginal vein not continued over the jugum .....Iassinae

11(12) Ocelli on face; frontal sutures continued up to the ocelli .....Idiocerinae

12(11) Ocelli on anterior margin of the head or on vertex; face convex in profile, insects aquat shaped or not depressed 13

13(14) Body distinctly dorsoventrally flattened; pronotum with lateral margins carinate; vertex, pronotum and scutellum without any longitudinal median impressed black like .....Hecalinae

14(13) Body not as above, rather, robust, broad and compressed .....Deltocephalinae

Subfamily I CICADELLINAE

Key to the genera

1(2) Lateral margins of vertex in line with the outer margin of the eye .....***Kolla***

2(1) Lateral margins of vertex not in line with the outer margin of eye 3

3(4) Head little wider than pronotum and its margin almost evenly rounded, male plate (Fig.9c) gradually convenient ..... ***Cicadella***

4(3) Head rather narrower than pronotum and its margin almost sinuate; male plate convenient only distally and with uniseriate lateral margin (Fig. 10c) ..... ***Cofana***

Genus 1. *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 Hemiptera of America, North Mexico*, 1916 : 66.

1. *Cicadella spectra* (Distant)
(Fig. 9)

1853. *Tettigonia albida* Signoret, *Ann. Soc. ent. Fr.*, **21** : 663
1908. *Tettigoniella 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 : 24 oo and 10 oo, North Bengal : Rajabhtkhawa Forest, Dist. Jalpaiguri' 9.V.1987; coll. *Raja Ram & party*; 7 oo and 3 oo, Puruliya, Bankura Dists. 3.xi.1985; coll. *S. Sen and Party* : 5 oo and 3 oo, Gour, Maldah; 20.xii.1986, coll. *B.C. Das and party*

Diagnosis : 4 Black spots on vertex, scutellum yellowish, tegmina greenish with fuscus and rather pale veins; pronotum greenish with transverse striations, abdomen greenish yellow; legs pale ochraceous. Male plate (Fig. 9c) 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 (Fig. 9d) densely spinuled, with macrosetae on posterior part, lateral margin unfolded. Style (Fig. 9b) beak-like, gradually tapering to pointed apex, subapically strongly concavous. Aedeagus (Fig. 9a) subapically curvate, strut developed, shaft slender. Anal tube as figured (Fig. 9e) Connective T-shaped.

Length : (F) 10 mm and o 8 mm.

Distribution : India : West Bengal (Bankura, Calcutta, Jalpaiguri, Maldah, Puruliya), Maharashtra, Madhya Pradesh, Orissa. Elsewhere : Asutralia, Bangladesh, Nepal, Sri Lanka.

Remarks : The species is abundantly found along with other paddy pests of the same group i.e. N. virescens N. nigropicta, Recilia dorsalis etc. during winter period. Although the species enjoys both tropical and subtropical distribution, there is apparently no recordof its transmitting any viral disease in rice. Sometimes it feeds onw ild grasses.

Genus 2. *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.

2. *Cofana mimica* (Distant)
(Fig. 10)

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 : 13 (F) and 8 (M); Koch Bihar and Jalpaiguri, Panitanki; 5.xii.1986, coll. *R.S. Barman and Party*; 3 (F) and 2 (M), Gosaba; Digha, North 24 Parganas; 23.iv.1986, coll. *B.N. Das & party*

Diagnosis : Head ochraceous brown, triangulate, vertex with one central black spot, two identical spots close to ocelli, extreme lateral margin with a black spot; face with central white streak, laterally striate; pronotum with fine tansverse impression; abdomen green dorsally; legs yellowish, tegmina greenish white. Aedeagus (Fig. 10a) with well developed basal strut, strongly geniculate at base, directed caudad; connective Y-shaped. Style (Fig. 10b) dorsoventrally compressed, mesal apical extension very short, apex truncate obliquely, directed latero cauded; male plate (Fig. 10c) robust, lateral margin uniseriate; pygofer simple, rectangulate.

Length : (F) 6 mm and o 5 mm.

Distribution : India : West Bengal (Calcutta, Koch Bihar, Jalpaiguri, Medinipur, North 24 Parganas), Assam, Bihar, Uttar Pradesh.

Remarks : The species is common on paddy crop during winter season. But its viruliferons nature in the field is yet to be ascertained.

Genus 3. *Kolla* Distant

1908. *Kolla* Distant, *Fauna Brit. India*, **4** : 223
Type by original designation : *Kolla insignis* Distant, 1908

Key to the species

1(2) Aedeagus distinctly bulbous at base (Fig. 11a) ..... *ganesha*

2(1) Aedeagus veriably shaped but not bulbous 3

3(4) Style robust, much swollen basally (Fig. 14b); male genital plate blunt (Fig.14c) at posterior extremity ..... *unimaculata*

4(3) Style rather slender, not swollen as above; male genital plate rather conical at the posterior extremity 5

5(6) Aedeagus hook-shaped (Fig. 13a) male genital plate coverging with a few stout setae at the posterior extremity .....*raja*

6(5) Aedeagus foot-shaped (Fig. 12a) apically; male genital plate robust, narrowed beyond middle, apex rounded and with normal setae at the posterior extremity .....*opponens*

3. ** *Kolla gonesha* Distant
(Fig. 11)

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: 2 (F) and 1 (M), Darjiling Dt.: Sukiapokri; 22.iv.1986; coll. *B.C. Das & Party.*

Diagnosis : Vertex ochraceous and with small balck spot at its tip; a dark transverse band of its subanterior margin extending to antennal bases; centrally with three linear bands united at posterior end; face and clypeas ochraceous and its anterior margin with a black Y-shaped band; pronotum ochraceous centrally with a dark triangular fascia; each basal angle of scutellum with a black spot. Tegmina blackish, its vien greyish and its costal margin darker; abdomen blackish. Aedeagus (Fig. 11A) bulbous at base with a filamentous process, style (Fig. 1b). short, apex conical, prepical lobe well differentiated, male Plate (Fig. 11d) convergent at distal end and with multiserial setae on distal half; pygofer (Fig. 11c) densely spinulate, pygofer hook geniculate with sharp apex.

Length : (F) 6.5 mm and (M).5.5 mm.

Distribution : India : West Bengal (Darjiling); Peninsular part.

* 4. *Kolla opponens* (Walker)
(Fig. 12)

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: 6 (F) and 2 (M) ; Darjiling, Jalpaiguri Dists., Botanical Garden; Mirik. 23.Iv. 1986, coll. *B.C. Das & Party.*

Diagnosis : Vertex with two anterior black spots and at base a transverse black spot; ocelli equidistant front each eye, basal margin and anterior margin of pronotum centrally connected, anterior margin black; a black spot at each basal angle of scutellum with a trnsverse furrow, face and clypeus b;ack; a longitudinal fascia on claval and costal margin of the tegmina; a black fascia on beneath the addomen, sternum spotted. Aedeagus (Fig. 12a) rod-shaped, apical portion foot-shaped; style (Fig. 12b) curved basally apex beak-shaped; male plate (Fig. 12b) robust, narrowed beyond middle and apex rounded;

pygofer (Fig. 12c) also robust, dagger-shaped, basally geniculate.

Length : (F) 9 mm and (M) 8 mm

Distribution : India : West Bengal (Darjiling, Jalpaiguri), Assam, Uttar Pradesh. Elsewhere : Burma and the Netherlands.

5. ***Kolla raja*** Distant
(Fig.13)

1918. *Kolla raja* Distant, *Fauna Brit. India*, **7** : 7.
1988. *Kolla raja* Distant : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 15.

Material examined : 1 (F) and 1 (M) Darjiling and jalpaiguri Distts. 22.iv.1986; coll. *B.C. Das and Party.*

Diagnosis : Head olivaceous; anterior margin conical, and vertex conically produced with a small central spot, three transverse spots close to posterior margin bluish; face ochraceous; a large dark oliveous green spot covering 2/3 of posterior margin; central part of clupeus dark olive green; pronotum and tegmina dark olive green and a pale bluish longitudinal spot near its costal margin, pronotum convex and scutellum subacute; abdomen dark ochraceous, connective Y-shaped; aedeagus as figured (Fig. 13a); Style (Fig. 13b) short, blunt, compressed dorsoventrally; male plate (Fig. 13d) converging with rounded apex; Pygofer (Fig. 13c) simple.

Length : (F) 6 mm and (M) 5.5 mm

Distribution: India: West Bengal (Darjiling, Siliguri), Andhra Pradesh, Himachal Pradesh, Sikkim.

6. ***Kolla unimaculata*** Signoret
(Fig. 14)

1854. *Tettigonia unimaculata* Signoret *Ann. Ent. Soc. France*, **2**(3) : 26
1988. *Kolla unimaculata* Signoret : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 16.

Material examined : 4 (F) and 3 (M), Darjiling and jalpaiguri, 2 km E. of Mirik; 20.iv. 1986; coll. *B.C. Das and Party.*

Diagnosis : head with semicircular vertex, anterior margin with 3 dark spots; pronotum beyond middle with a transverse band; scutellum with a dark spot; egmina with claval area blackish and a pale brown longitudinal band. Aedeagal shaft (Fig. 14a) spoon-shaped basally; styler shaft (Fig. 14b) with broader base, rather conical with acuminate apex, preapical lobe well differentiated; male plate (Fig. 14c) gradually converging; anal hook distinct.

Length : (F) 6 mm and (M) 5 mm.

Distribution : India : West Bengal (Calcutta, Darjiling, Jalpaiguri), Southern part of India. Elsewhere : Burma, Java; Malacca; Philippines; Sri Lanka.

Subfamily II. DELTOCEPHALINAE

Key to genera

1(2) Body robust, somewhat oval; tegmina usually punctate 3

2(1) Body moderately elongated, slender; tegmina usually not punctate 5

3(4) Vertex with an obscure transverse impression in front of eyes; posterior tibiae with a series of small piceous spot; numerous white spots on basal area of tegmina .....***Eutettix***

4(3) Vertex without such impression infront of eyes; posterior tibiae without any spot; white spots absent on basal area of tegmina .....***Goniagnathus***

5(6) Aedeagal shaft with a few spines at its dorsal aspect at about middle; pronotum without any spot on anterior margin .....***Nephotettix***

6(5) Aedeagal shaft without any spine; pronotum with the anterior margin bears more or less distinct brownish or piceous dots. .....***Exitianus***

Subfamily DELTOCEPHALINAE

Genus 4. *Cicadula* Zetterstedt

1840. *Cicadula Zetterstedt, Insecta lapponica*, 1 : 296. *Type by subsequent designation, Cicadula quadrinotata Fabricius*, 1794
1794. *Cicadula quadrinotata* Fabricius, *Entomolgia systematica*, 4 : 43.

7. * *Cicaudale indica* Pruthi

1930. *Cicadula indica* Pruthi, *Mem. Indian Mus.*, **11** : 54.
1988. *Cicadula indica* Pruthi : Datta, *Rec. zool. Surv. India.* Occ. Paper No. 90 : 105.

Distribution : West Bengal; Eastern Himalaya; Madras, "Central Province" Punjab.

Genus 5. *Deltocephalus* Brumeister

1838. *Deltocephalus* Burmeister, *Genera Insectorum*, I : 15. Type : *Cicada putocarius Fatter*; 1806.

8. * *Deltocephalus notatus* Pruthi

1936. *Deltocephalus notatus* Pruthi, *Mem. Ind. Mus.* **11** : 128.

1986. *Scaphoideus notatus* (pruthi) : Nath, Banerjee, Das and Das, *Proc. nat. Seminar on Ricehoppers, Hopperborne viruses and their integrated Management*, B.C.K.V. Kalyani (W.B.) : 77.

Distribution : India : West Bengal, Northern India.

Genus 6. ***Eugnathodus*** Baker,

1903. *Eugnathodus* Baker, *Invertebrate Pacifica*, 1 : 1.
1930. *Eugnathodus indica* Pruthi, *Mem. Indian Mus.*, **11** : 48-49.

10. * ***Eugnathodus ocellatus*** Pruthi

1930. *Eugnathodus ocellatus* Pruthi, *Mem. Indian Mus.*, **11** : 51.
1986. *Eugnathodus ocellatus* Pruthi : Nath *et al.*, *Proc. nat. Seminar on Ricehoppers, Hopperborne viruses and their integrated Management*, B.C.K.V., kalyani (W.B.) : 75.

Distribution : India : West Bengal; Himalayas; Bihar; Central Provinces; Madras; Punjab.

11. * ***Eugnathodus (nesosteles) sanguinescens*** Kirkaldy

1906. *Eugnathodus (nesosteles) sanguinescens* Kirkaldy, *Bull. Hawaii Sugar Planters Assoc.* D.V. Ent., **1**(9) : 343.
1986. *Eugnathodus (nesosteles) sanguinescens* Kirkaldy : Nath *et al.*, *Proc. nat. Seminar or Ricehoppers, Hopperborne viruses and their integrated Management*, B.C.K.V., Kalyani (W.B.) : 75.

Distribution : India : West Bengal (Calcutta), Madhya Pradesh, Punjab. Elsewhere : Christmas Is.; Fiji Is.

Genus 7. ***Eutettix Van*** Duzee

1892. *Eutettix* van Duzzee, *Psyche*, **6** : 307.
Type, by original designation, *Thamnotettix luridus* van Duzee
1890. *Thamnotettix luridus* van Duzee, *Canad. Ent.*, **22** : 250.

12. * ***Eutettix physitis*** Distant
(Fig. 15)

1908. *Eutettix phycitis* Distant, *Fauna Brit., India* **4** : 363.
1988. *Eutettix phycitis* : Datta, *Rec. zool. Surv. India*, Occ. paper 90 : 130.

Material examined : 2 (F) and 1 (M) Maldah Dist., Nimbera 24.vi. 1987. .Coll. *K.P. Mukherjee and party.*

Diagnosis : Body rather robust, flattened; vertex rounded atneriorly; clypeus dark yellow, pronotum broader, longitudinally faintly striate, rugulose; dark yellow with blackish tinge; tegminal surfaeds finely ornamented with reddish borwn patches and spots; abdomen dark yellow. Aedeagus (Fig. 15a) with a pair of tube-like shafts, spots, outer margin sinuate, apex sharp, hook-shaped, basal apodeme

short, triangulate, connective Y-shaped, arm short broad; style (Fig. 15b) attenuate, inner margin of apical half serrate; pygofer setose obliquely slanting, without hook; VIIth sternite in female with a tooth-like projection at posteromedially.

Length : (F) 4 mm; (M) 3.5 mm.

Distribution : India : West Bengal (Calcutta, Maldah; Assam; Bihar; Tamil Nadu. Elsewhere : Australia; Sri Lanka.

Remarks : it is a reported vector of little leaf virus of Brinjal Solanum melongena L., Datura, Lycpersicum and Tabacum nicotianum (Thomas et. at. 1937). According to Pruthi (1934) the species is a suspect vector of spike disease of Sandal (Santalum album L.) In India.

Genus 8. *Exitianus* Ball

1929. *Exitianus* Ball, *Trans. Amer. Ent. Soc.*, **55** : 5.
Type by original designation : *Exitianus obscurinervis* (Stal), 1859.
1859. *Jassus thamnotettix obscurinervis* Stal, *Svenska vet. Akad. Zool.*, **4** : 293.

Key to species

1(2) Pygofer posterior third with 4th macrosetae at apex almost of the same size and shape; scutellum with a large spot on each basal angel two linear discal spots. ..... *...nanas*

2(1) Pygofer with 2 macrosetae at apex scutellum without such spots. 3

3(4) Abdomen fuscus; aedeagal shaft massive, subapically sulcate, a pair of sharp lateral processes arising mesad (Fig. 16a) ..... *...atkinsoni*

4(3) Abdomen dark brown; aedeagal shaft not as above and without any lateral process (Fig.17a) .... *indicus*

13. *Exitianus atkinsoni* (Distant)
(Fig. 16)

1908. *Athysanus atkinsoni* Distant, *Fauna Brit. India*, **4** : 348.
1988. *Exitianus atkinsoni* (Distant) : Datta, *Rec. zool. Surv. India*. Occ. Paper No. 90 : 132.

Material examined : 3 (F) and 2 (M), West Bengal, tunidighi, West dinajpur; 26.ii. 1987, coll. *T.R. Mitra and party.*

Diagnosis : Vertex rounded, yellowish, eyes arcuted black, fascia present between the eyes; pronotum brownish with a series of arcuate linear black spots on the anterior margin; ocelli large; scutellum with large spot on each basal angle and two small central oblique black spots on disk; tegmina hyaline;

appendix large, expanded; abodmen fuscous; aedeagal shaft stout, subapically sulcate, a pair of lateral processes arising medially, apex pinted, directed posteriorly; style (Fig. 16b) with no pre-apical lobe, mesal apical extension truncate, distal third rugulose; male plate (Fig. 16b) densely spinulate, apex rounded; pygofer 1/3 posterolaterally thickly spinulose over 1/3 portion, sub-apical spur spatulate (Fig. 16c).

Length : (F) 5 mm, (M) 4 mm.

Distribution : India : West Bengal (Calcutta, Darjiling, W. Dinajpur), Bihar; Southern part of India. Elsewhere : Philippines; Sri Lanka.

14. ***Exitianus indicus*** (distant)
(Fig. 17)

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 : 8 (F) and 6 (M), Tunidighi, W. Dinajpur; 26.xi. 1987; coll. *T.R. Mitra*; 2 (M) and 2 (F) Mohodipur, Malda; 5.xii. 1987 coll. *T.R. Mitra.*

Diagnosis : Vertex rounded anteriorly brownish yellow with a black fascia across eyes, ocelli large, disc convex, face granulate; pronotum manulate; clypeus with dark brown band; scutellum granulate on basal area; tegmina subhyaline, veins pale brown; abdomen fuscus. Aedeagus laterally compressed, beak-shaped, apex sharp; male plate (Fig. 17a) posteriorly converging to angulate apex, disc and mesal margin densely spiulated. Pygofer (Fig. 17b) densely spinulate, with a pair of distinct apical spurs; style with apical extension and with apex sharply pinted. VIIth sternite medially inserted at posterior margin in fmale.

Length : (F) 5 mm; (M) 4.5 mm

Distribution : India : West Bengal (Calcutta, West Dinajpur, Malda), Bihar, Jammu. Elsewhere : Nepal.

Remarks : In the paddy field the species is usually found in association with *Nephotettix* sp. in India. The species transmits witches' broom virus of Lucerne and sugrcane.

15. ***Exitianus nanus*** (Distant)
(Fig. 18)

1908. *Athysanus nanus* Distant *Fauna, Brit. India*, **4** : 345.
1938. *Exitianus nanus* Oman, *Kans, Univ. Sci. Bull.* **24** : 383.

Material Examined : 1 (F) and 1 (M) Malda and Jalpaiguri Distts. Parbatdanga; 27.vi.1987; coll. *K.P. Mukherjee and Party.*

Diagnosis : Vertex rounded with an arcute fascia between eyes, ocelli large, disc convex; tegmina (Fig. 18e) hyaline, pronotum greenish yellow; scutellum, tegminal veins brown, at basal angle with a dark spot; abdomen pale brown. Aedeagal shaft (Fig. 18a) robust, curvata inwards cylindrate; stylar shaft (Fig. 18b) with beak-shaped mesal apical extension; male plate (Fig. 18c) thick, somewhat conical, apical half spined; pygofer with 5 spurs, the terminal one longer than others.

Length : (F) 5 mm; (M) 4 mm.

Distribution : India : West Bengal (Calcutta, Jalpaiguri, Maldah, Bihar, Himachal Pradesh; Punjab; Maharashtra. Elsewhere : Iraq.

Genus 9. *Goniagnathus* fieber

1866. *Goniagnathus* Fieber, *Verh. Z-6-Ges Wien*, 16 : 506. Type : *Jassus brevis* Herrich-Sch. 1835.
1835. *Goniagnathus punctifer* Walker : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 139.

16. * *Goniagnathus punctifer* Walker
(Fig. 19)

1858. *Bythoscopus punctifer* Walker, *Insecta Saundersiana* : 108.
1988. *Goniagnathus punctifer* Walker : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 139.

Material examined : 3 (F) and 2 (M), West Bengal : Bankura dist., Ramkrishna mission Vidyapith, Purulia, 3.xi. 1985; coll. *S.Sen and Party.*

Diagnosis : Body robust, vertex with obscurve dark spots, 3-4 times broader as middle length, anterior margin rounded, face punctate with distinct transverse stripes; protonum about 3 times the length of vertex, finely striate, anterior margin smooth; tegmina smoky with thick veins, spots fuscous, wing smoky with a grey white streak at radial area, legs ringed with black markings, posterior tibiae densely spined, abdomen deep brown. Aedeagus (Fig. 19a) with an apodeme, lateral part of shaft concave with a pair of sharp terminal processes directed caudad; style (Fig. 19a) with mesal apical extension, margin at apex bifurcate, apical 1/3 rugose; male plate simple (Fig. 19a); pygofer (Fig. 19b) with its apical 1/3 densely spined, pygofer hook dagger-shaped.

Length : (F) 7 mm and (M) 6 mm.

Distribution : India : West Bengal (Bankura, Darjiling, Puruliya), Bihar, Maharashtra, Uttar Pradesh. Elsewhere : Burma, Maldive, Malagasy, Sri Lanka.

Genus 10. *Nephotettix* Matsumura

1902. *Nephotettix* Matsumura, *Term Fuzetek*, **25** : 356
Type by subsequent designation, *Selenocephalus cinticeps* Uhler, 1892.
1892. *Selencephalus cincticeps* Uhler *Proc. U.S. Nat. Hist. Mus.*, **19** : 292.

Key to species

1(2) Crown with submarginal black band; Discal black patches of tegmen touching claval suture in male (Arms of connective not close to each other); paraphysis of aedeagal shaft rudimentary; pygofer without any long spur (Fig.20 e) ....*nigropicta* (Stal)

2(1) Crown without submarginal band; Discal black patches are either absent or present, if present, not touching claval suture in male (Arms of connective close to each other); paraphysis of aedeagal shaft short, or not projecting obliquely; pygofer with a long sharp spur besides three smaller spurs (Fig. 21 b) ....*virescence* (Distant)

17. * *Nephotettix malayanus* Ishihara and Kuwase

1986. *Nephotettix malayanus* Ishihara and Kuwase : Nath *et al.*, *Proc. Nat. Seminar on Ricehoppers and Hopperborne viruses and their integrated Management*, B.C.K.V., Kalyani (W.B.) : 75

18. *Nephotettix nigropicta* (Stal)
(Fig. 20)

1859. *Pediopsis apicalis* Motsch., *Etud. Ent.* : 110
1870. *Thamnotettix nigropicta* Stal, *ofv. vet. AK. Forh* : 74
1906. *Nephotettix nigropicta* Kirkadly, *Rep. Exp. Sta. Haw. Plant assoc.* pt. IX : 333.
1908. *Nephotettix apicalis* Distant, *Fauna Brit. India,* IV : 360
1971. *Nephotettix nigropicta* Ghauri, *Bull. ent. Res.*, **60**(3) : 481-572
1989. *Nephotettix nigropicta* (Stal) : Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa* (Insecta : Hemiptera) : *State Fauna Series* No.1, pt.2 : 195

Material examined : 12 (F) and 5 (M), 4 (F) and 1 (M), Koch Bihar Jalpaiguri Dist., Panitank; Darjiling, 5.xii.1986, coll. R.S. Barman; 3 (F) and 2 (M), Bankura Dist., Radhanagar; 31.viii.1986; Coll. *P. Mukherjee and Party*; 5 (F) and 2 (M), Nadia, Krishnanagore P.W.D./I.B.; 1 .ii.1986; coll. *A.R. Lahiri and Party*

Diagnosis : Vertex with a transverse line between eyes, face blackish basally, tegmina with an oblique broad stripe extending medially to claval suture; apical 1/3 of tegmina, sternum, abdomen, femora blackish. Aedeagus (Fig. 20a) with well developed apodeme; with 3 pairs of lateral processes, stylar shaft (Fig. 20b) with mesal apical extension gently notched posterolaterally, male plate (Fig. 20c) beyond middle spinulate on both margins; pyfoger subrectangular (Fig. 20e)

Length : (F) 5 mm (M) 4.5 mm.

Distribution : India : West Bengal (Koch Bihar, Darjiling, Bankura, Nadia), Bihar, Orissa, Punjab. Elsewhere : East Africa, Philippines, Sri Lanka.

Remarks : It is a common seasonal insect of rice fields in West Bengal. It is abundantly found during kharif season particularly during Aug.-Nov. Datta *et al.* (1978) studied the population of the species which is reported lower than *N. virescens* in the eastern zone. This study was based on population count on

specimens collected through light trap technique in the Calcutta Air Port. It occurs along with *N. virescens* (Fabricius) during winter in the Eastern and Southern India. Thus very often confused with N. Virescens but can be distinghished by coour pgmentation and structure of genitallic armatures. The species is reported to transmit dwarf sisease in Japan, Tungro discease in India, Philippines, Transitory yelowing in taiwn yellow-orange leaf in Thailand.

19. * *Nephotettix parvus* Ishihara & Kuwana

1986. *Nephotettix parvus* Ishihara and Kywana. Nath, Banerjee, Das and Das. *Proc. Nat. Seminar on Ricehoppers, Hopperborne viruses and their integrated Managment*, B.C.K.V. Kalyani (W.B.) : 75.

20. *Nephotettix virescens* (Fabricius)
(Fig. 21)

1803. *Nephotettix bipunctatus* Fabricius, *Sys. Rhyn* : 78.
1908. *Solenocephalus virescence* Distant, *Fauna Brit. India*, **4** : 291.
1971. *Nephotettix viorescens* (Fabricius) : *Ghauri, Bull. ent. Res.*, **60** : 481-512

Material examined: 16 (F) and 7 (M); Puruliya, Ramkrishna Mission Vidyapith, 3.xi.1985; coll. *S. Sen and party*; 7 (F) and 3 (M) Jalpaiguri Dist., 5.xii.1986, coll. *R.S. Barman and party*; 4 (F) and 2 (M) maldah Dist., 19.xii. 1986, coll. *B.C. Das & party.*

Diagnosis : Body Greenish yellow; face blackish basally, clypeus on each side with black spot in case of male, but not in female; male with tegmina deep black on 2/5 apical cells (Fig. 21f). Aedeagal shaft (Fig. 21a) linguiform, short, flat, apex convexly prothuberant with 3 paris of spur-like processes; style 9Fig. 21e) with apcal extension saw-like, apex obliquely truncate; male plate (Fig. 21d) gradually converging, apex obtuse, mesal margin spined. Pygofer (Fig. 21b) sub rectangulate, posteriorly with a long sharp spur besides three smaller spurs; 7th sternite (female) at posterior margin feebly concave near at the middle (Fig. 21c)

Length : (F) 4.5 mm and (M) 4 mm.

Distribution : India : West Bengal (Bankura, Calcutta, Koch Behar, Jalpaiguri, Maldah, Puruliya, Bihar. Elsewhere : Ethiopian region; Indonesia; Japan; Korea; Malaysia; Micronesia, Natal; Palestine; Philippines; Singapore; Sumbawa; Taiwan; Tahiland.

Remarks : The species transmits viruses consisting of Tmasitory yellowwing (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. The spread of these diseases usually takes place during the months of Sept.-Oct. when the population of the leaf hoppers also remains high.

Genus 11. *Recilia* Edwards

1922. *Recilia* Edwards, *Ent. mon. Mag.*, 58 : 206. Type by original designation, Deltocephalus dorsalis Mots.
1859. *Deltocephalus dorsalis* de Motschulsky, *Etude Ent.*, **8** : 114.

21. * ***Recilia dorsalis*** (de Mots)

1859. *Deltocephalus dorsalis* de Mots; *Ent.*, **8** : 114.
1988. *Reculia dorsalis* (de Mots.) : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 169.

Distribution : India : West Bengal; Tamil Nadu. Elsewhere : Burma, South East and Far East Asian Countries.

Remarks : The species is considered to be disseminating the viral diseases as Dwarf disease (Restricted to Japan), orange leaf virus (south East Asian countries) and Tungro in Thailand. However, the viruliferous trait of species is not yet recorded from India.

Genus 12. ***Thamnotettix*** Zetterstedt

1840. *Thamnotettix* Zetterstedtr, *Insecta Japonica*, 1 : 292. Type by subsequent designation *Cicada prasina* Fallen,
1806. *Cicada prasina* Fallen, *Sevenska Vet. Akad. Nya Handl.*, 27 : 27.

22. * ***Thamnotettix bicolor*** Pruthi

1936. *Thamnotettix bicolor* Pruthi, *Mem. Indian Mus.* **11** : 115.
1986. *Thamnotettix bicolor* Pruthi : Nath *et al.*, *Proc. Nat. Seminar on Ricehoppers, Hopperborne viruses and their integrated management B.C.K.*v., Kalyani (W.B.) : 78.

Distribution : India : West Bengal: Northern India; Punjab; Southern India.

23. * ***Thamnitettix chhota*** Pruthi

1936. *Thamnotettix chotta* Pruthi : Datta, *Rec. zool. Surv. India*, Occ. Paper 90 : 180.

Distribution : West Bengal (Calcutta); Northern India; Punjab; Southern India.

Genus 13. ***Evacanthus*** Le Peltier & Serville

1825. *Evacanthus* Le Peltier & Serville1825.
Type : *Evacanthus interruptus* (Linn., 1758.)
1758. *Evacanthus interruptus* Linnaeus, *Systema Naturae*, Ed. **10** : 438.

24. * ***Evacanthus repexus*** (Distant)
(Fig. 22)

1908. *Eucanthus repexus* Distant, *Fauna Brit, India*, **4** : 228.
1988. *Evacanthus repexus* (Distant) : Datta, *Rec. zool. Surv. India* Occ. Paper No. 90 : 55.

Material examined: 2 (F) and 1 (M) North Bengal : Tindharia Darjiling dist., 30.iii. 1980, coll. *A.K. Hazra.*

Diagnosis : Vertex ocharceous, pronotum pubescent, clypeus along median line carinate, striate;

scutellum densely pubscent, clypeus along median line carinate, straiate; scutellum densely pubescent broadly subtriangular, with a transverse impressed line before the apical area; tegmina (Fig. 22f) dark brown, punctate, apical cells brownish yellow; tibiae finely spinulose; VIIth sternite (Fig. 22e) in female deeply notched at posterior margin.

Aedeagus (Fig. 22) with a pair of apophyses; aedeagal shaft (Fig. 22a) concave along margin, obliquely truncate apically; style (Fig. 22b) with mesal apical extension strongly pointed; male plate (Fig. 22c) thick, finger-like; pygofer (Fig.22d) rather quadrangular.

Length : (F) 7.5 mm and (M) 7 mm.

Distribution : India : West Bengal (Darjiling); Punjab; Sikkim; Uttar Pradesh.

Subfamily III. HECALINAE

Genus 14. *Thomsoniella* Signoret

1879. *Thomosoniella* Signoret, *Ann. Soc. Ent. de France*, **9**(5) : 51.
Type by monotypy *Thomsoniella kirschbaumi* Signoret.
1880. *Thomsoniella kirschbaumi* Signoret, *Ann. Soc. Ent. de. France*, **10** (5) : 52.

25. * *Thomsoniella porrecta* Walker

(Fig. 23)

1858. *Accocehalus prorectus* Walker, *List. Hom. Suppl.* : 262.
1903. *Thomsoniella porrecta* Mellichar, *Hom, Faun. Ceylon* : 173.
1988. *Thomosniella pprrecta* : Datta,. *Rec. zool. Surv. India*, Occ. Paper 90 : 188.

Material examined : 1 (F) and 1 (M) West Bengal : Mahodipur, Maldah, dist. 5.xii. 1987, coll. *T.R. Mitra and party.*

Diagnosis : Vertex shorter than width between the eyes, anterior margin usually blackish; apex of clavus with a small spot, 2 nd spot near the middle of the first apical area. Pronotum transverse, almost broader than the head across eyes; scutellum trifasciate smometimes faciae obsolete. Tegmina transparent, hyaline with a narow marginal limbus. Male plate (Fig. 23c) long, slender, broadened based, gradually tapered with apical half transversely regulose, lateral margin of basal half with spines, such s[ines absent on apical half, Pygofer (Fig. 23d) broad basally , posterior half subtriangulate and spinulose. disc with setae.

Length : (F) 6 mm, (M) m mm.

Distribution : India : West Bengal (Malda), Bihar, Minikoi, Orissa; Punjab. Elsewhere : Burma; Formosa; Maldive; Philippine Islands; Queensland.

Remarks : Recorded as rice leaf hopper pest. It also occurs on Sandalwood causing spike disease (Pruthi 1946). The species is associated with microbes (Steinhans, 1946).

26. * *Thomosoniella (=Parabolocratus) concentralis* (Matsumura)

1986. *Thomsoniella (=Parabolocratus) concentralis* (Mastumura) : nath, Banerjee, Das and Das, *Proc. Nat. Seminar on Ricehoppers, Hopperborne viruses and their integrated management, B.C.K.V., Kalyani (W.B.)* : 72.

Distribution : India : West Bengal. Elsewhere : China; Formosa; Hongkong Is.

Subfamily IASSINAE

Genus 15. *Iassus* Fabricious

1803. *Iassus Fabr.* Systema Rhyngotorum : 85. Type, designation *Cirda iania* Fallen, 1826

27. * *Iassus indicus* (Lethierry)
(Fig. 24)

1982. *Macropsis indica* Lethierry, *Bull. Zool. Soc. France* : 209.
1988. *Issus indicus* (Lethierry) : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 218.

Material examined : 1 (M) and 1 (F), West Bengal; Bhatol; W. Dinajpur; 28.Xi.1987; Coll. *T.R. Mitra and party.*

Diagnosis: Body robust, vertex blunt at apex rounded, ocelli placed far apart from each other, froms raised above cheeks; pronotum finely striate; scutellum depressed at base narowing towards tip, brownish yellow, coarsely punctate, posterior tibiae densely spined; VIIIth tergite (M) with a deep circular notch medially, Aedeagal shaft (Fig. 24a) semitransparent, dorsoventrally flattened, deeply notched at base, a stout lateral process arising medially, margin at apex serrate; stylar shaft (Fig. 24b) at tip beak-shaped; pygofer with a sharply geniculate hook; male plate ligulate with minute setae (Fig. 24c).

Length : (F) 7.5 mm., (M) 7 mm.

Distribution : India : West Bengal (West Dinajpur), Andaman Is., Karnataka; Tamil Nadu. Elsewhere: Africa; Burma; Buru; Flores; Formosa; Fukeen; Java; Krakataus; Lomboj; Luzon; Marquesas Is; Mindano Is.; Philippine Islands; Samoa; Seychelles Islands; Silhouette; Sri Lanka; Sumbawa; Upolu.

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

Subfamily IV. IDIOCERINAE

Key to genera

Pygofer with a long appendage in inner surface; adeqgus without apical processes .....***Amritodus***

Pygofer without a long appendage in inner surface; aedeagus with apical processes .....***Idioscopus***

Genus 16. ***Amritodus*** Anufriev

1970. *Amritodus* Anufriev, *J. nat. Hist. Soc.*, **4** : 375-376.
Type, by subsequent designation, *Idiocerus atkinsoni* Leth. *J. Asiat. Soc. beng.* **58** : 252.

28. ***Amitodus atkinsoni*** (Lethierry)
(Fig. 25)

1989. *Idiocerus atkinsoni* Lethierry, *J. Asiat. Soc. Beng.*, **18** : 252.
1906. *Idocerus atkinsoni* Distant, *Fauna Brit. India*, **4** : 136.
1970. *Amritodus atkinsoni* Anufriev, *J. nat. Hist.*, 4(3) : 375-380.
1989. *Amritodous atkinsoni* (Lethierry) : Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa* (Insecta : Hemiptera): *State Fauna Series* No. 1, Pt. 2 : 196.

Material examined : 12 (F) and 6 (M) , West Bengal : Jalpaiguri and maldah Distts. 18.vi. 1987, coll. *K.P. Mukherjee & party.*

Diagnosis : Vertex anteriorly rounded, smoky; clypeus flattended, well developed with black stripes, laterally striate; pronotal disk brown, anterior margin with two spots and a darkj brown stripe; scutellum bears a dark brown streak, tegminal veins dark; prosternal disk with two black spots. Aedeagus 9Figf. 25a) with pairs of processes of asymmmetrical lengths, a pair of short processes arising medially, stylar shaft (Fig. 25b) robust, much longer than edeagal one, lateral margin subapically twisted and with spoon-shaped apex, male plate (Fig. 25c) arcuate, laterally uniseriate lateropaically; pygofer hook (Fig. 25d) sharp.

Length : (F) 4.8-5.1 mm; (M) 4.o-4.5 mm.

Distribution : India : West Bengal (Jalpaiguri, Maldah, North 24-Parganas); Bihar; Madhya Pradesh, Maharashtra, Tamil Nadu, Karnataka, Orissa, Punjab, Uttar Pradesh. Elsewhere : Burma; Japan; Pakistan; Sri Lanka.

Remarks : The species is a great threat to mangio plantation in India. The infestation leads to heavy financial losses to growers. Both adults and nymphs suck the sap from the tender shoots, leaves and inflorescence. They damage the inflorescence which has a direct bearing on the reduction of yeild. The hoppers also ooze 'honey dew' (like aphids) on which sooty mould grows. As a result, leaves and flower shoots become black, wither and no fruits are set.

The most distinguishing feature of this species is the presence of two distinct spots on the scutellum. The adults deposit eggs in spring on younger twigs or near tip of flower. The species is parasitised by *Halictophagus* sp. (Strepsiptera) (Bohart 1943).

Genus 17. ***Idioscopus*** Baker

1915. *Indioscopus* Baker, *Philippine J. Sci.*, **10**(6) : 338.

Type by original designation : *Idiocerus clypealis* Leth. 1889.

1889. *Idiocerus clypealis* Leth., *J. Asiat. Soc. Beng.*, **58** : 252.

Key to species

1(2) Male plate digitiform, widening distally, margin setose towards distal end; stylar shaft baculiform (Fig. 26 b) ..... *bimaculatus*

2(1) Male plate elongate, medially somewhat constricted with numerous marginal setae towards distal 2/3 portion; stylar shaft claviform (Fig. 27a) ..... *clypealis*

29. *Idiscopus bimaculatus* (Distant)
(Fig. 26)

1912. *Idiocepus bimaculatus* Distant, A.M.N.H., (8) **10** : 605.
1936. *Idiocerus bimaculatus* Pruthi, *Mem. Ind. Mus.*, **11** : 102.
1988. *Indioscipus bimaculatus* (Pruthi) : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 99 : 230.

Material examined: 1 (F) and 1 (M) West Bengal : Maldah and Jalpaiguri Distts. : 18.vi. 1987; coll. *K.P. Mukherjee and party.*

Diagnosis : Body pale brown; vertex sulcatus medially, rostral tip black; pronotum without marking, scutellum impressed medially, each basal angle marked black, no such spots on body parts with rectangulate grey patch on each of median suture; face binotate, medially blackish, clypeus longitudinally fsciate; tegman longer than body claval region coloured oapque; hind tibiae densely set with spines; tarsi black; VIIth sternite (female) posteromedially prominently pointed. Aedeagal shaft (Fig. 26a) cylindrical, apical part attenuate, apex opaquely turcate, serrate latered subapically, two pairs of sharp, elongate processes. directed anteriorly; stylar shaft 9Fig. 26b) baculiform, mesal apical extension twisted, apex sharply pointed; male plate (Fug. 26c) digitiform widened distally, margin setose; pygofer (Fig. 26d) triangulate on apical half, short, apically directed measally, cupuliform, caudal margin wavy.

Length : (F) 5 mm; (M) 4.5 mm.

Distribution : India : Wesg Bengal (Jalpaiguri and Maldah distts,); Orissa; Uttar Pradesh.

30. *Idioscipus cylypealis* (Lethierry)
(Fig. 27)

1889. *Idiocerus clypealis* Lethierry, *J. Asiat. Soc. Bengal.* **8** : 252.
1908. *Idiocerus clypealis* Distant, *Fauna Brit. India*, **4** : 187.
1964. *Idipscopus clupealis* Lethierry, *Capriles Proc. Soc. Wash.* **66** (2) : 89-100.
1988. *Idioscopus clypealis* (Lethierry) : Datta, *Rec. zool. Surv. India* occ. Paper No. 90 : 232.

Material examined: 2 (F) and 1 (M) West Bengal: Jalpaiguri and Maldah Distts. 18.vi. 1987, coll. *K.P. Mukherjee & party.*

Diagnosis : Vertex binotate, as long as 1/3 pronotum, anteriorly black, finely rugose transversely, anterior margin convex, posterior margin parallel, eyes on posterior margin of head; ocelli on face, clypeus well developed; pronotum anteriorly convex; scutellum short, triangulate, hind tibiae strongly spined; tegmina (Fig. 27d) longer than abdomen. Scutellam angle each with a black spot. Aedeagus (Fig. 27a) with two paris of subapical processes, basal apodome well developed; stylar shaft (Fig. 27a) claviform; pygoofer hook (Fig. 27d) short and pointed.

Length : (F) 3.5-4 mm; (M) 3-3.5 mm.

Distribution : India : West Bengal (Malda, Jalpaiguri); Bihar; Jammu and Kashmir ; Karnataka; Orissa; Punjab; Rajasthan; Tamil Nadu. Elsewhere : China; Japan; Burma,Java; Malaya; Philippines; Sri lanka.

Remarks : The species poses a serious problem to Mango cultivation ecause it is recorded as virulent pest on mangi inflorescence. It occurs along with I. atkinsoni (Pruthi 1934), Dover and Appana (1934) reported it is a suspect vector. The species is parasitised by *Ilalictophagus* sp. (Strepsitera) (Bohart 1934). The species can be distinghished by its lighter colour, with two spots on the scutellum and dark spots on the vertex.

Subfamily KRISNINAE

Genus 18. *Krisna* Kirakaldy

1900. *Krisna* Kirakaldy, *Entomologist*, **33** : 243. Type by subsequent designation, *Siva strigicollis* Spinola, 1850.

31. *Krisna strigicollis* (Spinola)
(Fig. 28)

1850. *Siva strigicollis* Spinola, *mem. Soc. Ital Moderna*, **25**(1) : 128.
1988. *Krisna strigicollis* (Spinola) : Datta, *Rec. zool. Surv. India*, Occ Paper No. 90 : 222.

Material examined : 2 (F) and 1 (M); West Bengal, Bankura dist.; 17.xii. 1985; coll. *D.K. Mandal and party.*

Diagnosis : Vertex dark brown binotate, anterior margin recurved, pronotum with transverse lines; scutellum striate transversely, tegmina (Fig, 28c) brownish rugulose, punctate; wings white, hind tibiae spined; abdomen pale brown. Aedeagal shaft plough-shaped 9Fig. 28a); style (Fig. 28b) with elongate mesal apical extension, apical part spatulate; male plate (Fig. 28c) converging distally, mesal margin rugulose; pygofer hook broadest at the point end.

Length : (F) 12 mm and (M) 10 mm.

Distribution : India : West Bengal (Bankura); Assam; Bihar; Maharashtra; Tamil Nadu and Uttar Pradesh. Elsewhere : Africa; Belgium; Billiran Is.;Borneo; Burma; Campuchia; China; Dutch; East Indies;

Indochina; Japan; Java; Luzon; Malay Peninsula; Malaysia; Nergos; Philippine Islands; Singapore; Sri Lanka; Sulawesi.

Remarks : The species is reported to be associated with spike disease of Sandal (Pruthi 1934 and Mathur 1953)

Subfamily TYPHLOCYBINAE

Genus 20. *Empoasca* Walsh

1862. *Empoasca* Walsh, *Prairie Farmer*, **10** (10) ; 149. Type *Viridescens* Walsh, 1862.
1862. *Empoasca viridescens* Walsh, *Prairie Farner*, 10(1), 149.

32. * *Empoasca* sp.

1986. *Empoasca* sp. : Nath, Banerjee, Das and Das, *Proc. Nat. Seminar on Ricehoppers, Hopperburn viruses and their integrated Management*, B.C.K.V., Kalyani (W.B.) : 74.

Distribution : India : West Bengal.

Genus 20. *Hardiana* Mahmood

1967. *Hardiana* Mahmood, *Pacific Ins. Monogr.*, **12** : 14-15. Type *Hardiana assamensis* Mahmood, 1967.

33. * *Hardiana thaiosimilis* Ramakrishnan & Menon

1974. *Hardiana thaiosimilis* Ramkrishna and Menon, *Oriental Ins.*, **8**(4) : 441-443.

Distribution : India : West Bengal, Karnataka.

Remarks : The species is popularly known as "orange headed Jassid". It causes Hopperburn in rice in Bangladesh (Alam and Alam, 1979).

Genus 21. *Zygina* Fieber

1966. *Zygina* Fieber, *Verh. Zool. bot. Ges.*, **16** : 509. Type *Typhlocyba nivea* Mulsant & Rey, 1855.

34. * *Zygina (=Vietnara) maculiforns* Motschulsky

1986. *Vietnara (+Zygina) maculifrons* (Motschulsky) ; Nath, Banerjee, Das and Das, *Proc. Nat Seminar on Ricehoppers, Hopperburn viruses and their integrated management*, B.C.K.V., Kalynai (W.B.) : 74

Distribution : The species occurs in mahy places of India on rice, wheat and sesame.

Remarks : The species popularly known as "blue jassids" is quite common in the rice fields. it lays eggs on the mid rip of leaf; resulting in yellowing of leaf (Nath *et al.* 1986).

SUMMARY

The paper incorporates the account of 34 species in 21 genera distributed over eight subfamilies from districts (vide Maps except Bardhaman, Birbhum, Haora, Hugli ,Murshidabad and south 24 parganas from West Bengal. Three species amongst a total of 20 species examined constituted the new locality records for West Bengal. Besides, keys to taxa, geographical distribution, notes on economic importance wherever posible, reference to original literature have also been provioded. Over and above, the species which are recorded from literautre but not studied at present, have been included in this paper. Necessary illustrations on general morphology of the group and genitallic features of all the species studied, are also provided.

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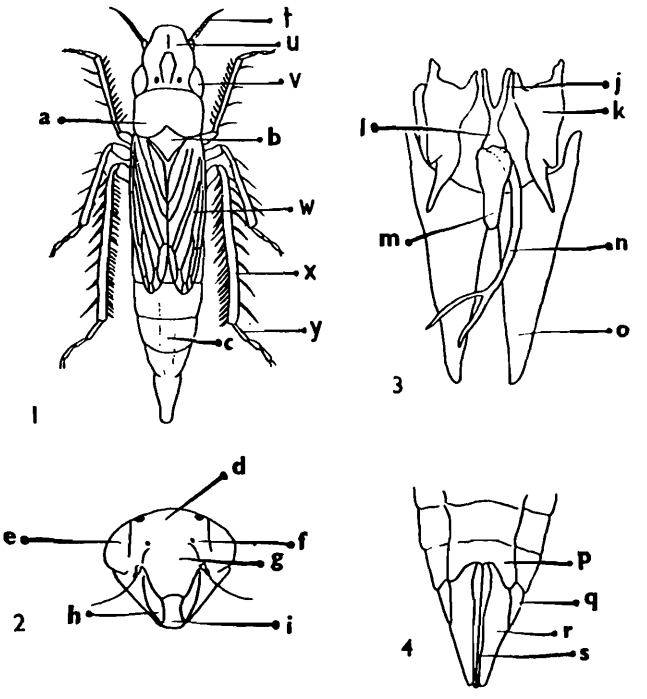


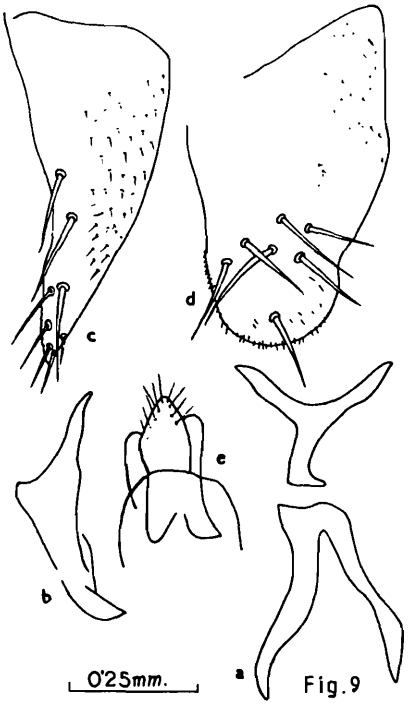


Fig.9

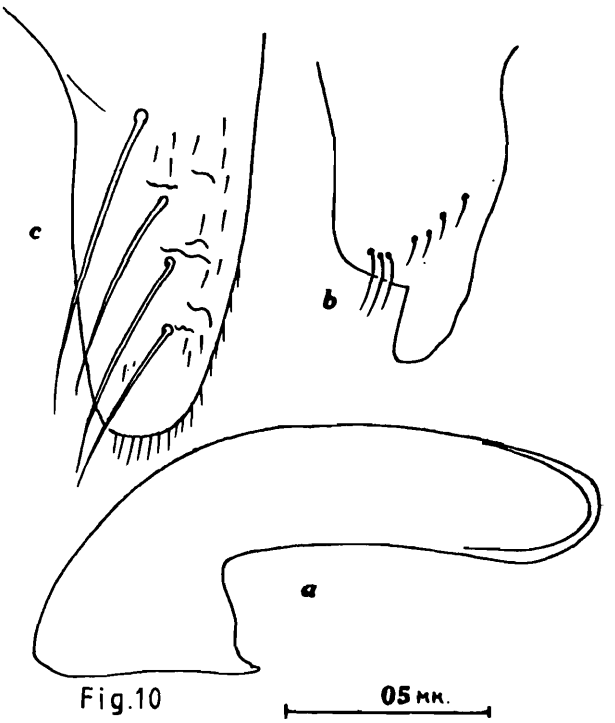


Fig.10

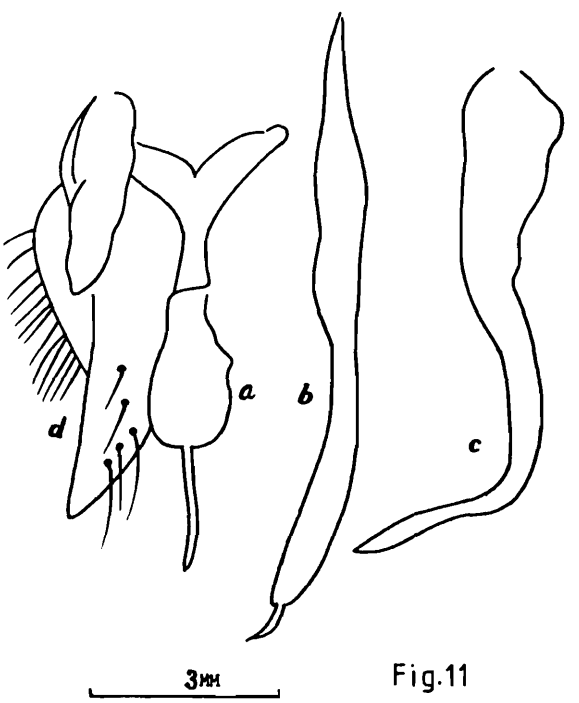


Fig.11

Fig. 9(a-e) : *Cicadella spectra* (Distant) : a, Aedeagus; b, style; c, Male plate; d, pygofer; e, Anal tube.
Fig. 10 (a-c) : *Cofana mimica* (Distant) : a, Aedeagus; b, Style; c, Male Plate.
Fig. 11(a-d) : *Kolla ganesha* Distant : a, Aedeagus; Style; c, Pygofer; d, Male Plate.

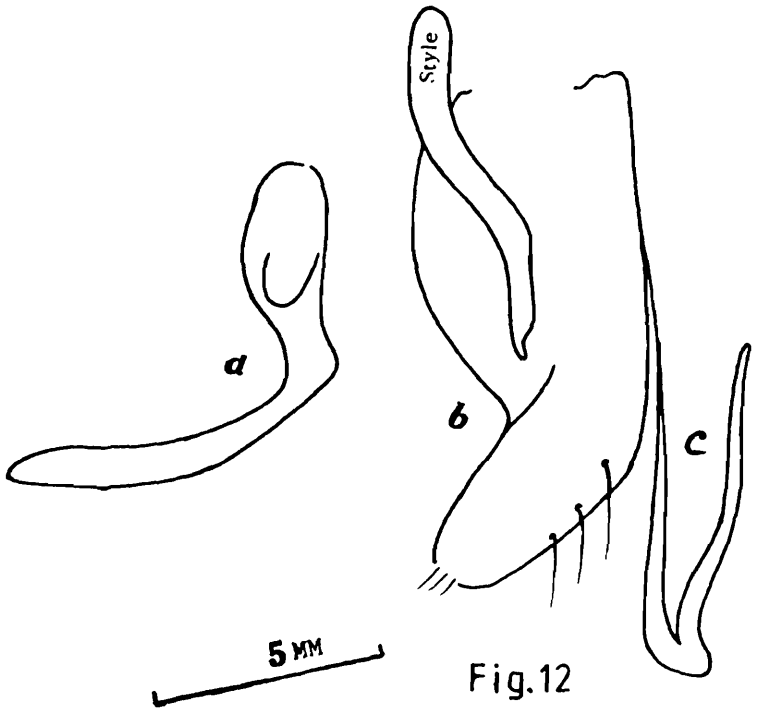


Fig.12

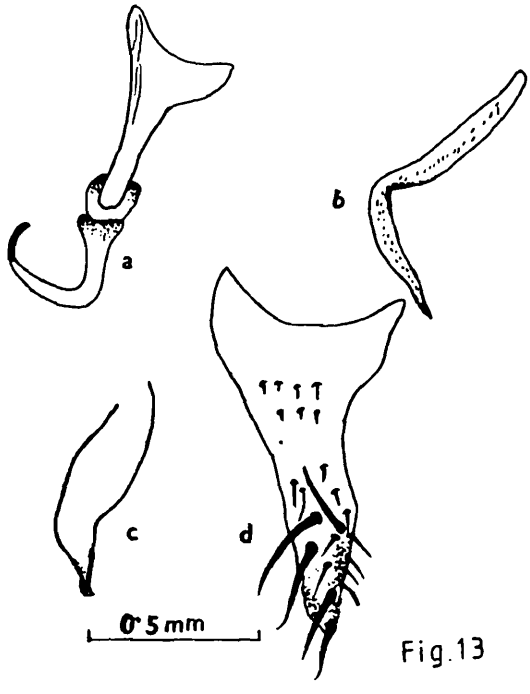


Fig.13

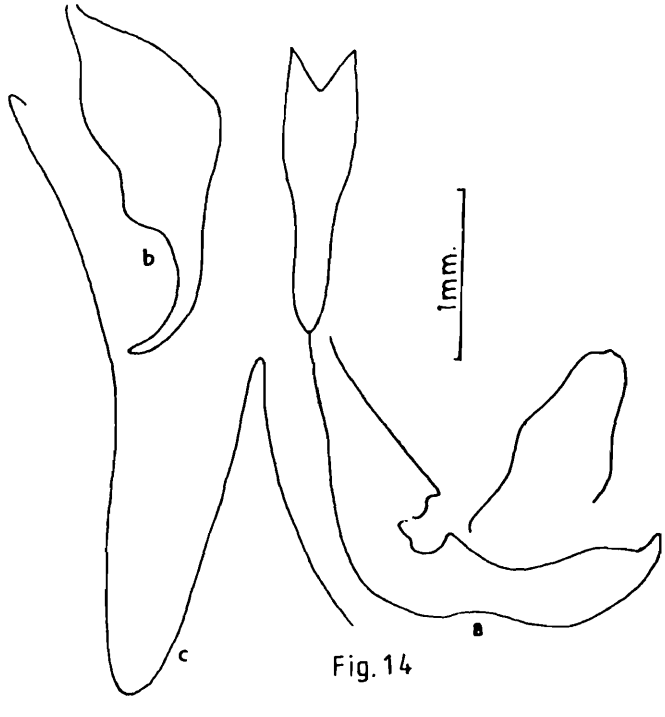


Fig. 14

Fig. 12(a-c) : *Kolla opponens* Walker : a, Aedeagus; b, Style and Male Plate; c, Pygofer.
Fig.13 (a-d) *K. raja* Distant : a, Aedeagus; b, Style; c, Pygofer; d, Male plate.
Fig. 14 (a-c) *K. unimaculata* Signoret : a, Aedeagus; b, Style; c, Male Plate.

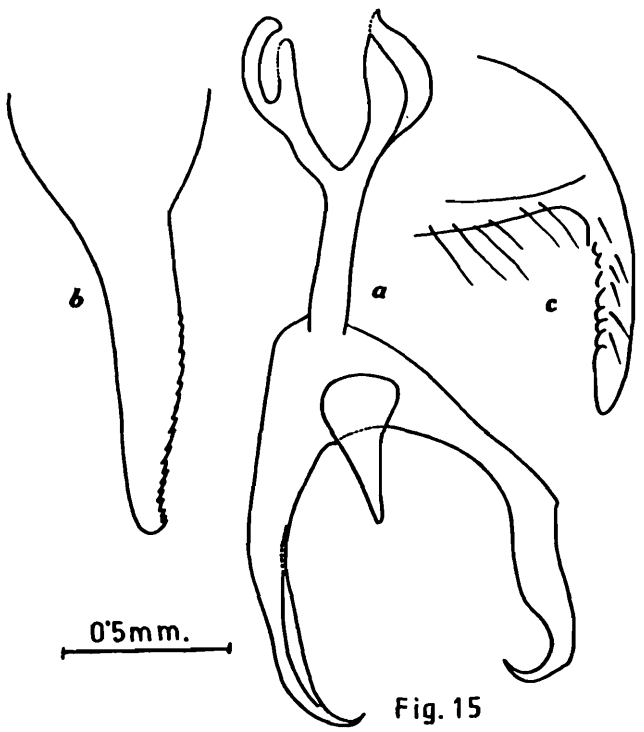


Fig. 15

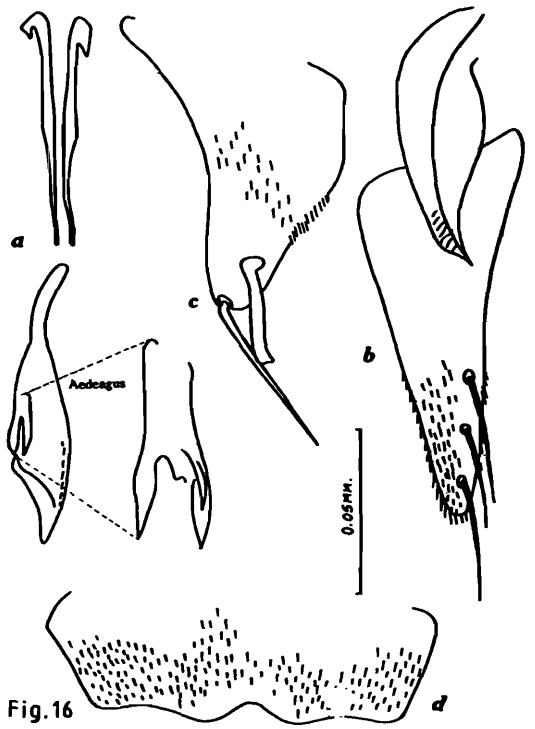


Fig. 16

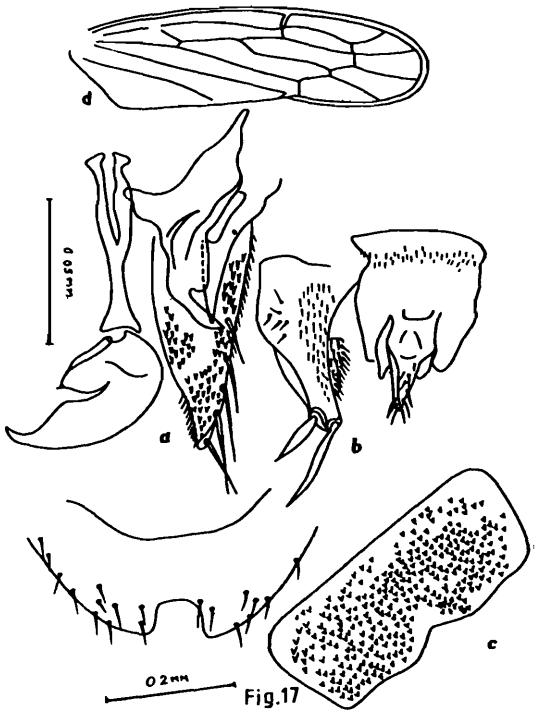


Fig. 17

Fig. 15 (a-c): *Eutettix phycitis* Distant : a, Aedeagus; b, Style; c, Male Plate.
Fig. 16 (a-d) : *Existianus atkinsoni* (Distant) : a, Aedeagus; b, Male Plate; c, Pygofer; d, 7th Sternite.
Fig. 17 (a-d) : *E. indicus* (Distant) : a, Aedeagus, Style, Male Plate; b, Pygofer; c, 7th Sternite, d, Tegmina.

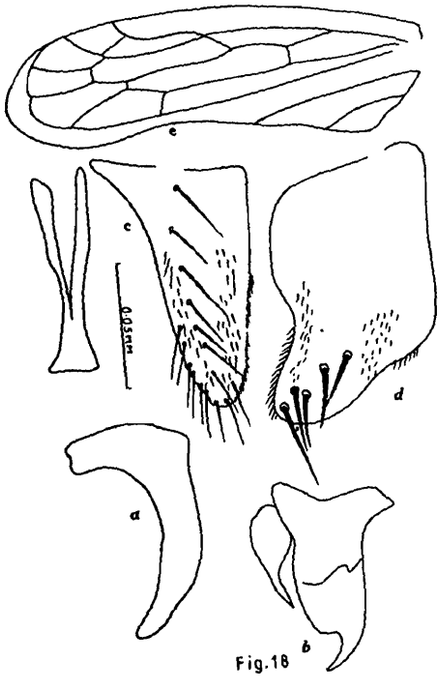


Fig.18

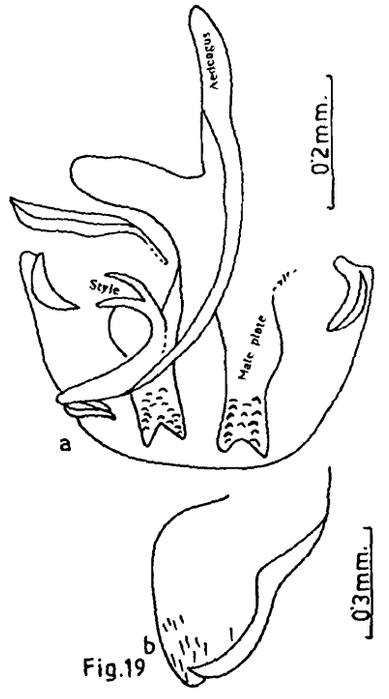


Fig.19

Fig. 18 (a-e) : *E. nanus* (Distant) : a, Aedeagus; b, Style; c, Male plate; d, Pygofer; e, Tegmina
Fig. 19 (a-b) : *Goniagnathus punctifer* Walker : a, Aedeagus, Style, Male Plate; b, Pygofer.

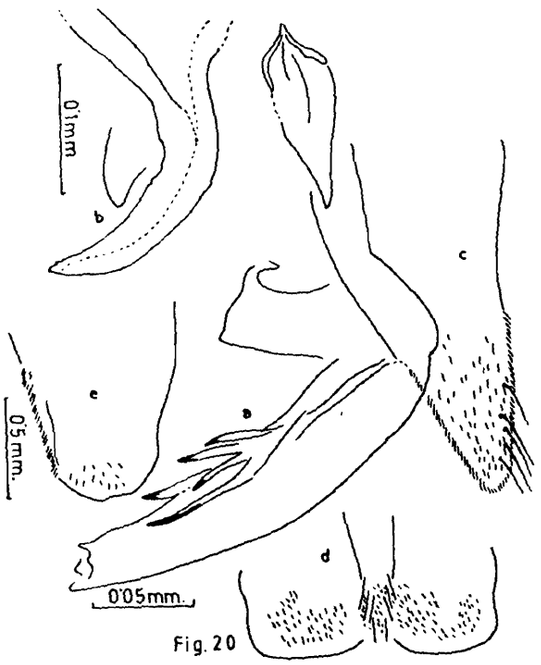


Fig. 20

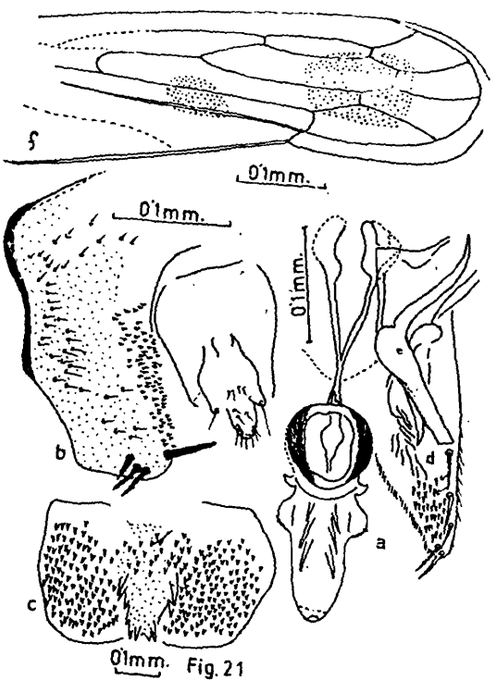


Fig. 21

Fig. 20 (a-e) : *Nephotettix nigropicta* (Stal) : a, Aedeagus, b, Style, c, Male Plate, d, 7th Sternite; e, Pygofer.
Fig. 21 (a-f) : *Nephotettix Virescens* Fabricius : a, Aedeagus; b, Pygofer; c, 7th Sternite; d, Male Plate; e, Style; f, Tegmina.

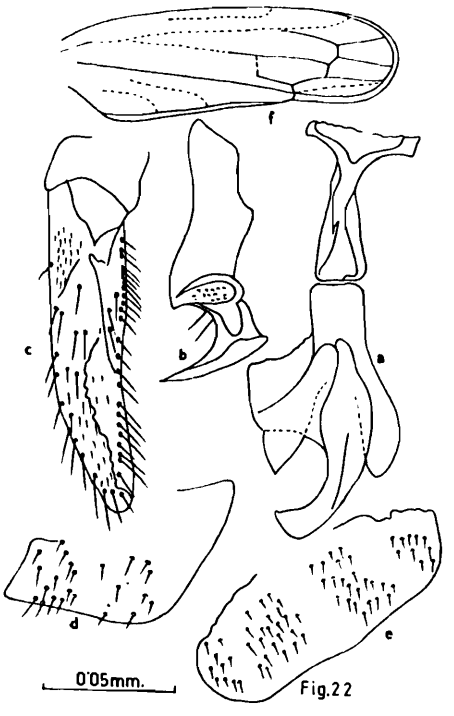


Fig.22

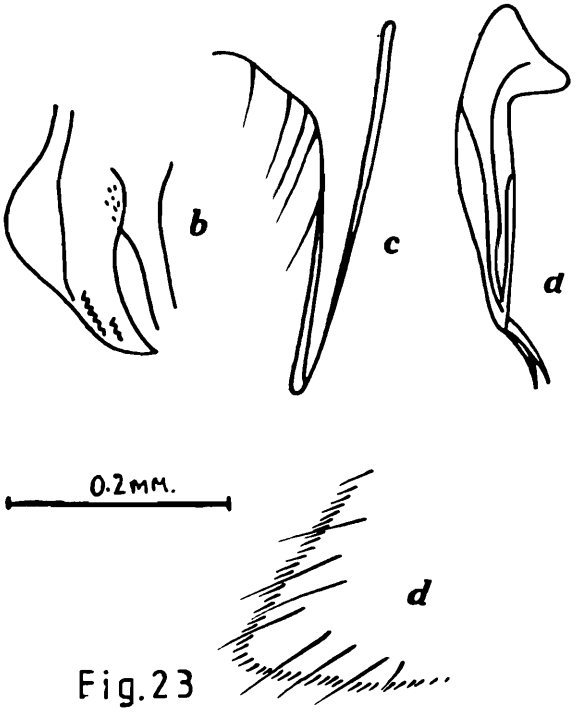


Fig.23

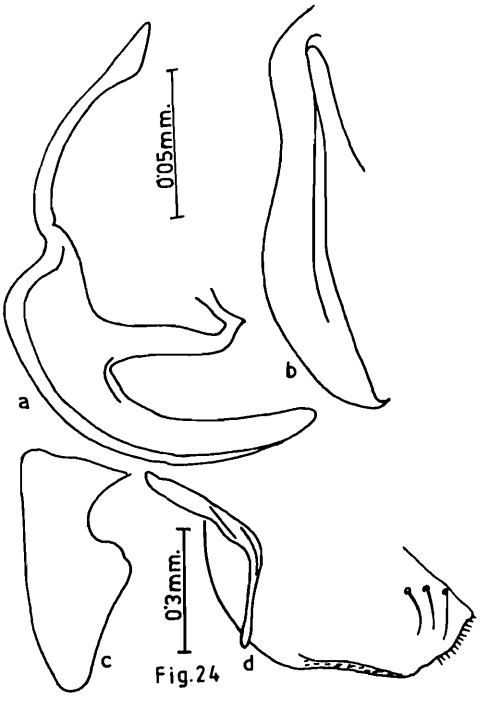


Fig.24

Fig. 22 (a-f) : *Evacanthus repexus* Distant : a, Aedeagus; b, Style; c, Male Plate; d, Pygofer; e, 7th Sternite; f, Tegmina.

Fig. 23 (a-d) : *Iassus indicus* Walker : a, Aedeagus; b, Style; c, Male Plate; d, Pygofer

Fig. 24 (a-d) : *Amritodus atkinsoni* (Lethierry) : a, Aedeagus; b, Style; c, Male Plate; d, Pygofer.

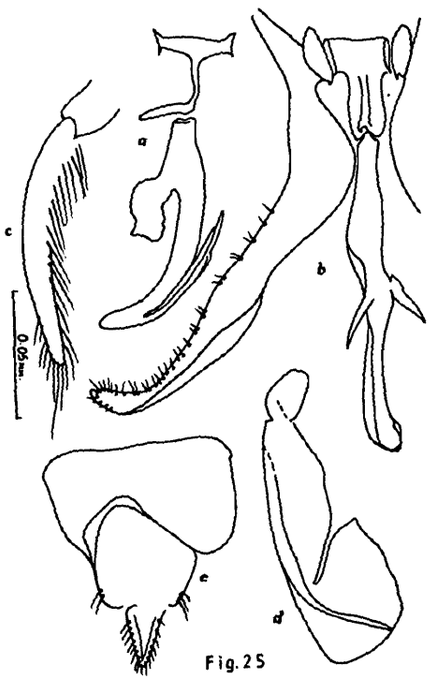


Fig. 25

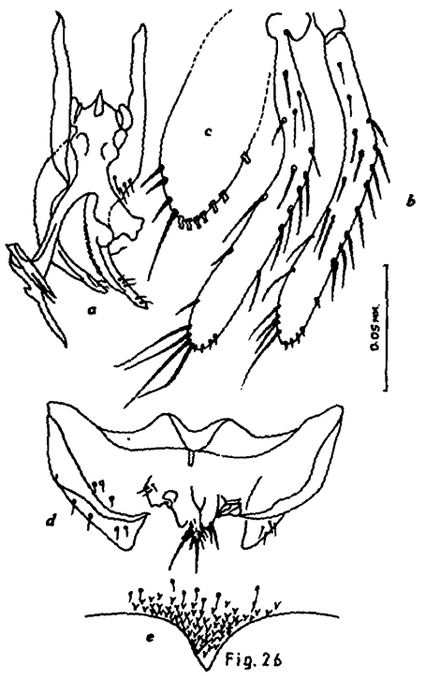


Fig. 26

Fig. 25(a-e) : *Amritodus atkinsoni* (Lethierry) : a, Aedeagus; b, Style; c, Male Plate; d, Pygofer; e, Anal tube.

Fig. 26 (a-e) : *Idioscopus bimaculatus* Distant : a, Aedeagus; b, Style; c, Male Plate; d, Pygofer; e, 7th Sternite.

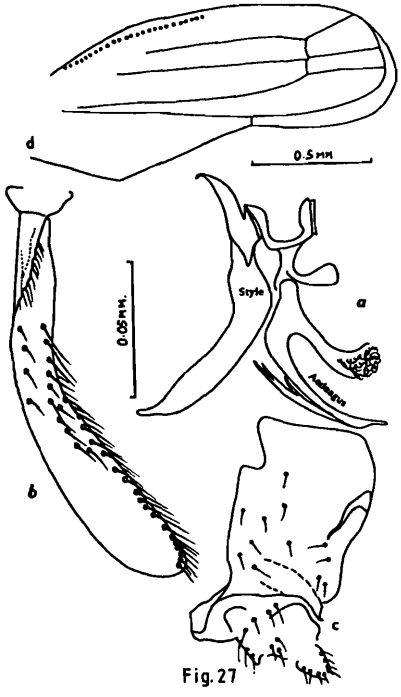


Fig.27

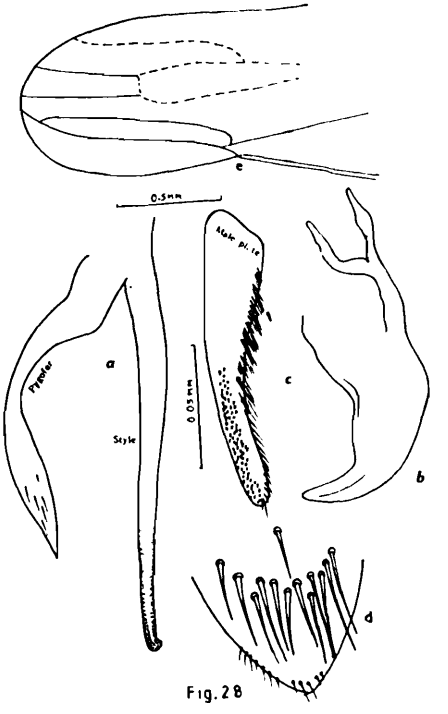
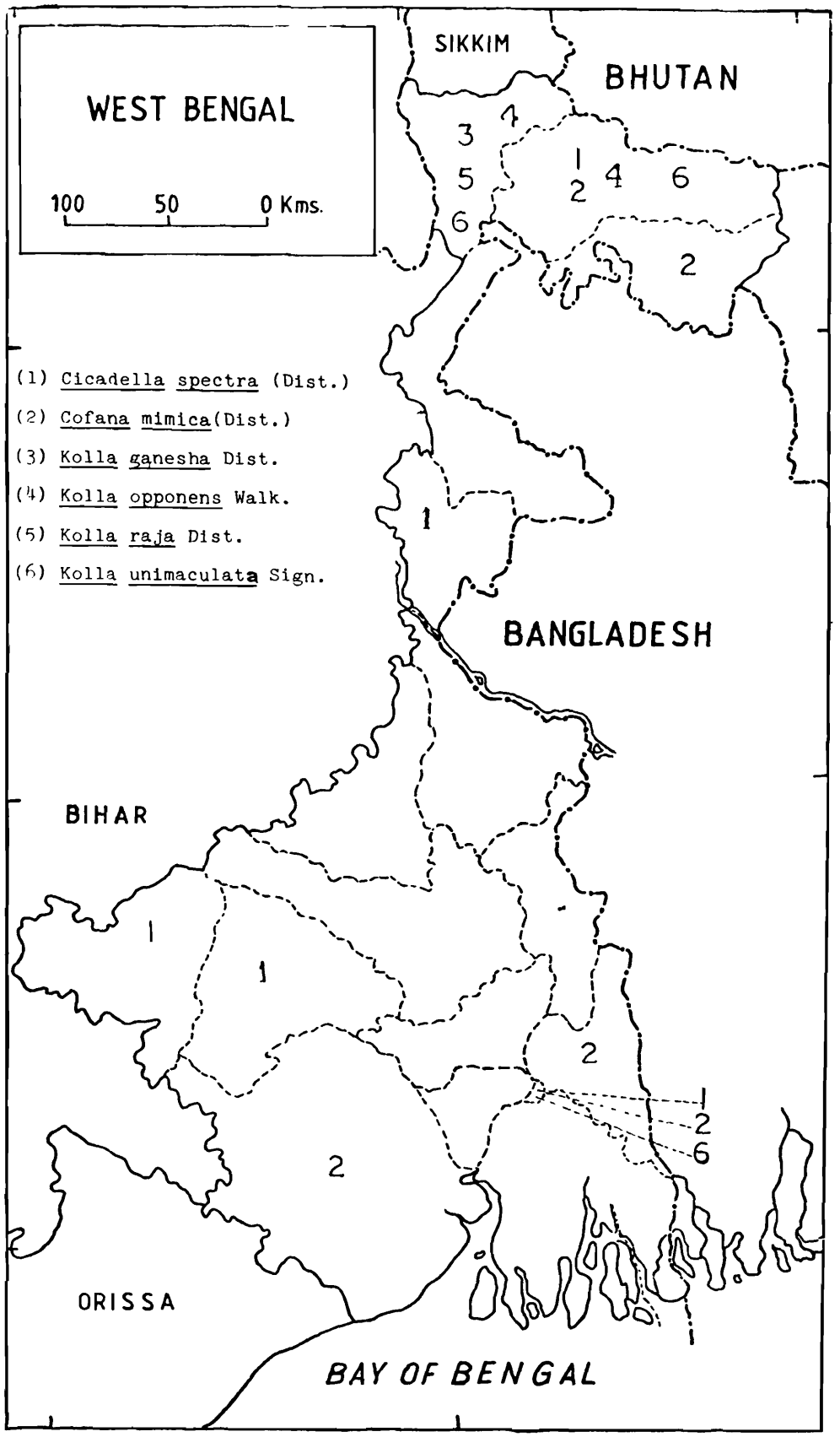


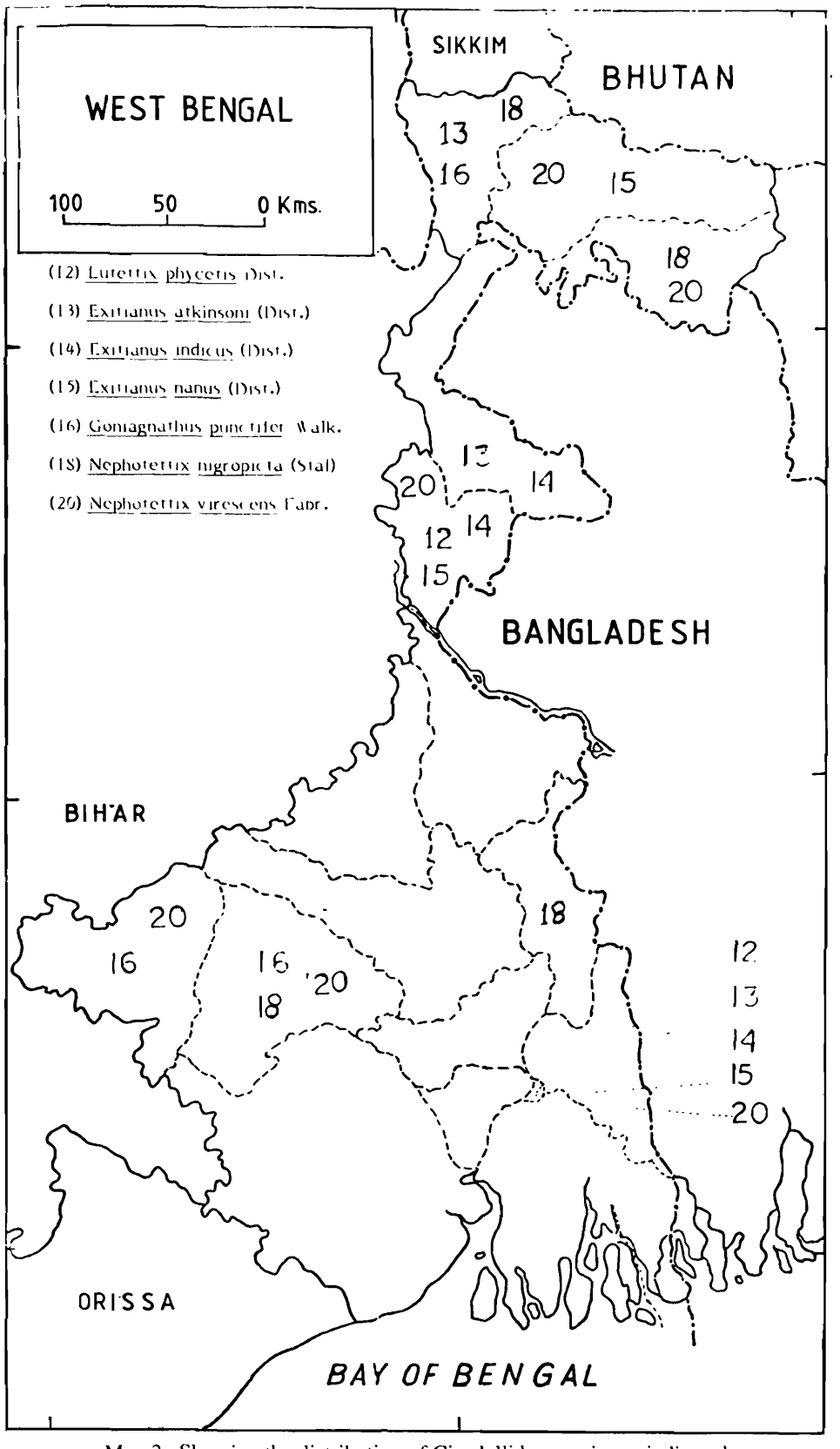
Fig.28

Fig.27 (a-d) : *Idioscopus clypealis* (Leth.) : a, Aedeagus, Style; b, Male Plate; c, Pygofer; d, Tegmina.
Fig. 28 (a-e) : *Krisna strigicollis* (Spinola): A, Aedeagus; b, Style, c, Male Plate; d, abdominal Portion; e, Tegmina.



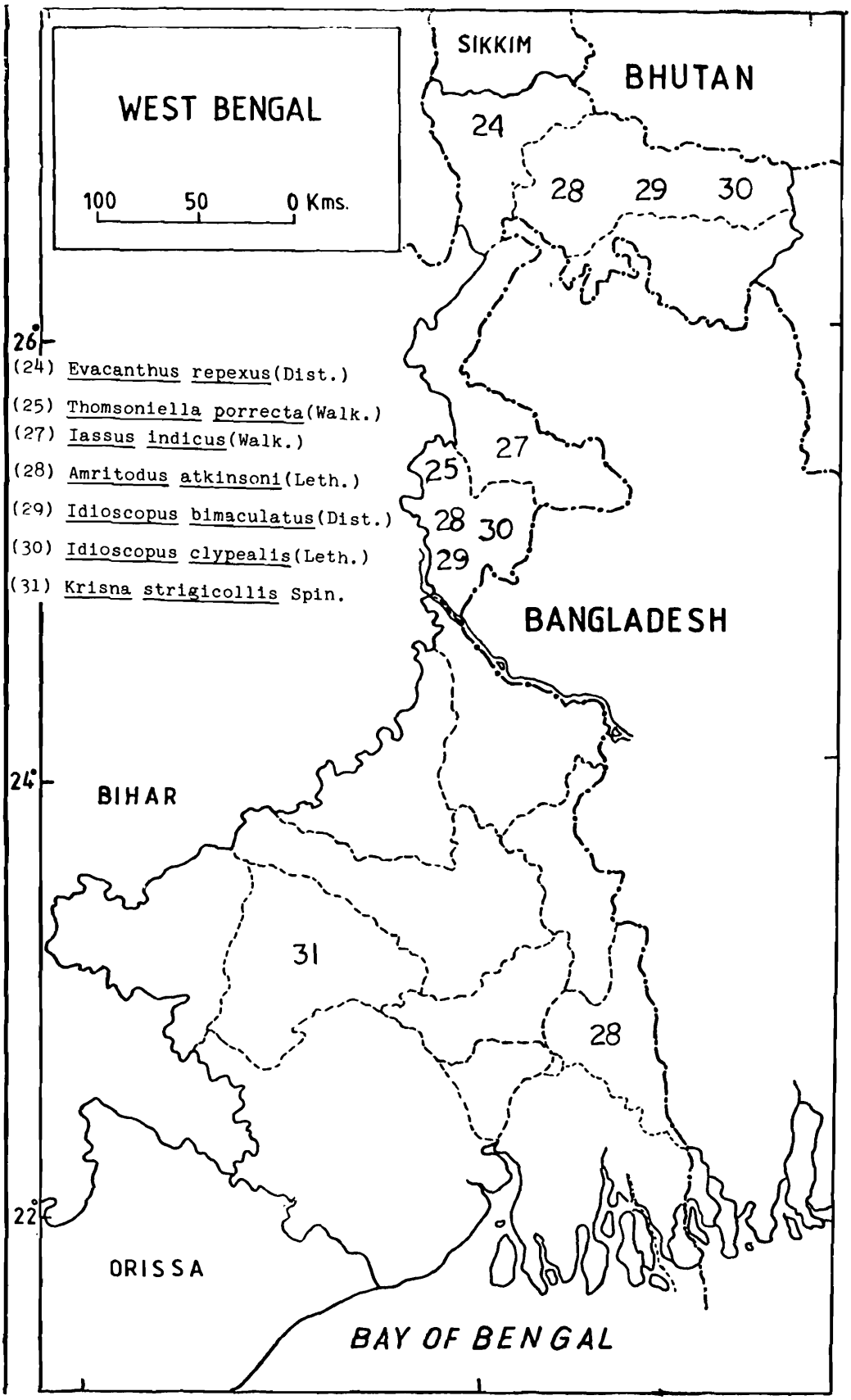
Map 1. Showing the distribution of Cicadellidae species as indicated.

Map. 1



Map 2. Showing the distribution of Cicadellidae species as indicated.

Map. 2



Map 3. Showing the distribution of Cicadellidae species as indicated.

Map. 3

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ADDENDA

The following species were also recorded earlier by Ghosh, M. (1974) from Darjeeling Himalayas, West Bengal :-

Subfamily	CICADELLINAE
	Bothrogonia ferrugiana (Fabricius)
	Kolla maculifrons Scmidt
Subfamily	EUSCELLINAE
	Scaphoideus rathini Ghosh
Subfamily	EVACANTHINAE
	Evacanthus extremus (Walker)
Subfamily	IASSINAE
	Iassus ranjiti Ghosh

(Reference : *J. Zool. Soc. India*, **26** (1 & 2) : 77-81)

State Fauna Series 3 : Fauna of West Bengal, Part 5 : 69-90, 1994

INSECTA : HEMIPTERA : HOMOPTERA : MEMBRACIDAE

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Zoological Survey of India, Calcutta

INTRODUCTION

The Membracids, commonly known as "tree hoppers", are economically important group of hemipteran insects. These are the representatives of one of the most distinct families of the Sub Order Homoptera.

A little over 200 species of Membracids belonging to 45 genera are so far known from the Indian subregion as against World record of about 2300 species under 307 genera (Metcalfe 1960). In India, 10 species are known to occur exclusively in the hills (Lefroy, 1917).

Our knowledge on Membracid fauna from West Bengal is meagre. A perusal of literature reveals that altogether 49 species in 17 genera are so far known from the State of West Bengal (Dutta *et al.* 1978), Ananthasubramanian (1980) & Ghosh *et al.* (1983).

The present paper is the first consolidated account of 29 species belonging to 7 genera of Membracids from West Bengal. The paper is based on the material collected during mopping Surveys of West Bengal. It is also supplemented by the materials deposited in the National Zoological collections made by the earlier survey parties of Zoological Survey of India. In addition to the taxonomic account the maps showing the distribution pattern of different species are also appended.

MATERIAL AND METHODS

Most of the species of Membracids are remarkably host specific. So in the field, Membracid is being searched on the plants belonging to the family Leguminosae, the *Acacias* in particular. Besides, the plant families Compositae, Rubiaceae, Solanaceae and Rhamnaceae are most preferred hosts for this group of insect. While some of the Membracids occur solitarily on their host plants, others decidedly gregarious forms congregate in hundreds. The tree hoppers are being collected either directly or sweeping these plants with insect nets. Moreover, Membracids are attended by ants for their anal secretions, the so called 'honey dew'. In many instances, the hiding place of Membracids are located by tracing the tract of marching ants.

After collection, the specimens are killed in a killing jar using benzene or chloroform vapour. Then the insects are transferred into the insect envelope and a separate data label mentioning collection locality, name of the collector, date of collection, altitude etc. is provided to each envelope. The Membracids are usually preserved dry with paradichlorobenzene and Naphthalene.

In laboratory, the specimens are set, pinned and mounted to display properly for easy handling under the binocular microscope during the process of identification.

GENERAL DIAGNOSIS

These insects are distinguished by its bizarre-shaped pronotum produced backward into a process, ocelli placed between the eyes, antennae inserted infront of head between the eyes.

SYSTEMATIC ACCOUNT

Family MEMBRACIDAE

Key to the Subfamilies

Scutellum obsolate or rudimentary, entirely concealed by pronotum, well developed propleural and metapleural process, fore tibiae dialated.....Oxyrhachinae Haupt

Scutellum distinct and more or less uncovered, propleural and metapleural process absent..... ..... Centrotinae Spinola

Subfamily OXYRHACHINAE

Genus ***Oxyrhachis*** Germar 1935

1835. *Oxyrhachis* Germar, *Rev. ent. Silb.*, **31** : 232.
1986. *Oxyrhachis* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, **83** (1 & 2) : 100.

Key to the species of ***Oxyrhachis***

1(2) Suprahumerals longer than space between their bases..... 3

2(1) Suprahumerals shorter than space between their bases..... 5

3(4) Posterior process extending beyond the tips of the tegmina, lower margin of the apical area of the posterior process weakly serrate; ocelli equidistant from each other and from eyes and located on the centrooocular line..... *tarandus* (Fabricius)

4(3) Posterior process not reaching the tips of the tegmina, apical areas of the posterior process slightly elevated; ocelli nearer to each other than from eyes..... *rufescens* Walker

5(6) Suprahumerals subhorizantal, about two third as long as space between their base; lower margin of the apical area of the posterior process strongly serrate.....*uncatus* Melichar

6(5) Suprahumerals very short and broad & a little upwardly recurved; the apex of the posterior process moderately upwardly recurved..... *lefroi* Distant

1. ***Oxyrhachis lefroi*** Distant

1916. *Oxyrhachis lefroi* Distant, *Fauna Brit. India*, **6** : 147.

Material examined : 1 ex., Nalbari, North Salt Lake, 11.XII.1985, Coll. *B. Biswas.*

Diagnosis : General colouration fuscus brown, a percurrent central longitudinal carination through the posterior process; posterior process hardly reaching the apex of the tegmina, tegmina subhyaline with it's base fuscous brown, other characters as in key.

Distribution : India : West Bengal (North 24 Parganas); Bihar.

Remarks : This species is reported for the first time from West Bengal.

2. *Oxyrhachis rufescens* Walker

1851. *Oxyrhachis rufescens* Walker, *List. Hom.*, 2 : 506.
1986. *Oxyrhachis rufescens* : Ghosh, Biswas & Das, *Rec. zool. Surv. India* **83** (1 & 2) : 100.

Material examined : 1 ex., North Salt Lake, 11.XII.1985, Coll. *B. Biswas* ; 10 exs., Dakshindari, Salt Lake, V.1926, Coll. *B.N. Chopra*; 2 exs., Karmatar; 1 ex., Calcutta, 25.IX.1912 Coll. *Mus.*; 1 ex., Calcutta, 29.I.1907 Coll. ? ; 2 exs., Katwa, Burdwan, Coll. *B.N. Das.*

Diagnosis : Head, pronotum ferruginous brown, head twice as broad as long, vertex sinuate and punctate with short silvery hairs; eyes subglobulate; suprahumeral process broad, horizantal, somewhat flat, their apices subacute and slightly directed caudad; posterior process moderately gibbous at base, anterior margin weakly serrate beneath; tegmina reddish brown, punctate with basal sixth ochraceous; hind wings with 3 apical cells, other characters as in key.

Distribution : India : West Bengal (Calcutta, Burdwan, North 24 Parganas); Mysore; Tamil Nadu.

Remarks : This species is abundantly found throughout India, including West Bengal and quite common on *Acacia, Caesalpinia* sp. *Cassia* sp. *Crotalaria* sp. etc. This species is attended by *Componotus compressus* and *C. servicans* regularly during rainy months (September to November)

3. *Oxyrhachis tarandus* (Fabricius)

1798. *Membracis taranda* Fabricius, *Ent. Syst. Suppl.*, 514.
1962. *Oxyrhachis tarandus* : Capener, *Repub. S. Afr. tech. ser. Ent. Mem.* **6** : 11.
1986. *Oxyrhachis tarandus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, **83** (1 & 2) : 100.

Material examined : 1 ex., Santoshpur, South 24 Parganas, 18.X.1962, Coll. *Saukat Ali,* 1 ex., Calcutta, 11.XII.1965, Coll. ?

Diagnosis : Head thickly punctate, frontally piceous, vertex twice as wide as long, sparsely covered with hairs; eyes subglobate; ocelli invisible; pronotum with a central longitudinal carination which traverses the length of the posterior process; suprahumeral process subhorizantal, upwardly recurved, strongly tricarinate, its apex obtusely acute, other characters as in key.

Distribution : India : West Bengal (Calcutta, South 24 Parganas); Mysore ; Tamil Nadu. Elsewhere: Africa, Algeria, Arabia, Europe, France, German, Northern Asia, Oriental, Tunisia.

Remarks : This species is widely distributed in India including Calcutta and West Bengal. It breeds upon Babul (*Acacic arabica*), Labrum (*Cassiafistula*), Pigeon pea (*Cajanus indicus*) etc. when the female usually attends the egg until they hatch (Lefroy 1971).

4. ***Oxyrhachis uncatus*** Melichar

1903. *Oxyrhachis uncatus* Melichar, *Hom. Fam. Ceylone*, 108.
1975. *Oxyrhachis uncatus* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, **68** : 176.

Material examined : 2 exs., Katwa, Burdwan, 10.XII.1985, Coll. *B.N. Das*

Diagnosis : Head, pronotum ochraceous and brownish, head broader than long, finely punctate with long, sparse, silvary white hairs; eyes subglobate, reddish brown; ocelli nearer to the eyes than to each other with a central yellowish carinate line through pronotum; apices of suprahumeral horns rounded & its outer areas with an oblique pale line; posterior process hardly reaching the apex of tegmina, apically slightly turned upward; tegmina thrice as long as wide, opaque with basal sixth coreaceous and punctate.

Distirbution : India : West Bengal (Burdwan) ; Kerala. Elsewhere : Ceylon.

Subfamily CENTROTINAE

Key to the genera of Subfamily Centrotinae

1(2) Hind wings with 4 apical cells 3

2(1) Hind wings with 3 apical cells 7

3(4) Ventral side of the posterior process distant from or rarely touching apex of scutellum, posterior process more or less arcuate 5

4(3) Base of the posterior process contiguous with or only slightly above scutellum and tegmina, posterior process slender not arcuate, scutellum wider than long ..... ***Otinotus***

5(6) Scutellum almost as wide as long, triangular, apically marginate; disc of the pronotum convexly elevated ..... ***Leptocentrus***

6(5) Scutellum much longer than broad, apex acute; disc of the pronotum not or slightly elevated ..... ***Telingana***

7(8) Scutellum normal or exposed; hind trochanter armed with spines ..... ***Tricentrus***

8(7) Scutellum partly concealed; hind trochanter unarmed 9

9(10) Tegminal veins coarsely or finely tuberculate; scutellum abortive in the middle; pronotum usually tuberculate..... ***Coccosterphus***

10(9) Tegminal veins not tuberculate; scutellum complete in the middle; pronotum not tuberculate..... ***Gargara***

Genus ***Leptocentrus*** Stal 1868

Key to the species of ***Leptocentrus***

1(2) Posterior process remote from scutellum and inner margin of tegmina..... 3

2(1) Posterior process distant from scutellum at it's base but its apex very near to or impinging on the inner margin of tegmina..... 7

3(4) 1st apical cell of tegmina nearly 8 times longer than broad..... 5

4(3) 1st apical cell of tegmina more than 10 times longer than maximum width; posterior process horizantal; supra humerals 1.5 times longer than distance between their bases; tegmina subhyaline; uniformly light brown legs..... *carinatus* Ananthasubramanian

5(6) Posterior process straight; suprahumerals narrow, slightly recurved, about equal in length to width between bases; tegmia pale bronzy..... *bajulans* Distant

6(5) Posterior process almost horizantal upto half of its length; suphahumerals robust, longer than distance between bases; scutellum white tomentose at basal lateral third, rest rusty brown, tip emerginate..... *beluri* Ananthasubramanian

7(8) Posterior process moderately or strongly elevated at base, then substraight to tip..... 9

8(7) Posterior process less arched at base and more obliquely straight..... 11

9(10) Tegmina pale bronzy,base and apical half of costal margin black, ochraceous; posterior process strongly arched, abruptly elevated from near base passing beyond 5th apical cell..... *taurus* (Fabricius)

10(9) Tegmina shingingly ochraceous, black on basal costal margin and apical limbus; posterior process recurved from base and touching the apex of the inner margin of tegmina..... *leucaspis* (Walker)

11(12) Suprahumerals much broader above and somewhat foliaceously convex at their anterior margin; legs piceous; abdomen pale..... *reponens* (Walker)

12(11) Suprahumerals narrow, slightly recurved, about equal in length to width between bases; legs dark brown and body blackish..... *substitutus* (Walker)

5. *Leptocentrus bajulans* Distant

1916. *Leptocentrus bajulans* Distant, *Fauna Brit. India, Append* **6** : 155.
1975. *Leptocentrus bajulans* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India.* **68** : 192.

Material examined : 1 ex., Calcutta, Eden Garden, 19. VIII. 1968. Coll. *G.S. Arora & Party.*

Diagnosis : General colouration black; head thrice as broad as long, palely pilose with white hairs; eyes pinkish, subglobate; ocelli nearer to eyes than to each other; pronotum thickly punctate with long white hairs; suprahumerals strongly tricarinate; posterior process slender curved at bases; tegmina wrinkled, basal part slightly darker upto distal fourth of femora; tibiae yellowish, tarsi pale white with black spots.

Distribution : India : West Bengal (Calcutta, Murshidabad); Kerala Elsewhere : Burma, Siam.

6. *Leptocentrus beluri* Ananthasubramanian

1980. *Leptocentrus beluri* Ananthasubramanian, *Rec. zool. Surv. India*, Occ. paper No. 16 : 15.

Material examined : Female holotype, Z.S.I. Regd. No. 643/H 15. Male allotype Z.S.I. Regd. No. Reg. No. 645/H/15, Belur, Haora, 14. Vii. 1966 Coll. *T R. Mitra* and Party.

Diagnosis : Head, pronotum pieceous brown; head almost 2.5 times as wide as long with long sparsely silvery hairs; eyes subglobate, pele red; ocelli closer to eyes than to each other; suprahumerals strongly tricarinate, directed upward, outward and little backwardly curved; posterior process originating from the posterior half of the disc, raised above scutellum and tegima almost horizantal upto half of its length, tip sharply acute, never impinging on inner margin of tegmina; 1st discodal cell shorter than 2nd.

Distribution : India : West Bengal (Haora).

Remarks : The type specimens of this species have been deposited with the National Zoological Collection of Zoological Survey of India.

7. *Leptocentrus carinatus* Ananthasubramanian

1980. *Leptocentrus carinatus* Ananthasubramanian, *Rec. zool. Surv. India*, Occasional Paper No. 16 : 11.

Material examined : Female Holotype, Z.S.I. Regd. No. 617/H 15, allotype male and one paratype male, Barasat, North 24 Parganss, 17. XII. 1965. Coll. *S.C. Mitra* and *R. Kulin.*

Diagnosis : Head pronotum greyishly black with shades of red; head nearly twice as wide as long, loosely pilose with silvery hairs; eyes subglobate, pinkish; ocelli black, nearer to eyes than to each other; suprahumeral horns stout, strongly tricarinate, viewed from lateral aspect directed upwards and outwards and gently curved backwards; tegmina more than 3 times longer than wide, 1st and 2nd discoidal cells of equal length.

Distribution : India : West Bengal (North 24-Parganas).

Remarks : The type specimens of this species have been deposited by the Author in the National Zoological Collection of Z.S.I.

8. *Leptocentrus leucaspis* (Walker)

1851. *Centrotus taurus* Walker, *List. Hom.*, **2** : 602.
1858. *Leptocentrus leucaspis* : Walker, *List. Hem. Suppl.*, : 158.
1986. *Leptocentrus leucaspis* : Ghosh, Biswas and Das, *Rec. zool. Surv. India.*, **83** (1 & 2) : 102.

Material examined : 2xs., Calcutta, Eden garden, 19, VIII.1968, Coll. *G.S. Arora & party* ; 2 exs. Tarakeshwar, Hughli, 15.X. 1965, Coll. *K. Rai.*

Diagnosis : Head, pronotum and scutellum black; head nearly thrice as broad as long; eyes hemispherical and black; ocelli slightly closer to eyes than to each other; pronotum strongly punctate; suprahumeral process slender, centrally carinate above, obliquely backward; posterior process tricarinate above impinging on tegminal inner margin, tips slightly raised.

Distribution : India : West Bengal (Calcutta, Hughli). Elsewhere : Borneo, Ceylon, Java, Malaya, Malacca, Philippines, Singapore, Sumatra.

Remark : This species is very common and found throughout India.

9. *Leptocentrus reponens* (Walker)

1851. *Centrotus reponens* Walker, *List. Hom.*, **2** : 604.
1908. *Leptocentrus reponens* : Distant, *Fauna Brit, India*, **4** : 30.

Material examined : 1 ex., Calcutta Eden garden, 20 VIII. 1966, Coll. *R.S.P.* and *K.G.P.*, 1 ex., Calcutta , Eden Garden, 19 VIII. 1965, Coll. *B.K.M.* and *G.P.*, 1 ex., Hatirampur, Bankura, 29.VIII. 1986, Coll. *P. Mukherjee.*

Diagnosis : Head and face thickly ochraceously pilose; tegmina pale bronzy base piceous and punctate basal costal margins narrowly piceous; head, pronotum, scutellum and abdomen beneath black; suprahumerals much broader above and somewhat foliaceously convex at the anterior margin; tegmina pale bronzy base piceous and punctate, basal costal margin narrowly piceous.

Distribution : Inida : West Bengal (Bankura, Calcutta, Darjiling, Jalpaiguri) Elsewhere : Burma, Ceylon, Malaya, New Guinea, Oriental region, Philippines.

10. *Leptocentrus substitutus* (Walker)

1851. *Centrotus substitutus* Walker, *List Hom.* **2** : 605.
1909. *Leptocentrus substitutus* : Distant, *Fauna Brit. India*, **4** : 28.
1986. *Leptocentrus substitutus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, **83** (1 & 2) : 103.

Material examined : 1 ex., Madanpur, Nadia, 11.XI.1968, Coll. *M. M. Ghosh* and party; 1 ex., Calcutta, Eden Garden, 20.VIII. 1966, Coll. *R.S.P. & G.P.*; 1 ex., Nayagopalganj, 9.VII.1965, Coll. *M.M. Ghosh & K. D. Chatterjee.*

Diagnosis : Head, pronotum black; head about three times wider than long; ocelli black nearer to eyes than to each other; the apices of the suprahumerals less acute; posterior pronotal process tricarinate above; scutellum and sternal lateral margins silky white.

Distribution : India : West Bengal (Bongaon, Calcutta, Jalpaiguri, Nadia). Elsewhere : Ceylon, Central China, Oriental region.

11. *Leptocentrus taurus* Fabricius

1775. *Leptocentrus taurus* Fabricius, *Syst. Ent.*, 675.
1986. *Leptocentrus taurus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, **83** (1 & 2) : 103

Material examined : 1 ex., Hatirampur, Bankura, 29.VIII.1986, Coll. *P. Mukherjee* ; 1 ex., Eden Garden, Calcutta, 19.VII. 1975, Coll. *B.K.M.* and *G.P.*; 1 ex., Eden Garden, Calcutta, 20.VIII. 1966 Coll?

Diagnosis : Head pronotum black and thickly punctate; head three times wider than long, ocelli black nearer to eyes than to each other; sprahumerals robust, strongly recurved, tricarinate above; posterior pronotal process tricarinate above, curved and apically touching the inner margin of tegmina; distal half of costal teginal margin black; scutellum cretaceously sericeous and as broad as long; hind wing with 4 apical cells; body beneath black; tibiae reddish brown.

Distribution : India : West Bengal (Bankura, Calcutta), Tamil Nadu, Uttar Pradesh. Elsewhere : Borneo, Burma, Cambodia, China, Philippines, Siam, Sumatra.

Remarks : This species breeds on *Dalbergia sissu*, ber (*Zizyphus jujuba*) and on brinjal (*Solanum melongena*). Hymenopteran parasites are located from the eggs of this species.

Genus *Telingana* Distant 1908

12. *Telingana paria* (Fairm)

1846. *Centrotus paria* Fairm, *Ann. Soc. Ent. Fr.*, : 51.
1908. *Telingana paria* : Distant, *Fauna Brit. India.* 4 : 18.

Material examined : 1 ex., Ichapur, North 24 Parganas, 8.XII. 1965, Coll. *K.R.P. & Party.*

Diagnosis : Head, pronotum ferruginous brown; suprahumeral process as seen from above somewhat short, recurved, strongly carinate near middle, apices obtusely acute, anterior margin ridged, as viewed from infront more slender, well separated from scutellum at base, tricarinate above, its apex acute and almost touching tegmina near posterior angle of the inner margins.

Distribution : India : West Bengal (Jalpaiguri, Malda, North 24 Parganas).

Genus ***Otinotus*** Buckton

Key to the species of ***Otinotus***

1(2) Lateral pronotal processes as viewed from above centrally carinate, somewhat slender, apically a little recurved; tegmina ochraceously opaque at base; body subelongate..... *oneratus* Walker

2(1) Lateral pronotal processes as viewed from above moderately broad, upwardly directed and apically strongly recurved; tegmina piceously opaque at base; body distinctly elognate and compressed. ..... *elongatus* Distant

13. ***Otinotus elongatus*** Distant

1908. *Otinotus elongatus* Distant, *Fauna Brit. India*, **4** : 41.
1986. *Otinotus elongatus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, **83** (1 & 2) : 105.

Material examined : 1 ex., Dhappa, Calcutta, 22 I. 1911, Coll. *F.H. Gravely*; 1 ex. Coachor, Bankura, 4 .IX. 1986, Coll. *P. Mukherjee.*

Diagnosis : General colouration piceous brown; head finely punctate, nearly thrice as wide across extrimities of eyes as length of vertex; eyes hemispherical, reddish brown; ocelli a little elevated, almost equidistant from each other and from eyes and located just above centrooccular line; suprahumerals centrally carinate, thickly pilose, slender gradually narowing from base to apex; posterior process slender, scarcely elevated above scutellum its apexe, passing posterior angle of inner margin of tegmina.

Distribution : India : West Bengal (Bankura, Calcutta).

14. ***Otinotus oneratus*** (Walker)

1858. *Centrotus oneratus* Walker., *Ins. Sound Hom.*, : 78.
1908. *Otinotus oneratus* : Distant, *Fauna Brit. India*, **4** : 40.
1986. *Otinotus oneratus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India.* **83** (1 & 2) : 104.

Material examined : 5 exs., Ichapur, North 24 Parganas, 8.XII.1968. Coll. *K.R. Rao* and Party; 4 exs., Kalyani, Nadia, 26 XI.1965., Coll. *K.S.P.*; 4 exs., Barasat, North 24 Parganas, 17.XII.1965, Coll. *S.C. Mitra* and *R. Kulin;* 9 exs., Bankura, 4. Ix. 1985 Coll. *P. Mukherjee & Party* : 1 ex., Medinipur, 9 III. 1984, Coll. *K.K. Rai and Party*; 1 ex. Horticulture Garden, Alipur, 27.XII.1965, Col. *S. Sen and party.*

Diagnosis : General colouration castaneous brown to brownish ochraceous; head finely punctate; eyes hemispherical, reddish brown; ocelli equidistant from each other and from eyes and located just above centro occular line; suprahumerls longer than spaces between their bases; basal areas of the horns darker, thickly pilose; posterior process slender, arising from the posterior margin of the disc turned outward, tricarinate almost contiguous with the scutellum and impinging on the inner margin of the tegmina which

is thrice as long as wide; scutellum slightly broader than wide; legs dark brown upto distal half of femora; tibiae light brown, tarsi pale white.

Distribution : India : West Bengal (Bankura, Medinipur, Nadia, North 24 Pargnas); Tamil Nadu. Elsewhere : Ceylon.

Remarks : This is a very common species in India.

Genus ***Tricentrus*** Stal 1866

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

1(2) Suprahumeral horns short and stout..... 3

2(1) Suprahumeral horns long; apex of the posterior process about reaching the posterior angle of the inner margin of tegmina; scutellum with small pale sericeous spots at each basal angle..... ..... *projectus* Distant

3(4) Posterior process little raised from scutellum..... 5

4(3) Posterior process contiguous with scutellum..... 7

5(6) Head, pronotum, body beneath black; apex of the posterior process not reaching and not impinging on the posterior angle of inner margin of tegmina..... *subangulata* (Distant)

6(5) Head, pronoum, body beneath and legs rusty brown; posterior process reaching and impinging on the posterior angle of inner margin of tegmina..... *dubius* Ananthasubramanian

7(8) Posterior process just reaching or passing the posterior angle of inner margin of tegmina..... 9

8(7) Posterior process just reaching or passing the posterior angle of inner margin of tegmina; suprahumeral horns slightly upturned; the apex of the posterior process slightly recurved..... ..... *gibbosulus* Walker

9(10) Posterior process just reaching the posterior angle of the inner margin of the tegmina..... 11

10(9) Posterior process attenuate at apical half & passing beyond the posterior angle of inner margins of tegmina; pronotum very broad; tegmina 3 times longer than wide; 1st discoidal cell smaller than 2nd..... *cineres* Anathasubramanian

11(12) Head, pronotum, body beneath and legs black; apex of the posteior process black & a little uncurved a large cream white spot on black basal area of the tegmina..... *albomaculatus* Distant

12(11) Head, pronotum, body beneath and legs rusty brown; apex of the posterior process attenuated; 1st

apical cell of the tegmina about 9 times longer than maximum width.....
..... *cornutus* Ananthasubramanian

15. *Tricentrus albomaculatus* Distant

1908. *Tricentrus albomaculatus* Distant, *Fauna Brit. India,* **4** : 56.
1985. *Tricentrus albomaculatus* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India,* **68**:234.

Material examined: 1 ex., Botanical garden, Calcutta 28.XI.1964, Coll. *K.K. R.* and *S. Ali* & Party.

Diagnosis : Head thrice as wide as long finely pilose with silvery hairs; eyes reddish brown, hemispherical; ocelli closer to eyes than each other and situated above centroocular line; suprahumeral horns as seen from above short broad, apically recurved, apices subacute, anterior margin rounded, longitudinally carinate behind middle, as viewed from infront much more slender and obliquely upcurved.

Distribution : India : West Bengal (Calcutta), Maharashtra. Elsewhere : Brazil, Singapore and Sumatra.

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

16. *Tricentrus cinereus* Anathasubramanian

1980. *Tricentrus cinereus* Ananthasubramanian, *Rec. zool. Surv. India*, occasional paper 16 : 20

Material examined: Female holotype Z.S.I. Reg. No. 663/H15 and one paratype female Z.S.I. Reg. No. 664/H 15, Lakshmikantapur, south 24 Paraganas, 15.XI.1965, Coll. ?.

Diagnosis : Head, pronotum fuscous brown, head 2-3 times as wide as long, thickly pilose with silvery hairs; eyes sublogbate; ocelli closer to eyes than to each other; suprahumerals more than three fourth as long as width between their bases, as viewed from dorsal and lateral aspects projecting upward with tips sharply recurved, as viewed from the front much narrow, apices subacute; posterior process pale reddish brown weakly arched, slightly raised above scutellum; 1st discoidal cell not petiolate and slightly longer than 2nd; legs dark brown; abdomen black ventrally.

Distribution : India : West Bengal (South 24 Parganas).

Remarks : The type specimens have been deposited with the National Zoological Collection of Z.S.I.

17. *Tricentrus cornutus* Ananthasubramanian

1980. *Tricentrus cornutus* Ananthasubramanian, *Rec.zool. Surv. India*. Occasional Paper No. 16 : 27.

Material examined : Holotype female Reg. No. Z.S.I. 676/H15, Canning Gorosthan-Ghari, 18.X.1965, Coll. *A.N.T. Joseph.*

Diagnosis : General colouration rusty brown; head thrice as wide as long, thickly pilose; eyes subgloblate; ocelli closer to eyes than to each other; suprahumeral horns as long as the distant between their bases, projecting upward and outward its tips gently recurved; apex of the posterior process passing a little beyond the clavus; tegmina subhylaine ,3.5 times as long as wide with a rounded pale white fascia on basal sixth, 1st discoidal cell petiolate and half as long as 2nd discoidal cell.

Distribution : India : West Bengal (South 24 Parganas).

Remarks : The type specumens of the species have been deposited with the National Zoological collection of Zoological Survey of India.

18. *Tricentrus dubius* Ananthasubramanian

1980. *Tricentrus dubius* Ananthasubramanian, *Rec. zool. Surv. India.* Occasional Paper 16 : 25.

Material examined; Female Holotype Reg. No. Z.S.I. 671/H 15, Male allotype,one paratype female and one paratype male, Calcutta, 17.XII.1965, Coll. *S.C. Mitra* and party. One female paratype from Tarakeshwar, Hooghly, 15. X. 1965, Coll. *Kuldip Rai.*

Diagnosis: Head, pronotum black; vertex slightly more than thrice as wide as log, finely punctate; eyes dark brown, subglobate; ocelli nearer to eyes than to each other; suprahumeral horns directed upward and backward gently recurved, apex subacute; posterior process slightly raised behind metathorax; tegmina pale brown nearly 3 times as long as wide, with a distinct black patch opposite to the 2nd apical cell, 1st discoidal cell not petiolate.

Distribution : India : West Bengal (Calcutta, Hughli).

Remarks : The type specimens of this species have been deposited with the National Zoological Collection of the Zoological Survey of India.

19. *Tricentrus gibbosulus* (Walker)

1886. *Centrotus gibbosulus* Atkinson, *J.A.S.B.*, **4** : 198.
1908. *Tricentrus gibbosulus* : Distant, *Fauna Britt. India*, **4** : 53.

Material examined : 2exs., Moubhandar, Medinipur, 3 X.1983, Coll. *A..K. Ilazra* 1 ex., Eden Garden, Calcutta, 24.XII.1964, Coll. *S.M. Ali.*

Diagnosis : Head, pronotum, legs piceous, somewhat thickly and very finely pilose; ocelli nearer to each other than to eyes; suprahumerals slightly upturned, with anterior margin rounded and posterior margins obliquely straight, apex obtusely acute and slightly recurved; posterior process raised centrally and laterally carinate, scarcely elevated above scutellum; tegmina pale bronzy brown, base piceous black.

Distribution : India : West Bengal (Calcutta, Medinipur); Assam; Bihar. Elsewhere : Borneo, China, Malaya, Sumatra, Singapore.

20. *Tricentrus projectus* Distant

1908. *Tricentrus projectus* Distant, *Fauna Brit. India*, 4 : 55.
1986. *Tricentrus projectus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, 83 (1 & 2) : 106.

Material examined : 1 ex., Tollygunge, Calcutta, 11.XI.1916, Coll. *F.H. Gravely*

Diagnosis : General colouration custaneous brown; pronotum punctate, it's disc and front thickly ochraceously pilose; lateral process as seen from above straightly obliquely porrect and on each lateral area sharply obliquely depressed and their apices subacute; tegmina strongly wrinkled with its base punctate and apical margin a little paler and more ochraceously brown.

Distribution : India : West Bengal (Calcutta). Elsewhere : Burma, Philippines.

21. *Tricentrus subangulata* Distant

1908. *Tricentrus subangulatus* Distant, *Fauna Brit. India*, 4 : 55.
1986. *Tricentrus (Otaris) subangulata* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, 83 (1 & 2) : 106.

Material examined : 1 ex., Bondel, Calcutta, 28.XI.1964, Coll. *S.K. Ghosh* and party; 1 ex., Horticulture garden, Calcutta 23.VI.1981, Coll. *H.K. Bhowmick.*

Diagnosis : Head about two and half times wider than long; ocelli nearer to eyes than to each other; pronotum black, thickly punctate; suprahumeral horns recurved, their anterior margin rounded; posterior margin almost straight; tegmina with a pale bronzy tint and punctate on black basal area, on outer margin of which is a distinct pale transverse fascia.

Distribution : India : West Bengal (Calcutta). Elsewhere : Burma

Genus *Coccosterphus* Stal, 1869

Key to the species of *Coccosterphus*

1(2) Posterior process broadly triangular, slightly elevated behind disc 3

Tegmina lacking a sterostigma, tubercles on pronotum and tegminal veins large..... ..... *minutus* (Fabricius)

2(1) Posterior process slender, contiguous with scutellum 4

3(4) Posterior process concave at base and strongly, convexly, laminately produced before apex; pronotum obtusely angulate before the base of the posterior process; tegmina especially on veins finely tuberculous..... *decoloratus* Distant

4(3) Posterior process slender, laminately, convexly gibbous before apex, which about reaches the posterior angle of inner margin of tegmina..... *obscurus* Distant

22. *Coccosterphus decoloratus* Distant

1908. *Coccosterphus decoloratus* Distant, *Fauna Brit. India*, **4** : 71.
1986. *Coccosterphus decoloratus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, **83** : (1 & 2) : 110.

Material examined : 1 ex., Maidan, Calcutta, 27.IV.1911, Coll. *F.H. Gravely;* 1 ex., Eden Garden, Calcutta, 17.IV.1965, Coll. *B.N. Nandi* & Party.

Diagnosis : General colouration black; body small and ovate; head about two and half times as long as wide; eyes deflexed; ocelli about twice as far from each other as from eyes; tegmina more or less finely tuberculous and variably coloured; legs piceous; tarsi ochraceous.

Distribution : India : West Bengal (Calcutta).

Remarks : This species is common throughout India including West Bengal. This small black species feeds on *Boerhaevia repens*.

23. *Coccosterphus minutus* (Fabricius)

1798. *Membracis minuta* Fabricius, *Ent. Syst. Suppl.*, 514.
1908. *Coccosterphus minutus* : Distant, *Fauna Brit. India*, **4** : 71.
1986. *Coccosterphus minutus* : Ghosh, Biswas and Das, *Rec. zool. Surv. India* **83** (1 & 2) : 111.

Material examined : 2 exs., Eden Garden, Calcutta, 17.IV.1965, Coll. *B. Nandi and Party*; 1 ex., Eden Garden, Calcutta, 30.IV.1964, Coll. *D.K.M.* and *S. Ali.*

Diagnosis : General colouration black; head two and a half times wider than long; eyes hemispherical; ocelli nearer to eyes than to each other and located above centrooccular line; humeral angles prominent and finely punctate; dorsal carina of the posterior process obsolate anteriorly and interrupted in the median depressed part; tegmina punctate and black veins more or less infascate, apical area tinted with reddish brown patches.

Distribution : India : West Bengal (Calcutta, North Bengal); Tamil Nadu.

24. *Coccosterphus obscurus* Distant

1908. *Coccosterphus obscurus* Distant, *Fauna Brit. India*, **4** : 73.

Material examined : 1 ex., Eden garden, Calcutta, 17.VI.1965, Coll. *B. Nandi and Party.*

Diagnosis : General colouration black; pronotum tuberculous and finely granulose between the tubercles, centrally the tubercles forms a longitudinal carination; tegmina piceous; sprinkled with small cretaceous spots and finely granulose at base.

Distribution : India : West Bengal (Calcutta). Elsewhere : Ceylon.

Key to the species of ***Gargara***

1(2) Posterior process just reaching the apex of the clavus; tips of the frontoclypeus broadly rounded 3

2(1) Posterior process just passing the apex of the clavus..... 7

3(4) Head, pronotum black; pronotum very thickly and somewhat finely punctate..... 5

4(3) Head, pronotum, tarsi light brown; 1st discoidal cell not pedicillate and as long as 2nd..... ..... *mixta* (Buckon)

5(6) Tegmina greyish opaque, with basal area black and the apical area fuscous brown; legs with femora black, tarsi ochraceous..... *confusa* Distant

6(5) Tegmina with apical limbus broad and with two black patches one opposite to the 3rd apical cell and another on the posterior angle of inner margin; legs entirely dark brown..... ..... *brevis* Ananthasubramanian

7(8) Body small (3.0-3.5 mm); pronotum thickly and somewhat coarsely punctate; tegmina subhyaline, black at base on apical margin; a pale brownish transverse spot near the end of the claws..... ..... *robusta* Distant

8(7) Body large (7.0 - 7.5 mm); pronotum finely punctate; tegmina pale bronzy ochraceous, base black, veins excluding claws and apical area piceous..... *majescula* Distant

25. ***Gargara brevis*** Ananthasubramanian

1980. *Gargara brevis* Ananthasubramanian, *Rec. zool. Surv. India* Occasional Paper No.16 : 32.

Material examined: Female holotype Reg. No. Z.S.I. 687/H 15 Belur, Haora, 14.I.1966, Coll. *T.R. Mitra.*

Diagnosis : Head two and half times as wide as long with sparse silvery hairs; tips of the frontoclypeus broadly rounded; eyes dark brown, subglobate; ocelli black, nearer to eyes than to each other; posterior process black, short, impinging on tegmial margins; tegmina pinkish brown, apical limbus broad with a black patch opposite to the 3rd apical cell and another black patch on the posterior angle of inner margin, 1st apical cell nearly 5 times as long as maximum width, 1st discoidal cell petiolate and much smaller than 2nd.

Distribution : India : West Bengal (Haora).

Remarks : The type specimens of this species have been deposited with the National Zoological Collection of the Zoological Survey of India.

26. *Gargara confusa* Distant

1906. *Gargara confusa* Distant, *Fauna, Brit. India*, **6** : 171.
1986. *Gargara confusa* : Ghosh, Biswas and Das, *Rec. zool. Surv. India* **83** (1 & 2) : 108.

Material examined : 1 ex., Calcutta, 15.VII.1907, Coll. *Mus.*; 2 exs., Eden garden, Calcutta, 29.VII,1964, Coll. *G. Pradhan and party.*

Diagnosis : Head, pronotum black; head two and half times wider across extremities of eyes than length of vertex; ocelli slightly closer to eyes than to each other; pronotum thickly and finely punctate, two lateral angles subacutely prominent, finely carinate centrally; posterior process greyish opaque, the basal area black; tarsi ochraceous.

Distribution : India : West Bengal (Calcutta).

27. *Gargara majescula* Distant

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

Material examined : 1 ex., Eden garden, Calcutta, 12.VIII.1968, Coll. *G.S. Arora and Party*

Diagnosis : Head, pronotum and eyes black; head about three times wide across extremities of eyes than the length of vertex; eyes reddish brown; ocelli slightly nearer to eyes than to each other; pronotum broad and convex, thickly and finely punctate, the lateral angles slightly prominant; tegmina pale bronzy with its basal area black and coarsely punctate.

Distribution : India : West Bengal (Calcutta, Darjiling); Sikkim.

28. *Gargara mixta* Bucktom

1903. *Gargara mixta* Buckton, *Mon. Memb.*, 257.
1986. *Gargara mixta* : Ghosh, Biswas and Das, *Rec. zool. Surv. India*, 83 (1 & 2) : 108.

Material examined : 1 ex., Eden garden, Calcutta, 17.IV.1965, Coll. *B.N. Nandi and party.*

Diagnosis : Head two and half times wider across extremities of eyes than the length of vertex, thickly and palely pilose; a central pale subcarinate line continued through pronotum and its posterior process; eyes reddish brown, subhemispherical; ocelli slightly nearer to eyes than each other; pronotum with the lateral angles angularly prominant but not produced; legs shaded with black upto basal half of femora, tibiae reddish brown, tarsi light brown; body beneath light brown.

Distribution : India : West Bengal (Calcutta); Bihar; Maharashtra; Tamil Nadu. Elsewhere : Borneo, Burma, Ceylon.

Remarks : This species has been found breeding upon Sissu (*Dalbergia sissu*).

29. *Gargara robusta* Distant

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., Kodalia, Subhasgram, 29.X.1965, Coll. *S.C. Mitra* and Party.

Diagnosis: Head about two and half times wider across extremities of eyes than the length of vertex; eyes brown; ocelli slightly nearer to eyes than to each other; the extreme apical margin of the posterior process short and robust only just passing the apex of the claval area, centrally and laterally carinate; femora black, their apices tibiae and tarsi castaneous.

Distribution : India : West Bengal (North 24 Parganas); Uttar Pradesh. Elsewhere : Borneo.

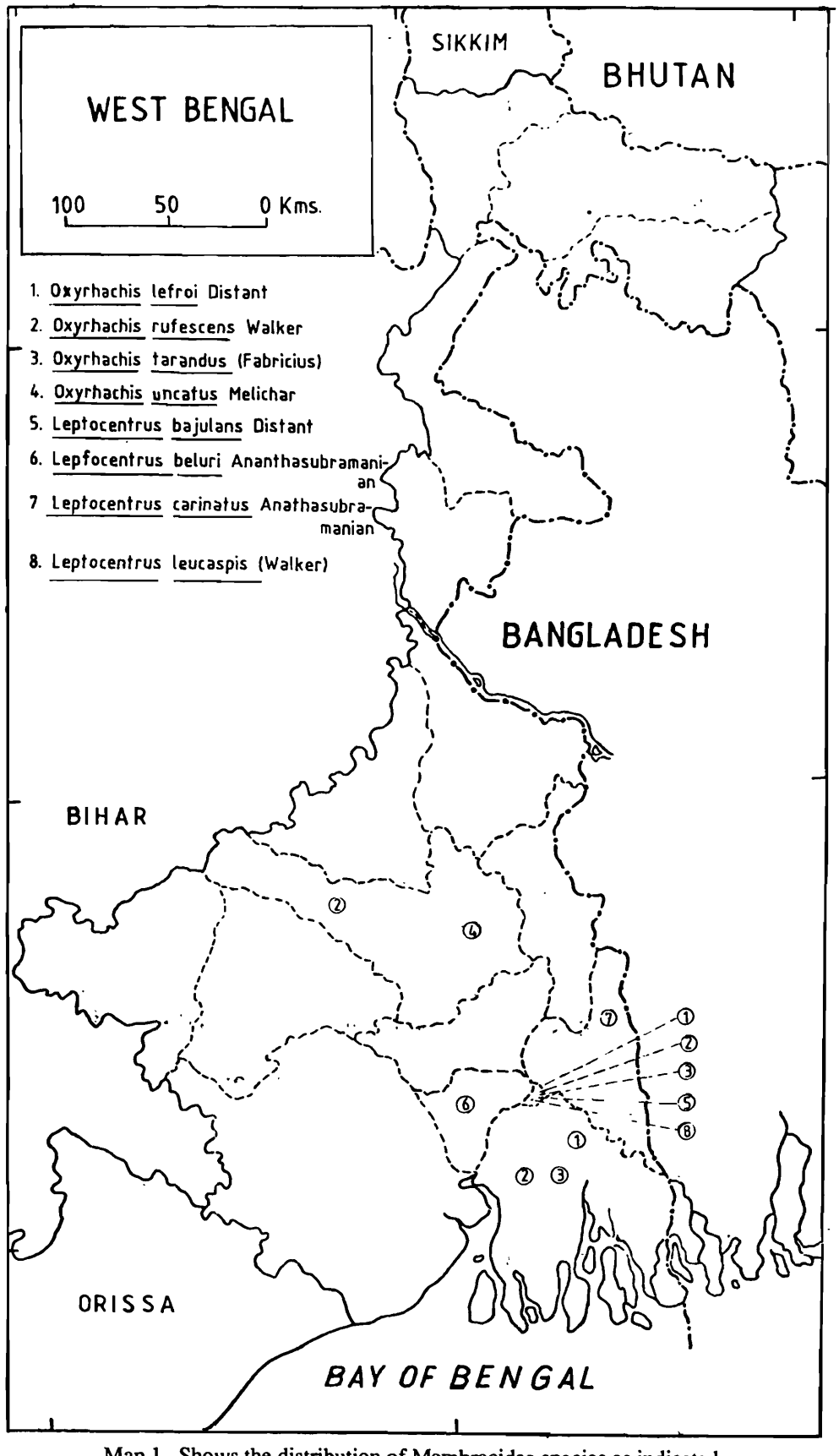
SUMMARY

The paper deals with a consolidated account of 29 species belonging to 7 genera of the family Membracidae from West Bengal. Of these, two species, viz., *Oxyrhachis lefroi* Distant and *Tricentrus albomaculatus* Distant were hitherto unknown from the state. Besides, 8 species belonging to 5 genera are added as new to National Zoological collection. The study is supplemented by the examinations of available type specimens of 6 species viz.,*Leptocentrus beluri* Ananthasubramanian, *Leptocentrus carinatus* Aranthasubra manian, *Tricentrus cinerus* Ananthasubramanian, *Tricentrus cornutus* Ananthasubramanian *Tricentrus dubius* Anathasubramanian and *Gargara brevis* Ananthasubramanian apart from named and unnamed collections lying with the Zoological Survey of India.

Running keys to the various taxa are incorporated for easy recognition of the group in addition to general diagnostic characters of each species is provided. The original and recent references and distributional records from India and abroad of each species are also furnished. The study is based on the existing collection as well as mopping survey materials of different survey parties in recent years. The distribution pattern of all the 29 species included in the paper are shown in the maps.

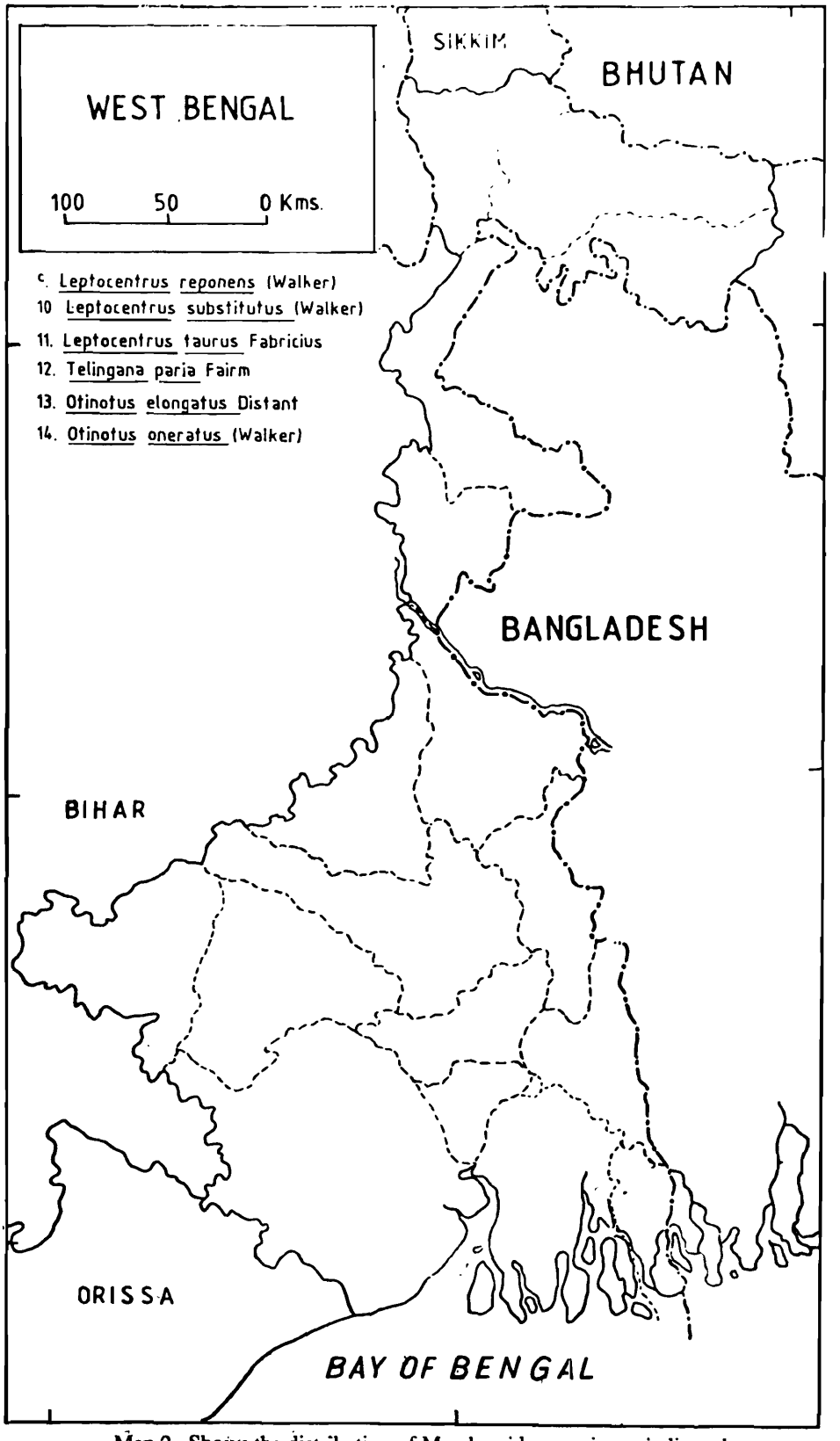
ACKNOWLEDGEMENT

The authors are grateful to the Director, Zoological Survey of India for providing laboratory facilities and constant encouragement. They are also grateful to Dr. A.K. Ghosh Scientist SF for critically reviewing the paper and suggesting for improvement. Sincere thanks are due to Dr. S.K. Tandon, Scientist SE and colleagues of Hemiptera Section for numerous courtesies.



Map 1. Shows the distribution of Membracidae species as indicated.

Map 1



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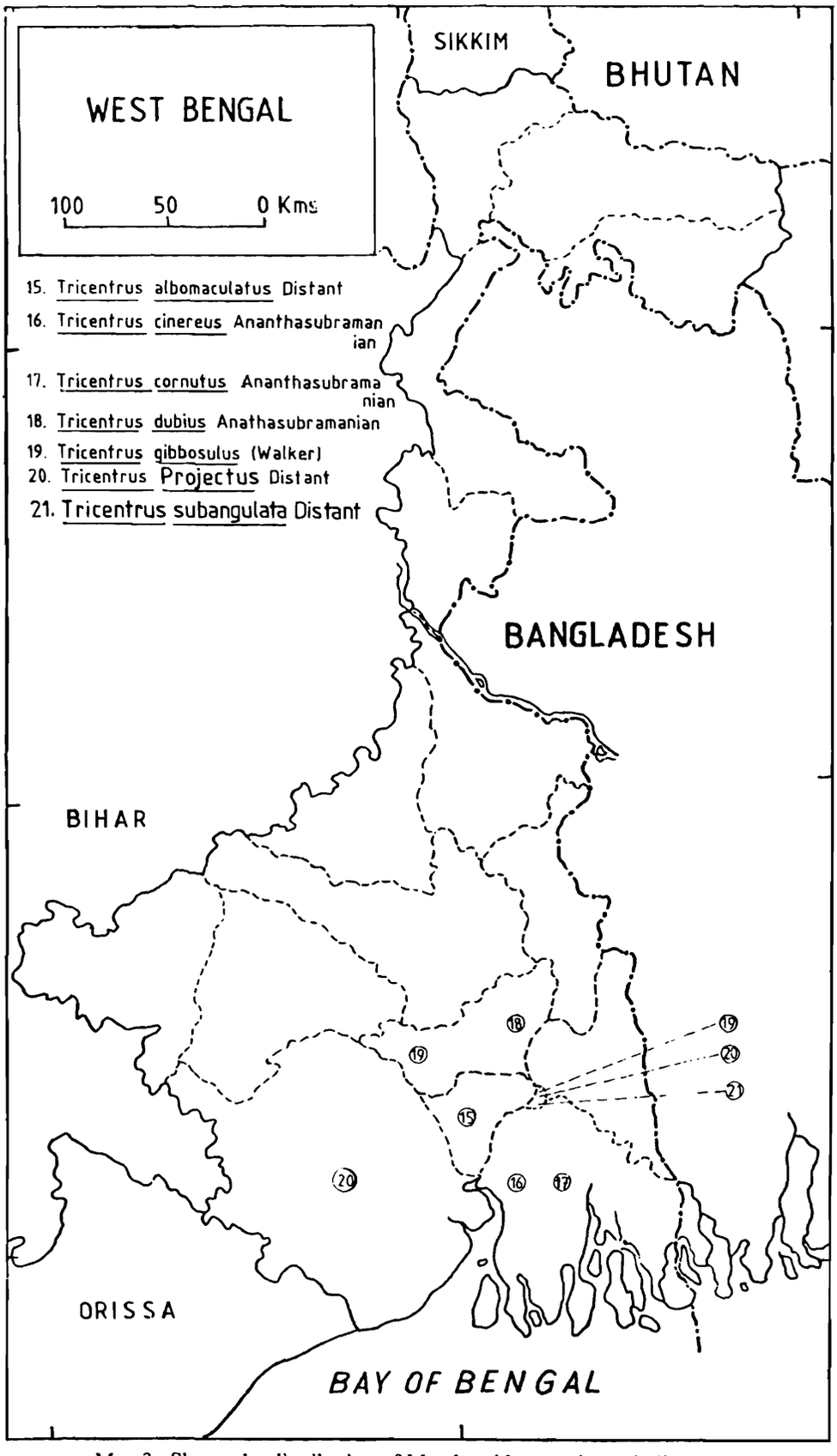

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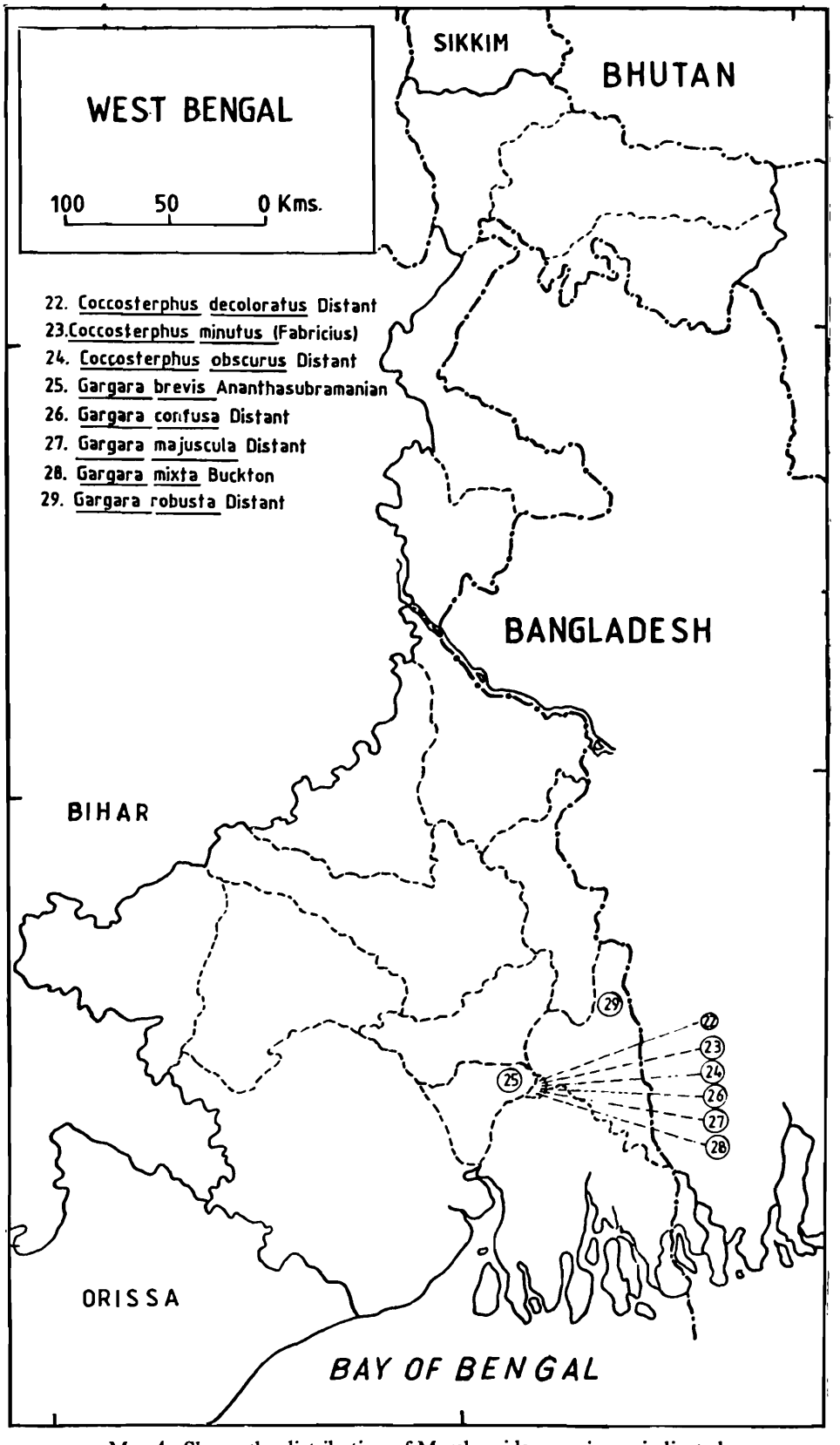

Map 4. Shows the distribution of Membracidae species as indicated.

Map 4

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State Fauna Series 3 : Fauna of West Bengal, Part 5 : 91 112, 1994

INSECTA : HEMIPTERA : PSYLLIDAE

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INTRODUCTION

Psyllids or Jumping plant lice are small sternorrhynchous homopteran plant sap-sucking insects infesting both aerial and subaerial parts of plants including the economically important ones. As a result of their attack the plants show various symptoms of damage. The damages which are due to their salivary injection, may range from necrosis to severe gall formation on plant organs. These insects exhibit considerable diversity in habits, as some are free living while others are gall makers. They are phytophagous in both larval and matured stages. Psyllids also act as vectors of bacterial and plant viral diseases. Secretion of honey dew in the form of threads through specialised wax gland pores is characteristic of psyllids, particularly of developing nymphs. The life cycle of psyllids generally involves five nymphal stages.

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.

The family Psyllidae is characterised by two pairs of membranous wings (Fig. 1,2C) normally held in stegopterous manner, ten-segmented antennae (Fig. 1,2B), 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.1). The ventation in the hind wing is extremely simple. Our knowledge of Indian Psyllidae dates back from Lethierry (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 sub-continent. 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.

Thus, a total of 126 species of Psyllids are so far known from India. Of these, 24 species are known from West Bengal.

Very little information is available in literature about the psyllid fauna of West Bengal. Out of 24 species of psyllids so far known from West Bengal, one species, *Paurocephala psylloptera* Crawford is hitherto reported for the first time from West Bengal. The present work is an attempt to provide a comprehensive account of these 24 species belonging to 14 genera of the family Psyllidae from West Bengal. The paper is based on the material collected during mopping survey of West Bengal. It is also supplemented by the materials deposited in the National Zoological Collections at Zoological Survey of India, Calcutta.

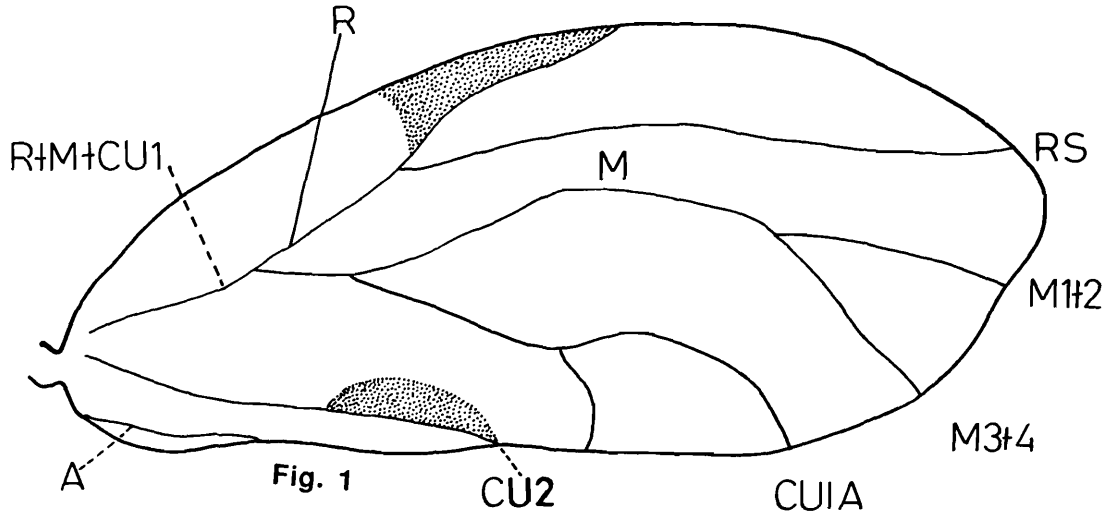

Fig. 1

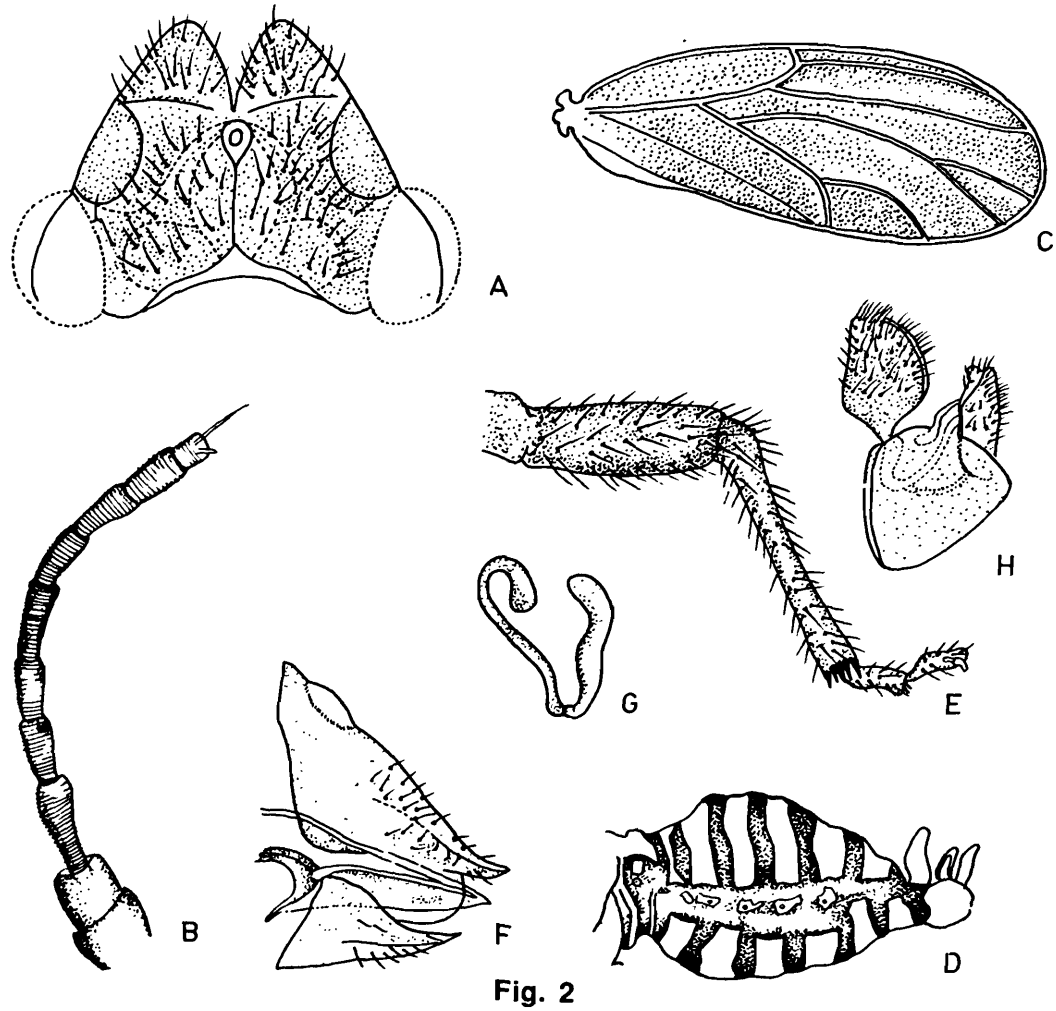

Fig. 2

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 - Antenna ; C - Fore Wing ; D - Male Abdomen ; E - Hind leg ; F - Female genitalia; G - Aedeagus ; H - Male genitalia (Entire).

The account deals with a brief note on earlier investigations, keys to taxa, geographical distribution of each species, new locality record (marked *) and literature references. The species which are recorded from the literature and are not available for study have been included (marked **) in the paper. Maps showing the distribution of 24 species known from various districts of West Bengal have also been included in the paper. Also, a list of host plant-Psyllid has been provided for ready reference.

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

MATERIAL AND METHODS

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.

The figures are drawn with desired magnification with the help of mirror type camera lucida and inked.

Family PSYLLIDAE

Subfamily 1. APHALARINAE

Genus 1. ***Aphalara*** Foerster

** 1. *Aphalara ossiannilssoni* Mathur

Subfamily II. PAUROPSYLLINAE

Genus 2. ***Apsylla*** Crawford

2. *Apsylla cistellata* (Buckton)

Genus 3. ***Paurocephala*** Crawford

** 3. *Paurocephala phalaki* Mathur

* 4. *P. psylloptera* Crawford

Genus 4. ***Pauropsylla*** Rubasaamen

** 5. *Pauropsylla ficicola* Kieffer

** 6. *Pauropsylla stivensi* Laing

Subfamily III. CIRIACREMINAE

Genus 5. ***Cecidopsylla*** Kieffer

** 7. *Cecidopsylla* Crawford

Genus 6. ***Diceraopsylla*** Crawford

** 8. *Diceraopsylla brunetti* Crawford

Genus 7. ***Mesohomotoma*** Kuwayama

** 9. *Mesohomotoma lutheri* Elderlein

Genus 8. ***Mycopsylla*** Froggatt

10. *Mycopsylla gardenensis* Bhanotar *et al.*

Genus 9. ***Tenaphalara*** Kuwayama

11. *Tenaphalara acutipennis* Kuwayama

Subfamily IV. PSYLLINAE

Genus 10. ***Acizzia*** Heslop-Harrison

** 12. *Acizzia indica* (Heslop-Harrison)

Genus 11. ***Diaphorina*** Loew

13. *Diaphorina citri* Kuwayama

Genus 12. ***Euphalerus*** Schwarz

14. *Euphalerus vittatus* Crawford

Genus 13. ***Psylla*** Geoffroy

** 15. *Psylla bengalensis* Mathur

** 16. *P. cedrelae* Kieffer

** 17. *P. longigena* Mathur

** 18. *P. quadrimaculata* Mathur

Subfamily V. TRIOZINAE

Genus 14. ***Trioza*** Foerster

19. *Trioza fletcheri* Crawford

20. *T. fletcheri minor* Crawford
21. *Trioza sp.* probably *fletcheri* Crawford
22. *T. gigantea* Crawford
23. *T. gigantea curta* Mathur
24. *T. hirsuta* Crawford

* New record from West Bengal

** Reviewed from Literature

SYSTEMATIC ACCOUNT

Key to the subfamilies of Psyllidae

1(2) Frons covered by genae; genae usually produced into conical processes..... 3

2(1) Frons not covered by genae, visible as a small sclerite; genae not produced into conical processes 7

3(4) Fore wings with only usual two marginal cells radial sector not branched and without any cross vein 5

4(3) Fore wings with more than usual two marginal cells, radial sector branched and with cross veins ..... Ciracreminae

5(6) Wings usually angulate at apex; Radius, media and cubitus usually diverging at the same point from basal vein..... Triozinae

6(5) Wings rarely angulate at apex; Radius, media and cubitus from basal vein not diverging at the same point but media and cubitus form a common cubital petiole (Fig. 2c)..... Psyllinae

7(8) Vertex flat and horizontal; wings often more or less thickened; head scarcely deflexed; antennal segments with normal setae..... Aphalarinae

8(7) Vertex rounded downward in front, not horizontal, wings usually membranous; head strongly deflexed; antennal segments beset with peculiar type of biramous setae under high magnification ..... Pauropsyllinae

Subfamily I. APHALARINAE

Genus 1. *Aphalara* Foerster, 1848

1848. *Aphalara* Foerster, *Verh. naturw. ver. preuss Rheinl.*, **3** : 67.

Type species : Aphalara caethe (Linnaeus) = *Chermes calthae Linn.* (Original designation).

** 1. ***Aphalara ossiannilssoni*** Mathur, 1975

1975. *Aphalara ossiannilssoni* Mathur, *Psyllidae of the Indian subcontinent* : 33.

Distribution : Originally described from 3 (F) and 3 (M) taken on *Polygonum microcephalum* Don (N.O. Polygonaceae) at Kalimpong, West Bengal. The psyllids are attended by red ants.

Subfamily II. PAUROPSYLLINAE

Key to the genera of Pauropsyllinae

1(2) All the legs are equal in length and similar; antennae with 3 terminal setae almost of equal length ..... ***Apsylla***

2(1) Legs are dissimilar, hind pair longer than middle; antennae usually with 2 terminal setae of unequal length..... 3

3(4) Head as wide as thorax; M + Cu smaller than radius, frons visible as a small sclerite first marginal cell wide, rarely maculate..... ***Pauropsylla***

4(3) Head not as wide as thorax; frons large, prominently visible; first marginal cell narrow and long often maculate..... ***Paurocephala***

Genus 2. *Apsylla* Crawford, 1912

1912. *Apsylla* Crawford, *Rec. Indian Mus.*, **7** : 421.
Type species : Apsylla cistillata (Buckton) (=*Psylla cistillata* Buckton, 1883) (Original designation)

2. *Apsylla cistellata* (Buckton 1893)

1893. *Apsylla cistellata* Buckton, *Indian Mus. Notes*, **3** : 91-92.
1912. *Apsylla cistellata* Crawford, *Rec. Indian Mus.*, **7** : 421-422.
1986. *Apsylla cistellata* : Kandasamy, *Rec. zool. Surv. India*, Occ. paper No. **84** : 59-60.

Material examined : 2 (F) , on Mango shoot gall, India : West Bengal : Bethudahari, Dist. Murshidabad, 19.iii.1980, coll. *Bhabatosh Das*, 1 (M), on Mango shoot gall, Bethuadahari, Dist. Murshidabad, v.1980, coll. *B. Das*; 1 (F), on Mango shoot gall, Bethuadahari, viii.1980, coll. *B. Das*.

Diagnosis : Width of head across eyes is equal to antennae, genal cones long, deflexed downward; antennal segments brown, apical segment with three equal spines, apical tarsal segment black, remaining segmens yellow; meso-and metacoxae somewhat similar in shape but latter longer than former; hind tibiae unarmed with 8-10 long pointed apical spines; forewings broadly rounded at apex, broadest apically; forewings hyaline, basal vein longer than M + Cu; R1 longer than radius; medial vein shorter than cubital petiole; second marginal cell large and triangular, parameres and proctiger apically brown, parameres

enclosed within the lateral lobes of anal valve, anterior and apical margins beset with simple setae; outer arm of aedeagus much smaller than basal; female genital segment smaller than abdomen; dorsal plate longer than ventral; ovipositor bivalved and exerted.

Distribution : India : West Bengal (Murshidabad, Malda); Bihar; Uttar Pradesh; Tamil Nadu. The species occurs throughout the Terai area of northern India (Mathur 1975).

Remarks: The most diagnostic feature of the species is the metacoxae which is similar to mesocoxae and both nearly of equal size, thick antennae of peculiar type and also venation of forewings.

This endemic species is economically important. It is a serious pest of mango and causes devastation in buds of mango trees by making galls throughout India specially in the Terai area of northern India.

Genus 3. ***Paurocephala*** Crawford, 1913

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

** 3. ***Paurocephala phalaki*** Mathur, 1975

1975. *Paurocephala phalaki* Mathur, *Psyllidae of the Indian subcontinent* : 58.
1986. *Paurocephala phalaki* : Kandasamy, *Rec. zool. Surv. India* Occ. Paper No.84 : 62.

Host plant : "Khasare"

Distribution : India : West Bengal (Darjiling); Tamil Nadu.

Remarks: Originally described from Tista village (Darjiling) in West Bengal. The species is readily recognised by its banded forewings, presence of pterostigma and metascutellum with a conical epiphysis and genital characters.

* 4. ***Paurocephala psylloptera*** Crawford, 1913

1913. *Paurocephala psylloptera* Crawford, *Philipp. J. Sci.*, **8** : 204.
1975. *Paurocephala psylloptera* : Mathur, *Psyllidae of the Indian subcontinent* : 62.

Material examined: 2 (F), 1 (M), on *Ficus hispida*, India : West Bengal, Calcutta, January, 1981, coll. *A. Mukherjee.*

Diagnosis : Body sparsely and briefly pubsecent; head greatly deflexed, vertex broader than long; frons swollen beneath antennal insertions; antennae about twice as long as width of head; thorax broad, arched; legs slender, hind tibiae spinose. Forewings hyaline, narrowed basally, broadly rounded, more than two and a half times as long as broad, first marginal cell elongate, narrow, a little longer than pterostigma.

Distribution : India : West Bengal (Calcutta), South India. "Probably distributed throughout the old World Topics" (Mathur, 1975).

Remarks : The species is characterised by the first marginal cell longer than pterostigma and longer antennae being about twice as long as the width of head.

Genus 4. ***Pauropsylla*** Rubsaamen, 1899

1899. *Pauropsylla* Rubsaamen, *Ent. Nachr. Berlin*, **25** : 262.

** 5. ***Pauropsylla ficicola*** Kieffer

1905. *Pauropsylla ficicola* Kieffer, *Ann. Soc. Sci. Bruxelles*, **29** : 169-172.
1975. *Pauropsylla ficicola* Kieffer : Mathur, *Psyllidae of the Indian subcontinent* : 83.

Distribution : India : Uttar Pradesh and "Bengal" (Mathur 1975)

** 6. ***Pauropsylla stivensi*** Laing, 1930

1930. *Pauropsylla stivensi* Laing, *Indian Forest Rec.*, **14**(8) : 37-39.
1975. *Pauropsylla stivensi* : Mathur, *Psyllidae of the Indian Sub continent* : 109.

Distribution : India : West Bengal (Darjiling).

Remarks : Laing (1930) described the species collected from Darjiling district in West Bengal. It is yet to be recorded from elsewhere in India.

Subfamily III. CIRIACREMINAE

Key to the genera of Ciriacreminae

1(2) Forewings rounded at apex..... ***Diceraopsylla***

2(1) Forewings rather subangulate at apex..... 3

3(4) Fork M1 + 2 terminating above apex of wing; apex within second marginal cell; Radius and media separate and not continuous..... ***Mycopsylla***

4(3) Fork M1 + 2 terminating below apex of wing..... 5

5(6) Radial sector large and much deflexed, terminating below apex of wing..... ***Cecidopsylla***

6(5) Radial sector small and terminating to costa..... 7

7(8) Forewings with pterostigma; head not birostrate, vertex more or less quadrate..... ***Tenaphalara***

8(7) Forewings without pterostigma; head birostrate.....***Mesohomotoma***

Genus 5. ***Cecidopsylla*** Kiefer, 1905

1905. *Cecidopsylla* Kiefer, *Ann. Soc. Sci. Bruxelles* : 160-161.
Type species : Cecidopsylla schimae Kieffer 1905 (Original description)

** 7. ***Cecidopsylla schimae*** Kieffer, 1905

1905. *Cecidopsylla schimae* Kieffer, *Ann. Soc. Sci. Bruxelles* : 165-167.
1975. *Cecidopsylla schimae* : Mathur, *Psyllidae of the Indian sub-continent* : 126.

Distribution : India : West Bengal (Darjiling); Meghalaya.

Remarks : This is the only species representing the genus Cecidopsylla from India. Mathur (1975) has redescribed the species on a small collection made on *Schima wallichii* Chois from Darjeeling district of West Bengal. The neotypes are in the collections of Forest Research Institute, Dehra Dun. According to Mathur (*op. cit.*) "this species makes stiff rolled galls along the margins of leaves and nymphs feed inside them. The nymphs produce large amount of waxy matter and exude honey dew copiously inside the rolled galls"

Genus 6. ***Diceraopsylla*** Crawford, 1912

1912. *Diceraopsylla* Crawford, *Rec. Indian Mus.*, 7 : 425.
Type species : Diceraopsylla brunetti Crawford

** 8. ***Diceraopsylla brunetti*** Crawford

1912. *Diceraopsylla brunetti* Crawford, *Rec. Indian Mus.*, 7 : 425.
1975. *Diceraopsylla brunettii* : Mathur, *Psyllidae of the Indian subcontinent* : 131.

Distribution : India : West Bengal (Darjiling); East Himalaya.

Remarks : Crawford (1912) described the species based on two males collected from Darjeeling in East Himalayas. Type specimens are lost. Mathur (1975) while dealing with a species in his monograph work on Indian Psyllidae, reproduced the description from Crawford (*op. cit.*). It is, therefore, desirable to have collections from the Topotype and redescribe the species. Also, nothing is known about any biological information of the species.

Genus 7. ***Mesohomotama*** Kuwayama, 1907

1907. *Mesohomotoma* Kuwayana, *Trans. Sapporo nat. Hist. Soc.*, 2 : 180.
Type species : Mesohomotoma camphorae, 1907 (Original description)

** 9. *Mesohomotama lutheri* (Enderlein 1918)

1918. *Udamostigma lutheri* Enderlein, *Zool. J.*, **41** : 484-485.
1925. *Mesohomotoma lutheri* Crawford, *Proc. Hawaii. ent. Soc.*, **6**(1) : 32-34.
1975. *Mesohomotoma lutheri* : Mathur, *Psyllidae of the Indian sub continent* : 146.

Distribution : India : West Bengal (Darjiling); South India. Elsewhere : Sri Lanka; Moluccas, Amboina.

Genus 8. *Mycopsylla* Froggatt, 1901

1901. *Mycopsylla* Froggatt, *Proc. Linn. Soc. N.S.W.*, **26** : 258-259.
Type species : Mycopsylla fici (Tryon) (=*Psylla fici* Tryon 1894) (Original description, Froggatt 1901).

10. *Mycopsylla gardenensis* (Bhanotar, Ghosh and Ghosh, 1971)

1971. *Edenus gardensis* Bhanotar *et al.*, *Bull. Ent.*, **12** (2) : 109-112.
1986. *Mycopsylla gardenensis* : Kandasamy, *Rec. zool. Surv. India* Occ. Paper No.84 : 69-71.

Material examined : 1 (F), dry pinned (ZSI Reg. No. 10093/H7), on *Psidium guyava*, West Bengal, Eden Garden, Calcutta, 3.xi.1963, coll. *M. Ghosh*; 1 (M), (ZSI Regd. No. 10094/H7), 2 (F) (ZSI Reg. Nos. 10095/H7 and 10096/H7), 1 (F) (ZSI Regd. No. 10097./H7) same data as above.

Diagnosis : Head pale yellow with black patch in between genae, wings pale green, across eyes broader than thorax, vertex broader than long, depressed between the eyes; antennae 10-segmented, third longest, terminal segment with two unequal spines; tibia longer than femur, tibiae of hind leg with five short, black spines at apex; basal tarsus with five long spurs; wings hyaline, acutely pointed; basal vein longest, about 5 times as long as cubital petiole; cubitus longer than R1 but shorter than radius; first marginal cell larger than second, second cell almost rectangular; anal pore ring arrow-shaped on its dorsal side.

Distribution : India : West Bengal (Calcutta); Tamil Nadu.

Remarks : Bhanotar *et al.* (1971) described the species under the name *Edenus gardensis* based on the collections made on *Psidium guyava* (N.O. Myrtaceae). The species is closely related to *Mycopsylla indica* Mathur in the shape and structure of wing venation.

The adult specimens cause severe damage to the leaves of the host plants by producing enormous pouch galls on the laminae (Kandasami 1986).

Genus 9. *Tenaphalara* Kuwayama, 1907

1907. *Tenaphalara* Kuwayama, *Trans. Sapporo nat. Hist. Soc.*, **2** : 155.
Type species : Tenaphalara acutipennis Kuwayama 1908 (originat description).

11. *Tenaphalara acutipennis* Kuwayama

1908. *Tenaphalara acutipennis* Kuwayama, *Trans. Sapporo nat. Hist. Soc.*, **2** : 155.
1975. *Tenaphalara acutipennis* Kuwayana : Mathur, *Psyllids of the Indian subcontinent* : 166.

Distribution : India : West Bengal (Calcutta); Bihar; Delhi; Uttar Pradesh. Elsewhere : Formosa; Luzon; Laguna Province and Los Banos.

Remarks: The infestation by this species begins in winter and the rapid increase in insect population causes the leaflets to wilt and turn yellow. The nymphs remain covered with white flocculent mass of waxy matter and exude copious amount of honey dew. (Mathur, 1975)

Key to the genera of Psyllinae

1(2) Antennae longer than width of head; pleural suture of prothorax extending obliquely to posterior part of lateral extremity of pronotum..... ***Psylla***

2(1) Antennae seldom long, usually very short; pleural suture of prothorax extending to middle of lateral extremity of pronotum which is more or less swollen and knob-like..... 3

3(4) Vertex large, flat, eyes strongly recessive..... 5

4(3) Vertex smaller, less flat, eyes less recessive, genal cones roundly swollen, widely separated..... ***Acizzia***

5(6) Genal cones large, broad, usually quadrate; forewings rounded or somewhat angulate at apex..... ***Euphalerus***

6(5) Genal cones thick, as long as or longer than broad porrect; forewings broastet subapically rounded at apex..... ***Diaphorina***

Genus 10. *Acizzia* Heslop-Harrison, 1960

1960. *Acizzia* Heslop-Harrison, *Ann. Mag. nat. Hist.* (13), **3** (31) : 417-418.
Type species : Acizzia acaciae (Maskell) (=*Psylla acaciae* Maskell 1894) (Original designation Heslop-Harrison, 1960).

** 12. *Acizzia indica* Heslop-Harrison 1949

1949. *Neopsylla indica* Heslop-Harrison, *Entomologist's mon. Mag.*, **85** : 161-162.
1951. *Acizzia indica* Heslop-Harrison, *Ann. Mag. nat. Hist.* (12), **4** : 417.
1975. *Acizzia indica* Heslop-Harrison; Mathur, *Psyllidae of the Indian subcontinent*, ICAR Publications, New Delhi: 172.

Distribution : India : West Bengal (Calcutta), Assam; Delhi; Maharashtra; Uttar Pradesh.

Elsewhere : Pakistan.

Remarks : Biology on the species is given by Mathur (1935) and Beeson (1941). This psyllid is found in abundance on *Albizzia procera* at New Forest, Dehra Dun, during April-August. The ravages of the pest are restricted to fresh shoots and buds. Both adults and nymphs are very active (Mathur 1975). Mathur (1952) described the nymphal stages of the Psyllid.

Genus 11. ***Diaphorina*** Loew, 1879

1879. *Diaphornia* Loew, *Verh. zool. bot. Ges. Wien.*, **29** : 567.
Type species : Diphorina putonii Loew
1975. *Diaphornia,* Mathur : *Psyllidae of the Indian subcontinent* : 189

13. ***Diaphornia citri*** Kuwayama

1907. *Diaphorina citri* Kuwayama, *Trans. Sapporo nat. Hist. Soc.*, **2** : 160.
1975. *Diaphorina citri* Kuwayama : Mathur, *Psyllidae of the Indian subcontinent* : 198.

Material examined: 1 (F) and 1 (M), Anakapalle, *K.K. Prasad Rao*, CIEA 10026, (395/H15) No.2 (ZSI 173/77); 3 alatae, on *Citrus* sp.; India : West Bengal (ZSI Lot No. 86/80).

Diagnosis : Head narrowed than thorax, vertex wider than long, lateral margins almost parallel to each other, frons concealed by genae; antennae about 3 times as long as genal cones, apical segments black; femur more than twice the width of tibia; Hind tibia without apical spines; apical tarsal segment with two black short spines at apex; forewings partially maculate; radial sector joining near centre of anterior margin, radius about 2.5 times as long as cubital petiole; fork M1 + 2 longer than fork M3 + 4; Cu1 more than twice as long as Cu2.

Distribution : Widely distributed throughout India including West Bengal. Elsewhere : Formosa; Japan; Philippine Is.; Moluccas; and southern China.

Remarks : The species is characterised by Media and Cubitus without bands, head with somewhat parallel sides, longer genal cones and maculated wing.

Genus 12. ***Euphalerus*** Schwarz, 1904

1904. *Euphalerus* Schwaz, *Proc. ent. Soc., Wash.*, **6** : 234-245.
Type species : Euphalerus nidifex Schwarz, 1904 (Original designation) from Key West, Florida.

14. ***Euphalerus vittatus*** Crawford, 1912

1912. *Euphalerus vittatus* Crawford, *Rec. Indian Mus.*, **7** : 423-424.
1975. *Euphalerus vittatus* Crawford : Mathur, *Psyllidae of the Indian subcontinent* : 225.

Material examined: 1 (M) and 2 (F)(3804/H1, 3808/H1), Ind. Mus. of June 8, 1911; 5 exs. (in spirit) from Calcutta (*N. Annandale*)

Diagnosis : Head rugulose, as wide as thorax; vertex horizontal, pubescent, genal cones quadrate; eyes recessive; Hind tibia with basal spur and 3-6 thick, black apical spines; apical tarsal segment with two claw like spines at apex; forewing ovate, hyaline, membranous, apex rounded; pterostigma present; veins sometimes maculate, surface maculate; first marginal cell larger than second; radial sector long and touches apical margin.

Distribution : India : West Bengal (Calcutta), Uttar Pradesh. Elsewhere : Bangladesh.

Remarks: Only two species, *E. vittatus* Crawford and *E. marginallis* Capener are so far known from Oriental region.

Genus 13. ***Psylla*** Geoffroy, 1762

1762: *Psylla* Geoffroy, *Historic Abreqea des Insects*, **1** : 482.
Type species : Psyalla alni (Linn.) (=*Chermes alni* Linn. 1758) (Original designation Geoffroy 1762)

** 15. ***Psylla bengalensis*** Mathur, 1975

1975. *Psylla bengalensis* Mathur, *Psyllidae of the Indian subcontinent* : 246.

Distribution :India : West Bengal (Darjiling).

Remarks : According to Mathur (1975) the species appears to be rare and nothing is known about its life history and economic importance. Mathur (*op. cit.*) described the nymphal stages of the species.

** 16. ***Psylla cedrelae*** Kieffer, 1905

1905. *Psylla cedrelae* Kieffer, *Ann. Soc. Sci. Bruxelles* : 174.
1924. *Psylla cedrelae* Kieffer : Ayyar, *Rec. Indian Mus.*, **26**(6) : 623.

Distribution : India : West Bengal (Darjiling); Uttar Pradesh.

Remarks : "This is a free living species and is commonly found on young leaves and twigs of *Cedrela toona*, during February-April at Dehra Dun. The nymphs move about actively, carrying waxy filaments sticking out from their body" (Mathur 1975). The species was originally described from Kalimpong in Darjeeling district of West Bengal.

** 17. ***Psylla longigena*** Mathur

1975. *Psylla longigena* Mathur, *Psyllidae of the Indian subcontinent* : 263.

Distribution : India : West Bengal (Darjiling).

Remarks: Originally described from 4 specimens collected on *Bucklandia (Symingtonia) populnea* R. Br. at Kurseong in Darjeeling district of West Bengal. The description of the fifth stage nymph is described by Mathur (1975).

** 18. *Psyalla quadrimaculata* Mathur

1975. *Psylla quadrimaculata* Mathur, *Psyllidae of the Indian subcontinent* : 276.

Distribution : India : West Bengal (Darjiling); Assam.

Remarks: The species is originally described from a small series of collection from Jorhat in Assam. Nothing is known about the biology and nymphal stages of the species.

Key to species and subspecies of ***Trioza***

1(2) First marginal cell unusually very large; genae almost wanting or represented as small swellings ..... *hirsuta*

2(1) First marginal cell rather normal; genae small to large..... 3

3(4) Body larger, veins of forewings setose..... *gigantea*

4(3) Body small to medium in size..... 5

5(6) Radial sector long and greatly deflexed, forewings with apices of veins without black spots..... ..... *gigantea curta*

6(5) Radial sector short, curved to costa..... 7

7(8) Second marginal cell small..... *fletcheri*

8(7) Second marginal cell long..... *fletcheri minor*

Genus 14. *Trioza* Foerster, 1848

1848. *Trioza* Foerster, *Verh. naturh. Ver preuss. Rheinl.*, **3** : 67.
Type species : Trioza urticae (Linn.) (=*Chermes urticae* Linn.)
(Original designation Foerster, 1848)

19. *Trioza fletcheri* Crawford, 1912

1912. *Trioza fletcheri* Crawford, *Rec. Indian Mus.*, **7** : 434.

Material examined : 3 exs., India : West Bengal, Gobardanga 24 Parganas, on *Trewia nudiflora*, 24.i.1954, coll. *B. Dasgupta*.

Diagnosis : Head smaller than thorax, rather deflexed; vertex somewhat horizontal, swollen anteriorly, with circular fovea on each side of median suture; genal cones about half as ong as vertex, with 3-4 setae; eyes hemispherical. Antennae about twice as long as width of head, terminal segment with two

unequal apical spines; scutellum somewhat triangular; Hind femur armed with four long dorsal setae, Hind tibiae beset with several conspicuous basal spurs and 3 tooth-like spines at apex; forewings hyaline, more than two and a half times as long as broad and subacute at apex, marginal cells unequal.

Distribution: India : West Bengal (Calcutta, North 24-Parganas) and widely distributed throughout the country. *Elsewhere* : Java.

Remarks : This is a gall forming Psyllid damaging the leaves of *Trewia nudiflora.* Mani (1935, 1959) has given its distribution and description of the gall.

20. *Trioza fletcheri minor* Crawford

1912. *Trioza fletcheri minor* Crawford, *Rec. Indian Mus.*, 7(5) : 434.
1986. *Trioza fletcheri minor* Crawford : Kandasamy, *Rec. zool. Surv. India*, Occ. Paper No. 84 : 40.

Material examined : 5 alatae, on *Terminalia arjuna* (Leaf gall), C.S.R.S. Berhampore (W..B.), 20.viii.1980, coll. *P.K. Das.*

Diagnosis : Head narrower than vertex, deflexed; vertex about 1.5 times as long as wide; genal cones in the same plane as vertex; antennae a little longer than width of head; hind femur about 0.7 times as long as tibia, apex of hind tibia with 3 long black spurs; Forewings acutely angled, hyaline, hind wings about half as long as forewings, median veins about twice as long as basal vein; cubitus longer than radial sector, curved to costa; R1 about half as long as radius, first marginal cell narrower and shorter than second.

Distribution : India : West Bengal (Murshidabad), from South India and throughout the plains and Low hills of India (Mani 1959).

Remarks : This is a gall forming psyllid damaging the leaves of *Terminalia alata* var *tomentosa* and *T. arjuna.* Mathur (1935) has studied in detail its life history and biology. The species is smaller than *T fletcheri* and differs from it in shape of head, genal cones and marginal cells in forewings.

21. *Trioza sp.* Probably *fletcheri* Crawford

Material examined : 3 exs., on Leaf gall of indet plant, West Bengal : Gobardanga (ca 30 miles NE of Calcutta), North 24-Parganas, 22nd January, 1954, coll. *B. Dasgupta.*

Distribution : India : West Bengal (North 24-Parganas).

Remarks : The specimens were collected from the undersurface of a leaf showing numerous galls. Due to paucity of sufficient material in good condition, authentic identification upto specific level could not be possible.

22. *Trioza gigantea* Crawford, 1912

1912. *Trioza gigantea* Crawford, *Rec. Indian Mus.*, 7 : 428.
1975. *Trioza gigantea* Crawford : Mathur, *Psyllidae of the Indian subcontinent* : 373.

Material examined: 1 (F) (No. 9734/18), INDIA: West Bengal, Darjeeling, 26.v.1910, *E. Brunetto* coll.

Diagnosis: Head broad, moderately deflexed, vertex large, broadly concave between eyes, anterior ocellus visible in front, frons slightly visible, post-ocellus raised; genal cones about half as long as vertex. Antennae smaller than body, terminal segment extremely small bearing two small blunt apical spines, hirsute with stiff setae; scutellum broadly transverse, anteriorly margin weakly concave with prominent antero lateral angles. Forewings large, hyaline, about two and a half times as long as broad; Abdomen long large, strongly rugulose; legs long, coarsely pubescent with long setae.

Distribution: India : West Bengal (Darjiling).

23. *Trioza gigantea curta* Mathur

1975. *Trioza gigantea curta* Mathur, *Psyllidae of the Indian sub continent* : 375.
1986. *Trioza gigantea curta* Mathur : Kandasamy, *Rec. zool. Surv. India* Occ. Paper No.84 : 41.

Material examined: 3 (F), 2 (M), India: West Bengal (Darjiling), host unknown, coll. *L.K. Ghosh.*

Diagnosis: Body moderately long and slender; head hirsute slightly broader than thorax, strongly deflexed, two lobes of vertex appearing like a parallelogram, posterior margin deeply invaginated, genal cones large, slightly more than half as long as vertex, narrowly rounded at apex; eyes prominent, somewhat hemispherical; antennae slender except two robust basal segments, terminal segment bearing two unequal apical spines; pronotum short collar - like, scutellum small, finely rugulose, with prominent anterolateral angles; hind tibiae with 3-5 strong and a series of small spurs near base, and four spur - like spines at apex; forewings acutely pointed, quite large, hyaline, Rs quite long and deflexed subapically, radius longer than R1, marginal veins unequal, veins armed with microscopic setae; abdomen baloon-shaped, tapering caudally, sparsely pubescent.

Distribution : India : West Bengal (Darjiling); Meghalaya; Tamil Nadu.

Remarks : The species is originally described from Darjiling (West Bengal). Later, Kandasamy (1986) recorded a series of males and females of the subspecies from Shevoroy hills in Tamil Nadu.

Both *T. gigantea* and *T. gigantea curta* make leafgalls on *Vaccinium neilgherrense* (Kandasamy, 1980) and on *Symplocos spicata* respectively (Kandasamy, 1986). The subspecies is comparatively smaller in size than *T gigantea* Crawford. According to Lahiri & Biswas (1979), the nymphs of the subspecies are free living and aggregate on the back surface of leaves. The newly emerged flies are pale green in colour and unmarked while the adults are marked conspicuously with black.

24. *Trioza hirsuta* (Crawford)

1912. *Kuwayama hirusta* Crawford, *Rec. Indian Mus.*, 7(5) : 427.
1975. *Trioza hirsuta* Mathur, *Psyllidae of the Indian subcontinent* : 329.

Material examined: 1 (M) and 1 (F) on 'Arjan' plant, West Bengal : Kalyani, 11.ix.1963, coll. *A.K. Bhattacharya.*

Diagnosis: Body covered with long hairs. Head large, across eyes about as broad as thorax, hirsute; vertex about one and a half times as broad as long. Eyes very large and prominent. Antennae 10-segmented, two basal segments robust and transverse, terminal segment with two apical spines. Genae represented by small rounded swellings at base of antennae. Legs long and thickly beset with minute points, femora stout and shorter than tibiae, hind tibiae with an extremely large and strong spur, bearing four black, stout spur-like setae. Forewings large, hyaline, about two and half times as long as broad, acutely angled at apex, large brown spot near clavus, first marginal cell unusually large and about twice as long as second marginal cell.

Distribution : India : West Bengal (Nadia) and "apparently throughout the plains and Low hills of India" (Mathur 1975).

Remarks : The species is characterised by its hirsute body, hind tibial spur, large brown spot near clavus, large first marginal cell in forewing having triozine venation.

HOST - PSYLLID LIST

Plant Name	Plant family	Name of Psyllid
Albizzia procera	Leguminosae	*Acizzia indica* Heslop-Harrison
Buklandia (Symiagtonia) populnea		*Psylla longigena* Mathur
Cassia fistula	Leguminosae	*Euphalerus vittatus* Crawford
Cedrela toona	Meliaceae	*Psylla cedrelae* Kieffer
Citrus aurantium	Rutaceae	*Diaphornia citri* Kuwayama
Citrus sp.	Rutaceae	*Diaphornia citri* Kuwayama
Duabanga grandiflora	Sonneratiaceae	*Trioza lobata* Mathur
Ficus hookeri	Moraceae	*Pauropsylla ficicola* Kieffer
Ficus hispida	Moraceae	*Pauropsylla psylloptera* Crawford
Ficus nervosa	Moraceae	*Dynopsylla grandis* Crawford
Ficus sp.	Moraceae	*Pauropsylla globuli* Kieffer
Gmelina arborea	Verbenaceae	*Trioza fletcheri* Crawford
Mangifera Indica	Anacardiaceae	*Apsylla cistellata* (Buckton)
Machilus gamblei	Lauraceae	*Neotrioza machili* Kieffer

Polygonum microcephalum	Polygonaceae	*Aphalara ossiannilssoni* Mathur
Psydium guyava	Myrtaceae	*Mycopsylla gardenensis* (Bhanotar *et al.*)
Schima wallichii	Ternstroemiaceae	*Cecidopsylla schimae* Kieffer
Symplocos sp.	Symplocaceae	*Cecidotrioza baccarum* Kieffer
Symplocos spicata	Symplocaceae	*Trioza gigantea curta* Mathur
Terminalia alata	Combretaceae	*Trioza fletcheri minor* Crawford
Trewia nudiflora	Combretaceae	*Trioza fletcheri* Crawford
Urena lobata	Malvaceae	*Mesohomotoma lutheri* Endl.
"Uttis"		*Trioza gigantea* Crawford

SUMMARY

The paper incorporates the account of 24 species in 14 genera distributed over 5 subfamilies of Psyllidae from West Bengal. One species, *Paurocephala psylloptera* Crawford constitutes the new locality record for West Bengal. Besides, keys to taxa, geographical distribution, references to the original literature have also been provided. Diagnosis of each species is provided. Over and above, the species which are recorded from literature but not studied at present have been included in the paper. Moreover, hostplant-psyllid list has been given. The distributional records of all the 24 species incorporated in the paper are shown in the maps.

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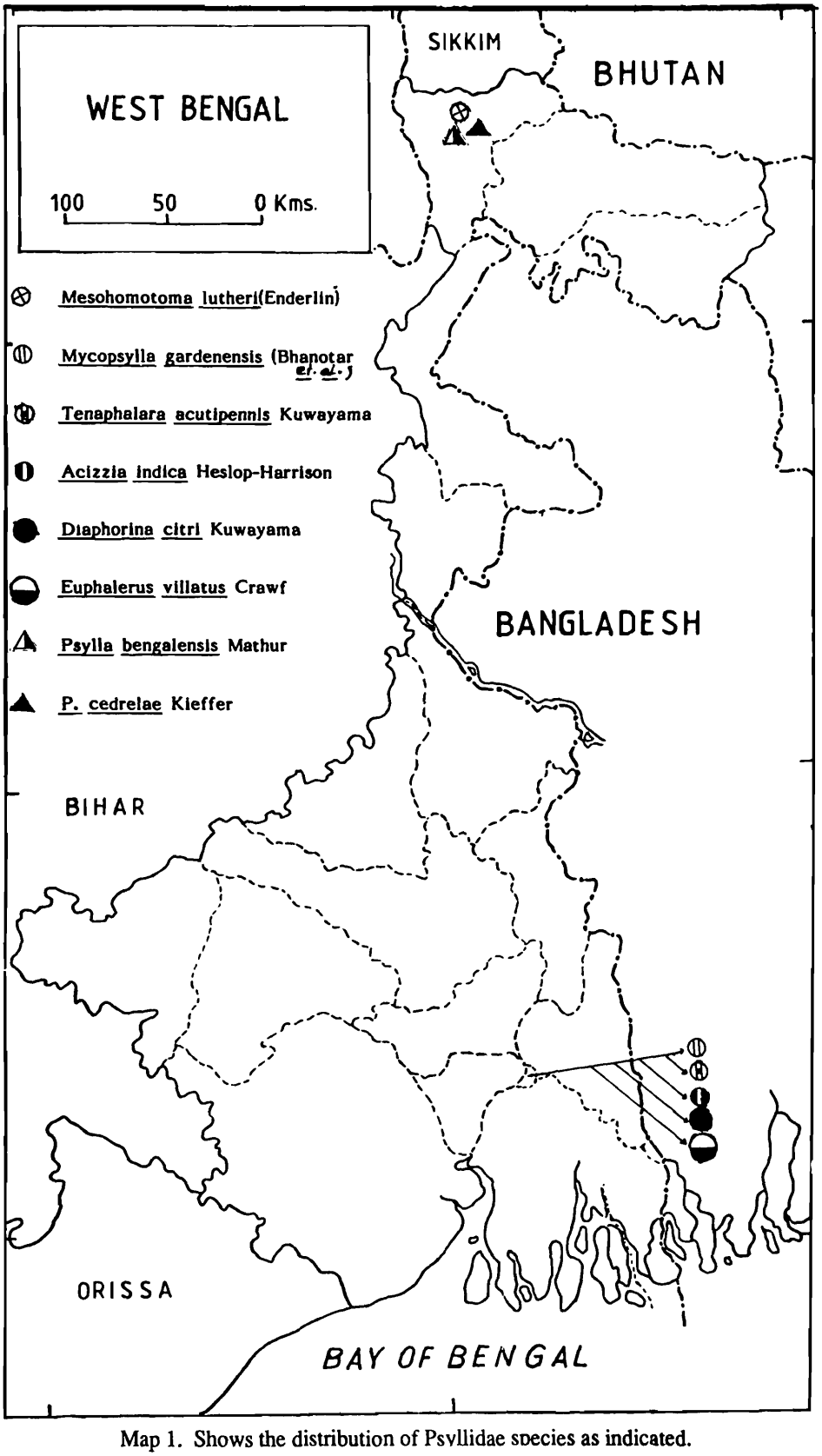
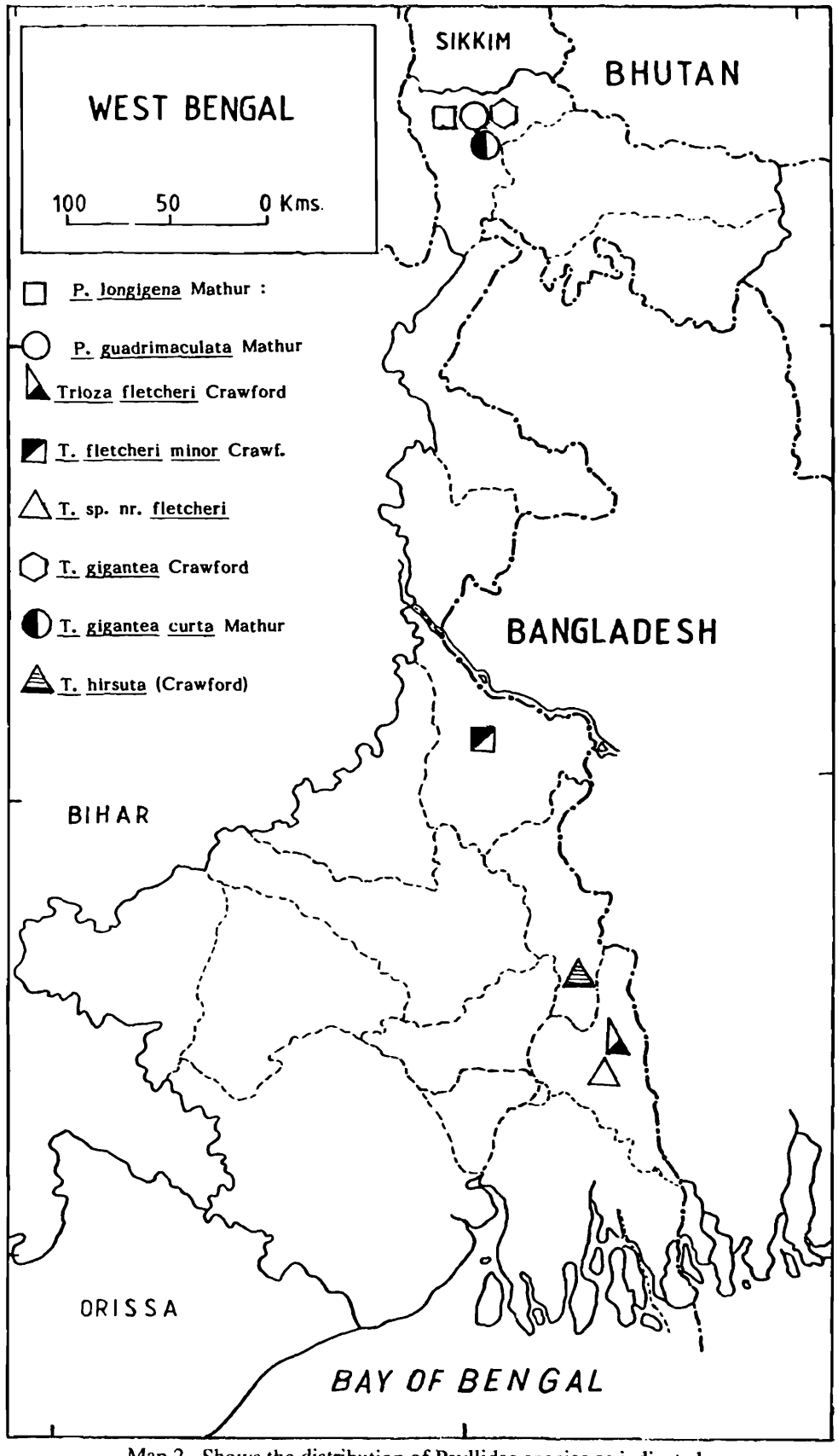


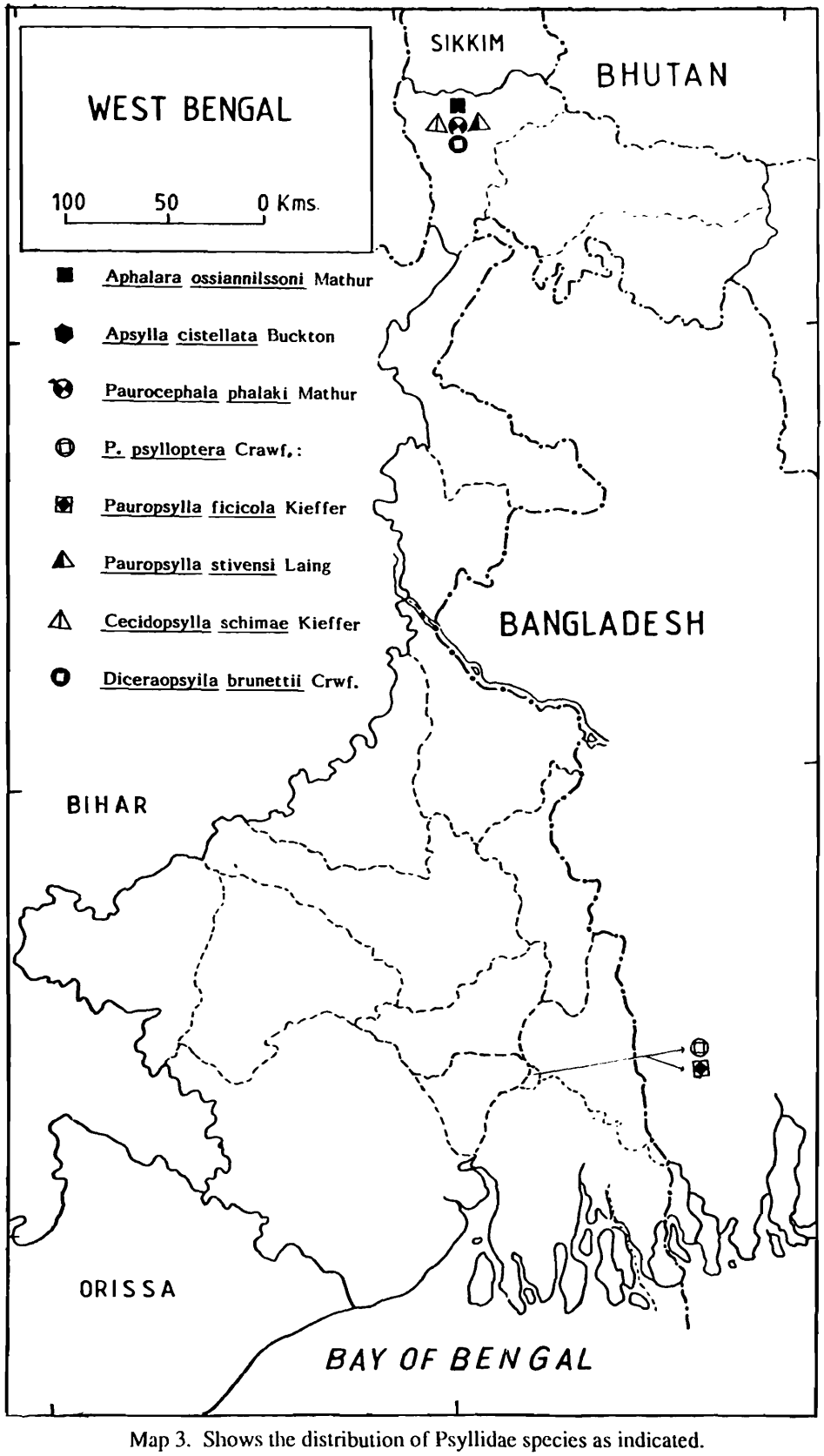
Map 1. Shows the distribution of Psyllidae species as indicated.

Map 1



Map 2. Shows the distribution of Psyllidae species as indicated.

Map 2



Map 3. Shows the distribution of Psyllidae species as indicated.

Map 3

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State Fauna Series 3 : Fauna of West Bengal, Part 5 : 113-124, 1994

INSECTA : HOMOPTERA : ALEYRODIDAE

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INTRODUCTION

Aleyrodids or whiteflies are small phytophagous insects belonging to the family Aleyrodidae of Suborder Homoptera. The whiteflies are small inconspicuous insects which are not true flies but are plant bugs. The adult insects have a pair of flowry wings which are usually white, with a few veins. The eggs are laid on leaf surface. The immature stages are always sessile and the anus is situated dorsally in both adults and larvae. The 1st instar larvae are quite active with functional legs and antennae. The legs and antennae of the 2nd, 3rd and 4th instar larvae are atrophied and the instars are sessile. The adult develops from 4th instar usually referred to 'pupal stage' which plays an important role in taxonomy of this group.

The family Aleyrodidae is classified into three subfamilies viz., Udamoselinae, Aleurodicinae and Aleyrodinae. Among these, Udamoselinae is represented by a single specimen which has probably been destroyed. The subfamily Aleyrodicinae is more primitive than the larger and most wide spread subfamily Aleyrodinae.

The whiteflies are economically important pests of crops and ornamental plants.

The world Aleyrodidae as revealed by Mound and Halsey (1978) include 1156 species in 126 genera.

In India, taxonomic studies on Aleyrodidae are few. So far, 166 species belonging to 38 genera are known from India (Maskell 1895 ; Buckton 1900; Quaintance and Baker 1913-1917, Misra 1900 ; Dozier 1928 ; Corbet 1935, 1939 ; Singh 1931, 1938, 1940, 1945; Rao 1958 ; David and Subramanian 1976 ; David & Jesudassan 1987, 1988 ; David & Selvakumaran 1987, 1990; Takahashi 1982, 1950; Jesudassan and David 1991.)

Aleyrodid fauna of West Bengal on the other hand is very poorly known. A perusal of literature reveals that altogether 13 species belonging to 6 genera are known to occur in West Bengal.

The present paper is an attempt to give a consolidated account of these species based chiefly on literature because of extremely poor collection at our disposal.

GENERAL DIAGNOSIS

The adult aleyrodids or white flies are very small insects characterised by two equal pairs of whitish, opaque, clouded or banded wings; 7 segmented antennae; two ocelli, one near the front of each compound eye; rostrum three-segmented; tarsi two-segmented with a spiniform or pad-like empodium between the claws. Among four larval instars the last or 'pupal instar' being of considerable value in determination of

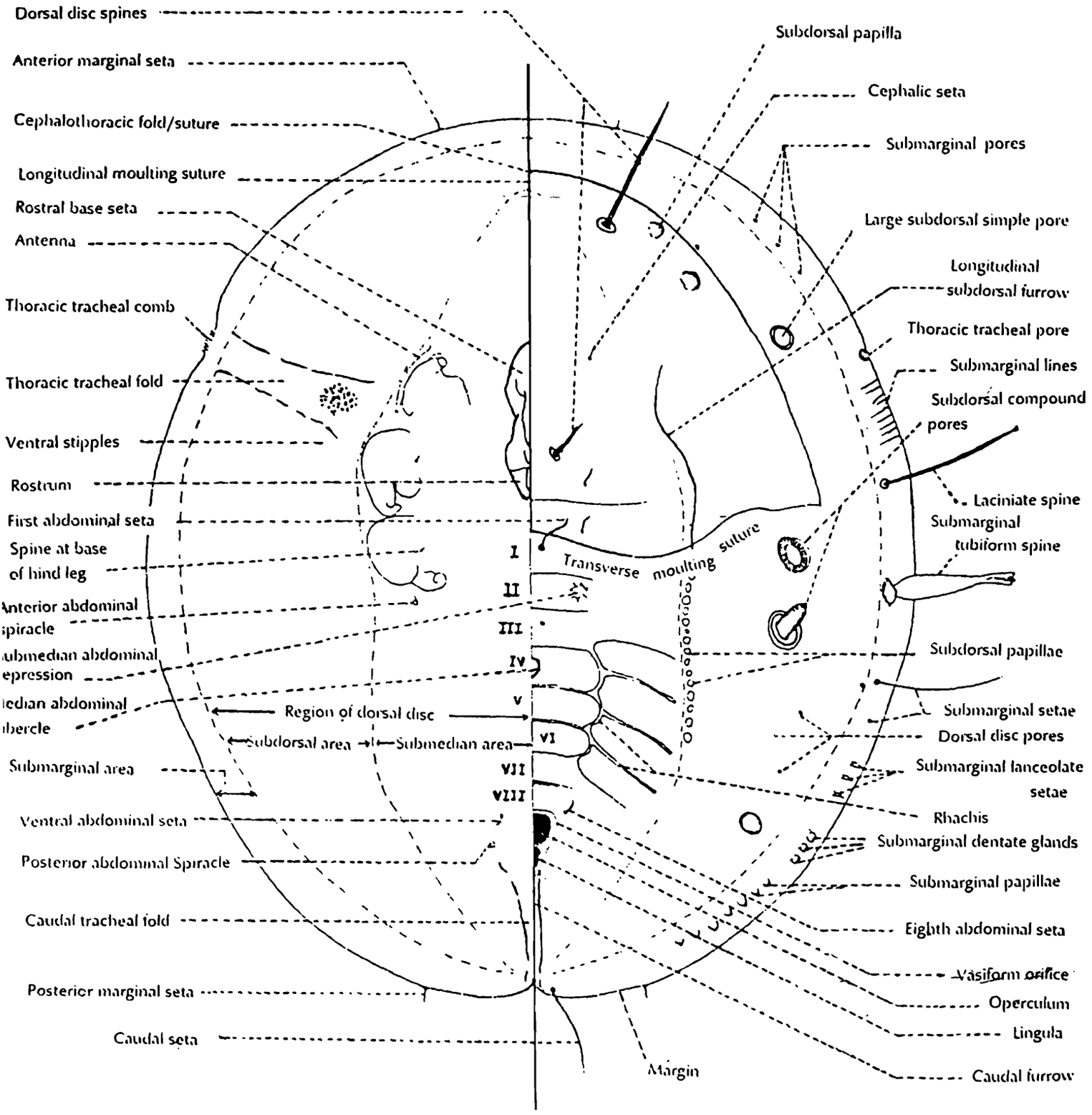

Fig.1 : A schematic diagram of whitefly pupal case with morphological terminology indicated (After Jesudasan & David 1991)

species for possession of many striking characteristics in the 'pupal case' of it.

MATERIALS AND METHODS

The dry specimens are moistened by sprinkling water on the leaf surface. The moistened pupal cases from which adults have emerged are removed carefully from the leaf surface with a very fine needle.

The specimens are treated with 10% KOH or NaOH and heated gently for 10-15 minutes whereas the dark specimens are allowed to remain in the KOH or NaOH for 12-36 hours till they are decolorised. Specimens which are very dark are required to be bleached in hydrogen peroxide. The specimens are then transferred to glacial acetic acid which neutralises the action of alkali and also removes wax. If required, these specimens are cleared by gently pressing them with a fine bent needle. These colourless specimens are stained in acid fuchsin and again transferred to glacial acetic acid for dehydration and removal of excess stain. Dark specimens are generally not stained. They are finally cleared in carboxylol (a mixture of cabolic acid & Xylol at 1:3) for 10-15 minutes, then taken to clove oil and after about 5 minutes mounted in DPX or Canada balsom keeping the dorsal side above.

MORPHOLOGY & TERMINOLOGY

The most important characteristic feature from the taxonomic view point of aleyroid are the vasiform orifice which opens on the dorsal surface of the last abdominal segment. It is a conspicuous opening provided with an operculum, and situated within the orifice & beneath the operculum is a tongue or strap-shaped organ known as lingula.

The latter in some species is covered by the operculum and in others it projects beyond it. The anus opens within the orifice at the base of the lingula. The honey dew issues through the anus and accumulate on the lingula.

SYSTEMATIC ACCOUNT

Subfamily : ALEYRODOIDEA Handlirsch, 1903

Family : ALEYRODIDAE Westwood, 1840

Subfamily : ALEYRODINAE Enderlin, 1909

Tribe I : ALEUROCANTHINI Takahashi, 1954

Genus i : ***Aleurocanthus*** Quaintance & Baker, 1914

1. *Aleurocanthus bambusae* (Peal)
2. *A. longispinus* Quaintance & Baker
3. *A. spiniferous* (Quaintance)

Tribe II : ALEUROLOBINI Takahashi, 1954

Genus iii : ***Aleurolobus*** Quaintance & Baker, 1914

4. *Aleurolobus barodensis* (Maskell)

5. *A. simula* (Peal)

Tribe III : ALEUROPLATINI David, 1990

Genus iii : ***Aleuroplatus*** Quaintance and Baker, 1914

6. *Aleuroplatus alcocki* (Peal)

7. *A. ficusrugosae* Quaintance and Baker

8. *A. hoyae* (Peal)

9. *A. quaintancei* (Peal)

Tribe IV : BEMISINI David, 1990

Genus iv : ***Bemisia*** Quaintance & Baker, 1914

10. *Bemisia leakii* (Peal)

11. *B. religiosa* (Peal)

Tribe V : DIALEURODINI Sampson, 1943

Genus v : ***Dialeurodes*** Cockerell, 1902

12. *Dialeurodes pallida* Singh

Tribe VI : NEOMASKELLINI Sampson, 1943

Genus Vi : ***Pealius*** Quaintance & Baker, 1914

13. *Pealius bengalensis* (Peal)

Key to tribes of the subfamily Aleyrodinae

1 (2) Thoracic and caudal tracheal combs, clefts, pores or furrows present 3

2 (1) Thoracic and caudal tracheal combs, clefts, pores or furrows absent 5

3 (4) Many prominent spines on the dorsum, often longer; vasiform orifice rounded; lingula concealed by operculum ..... Aleurocanthini Takahashi

4(3) Prominent spines lacking on dorsum; vasiform orifice elongately elliptic or transversely oval; operculum transversely rectangular and extremely short exposing lingula; rhachies sometimes present; submargin in some with a row of setae..... .Neomaskellini Sampson

5(6) Submagin seperated from dorsal disc; margin generally toothed; seventh abdominal segment much shortened at the median area in many genera; eighth abdominal segment often trilobed; caudal furrow sometimes discernible; vasiform orifice nearly triangular & subcordate; lingula knobbed and exposed..... ..Aleurolobin Takahashi

6(5) Submargin generally not separated from dorsal disc; it separated eighth abdominal segment not trilobed.....7

7(8) Tracheal pores, clefts, folds, furrows absent; rhachis present or absent; dorsum generally with setae or tubercles; submargin with row of papillae; margin with series of setae in some genera 9

8(7) Tracheal pores, clefts, folds, furrows absent but combs sometimes developed; margin toothed; thoracic and caudal tracheal combs indicated; pores on dorsum variously distributed; dorsum with a prominent central ridge terminating cephalad in a more or less arrow-shaped figure, or elevated and fringed with rounded protrusions around lingula usually concealed..... Aleuroplatini David

9(10) Vasiform orifice cordate or subcordate; lingula usually small, concealed and wanting setae.....Dialeurodini Sampson

10(9) Vasiform orifice subcordate or triangular or subrectangular; sometimes in a ribbed pyriform pit; lingula long or spatulate, setose and exposed ..... Bemisini David

Key to the genera of the subfamily ***Aleurodinae***

1(2) Seventh abdominal segment not shorter than sixth; vasiform orifice subcordate shape..... ***Dialeurodes***

2(1) Seventh abdominal segment shorter than sixth; lingula exposed and included; vasiform orifice not surrounded by any trilobed figure.....3

3(4) Vasiform orifice elongately triangular, operculum subcordate to transversely elliptical; lingula spatulate with a pair of terminal setae..... .....***Bemisia***

4(3) Vasiform orifice not triangular; lingula hidden.....5

5(6) Submargin separated from dorsal disc by a suture like line and fold; vasiform orifice surrounded by a trilobed figure.....***Aleurolobus***

6(5) Submargin not seperated from dorsal disc..... 7

7(8) Vasiform orifice situated in a ribbed pyriform pit; submargin with a series of setae.....***Pealius***

8(7) Vasiform orifice not situated in the pit; submargin without setae 9

9(10) Vasiform orifice elevated, small, rounded or subcordate; dorsum with many prominent spines; presence of larval skin of previous stage on pupal case.....***Aleurocanthus***

10(9) Vasiform orifice not elevated; lingula hidden by rounded operculum..... .... ***Aleuroplatus***

Genus *Aleurocanthus* Quaintance & Baker, 1914

1914. *Aleurocanthus* Quaintance & Baker, *U.S.D.A. Bur. Ent. Tech. Sr.* no. **27**(2) : 102.

Key to species of the genus *Aleurocanthus*

1(2) Submargin with short knobbed setae 3

2(1) Submargin without setae; but with a row of numerous spines; abdominal segments with tubercles; operculum with distinct rectangular markings in 3 rows..... ..... ***longispinus***

3(4) Dorsal spines 32 pairs; vasiform orifice oval..... .... ***bambusae***

4(3) Dorsal spines 31 pairs..... .... ***spiniferus***

1. *Aleurocanthus bambusae* (Peal)

1903. *Aleurodes bambusae* Peal, *J. Asiat. Soc. Bengal,* **72**(2) : 85.
1914. *Aleurocanthus bambusal* : Quaintance & Baker, *U.S. Dept. Agric. Bur. Ent. Tech.* Sr. No. **27**(2) : 102.
1991. *Aleurocanthus bambusae* : Jesudassan and David, *Oriental Insects*, **25** : 244.

Host : *Bambusa* sp. ; *Phoneix dactylifera*

Distribution : West Bengal (Calcutta) (Peal 1903).

2. *Aleurocanthus longispinus* Quaintance and Baker

1917. *Aleurocanthus longispinus* Quaintance and Baker, *Proc. U.S. nat. Mus.*, **51** : 344.
1978. *Aleurocanthus longispinus* : Mound and Halsey, *Publications Br. Mus. Hist.* No. 787 : 17.
1991. *Aleurocanthus longispinus* : Jesudassan and David, *Oriental Insects*, **25** : 248.

Host : *Bambusa arundinaceae*

Distribution : India : West Bengal (Calcutta),(Quaintance and Baker 1917); Bihar. Elsewhere : Burma; Cambodia; Malaya; Thailand.

Natural enemies : Hymenoptera (Chalcidoidea, Aphelinidae).

Remarks : The type species labelled. "INDIA : Calcutta, x. 1910 coll. R.S. Woglum" is deposited with B.M.N.H.

3. *Aleurocanthus spiniferous* (Quaintance)

1903. *Aleurodes spinifera* Quaintance, *Canadian Ent.*, **35** : 63.
1914. *Aleurocanthus spiniferous* : Quaintance and Baker, U.S.D.A. *Bur. Ent. Tech. Ser.*, **27** : 102.
1991. *Aleurocanthus spiniferous* : Jesudassan and David, *Oriental Insects* : 252.

Host : *Citrus* sp., *Rosa* sp.; *Vitis vinifera.*

Distribution : West Bengal; Burirhat (Sing 1931) Widely distributed in India.

Remarks : Singh (1991) has recorded this species from Poona and Pondicherry.

Genus *Aluerolobus* Quaintance & Baker, 1914

1914. *Aleurolobus* Quaintance & Baker, U.S.D.A. *Bur. Ent. Tech. Ser.*, **27**(2) : 108-109.

Key to species of the genus ***Aleurolobus***

1(2) Pupal case yellow in colour ..... *simula*

2(1) Pupal case brown or black; elongately elliptical 2.25 X 1.15 mm; submargin with 12 pairs of setae ..... *barodensis*

4. *Aleurolobus barodensis* (Maskell)

1895. *Aleurodes barodensis* Maskell, Trans. *Proc. N.Z. Inst.* **28** : 424-425.
1914. *Aleurolobus barodensis* : Quaintance and Baker, U.S.D.A. *Bur. Ent. Tech. Ser.*, **27**(2) : 109.
1991. *Aleurolobus barodensis* : Jesudassan and David, *Oriental Insects*, **25** : 270.

Host : *Erianthus aurundanaceum*; *Miscanthus* sp.; *Saccharum officinarum.*

Distribution : West Bengal (Maskell 1895); Tamil Nadu.

Natural enemies : Hymenoptera (Chalcoidoidea, Aphelinidae)

5. *Aleurolobus simula* (Peal)

1903. *Aleurodes simula* Peal, *J. Asiat. soc. Bengal*, **72**(2) : 81.
1914. *Aleurolobus simula* : Quaintance and Baker, U.S.D.A. *Bur. Ent. Tech.* Sr. No. **27**(2) : 109.
1991. *Aleurolobus simula* : Jesudassan and David, *Orienal Insects*, **25** : 276.

Host : *Bombax malabaricum*

Distribution : West Bengal (Calcutta) (Peal 1903).

Remarks : This species is not typical of *Aleurolobus* and would seem, from a study of its original

description, to be closely related certain species placed in the genus *Africaleyrodes* (Mound and Halsey, 1978).

Genus *Aleuroplatus* Quaintance & Baker, 1914

1914. *Aleuroplatus* Quaintance & Baker, U.S.D.A. *Bur. Ent. Tech. Ser.*, **27**(2) : 98.

Key to the species of the genus *Aleuroplatus*

1(2) Vasiform orifice conical, thoracic fold without any teeth..... .3

2(1) Vasiform orifice minute,rounded, wider than long and nearly filled with operculum; distal extremities of the lingula exposed; marginal comb of thoracic fold very faint and composed of short rounded teeth.....*ficusrugosae*

3(4) Lingula long; the apex of the vasiform orifice conical 5

4(3) Lingula short, cylindrical, shorter than operculum, apex of vasiform orifice pointed cauded, a dark brown elevated median keel running from thorax to cephalic margin beyond which is slightly projected..... .....*alcocki*

5(6) Operculum nearly filling the aperture of vasiform orifice; lingula cylindrica;, patulate at tip and projects bout 1/3 of its length beyond operculum ..... *quaintancei*

6. *Aleuroplatus alcocki* (Peal)

1903. *Aleurodes alcocki* Peal, *J. Asiat. Soc. Bengal*, **72**(2) : 74.
1931. *Aleuroplatus alcocki* : Singh, Mem. Dept. *Agric., India Ent. Ser.* **12**(1) : 19.
1976. *Aleuroplatus alcocki* : David and Subramaniam, *Rec. zool. Surv. India,* **70** : (1-4) : 165.
1991. *Aleuroplatus alcocki* : Jesudassan and David, *Oriental Insects*, **25** : 281.

Host : *Ficus religiosa.*

Distribution : West Bengal (Calcutta) (Peal 1908) Bihar, Tamil Nadu.

7. *Aleuroplatus ficusrugosae* Quaintance and Baker

1917. *Aleuroplatus ficusrugosae* Quaintance and Baker, *Proc. U.S. nat. Mus.*, **51** : 387-388.
1978. *Aleuroplatus ficusrugosae* : Mound and Halsey, Publications *Br. Mus. nat. Hist.* No. 787 : 48.
1991. *Aleuroplatus ficusrugosae* ; Jesudassan and David, *Oriental Insects*, **25** : 283.

Host : *Ficus rugosa*

Distribution : West Bengal (Haora).

8. *Aleuroplatus hoyae* (Peal)

1903. *Aleurodes hoyae* Peal, *J. Asiat. Soc. Bengal*, 72(2) : 88.
1914. *Aleuroplatus hoyae* : Quaintance and Baker, U.S. Dept. *Agric. Bur. Ent. Tech.* Sr. No. 27(2) : 98.
1991. *Aleuroplatus hoyae* : Jesudassan and David, *Oriental Insects*, 25 : 284.

Host : *Hoya* sp.

Distribution : West Bengal (Calcutta) (Peal 1903).

9. *Aleuroplatus quaintancei* (Peal)

1903. *Aleurodes quaintancei* Peal, *J. Asiat. Soc. Bengal*, 72(2) : 78.
1914. *Aleuroplatus quaintancei* : Jesudassan and David, *Oriental Insects*, 25 : 285.

Host : *Ficus religiosa*

Distribution : West Bengal (Calcutta) (Peal 1903).

Remarks : The species is extremely abundant after the rains (October-November).

Genus *Bemisia* Quaintance & Baker, 1914

1914. *Bemisia* Quaintance & Baker, U.S.D.A. *Bur. Ent. Tech.* Sr. No. 27(2) : 99-100.

Key to the species of the genus *Bemisia*

1(2) Vasiform orifice elongated, triangle, about half of it is covered by operculum, dorsum containing pairs of minute setae; tracheal folds dotted; a few indistinct teeth on tracheal pores..... ..*leakii*

2(1) Vasiform orifice triangular, operculum covering two third of it; dorsum without setae; tracheal folds indistinct... .....*religiosa*

10. *Bemisia leakii* (Peal)

1903. *Aleurodes leakii* Peal, *J. Asiat. Soc. Bengal*, 72(2) : 87.
1931. *Bemisia leakii* : Singh, *Mem. Dept. Agric., India Ent. Ser.* 12(1) : 81.
1991 *Bemisia leakii* : Jesudassan and David, : *Oriental Insects*, 25 : 296.

Host : *Dalbergia sissoo.*

Distribution : West Bengal (Haora) (Peal 1903); Bihar; Fiji; Tahati

11. *Bemisia religiosa* (Peal)

1903. *Aleurodes religiosa* Peal, *J. Asiat. Soc. Bengal*, 72(2) : 67.

1914. *Bemisia religiosa* : Quanintance and Baker, U.S.D.A. *Bur. Ent. Tech. Ser.* **27**(2) : 100.
1991. *Bemisia religiosa* : Jesudassan and David, Oriental Insects, 25 : 296.

Host : *Ficus bengalensis ; Ficus religiosa*

Distribution : West Bengal (Calcutta).

Genus : ***Dialeurodes*** Cockerell, 1902

1902. *Dialeurodes* Cockerell, *Proc. Acad. nat. Sci. Philad.* **54** : 283.

12. ***Dialeurodes pallida*** Singh

1931. *Dialeurodes pallida* Singh, *Mem. Dep. Agic. India,* **12**(1) : 30.
1991. *Dialeurodes pallida* : Jesudassan and David, *Oriental Insects*, **25** : 306.

Host : *Piper betel*

Distribution : West Bengal (Calcutta) (Singh 1931); Bihar.

Remarks : This species is a serious pest of the leaves of *Piper betel* in West Bengal.

Genus ***Pealius*** Quaintance & Baker, 1914

1914. *Pealius* Quaintance & Baker, U.S.D.A. *Bur. Ent. Tech. Sr.* No. **27**(2) : 99.

13. ***Pealius bengalensis*** (Peal)

1903. *Aleurodes bengalensis* Peal, *J. Asiat. Soc. Bengal* **72**(2) : 70.
1914. *Pelius bengalensis* : Quaintance and Baker, U.S.D.A. *Bur. Ent. Tech. Ser.*, **27** : 99.
1991. *Pealius bengalensis* : Jesudassan and David, *Oriental Insects,* **25** : 319.

Host : *Ficus* sp.

Distribution : West Bengal (Peal 1903).

Remarks : The name suggests that this species was described fom Bengal. According to Mound and Halsey (1978), no data of the material was given in the original description.

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INSECTA : HEMIPTERA : APHIDIDAE

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INTRODUCTION

Aphids are a group of small to large homopteran insects.They form one of the most important group of phytophagous insects because of their polymorphism, host alternating heteroecious behaviour, reproductive habits and above all for their role as lergest group of insect vectors of plant viruses. Practically no plant part is spared by the insects and as a consquence of their infestations, the plants show various malformations like gall. The aphids enjoy a more or less cosmopolitan distribution and are found in abundance in places having temperate climate. These have attracted the attention of scientific community on global basis.

The aphidological studies in India dates back the 1st decade of 19th Century. The studies carried out during 1890-1960 revealed only a part of Indian fauna. The surveys to various parts of the country during last 30 years explored the aphid fauna rather in a better state on regional basis.

A perusal of literature reveals that out of estimated world fauna of over 4,000 species of aphids, about 787 species belonging to 211 genera (A.K.Ghosh 1989) are known from Indian region. Thus, the Indian aphids consitute 20% of the global fauna. Compilation of data also reveals that at least 1200 species of Plants belonging to nearaly 700 genera and 175 families are infested by these aphids in India. As a result of thorough investigation on the group, a series of publications on Indian aphids are on print now, but for limitation of space only some importnt references have been given here.

However, major contributons on Indian aphids are by Barlow (1890), Buckton (1893-1898), Cotes (1983), 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 (1956-1975), Chakrabarti and his associates (1972-recent), Raychaudhuri, D.N. and his collaborators (1956-1983), Basu, R.C. and Raychaudhuri, D.N. (1980), Ghosh, A.K. (1974,1977,1980,1982,1984,1988) Stary and Ghosh (1983), Ghosh, L.K. (1986,1989), Chakrabarti and Quednau (1976),Ghosh, A.K. and Quednau (1990).

The Aphididae of West Bengal are known through the works of Cotes 1896; van der Goot 1916, 1917; Anonymous 1948-1955; Banerjee, S.N.and Basu, A.N. 1955; Basu, A.N.and Banerjee, S.N. 1958; Ghosh , A.K. and Raychaudhuri, D.N. 1959; Basu, A.N. 1961a, 1961b, 1964, 1967,1969a,1969b; Basu, A.N. and Hille Ris Lambers 1968; Bhanotar and Ghosh, L.K. 1969; Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N. 1969; Ghosh, A.K. 1969, 1974a, 1974b, 1980,1982,1984,1988; David, Rajasingh and Narayanan 1970; Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. 1971a,1971b,1972; Chakrabarti and Raychaudhuri, D.N.1975,1978a; Ghosh, A.K. and Quednau 1990.

A Review of literature reveals the existence of altogether 283 species/subspecies of aphids

belonging to 126 genera in 8 subfamilies of aphididae from West Bengal

The present paper is an attempt to provide a consolidated account of the above species/subspecies from the State. The account deals with a brief note on earlier investigations, keys to subfamilies, tribes, subtribes, genera and species/subspecies, literature references, geographical distribution of each species both within the state, India and abroad.Total number aphid genera and species under different subfamilies of Aphididae so far known from West Bengal has been shown (Table 1). Besides, charts showing districtwise distribution of 283 species have also been included in the paper. The taxonomic keys, however, presented here are essentially for identification of Aphididae of West Bengal and it may not work for aphids not represented in this region. Taxonomic nomenclature of the listed genera and species have mostly been adopted from Eastop and Hille Ris Lambers (1976), Raychaudhuri D.N.(ed.) (1980),Ghosh, A.K.(1980,1982,1984,1988) Ghosh and Quednau (1900).

An analysis of the aphid fauna of West Bengal reveals that it constitutes about 36% of the total species known from India, 28% of the species from the oriental and 7% of the species from the world aphid fauna. Of the 283 species so far known from the State,16 species constituting 6% are endemic in origin. The find of these sexuales in the area hints at the possibility of completion of holocyclic for these species, althouth anholocyclic type of lifie cycle is shown by majority of the aphids found in West Bengal.

All the material, unless otherwise mentioned in the text, were examined from the collections represented in Zoologcal Survey of India and Entomological Laboratory, Dept. of Zoology,Universty of Calcutta. But for limitation of space detailed collection data under each species are not provided.

CLASSIFIED LIST OF APHIDIDAE OF WEST BENGAL

Subfamily ANNOECIINAE

Tribe ANOECIINI

Genus 1. ***Anoecia*** Koch

1. *Anoecia radiciphaga* Pal and Raychaudhuri

Genus 2. ***Aiceona*** Takahashi

2. *Aieona longisetosa* Ghosh and Raychaudhuri
3. *A. pallida* Ghosh and Raychaudhuri
4. *A. paraosiugii* Ghosh, Ghosh and Raychaudhuri
5. *A. pesudosugii* David, Sekhon and Bindra
6. *A. retipennis* David, Narayanan and Rajasingh
7. *A. robustiseta* Ghosh and Raychaudhuri
8. *A. titabarensis* (Raychaudhuri and Ghosh)

Subfamily APHIDINAE

Subtribe APHIDINA

Genus 3. ***Aphis*** Linnaeus

9. *Aphis citricola* Patch
10. *A. craccivora* Koch
11. *A. fabae* Scopoli
12. *A. gossypii* Glover
13. *A. glycines* Matsumura
14. *A. kurosawai* Takahashi
15. *A. longisetosa* Basu
16. *A. nasturtii* Kaltenbach
17. *A. nerii* Boyer de fonscolombe
18. *A. punicae* Passerini
19. *A. rubifolii* Thomas

Genus 4. ***Indiaphis*** Basu

20. *Indiaphis carassicornis* Basu

Genus 5. ***Toxoptera*** Koch

21. *Toxoptera aurantii* (Boyer de fonscolombe)
22. *T citricidus* (Kirkaldy)
23. *T.odinae* (van der Goot)

Genus 6. ***Hyalopterus*** Koch

24. *Hyalopterus pruni* (Geoffory)

Genus 7. ***Hysteroneura*** Davis

25. *Hysteroneura setariae* (Thomas)

Genus 8. ***Melanaphis*** van der Goot

26. *Melanaphis bambusae* (Fullaway)
27. *M.mghalayensis bengalensis* Raychaudhuri and Banerjee
28. *M.meghalayensis mghalayensis* Raychaudhuri and Banerjee
29. *M.sacchri* (Zehntner)
30. *M.vandergooti* Raychaudhuri and Banerjee

Genus 9. ***Rhopalosiphum*** Koch

31. *Rhopalosiphum maidis* (Fitch)
32. *R. nymphaeae* (Linnaeus)
33. *R. padi* (Linnaeus)
34. *R. rufiabdominalis* (sasaki)

Genus 10. ***Schizaphis*** Borner

35. *Schizaphis graminum* (Rondani)
36. *S. punjabipyri* (Das)

Tribe MACROSIPHINI

Genus 11. ***Acutosiphon*** Basu, Ghosh and Raychaudhuri

37. *Acutosiphon obliquoris* Basu, Ghosh and Raychaudhuri

Genus 12. ***Acyrthosiphon*** Mordvilko

38. *Acyrthosiphon pisum* (Harris)

Genus 13. ***Akkaia*** Takahashi

39. *Akkaia bengalensis* Basu
40. *A. neopolygonicola* Ghosh ,Ghosh and Raychaudhuri

Genus 14. ***Amphicercidus*** oestlund

41. *Amphicercidus indicus* Hille Ris Lambers and Basu

Genus 15. ***Amphorophora*** Buckton

42. *Amphorophora ampullata bengalensis* Hille Ris Lambers and Basu

Genus 16. ***Aulacorthum*** Modvilko

43. *Aulacorthum fagopyri* Ghosh and Raychaudhuri
44. *Aulacorthum magnoliae* (Essig and Kuwana)
45. *A. nipponicum* (Essig and Kuwana)
46. *A rhamni* Ghosh,Ghosh and Raychaudhuri
47. *A. solani* (Kaltenbach)

Genus 17. ***Brachycaudus*** van der Goot

48. *Brachycaudus helichrysi* (Kaltenbach)

Genus 18. ***Brachymyzus*** Basu

49. *Brachymyzus jasmini* Basu

Genus 19. ***Brevicoryne*** van der Goot

50. *Brevicoryne brassicae* (Linnaeus)

Genus 20. ***Capitophorus*** van der Goot

51. *Capitophorus formosartemisea* (Takahashi)
52. *C. himalayensis* Ghosh, Ghosh and Raychaudhri
53. *C. hippophaes javanicus* Hille Ris Lambers
54. *C. hippophaes mitegoni* Eastop
55. *C. indicus* Ghosh and Raychauddhuri
56. *C. polygoni* Ghosh, Ghosh and Raychaudhuri

Genus 21. ***Cavariella*** del Guercio

57. *Cavariella aegopodi* (Scopoli)
58. *C. biswasi* Ghosh, Basu and Raychaudhuri
59. *C. nigra* Basu
60. *C. salicicola* Matsumura

Genus 22. ***Coloradoa*** Wilson

61. *Coloradoa rufomaculat* a (Wilson)

Genus 23. ***Cryptosiphum*** Buckton

62. *Cryptosiphum artemisae* Buckton

Genus 24. ***Diphorodon*** Borner

63. *Diphorodon cannabis* (Passerin)

Genus 25. ***Dysaphis*** Borner

64. *Dysaphis multisetosa* Basu

Genus 26. ***Eumyzus*** Takahashi

65. *Eumyzus darjeelingensis* Basu and Raychaudhuri

Genus 27. ***Hayhurstia*** del Guercio

66. *Hayhurstia atriplics* (Linnaeus)

Genus 28. ***Hillerislambersia*** Basu

67. *Hillerislambrsia darjeelingi* Basu

Genus 29. ***Hyadaphis*** Kirkaldy

68. *Hyadaphis coriandri* (Das)

Genus 30. ***Hyalomyzus*** Richards

69. *Hyalomyzus sensoritus* (Mason)

Genus 31. ***Hyperomyzus*** Borner

70. *Hyperomyzus carduellinus* (Theobald)

Genus 32. ***Impatientinum*** Mordvilko

71. *Impatientinum impatiens* (Shinji)

Genus 33. ***Indomyzus*** Ghosh, Ghosh and Raychaudhuri

72. *Indomyzus sensoriatus* Ghosh, Ghosh and Raychaudhuri

Genus 34. ***Liosomaphis*** Walker

73. *Liosomaphis himalayensis* Basu

Genus 35. ***Lipaphis*** Mordvilko

74. *Lipaphis erysimi* (Kaltenbach)

Genus 36. ***Macromyzella*** Ghosh, Basu and Raychaudhuri

75. *Macromyzella polypodicola* (Takahashi)

Genus 37. ***Macromyxus*** Takahashi

76. *Marcomyzus woodwardiae* Takahashi
77. *M. manoji* Raha and Raychaudhuri
77.a. *Macromyzus* (*Anthracosphoniella*) *maculatum* (Basu)

Genus 38. ***Macrosiphoniella*** del Guercio

78. *Macrosiphoniella grandicauda* Takahashi and Moritsu
79. *M. kalimpongense* Basu and Raychaudhuri
80. *M. pseudoartemisiae* Shinji
81. *M. sanborni* (Gillette)
82. *M. spinipes* Basu
83. *M. yomogifoliae* (Shinji)

Genus 39. ***Macrosiphum*** Passerini

84. *Macrosiphum aulacorthoides* David, Narayanan and Rajasingh
85. *M.(Macrosiphum)pachysiphon* Hille Ris Lambers
86. *M.(M.) rosae* (Linnaeus)
87. *M.(M.) spinotibium* Ghosh, Ghosh and Raychaudhuri
88. *M. (Neomacrosiphum) microspinulosum* David, Rajasingh and Narayanan
89. *M. (N.) pesudolueum* (Ghosh)
90. *M.(Sitobion) akebiae* Sjinji
91. *M.(S.) fagopyri* Ghosh and Raychaudhuri
92. *M.(S.) indicum* (Basu)
93. *M.(S.) lambersi* David
94. *M.(S.) mimosae* Ghosh, Basu and Raychaudhuri
95. *M.(S.) miscanthi* (Takahashi)
96. *M.(S.) plectranthi* Ghosh, Ghosh and Raychaudhuri
97. *M.(S.) rosaeformis* (Das)
98. *M.(S.) sikkimensis* Ghosh and Raychaudhuri
99. *M.(S.) takahashi* iEastop

Genus 40. ***Masonaphis*** Hille Ris Lambers

100. *Masonaphis (Neomasonaphis) anaphilidis* Basu

Genus 41. ***Matsumuraja*** schumacher

101. *Matsumuraja capitophorodies* Hille Ris Lambers
102 *M. nuditerga* Hille Ris Lambers
103 *M. urticae* Ghosh, Ghosh and Raychaudhuri

Genus 42. ***Metopolophium*** Mordvilko

104. *Metopolophium (Metopolophium) ? caraganae* (Cholodkovsky)
105. *M. (M.) malvae* (Mosley) group
106. *M. (M.) rubi* (Narzikulov)
107. *M. (Metopolophinum) darjeelingensis* Ghosh
108. *M. (Microlophium) darjeelingnse* Raychaudhuri, Ghosh and Basu

109. *M. (Neometopolophium) davidi* Raychaudhuri, Ghosh and Basu

Genus 43. ***Micromyzus*** van der Goot

110. *Micromyzus granotiae* Ghosh , Ghosh and Raychaudhuri
111. *M. judekoi* Carver
112. *M. kalimpongensis* Basu
113. *M. nigrum* van der Goot

Genus 44. ***Myzakkaia*** Basu

114. *Myzakkaia himalayensis* Basu
115. *M. polygonicola* Basu

Genus 45. ***Myzus ascalonicus*** Doncaster

116. *Myzus ascalonicus* Doncaster
117. *M. bevisiphon* Basu
118. *M. carasi* (Fabricius)
119. *M. cymbalariae* Stroyan
120. *M. dycei* Carver
121. *M. filicis* Carver
122. *M. lefroy*i Basu and Raychaudhuri
123. *M. leptotrichus* David, Rajasingh and Narayanan
124. *M. maculocorpus* Basu and Raychaudhuri
125. *Myzus manoji* Basu Raychaudhuri
126. *M. ornatus* Laing
127. *M. persicae* (Sulzer)
128. *M. ranunculinus* (Walker)
129. *M. siegesbeckicola* Strand
130. *M. umefoliae* (Shinji)

Genus 46. ***Neoacyrthosiphon*** Tao

131. *Neoacyrthosiphon rhododendri* Ghosh and Raychaudhuri
132. *N. setosum* (Hille Ris Lambers and Basu)
133. *N. taihesianum ovalifoliae* Ghosh, Ghosh and Raychaudhuri

Genus 47. ***Neohyalomyzus*** Basu, Ghosh and Raychaudhuri

134. *Neohyalomyzus raoi* (Hille Ris Lambers)

Genus 48. ***Neomegouropsis*** Ghosh, Basu and Raychaudhuri

135. *Neomegouropsis cajanae* (Ghosh and Raychaudhuri)

136. *N. dooarsis* (Ghosh and Raychaudhuri)

Genus 49. ***Neomyzus*** van der Goot

137. *Neomyzus circumflexus* (Buckton)
138. *N. dendrobi* (Basu)
139. *N. (Paraneomyzus) dicentrae* (Basu)

Genus 50. ***Oedisiphum*** van der Goot

140. *Oedisiphum soureni* Basu

Genus 51. ***Paczoskia*** Mordvilko

141. *Paczoskia budhium* Banerjee, Ghosh and Raychaudhuri

Gunus 52. ***Pentalonia*** Coqeurel

142. *Pentalonia nigronervosa* Coquerel

Genus 53. ***Perillaphis*** Takahashi

143. *Perillaphis perillae* (Shinji)

Genus 54. ***Pleotrichophorus*** Borner

144. *Pleotrichophorus glandulosus* (Kaltenbach)

Genus 55. ***Pseudaphis*** Hille Ris Lambers

145. *Pseudaphis absyssinica* Hille Ris Lambers

Genus 56. ***Pseudoacyrhosiphon*** Ghosh and Raychaudhuri

146. *Pesudoacyrthosiphon (Pseudoacyrthosiphon) holsti* (Takahashi)
147. *P. (Anacyrthosihon takahashii* (Ghosh)

Genus 57. ***Rhodobium*** Hill Ris Lambers

148. *Rhodobium porosum* (Sanderson)

Genus 58. ***Semiaphis*** Takahashi

149. *Semiaphis heraclei* (Takahashi)

Genus 59. ***Shinjia*** Takahashi

150. *Shinjia pteridifoliae* (Shinji)

Genus 60. ***Sinomegour*** aTakahashi

151. *Sinomegoura citricola* (van der Goot)
152. *S. photinae* (Takahashi)
153. *S. rhododendri* (Takahashi)

Genus 61. ***Subovatomyzus*** Basu

154. *Subovatomyzus leucosceptri* Basu

Genus 62. ***Taiwanomyzus*** Tao

155. *Taiwanomyzus darjeelingensis* Ghosh , Basu and Raychaudhuri

Genus 63. ***Tricaudatus*** Narzikulov

156. *Tricaudatus polygoni* (Narzikulov)

Genus 64 ***Trichosiphonaphis*** Takahashi

157. *Trichosiphonaphis gerbera* Ghosh and Raychaudhuri

Genus 65. ***Tuberoaphis*** Tseng and Tao

158. *Tuberoaphis hydrangeae digiata* Hille Ris Lambers and Basu

Genus 66. ***Tuberocephalus*** Shinji

159. *Tuberocephalus sasaki* (Matsumura)

Genus 67. ***Uroleucon*** Mordvilko

160. *Uroleucon (Uroleucon) formosanus crepidis* Ghosh, Ghosh and Raychaudhuri
161. *U. (U.) sonchi* (Linnaeus)
162. *U. (U.) gobonis* (Matsumura)
163. *U. (U.) lambersi* Ghosh, Basu and Raychaudhuri
164. *Uroleucon (Uromelan) compositae* Theobald

Genus 68. ***Vesiculaphis*** del Guercio

165. *Vesiculaphis caricis* (Fullaway)

166. *V. grandis* Basu
167. *V. kalimongensis* Ghosh, Basu and Raychaudhuri
168. *V. kuwanis* Ghosh, Basu and Raychaudhuri
169. *V. piridis* Basu
170. *V. rhododendri* Ghosh and Raychaudhuri
171. *V. verbasci* Chowdhuri, Basu, Chakrabarti and Raychaudhuri

Genus 69. ***Xenomyzus*** Aizenberg

172. *Xenomyzus polygoni* (van der Goot)
173. *X. scabripes* Basu, Ghosh and Raychaudhuri

Tribe PTEROCOMMATINI

Genus 70. ***Pterocomma*** Buckton

174. *Pterocomma* sp.

Subfamily CALLIPTERINAE

Genus 71. ***Betacallis*** Matsumura

175. *Betacallis prunicola* Basu, Ghosh and Raychaudhuri

Genus 72. ***Betulaphis*** Glendening

177. *Betulaphis longicornis* Quednau and Chakrabartyi

Genus 73. ***Chaitophorus*** Koch

178. *Chaitophorus dorocola* Matsumura
179. *C.indicus* Ghosh, Ghosh and Raychaudhuri
180. *Chaitophorus* sp.

Genus 74. ***Clethrobius*** Mordvilko

181. *Clethorbius dryobius* Chakrabarti and Raychaudhuri

Genus 75. ***Cranaphis*** Takahashi

182. *Cranaphis indica* Chakrabarti and Raychaudhuri

Genus 76. ***Mesocallis*** Matsumura

183. *Mesocallis* Matsumura

Genus 77. ***Neobetulaphis*** Basu

184. *Neobetulaphis pusilla* Basu

Genus 78. ***Neocranaphis*** Ghosh

186. *Neocranaphis bambusicola* David, Rajasingh and Narayanan

Genus 79. ***Periphyllis*** van der Hoven

187 *Periphyllus bengalensis* Ghosh and Raychaudhuri
188. *P. californiensis* Shinji
189. *P. himalayensis* Chakrabarti

Genus 80. ***Shivaphis*** Das

190. *Shivaphis* Das

Genus 81. ***Subtakecallis*** Raychaudhuri and Pal

191. *Subtakecallis brevisetosus* Raychaudhuri and Pal
192. *S. pilosa* (David, Rajasingh and Narayanan)

Genus 82. ***Taiwanaphis*** (Raychaudhuri and Ghosh)

193. *Taiwanaphis kalipadi* (Raychaudhuri and Ghosh)

Genus 83. ***Takecallis*** Matsumura

194. *Takecallis aurandinariae* (Essig)

Genus 84. ***Taoia*** Quednau

195. *Taoia indica* (Ghosh and Raychaudhuri)

Genus 85. ***Tinocallis*** Matsumura

196. *Tinocallis disutinctus* Ghosh, Ghosh and Raychaudhuri
197. *T himalayensis* Ghosh and Raychaudhri
198. *T kahawaluokalani* (Kirkaldy)

Genus 87. ***Trichaitophorus*** Takahashi

200. *Trichaitophorus recurvispinus* Hille Ris Lambers and Basu

Genus 88. ***Yamatocallis*** Matsumura

201. *Yamatocallis obscurus* (Ghosh, Ghosh and Raychaudhuri)

Subamily CREENIDEINAE

Tribe CERVAPHIDINI

Genus 89. ***Anomalosihum*** Takahashi

202. *Anomalosium indigoferae* Ghosh, Ghosh and Raychaudhuri

Genus 90. 203. ***Cervaphis rappardi indica*** Basu

Genus 91. ***Schoutedenia*** Rubsaamen

204. *Schoutedenia lutea* (van der Goot)

Genue 92. ***Sumatraphis*** Takahashi

205. *Sumatraphis celti* Takahashi

Tribe GREENIDEINI

Genus 93 ***Brevitrich ·siphon*** Raychaudhuri, Ghosh Banerjee and Ghosh

206. *Brevitrichosiphon* Mukherjee Raychaudhuri, Ghosh, Banerjee and Ghosh

Genus 94. ***Eutrichosiphum*** Essig and Kuwana

207. *Eutrichosaphum (Eutrichosiphum) passaniae pseudopasaniae* Szelegiewicz
208. *E. (E.) quercifoliae* Raychaudhuri, Ghosh, Banerjee and Ghosh
209. *E. (E.) sankari* Raychaudhuri, Ghosh, Banerjee and Ghosh
210. *E. (E.) taoi* Ghosh, Basu and Raychaudhuri
211. *E. (Neoparatrichosiphum) raychaudhuri* (Ghosh)
212. *E. (Paratrichosiphum) alnicola* (Basu)
213. *E. (P.) tattakanum* (Takahashi)

Genus 95. ***Greenidea*** Schouteden

214. *Greenidea (Greenidea) ficicola* Takahashi
215. *Greenidea (Grreenidea) longicornis* Ghosh, Ghosh and Raychaudhuri
216. *G. (G.) longirostris* Basu
217. *G. (G.) neoficicola* Ghosh Ghosh and Raychaudhuri
218. *G. (G.) photiniphaga* Raychaudhuri, Ghosh, Banerjee and Ghosh

219. *G. (Neogreenida) ayyari* Raychaudhuri, Ghosh, Banerjee and Ghosh
220. *G. (N.) longisetosa* Raychaudhuri, Ghosh, Banerjee and Ghosh
221. *G. (Neogreenidea) symplocosis* Raychaudhuri *et al.*
222. *G. (Paragreenidea) symplocosis* Ghosh, Basu and Raychaudhuri
223. *G. (Trichosiphum) anonae* (Pregande)
224. *G. (T.) bucktoni* Ghosh, Basu and Raychaudhuri,
225. *G. (T.) formosana heeri* Raychauduri, Ghosh, Banerjee and Ghosh
226. *G. (T.) gigantea* Ghosh and Raychaudhuri
227. *G. (T.) schoutedeni* Raychaudhuri, Ghosh, Banerjee and Ghosh
228. *G. (T.) spinotibium* Chatterjee and Raychaudhuri

Genus 96. ***Greenideoida*** van der Goot

229. *Greenideoida (Neogreenideoidea) bengalensis* Raychaudhuri and Chatterjee
230. *G. (Pentatrichosiphum) luteum* Basu
231. *G. (Pentatrichosiphum)? lambersi* Basu

Genus 97. ***Hollotrichosiphon*** Raychaudhuri

232. *Hollotrichosiphon dubius* (Van der Goot)
233. *H. russellae* Ghosh and Raychaudhuri

Genus 98. ***Mollitrichosiphum*** Suenga

234. *M. (M.) singh* Raychaudhuri, Banerjee and Ghosh
235. *Mollitrichosphum (Mollitrichosihum) tenuicorpus* (Okajima)
236. *Mollitrichosiphum (Metatrichosiphum) alni* Ghosh, Ghosh and Raychaudhuri
237. *M. (M.) nandii* Basu

Subfamily HORMAPHIDINAE

Tribe CERATAPHIDINI

Genus 99. ***Aleurodaphis*** van der Goot

238. *Aleurodaphis blumeae* van der Goot

Genus 100. ***Astegopteryx*** Karsch

239. *Astegopteryx minuta* (van der Goot)

Genus 101. ***Cerataphis*** Lichtenstin

240. *Cerataphis palme* (Ghesquire)

Genus 102. ***Ceratoglyphina*** van der Goot

241. *Ceratoglyphina bambusae bengalensis* Ghosh

Genus 103. ***Ceratovacuna*** Zehntner

242. *Ceratovacuna indica* Ghosh, Pal and Raychaudhuri
243. *C. lanigera* Zehntner
244. *C. perglandulosa* Basu, Ghosh and Raychaudhuri
245. *C. silvestri* (Takahashi)
246. *C. spinulosa* Ghosh and Raychaudhuri

Genus104. ***Chaitoregma*** Hille Ris Lambers and Basu

247. *C. tattakana* (Takashashi)

Genus 105. ***Glyphinaphis*** van der Goot

248. *Glyphinaphis bambusae* van der Goot

Genus106. ***Pesudoastegopteryx*** Ghosh, Pal and Raychaudhuri

249. *Pseudoastegopteryx himalayensis* Ghosh,Pal and Raychaudhuri
250. *Pseudoregma alexandri* (Takahashi)
251. *Pesudoregma bucktoni* Ghosh, Pal and Raychaudhuri
252. *Pseudoregma panicola* (Takahashi)

Tribe NIPPONAPHIDINI

Genus 108. ***Euthoracaphis*** Takahashi

253. *Euthoracaphis heterotricha* Ghosh ad Raychaudhuri

Genus 109. ***Hemipodaphis*** Davis, Narayanan and Rajasingh

254. *Hemipodaphis monstrata* David, Narayanan and Rajasingh

Genus 110. ***Nipponaphis*** Pergande

255. *Nipponaphis (Nipponaphis) manoji* Ghosh and Raychaudhuri
256. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh and Raychaudhuri
257. *Nipponaphis (Pseudonipponaphis) machiliphaga* Takahashi

Genus 111. ***Sinonipponaphis*** Tao

258. *Sinonipponaphis holboelliae* (Ghosh and Raychaudhuri)

258. *Sionipponaphis holboelliae* (Ghosh and Raychaudhuri)

Genus 112. ***Tuberaphis*** Takahashi

259. *Tuberaphis indica* Ghosh, Ghosh and Rychaudhuri
260. *T loranthi* (van der Goot)

Subfamily LACHNINAE

Tribe LACHNINI

Genus 113. ***Lachnus*** Burmeister

261. *Lachnus tropicalis* (van der Goot)

Genus 114. ***Nippolachnus*** Matsumura

262. *Nippolachnus bengalensis* Basu and Hille Ris Lambers
263. *N. himalayensis* (van deer Goot)
264. *N. pyri* Matsumura

Genus 115. ***Pyrolachnus*** Basu and Hille Ris Lambers

265. *Pyrolachnus pyri* (Buckton)

Genus 116. ***Stomaphis*** Walker

266. *Stomaphis mordvilkoi* Hille Ris Lambers

Genus 117. ***Tuberolachnus*** Mordvilko

267. *Tuberolachnus salignus* (Gemelin)
268. *Tuberolachnus (Tubrolachniella) scleratus* Hill Ris Lambrs and Basu

Subfamily PEMPHIGINAE

Tribe ERIOSOMATINI

Genus 118. ***Tetraneura*** Hartig

269. *Tetraneura (Indoteraneura) basui* Hille Ris Lambers
270. *Tetraneura (Tetraneura) Kalimpongensis* Raychaudhuri, Pal and Ghosh
271. *Tetraneura (T.) multisetosa* Raychaudhuri, Pal and Ghosh
272. *Tetraneura (Tetraneurella) nigriabdominals* (Sasaki)
273. *Tetaranura (Tetraneura) radicicola* Strand/ yezoensis Maaatsumura group

Tribe PEMPHIGINI

Genus 119. ***Formosaphis*** Takahashi

274. *Formosphis micheliae* Takahashi

Genus 120. ***Pemphigus*** Hartig

275. *Pemphigus vulgaris* Raychaudhuri, Pal and Ghosh

Genus 121. ***Prociphilus*** Koch

276. *Prociphilus micheliae* Hille Ris Lambers

Tribe FORDINI

Genus 122. ***Asiphoniella*** Theobald

277. *Asiphoniella cynodonti* (Das)

Genus 123. ***Chaetogeoica*** Remaudiere and Rao

278. *Chaetogeoica graminiphaga* Raychaudhuri, Pal and Ghosh
279. *C. ploychaeta* Raychaudhuri, Pal and Ghosh

Genus 124. ***Forda*** Heyden

280. *Forda marginata* Koch

Genus 125. ***Geoica*** Hart

281. *Geoica lucifuga* (Zehntner)
282. *G. sikkimensis* Raychaudhuri, Pal and Ghosh

Genus 126. ***Smynthurodes*** Westwood

283. *Smynthurodes betae* Westwood

Note : Two subfamilies are now recognised under callipterinae i.e. subfamily Chaitophorinae (General No.73,79,87 of this list) and subfamily Drepansoiphinae (other genera listed under Callipterinae in the present list). These can be separated by characters as shown in the key in the following pages.

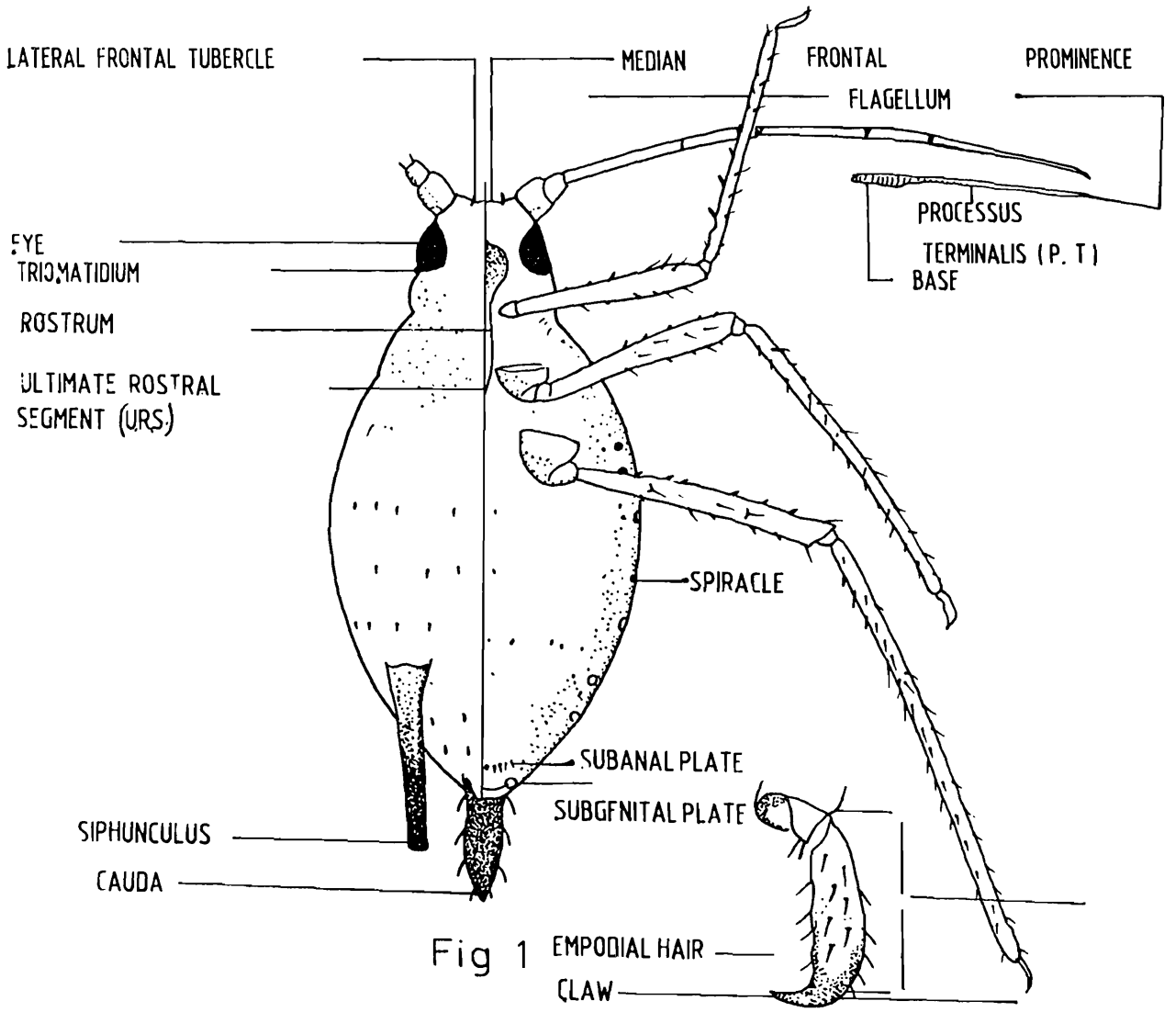


Fig 1

External morphology. Fig. 1. Typical Apterous viviparous female

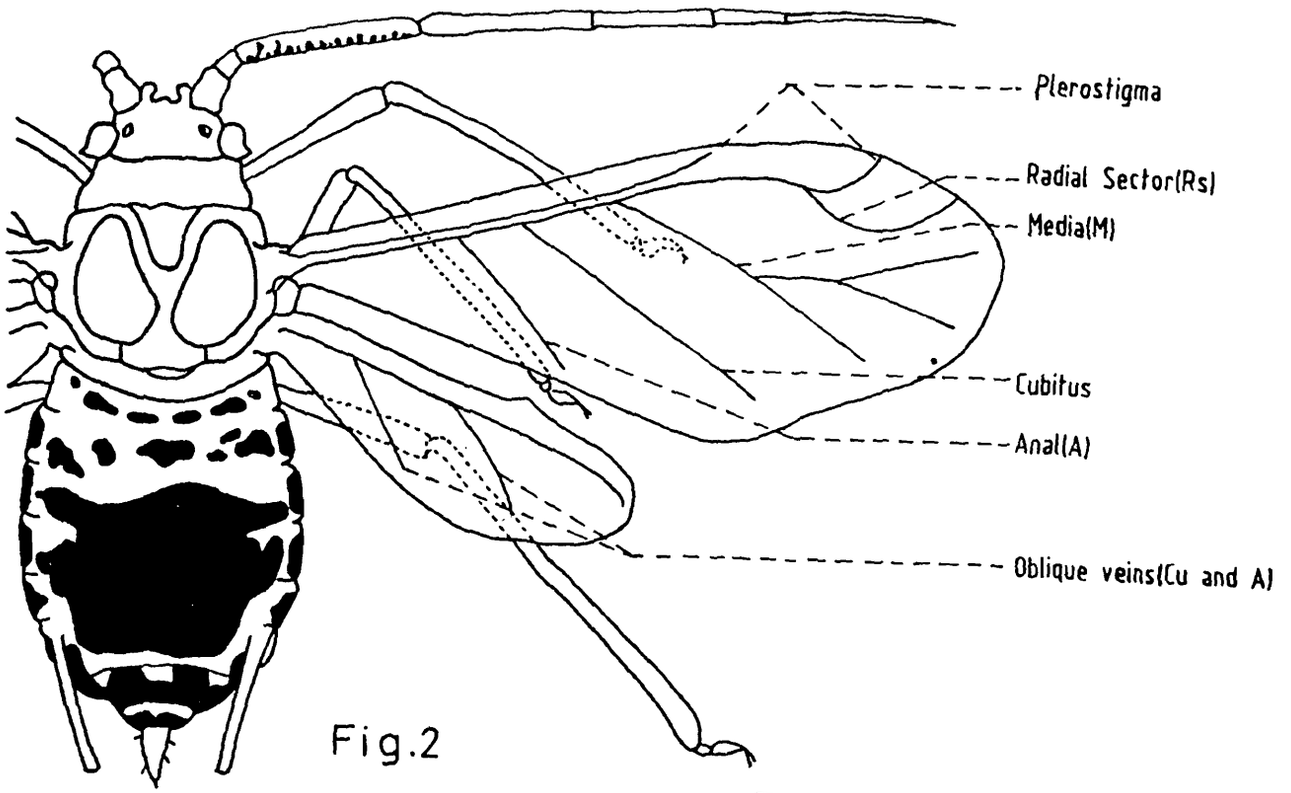
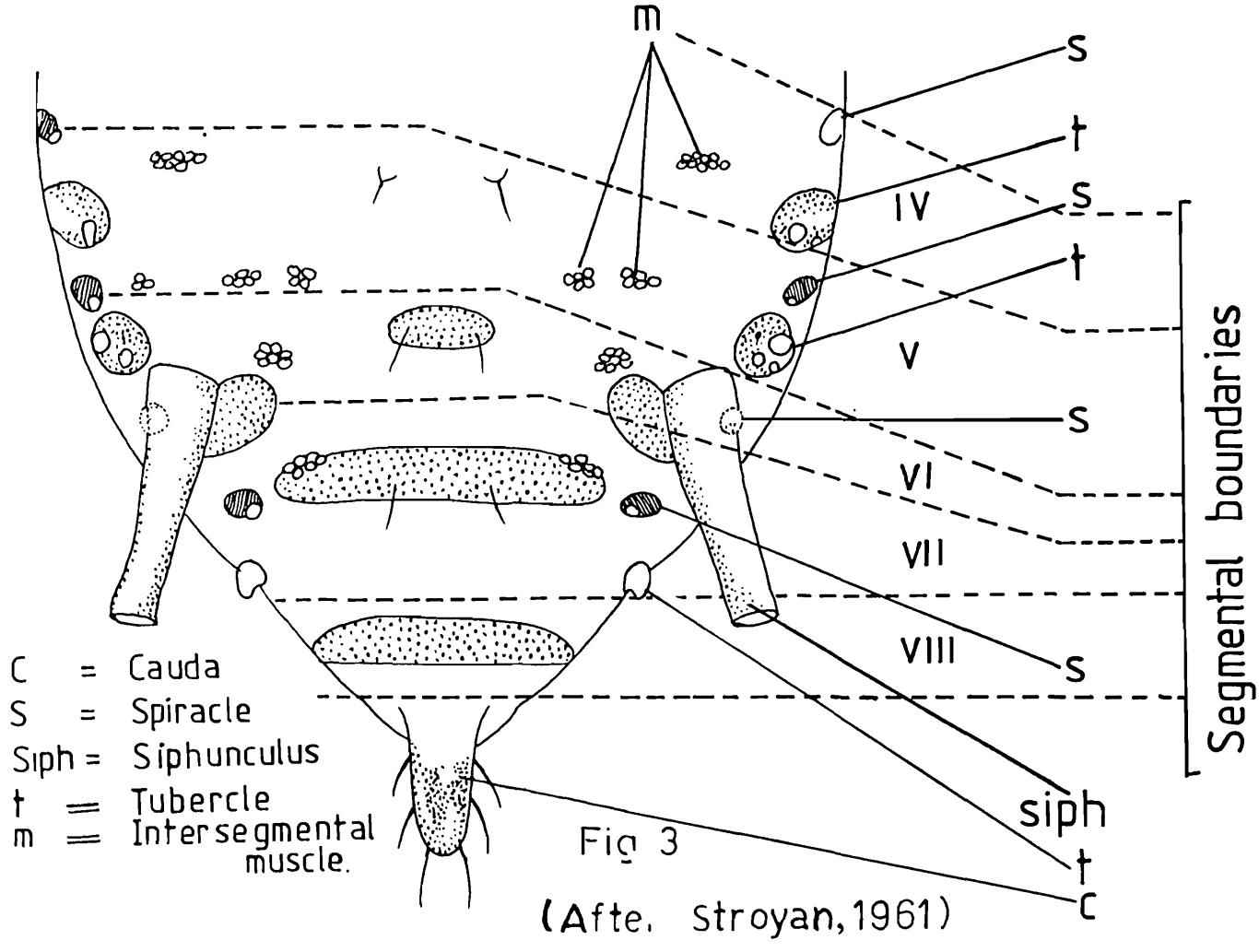


Fig.2

[After Raychaudhari.D.N.(ed) 1980]

External morphology. Fig. 2. Typical Alate viviparous female



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

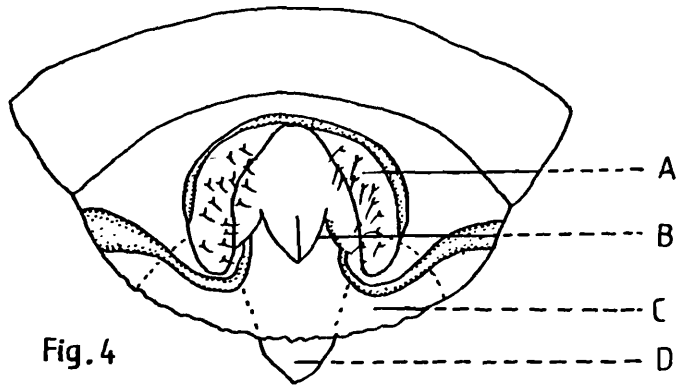


Fig. 4

Typical male appendages of Aphis L.

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

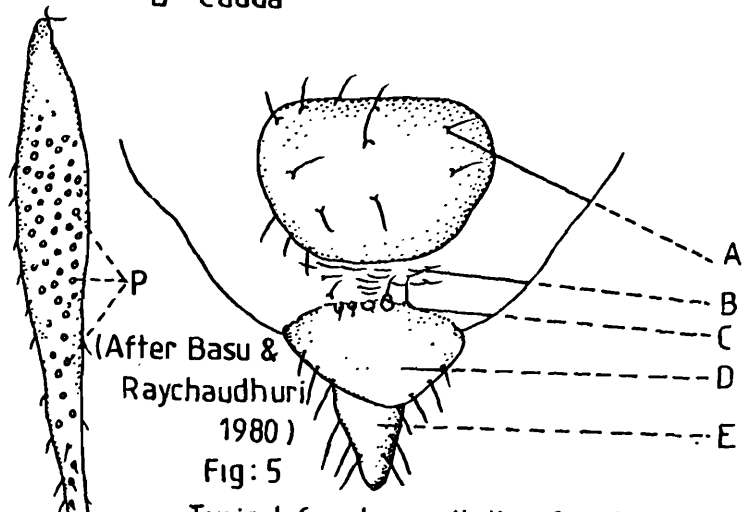
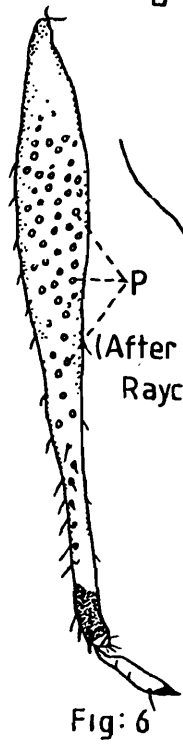


Fig: 5

Typical female genitalia of apterous oviparous female of Aphis L.

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



(After Basu & Raychaudhuri 1980)

Fig: 6

Hind tibia showing pseudosensoria in apterous Oviparous female of Aphis L.

P - Pseudosensoria

External morphology. Fig. 4. Typical male genitalia. Fig. 5. Typical female genitalia. Fig. 6. Hind tibia showing pseudosensoria in apterous oviparous female.

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 prothoax or may be various types of fusion of abdominal segments. The head (fin.1) bears a flat or concaves frons, with or without lateral frontal tuberces which when present may be smooth,rugose, spinulose and parallel, converging or diverging. Eyes are normally 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 (fig.2) Antennae usually consi'ts of two short basal segments and a flagellum of 1-4 segments; the penultimate segment bears a primary rhinarium to the distal end and in the last antennal segment consist of ' base' and slender apical part, called' processus terminalis' (Fig.1); secondary rhinaria may vary in shape,size and number and may variably present on segment III,IV and Vand sometimes on base of segment VI in alatae,and on antennal sgment III of apterae in some aphididae.Rostrum consists of 5 segments, last segment being usually small and fused with 4 th 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 other 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 are usually 2 segmented (Fig.1) and the samll first tarsal joint bears 2-7 ventral hairs, may also be present. Second tarsal joint usuallu bears dorso and latero apical hairs and a pair of terminal claws; empodial hairs present betwen the claws (fig.1). Forewing (Fig.2) possesses stigma, a straight or curved radial sector, simple, once or twice forked, media besides and cubital veins; hind wings (Fig.2) usually smaller than fore wings, bears 2 oblique veins which may be reduced to 1 or may even be absent. Abdomen (Fig.3) consists of 9 segments, each of the segments 1-7 usually bears a pair of spiracles . 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 (Figs.1,2,3,5) of various shapes and characters, however in some Aphididae, siphunculi are absent. Subanal plate (Fig.1) situated ventral to cauda, modification of terminal abdominal segment. Cauda (Figs.1,2,3,5) maybe of various shapes and bears 2 to many hairs.

The males are usually but smaller in size than alate viviparous females, exhibit sclerotic clapers (Fig.4) and bears many secondary rhinaria on antennal segment III,IV,V and sometimes also on VI. The oivparous females are usually apterous and possess numerous pseudosensoria on hind tibiae (Fig.6) which are distinctly swollen than those of apterous viviparous females. Female genitalia with rudimentary gonapophyses, vulva etc. (Fig.5).

MATERIAL AND METHODS

Habitat : Aphids usually feedin 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 co..cinellid 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.

ii) Asheet 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 techniqe 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 methods may be adopted by using tubes of standard width that can be fitted to an exhauster,and thereby the aphids are sucked in from the threshing board . 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 collcting aphid 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 that it may be possible to have winged spcimens that come out within a day or two from th 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 stuy.

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 collcting 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 certan heights, winged aphids are attacted perhaps by yellow colour and fall on water. These aphids are then collected and preservd in 70% alcohol. This process is maintained at every 24 hours. The water is preferably changed after each catch.

Litht 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 ar placed directly into vials containing the c learing fluid made of saturated solution of the lactic acid with clear phenol crystals . In this solution, 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 of host :

Locality : (Name, district, State and if necessary, altitude latitudes, and longitude

Date of collection :

Collector :

It is also desirable to maintain a field note book to record all the necessary deta with 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.

Transportation : The aphid specimens which are collected in the field, should be put into a tube containing fluid of 9% 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 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 maintans the orientation of chaetotaxy which are of paramount inmportance in aphid taxonomy.

The lables should be inserted in each tube which is closed with cotton plug. Similar label should also be provided outside each tube. Care should be taken that no trace of air remains 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 slids. For this purpose aphids are brashed 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 collction, preservation and mounting techniques.

Abbreviations used :

Aptera (e) : Apterous viviparous females (s) ; Alata (e) : alate vivparous female (s); a.s. : Antennal segment; b.d. ; Basal diameter of antennal sgment III ; C.U. : Calcutta University ; F.T.C. : first tarsal chaetotaxy; ht2 :Second segment of hind tarsus; p.t. : Processus terminalis; u.r.s. : Ultimate rostral segment ; x : Times as long as.

SYSTEMATIC ACCOUNT

Key to the subfamilies

1(2) First tarsal segments always with more than 7 ventral hairs nd 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) Siphnuculus usually elongated and densely hairy,if short and truncate then without any hair but with a pair of dorsal processi arising from abdominal tergite 7 and eyes in apterae 3- faceted ... .Greenideinae

4(3) Siphunulus of various shapes, if elongate then usually without hairs.....5

5(6) Empodial hair always fine; subanal plate never indentred or bilobd; head and pronotum usually separate 7

6(5) Empodial hair flattened or fine subanal plate usually indented or bilobed,if entire then body usually indented or bilobed, if entire then body usually with wax gland plates; head and pronotum sometimes also entire 9

7(8) Siphunculus usually elongate; cauda longer than broad; p.t. usually longer than base of last antennal segment ..... Aphidinae

8(7) Siphunculus never elongate, cone-shaped with apical rim not chitinised; cauda broader than long;p.t.always shorter than base of last antennal sgment .....Anoeeinae

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 ....Callipterinae*

10(9) Eyes in apterae always 3-faceted,siphunculi truncete, cone-shaped, ring-like or absent; wax gland plate usually present 11

11(12) Head in apterae free fom pronotum separate; frontal processi absent; antennae 5-6 segmented, first tarsal segments with 2-7 hairs dorsoapical hairs; dorsoapical hairs of second tarsal segments fine;cauda rounded .....Pemphiginae

12(11) Head in apterae fused with pronotum in apterae; usually with a pair of frontal horns; antenae usually with a paix of frontal horns; antennae 2-5 segmented;first tarsal segments with less than 5 hairs;dorso apical hairs of second tarsal segments capitate; cauda weakly or distinctly knobbed or rounded .....Hormaphidinae

* The subamily Callipterinae is now recognised to be composed of two separate subfamilies i.e.,Chaitophorinae and Drepanosiphinae. These can be sparated as follows :

Body and appendages usually with conspicuous dorsal hairs; eyes of all forms large; p.t. never shorter than base of last antennal segment; siphunculi usually with reticulation,truncate or ring-like, never clavate; wax gland plate absent .....Chaitophorinae

Body and appendages devoid of conspicuous hairs as above; eyes of apterae sometimes 3-faceted;p.t.may be shorter or longer than base of last antennal segment; siphunnculi not reticulated,usually truncate or ring-like,if elongae then cauda distinctly knobbed, wax gland plate present or absent ..... Drepanosiphinae.

Subfamily ANOECIINAE

Key to the Tribes of the Subfamily Anoeciinae

1(2) Apterae with the addominal dorsum pale and 3- faceted eyes; mesothoracic furca with separate arms; lateral abdominal tubercles absent; M of forewings twice-branched ..... Aiceonini

2(1) Apterae with abdominal dorsum strongly sclerotized and with many faceted eyes;arms of midthoracic furca connected basally; lateral abdominal tubercles present; M of forewings once-branched ..... Anoeciini

Tribe ANOECIINI

Genus I. ***Anoecia*** Koch

1857. *Anoecia* Koch,1857, *Die Apfl. phiden*, **3**:375
Type species : *Aphis corni* Fabricius, 1775.

1. ***Anoecia radiciphaga*** Pal and Raychaudhuri

1977. *Anoecia radiciphaga* Pal and Raychaudhuri,*Orient.Insects*,**11**:374.
1980. *Anoecia radiciphaga* : Raychaudhuri,D.N., Pa1.P.K. and Ghosh, A. K.*In* Taxonomy of the Aphids of North East India and Bhutan The Zoologcal Society Calcutta :46.

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

Host plant : *Eragrositis nigra* and unidentifed grass (Gramineae)

Distribution : India : West Bengal (Darjiling).

Tribe AICEONINI

Genus 2. ***Aiceona*** Takahashi

1921. *Aicona* Takahashi, *Aphididae of Formosa*,**1** : 85.
Type species: *Aiceona actinodaphis* Takahashi, 1921

Key to the species of the genus ***Aiceona*** Takahashi

Apterous vivaparous females

1(2) Body hairs arise from distinct sclerites or sclerotic bases 3

2(1) Body hairs never arise from distinct sclerites or sclerotic bases

3(4) Dorsal hairs arise from dusky sclerotic bas; siphunculi on pale cones;8th tergite with 6 hairs .... *pallida*

4(3) Dorsal hairs arise from distinct scattered sclerites;siphunculi on dark or dark brown sclerotic cones; 8th ergite with 8-12 hairs ..... *titabarensis*

5(6) Hairs on abdominal dosum 5.0-7.0 times as long as b.d. III;u.r.s.with 2 accessory hairs;8th tergite with 12 hairs ..... *longisetosa*

6(5) Hairs variable, if long and fine on abdomen then u.r.s. with more than 2 accessory hairs and 8th tergite with not more than 8 hairs 7

7(8) Antennal segment VI with one accessory rhinarium placed wide apart from primary rhinarium;dorsal hairs fine, upto 160 μ long, 3.1 times as long as b.d.III; cauda with 10 hairs ..... *pesudosugii*

8(7) Antennal segmert VI with accessory rhinaria placed close to primary rhinaria; dorsal hairs of variable length 9

9(10) 8th tergite with 7-8 hairs,upto 5.6-6.5 times as long as b.d. III; First tarsal segments usually with 5-6 hairs 11

10(9) 8th tergite with 6-23 hairs,upto3.5 times as long as b.d III; first trrsal segment with 6-9 hairs; u.r.s. with 4 accessory hairs; dorsum of abdomen pale membranous, with scleroites ..... *retipennis*

11(12) Dorsal hairs 3.2-4.8 times as long as b.d III; first segments with 5-6 hairs; cauda bears 10 hairs ..... *robustietsosa*

12(11) Dorsal hairs 5.0-5.5 times as long as b d. III first tarsal segment with 6,6,6 hairs; cauda bears 6-8 hairs ..... *paraosuguii*

Alate viviparous females

1(2) Forewings with numerous long hairs scatterd all over the surface; antennal segment III with 20-27, IV with 7-14 and V with 1-8 secondary rhinaria ..... *titabarensis*

2(1) Forewing with hairs arranged only along subcosta and pterostigma 3

3(4) Wings with dark reticulation; antennal segment III with 27-37, IV with 9-13 and V with 3-6 secondary rhinaria ..... *retipennis*

4(3) Wings never reticulated 5

5(6) Ultimate rostral segment equal to or longer than h.t.2 7

6(5) Ultimate rostral segment distinctly shorter than h.t. 2 9

7(8) Hairs on abdominal dorsum shorter,3.5-5.6 times as long as b.d III; antennal segment IIIwith 50-66, IV with 16-25 and V with 6-14 secondary rhinaria .....*pallida*

8(7) Hairs on abominal dorsum longer,6.6-8.3 times as long as b.d. III; antennal segment III with 43-45, IV with 12-15,V with 6-7 secondary rhinaria and also base of VI with one secondary rhinarium .....*paraosugii*

9(10) Abdominal dorsum with segmental sclerotic bands on 1 st -7 th tergites; antennal segment III with 32-38, IV with 8-11, V with 2-7 secondary rhinaria .....*robustisetosa*

10(9) Abdominal dorsum with sclerotic spinal bars on 1st -3 rd tergites only; Antennal segment IIIwith 43-46,IV with 13-18 and V with 3-5 secondary rhinaria .....*pseudousugii*

2. *Aiceona longisetosa* Ghosh and Raychaudhuri

1973 *Aiceona longisetosa* Ghosh, M.R. and Raychaudhuri, *D.N., Orient. Insects* **7** : 550.
1988 *Aiceona longisetosa* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 4:21.

Material examined : 3 apterous viviparous females and a few nymphs.

Host plant : Unidentified plant.

Distribution : India : West Bengal (Darjiling).

3. *Aiceona pallida* Ghosh and Raychaudhuri

1972. *Aiceona pallida* Ghosh, A.K. and Raychaudhuri, *D.N., Proc. zool. Soc. Calcutta*, **25**: 105.
1988. *Aiceona pallida* : Ghosh, A.K., Fauna of India: *Aphidoidea, Zool. surv. India*, pt. 4 : 32.

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

Host plant : Unidentified plant.

Distribution : India : West Bengal (Darjiling).

4. *Aiceona paraosugii* Ghosh and Raychaudhuri

1971. *Aiceona paraosugii* Ghosh,A.K., Ghosh, M.R.and Raychaudhuri, *D.N. Orient. Inscts*, **5**: 324.
1988. *Aiceona paraosugii* : Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 4:37.

Material examined: 3 apterous ,1 alate viviparous females and 3 nymphs; an alate oviparous female.

Host plant: Unidentified trees.

Distribution : India : West Bengal (Darjiling)

Remarks : Pal, P.K. and Raychaudhuri, D.N. (1977) reported alate oviarous female of this species from the Darjiling District of West Bengal

5. ***Aiceona pseudosugii*** David, Sekhon and Bindra

1970. *Aiceona pseudosugii* David, Sekhon and Bindra, *Bull. Ent.*, **11**(2): 150.
1988. *Aiceona pseudosugii* : Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.4 :49.

Material examined : 2 apterous and 2 alate viviparous females and nymphs.

Host plant : Unidentified plant or Lauraceae

Distribution : India : West Bengal (Darjiling); Himachal Pradesh.

6. ***Aiceona rettipennis*** David, Narayanan and Rajasingh

1970. *Aiceona retipennis* David, Narayanan and Rajasingh *Orient. Insects*, **4**: 413.
1988. *Aiceona retipennis* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 4:51.

Material examined : Many apterous, 2 alate viviparous females and many nymphs; 1 alate male.

Host plants: Unidentified plant s of lauraceaae, *Buddelia asiatica* (Loganaceae) and *folia lanceolata*

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Himachal Pradesh; Uttar Pradesh.

Remarks : Pal and Raychaudhuri (1977) reported the alate male of this species for the first time from the state of West Bengal.

7. ***Aiceona robustiseta*** Ghosh and Raychaudhuri

1973. *Aiceona robustiseta* Ghosh, M.R.and Raychaudhuri., *Orient. Insects* **7** :553.
1988. *Aiceona robustiseta* : Ghosh,A.K., Fauna of India : *Aphidoidea, Zool. Surv. India.* pt.4:58.

Materal examined : 14 apterous, 6 alate viviparous females and many nymphs ; 3 alate oviparous females.

Host plant : *Litsea polyantha* (Lauraceae).

Distribution : India : West Bengal (Darjiling).

Remarks: Pal and Raychaudhuri, D.N.(1977) reported alaate oviparous females of this species for the first time from the State of West Bengal.

8. *Aiceona titabarensis* (Raychaudhuri and Ghosh)

1964. *Lachnus titabarensis* Raychaudhuri,D.N. and Ghosh.A.K., *Zool. Meded. Leidn*, 39:257.
1988. *Aiceona titabarensis* (Raychaudhuri and Ghosh); Ghosh,A.K., Fauna of India; *Aphidoidea, Zool. Serv. India*, pt.4:64.

Material examined : Many apterous, alate viviparous females, nymphs land 6 alate oviparous females.

Host plant : *Litsa polyantha* (Lauraceae).

Distribution : India : West Bengal (Darjiling); Assam; Sikkim

Remarks: Ghosh,A.K. (1988) considered both *Lachnus titabarensis* Raychaudhuri and Ghosh land *Aiceona litseae* Basu and Hille Ris Lambers synonymous to *Aiceona titabarensis* (Raychaudhuri and Ghosh).

Subfamily APHIDINAE

Key to Tribes of the subfamily Aphidinae

1(2) Spiracles of abdominal segments 1 and 2 placed close together; lateral abdominal tubercles usually absent from sgments 1 and 7 but variably present on abdomnal segments 2-5 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 3

3(4) Antennae and body much hairy ..... Pterocommatini

4(3) Antennae and body with normal hairs and not with dense 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 these 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 projection as above ..... Aphidina

Subtribe APHIDINA

Key to the genera to the Subtribe Aphidina

1(2) Lateral abdominal tubercles absent from 1st and 7th segments; F.T.C. 3,3,3 ..... ***Indiaphis***

2(1) Lateral abdominal tubercles present on first and usually on 7th segment; F.T.C.usually 3,3,2,rarely 3,3,3 or 2,2,2 3

3(4) 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***

4(3) Hind tibiae without such structures and rows of spinulcs absent; siphunculi moderately long, more than 0.07 times as long as body;u.r.s. always more than 0.06 times as long as ht.2 ..... ***Aphis***

Genus 3. *Aphis* Linnaeus

1758. *Aphis* Linnaeus.*Syst. Nat.*, (10th Ed.) **1**: 451.
Type spcies : *Aphis sambuci* Linnaeus, 1758.

Key to the species of the genus *Aphis* Linnaeus

1(2) Ultimate rostral segment stiletto- shaped ..... *kurosawai*

2(1) Ultimate rostral segment may be of various shapes but not stiletto-shaped 3

3(4) F.T.C. 3,3,3; dorsum of abdomen with polygonal reticulations; siphunculi longer than cauda bearing 10-12 hairs; u.r.s. about 1.2-1.4 times as long as ht.2; p.t 3.8-4.3 times as long as base antennal segment VI ..... *nerii*

5(6) 8th abdominal tergite with 3-8 hairs ..... *fabae*

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 3.0 times as long as b.d. III ..... *longisetosa*

10(9) Hairs on posterior abdominal tergites shorter, about 0.5-1.8 times as long as b.d. III 11

11(12) Siphunculi pale, smooth, dusky near apices; cauda pale to blackish, bearing 6-10 hairs ..... *punicae*

12(11) Siphuncuil borwn to blackish, imbricated 13

13(14) Longest hair on hind femora as long as or longer than its maximum width; abdominal tergite 7 with 4 hairs;siphunculi 0.9-1.8 times as long as blackish cauda bearing 8-15 hairs ..... *citricola*

14(13) Longer hair on hind femora appreciably shorter than its maximum width 15

15(16) Second trasal segment with only primary hairs; cauda usually with 5 hairs ..... *nasturtii*

16(15) Second trasal segment with both primary and secondary hairs 17

17(18) Cauda normally pale to dusky but never black; secondary hairs on u.r.s variable (2-9), hairs on posterior abdominal tergites at most as long as b.d III ..... *glycines*

18(17) Cauda dark brown to black; secondary hairs on. u.r.s. never more than 4 19

19(20) Siphunculi shorter than to almost as long as cauda; p.t. at least 3 times as long as base of antennal segment VI ..... *rubifolli*

20(19) Siphunculi always longer, even upto twice as long as cauda; p.t. usually less than 3 times as long as base of a.s. VI; u.r.s. normal, 1.0-1.3 times as long as h.t. 2; siphunculi 1.2-1.8 times as long as cauda bearing 4-7 hairs ..... *gossypii*

9. *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 :3 apterous and 2 alate viviparous fmales and nymphs; 1 apterous oviparous female

Host plant : *Bidens pilosa* (Compositae).

Distribution : India : West Bengal : all over and almost all States in India.. Elsewhere : Australia; Bhutan; Bermuda Island; China; Nepal ; New Zealand; North America; Pakistan; Sri Lanka; Syria; Thailand and Vietnam.

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

10. *Aphis craccivora* Koch

1854. *Aphis craccivora* Koch, *Die. pfl. Aphiden*, **1**:124.
1990. *Aphis craccivora* : Ghosh, L.K., *Mem. Zool. surv. India*, **17**(3) :22

Material examined : Many apterous and alate viviparous females and nymphs; 11 apterous oviparous females and 2 alate males.

Host plants : Polyphagous, feed on plants belonging to families Apocynaceae, Amaranthaceae,Caesalpinae,Commpositae,Cucurbitaceae,Ericaceae,Lythraceae,Malvaceae,Manispermaceae, Mimosae, Papilionaceae, Schrophulariacae and Solanaceae.

Distribution : India : West Bengal (almost all districts) and all over India. Eleswhere : Virtually cosmopolitan.

Remarks : Basu, R.C., Chakrabarti and Raychaudhuri, D.N. (1968) reported apterous oviparous females and alate males from Calcutta, West Bengal

11. *Aphis fabae* Scopoli group

1763. *Aphis fabae* Scopoli, *Entomologe carnioica*; 136
1990. *Aphis fabae* Scopoli complex; Ghosh, L.K., *Mem. Zool. surv. India* 17(3) : 29.

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

Host plants : Polyphagous, infesting plants belonging to families Amaranathaceae, Apocynacae,Compositae,Curcurbitacae,Myrtacae,Nyctaginaceae,Papillionaceae,Polygonaceae,Rhamnaceae, Rubiaceae, Solanacae, Ternstroemiaceae and Verbenaceae.

Distribution : India ; West Bengal (Darjiling and almost all other districts); Arunachal Pradesh; Assam; Himachal Pradesh; Sikkim; South India; Tripura and Uttar Pradesh. Elsewhere : Africa, Europe; Middle East.

12. *Aphis glycines* Matsumura

1917. *Aphis glycines* Matsumura, *J.Coll . Agric. Hokkaido Imp. Univ.*, 7 : 387.
1990. *Aphis glycines* : Ghosh, *L.K.Mem. Zool. surv. India*, 17(3) : 34.

Material examined : 2 apterous viviparous females and 3 nymphs

Host plant : *Glycine max* (Papilionaceae)

Distribution : India : West Bengal (Darjiling); Manipur. Elsewhere : China; Japan; Korea; Malayasia; Manchuria; Nepal ; Philippines, Taiwan and Thailand

13. *Aphis gossypii* Glover Group

1877. *Aphis gossypii* Glover, *Re. Comm. Agric Oper. Dep.*, (1876) :36.
1990 *Aphis gossypii* : Ghosh, L.K. *Mem Zool. surv., India* 17(3): 35.

Material examined: Many apterous and alate viviparous females and nymphs; 4 apterous oviparous females and 2 alate males.

Host plants : Extremely polyphagous, infesting plants belonging to families acanthaceae, amaranthaceae, Amarylidaceae, Anacardiaceae, Apocyanaceae, Araceae, Aroidae, Canaceae, Capparidaceae,Caproifoliaceae, Caryophyllaceae, Chenopoidaceae, Commelinaceae, Convolvulaceae, Cruciferae,Cucurbitaceae, Dipterocaraceae, Ericaceae, Euphorbiacae, Geraniaceae, Hypercaceae, Labiatae, Lauraceeae,Liliaceae, Loganaceae, Lythraceae, Malvaceae, Melastomaceae, Mimosae, Moraceae, Musaceae, Myrsinaceae,Myrtaceae, Nyctaginaceae, Orchidaceae, Oxalidaceae, Papillioaceae, Plantaginaceae, Polygonaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Saxifragacae, Scrophulariacae, Solanaceae,Styraceae, Tiliaceae, Ternstromeiaceae, Urticaceae, Verbenaceae and Zinziberaceae.

Distribution : India : West Bengal (all districts) and all over India Elsewhere : Virtually cosmopolitan.

Remarks : Ghosh, L.K.(1970) reported apterous oviparous females of this species as *Aphis* sp. Basu, R.C.and Raychaudhuri, D.N. (1980) reported alate male of this species from West Bengal

14. *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 : *Artetemesia vulgaris, Artemesia* spp. (Compositae)

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

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

15. *Aphis longisetosa* Basu

1969. *Aphis ruborum longisetosus* Basu, A.N., *Orient. Insects*, **3** : (4) : 345
1990. *Aphis longiestosa* :Ghosh, L.K., *Mem. Zool. surv. India*, **17** (3) : 45.

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

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

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

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

16. *Aphis nasturtii* Kaltenbach

1834. *Aphis nasturtii* Kaltenbach. *Mongr. fam. Planz.* : 76.
1990. *Aphis nasturtii* :Ghosh, L.K., *Mem. Zool. surv. India*, **17**(3) : 45.

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

Host plants : Extremely polyphagous, feeding on plants belonging to Acanthaceae, Amaranthaceae, Aroideae, Asclepiadaceae, Balsaminaceae, Boraginaceae, Chenopodiaceae, Compositae, Convolvulaceae, Cruciferae, Dipterocarpacae, Hypereaceae, Labiatae, Lythraceae, Mangnoliaceae, Malvaceae, Melastomaceae, Moraceae, Myrtaceae, Orchidceae, Oxalidaceae, Papilionaceae, Plantaginaceae, Polygonaceae, Ranunculaceae, Rubiaceae, Rutaceae, Scrophulariaceae, Solanaceae, Utricaceae, Vacinaceae and Verbenaceae.

Distribution ; India : West Bengal (Darjiling and other districts); Arunachal Pradesh; Haryana; Himachal Pradesh; Manipur ; Meghalaya; Nagaland; Sikkim and Uttar Pradesh. Eslewhere : America; Europe; Great Britain; Middle East; Nepal; Pakistan; Taiwan; U.S.A

17. *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 apterous and alate viviparous females and nymphs.

Host plants : *Asclepias currassavica, Calotropis* sp. (Asclepiadaceae).

Distribution : India : West Bengal (Darjiling and other districts) and all over India . Elsewhere: Africa; America; Australia; Bhutan ; Burma; British Guinea; China; Europe; Fiji; Formosa; Japan; Java; Korea; Malaya; Middle East; Nepal; New zealand; Siam; Solomon Islands; Spain; Sri Lanka; Somaliland; Transvaal; U.S.A.

Remarks : This is a light yellow coloured species which is distinguished both form *craccivora* and *gossypii* in the colour and number of caudal hairs (9-11).

18. *Aphis punicae* Passerini

1863. *Aphis punicae* Passerini, *Arch. Zool. Anaat. fisiol.* (Modena), **2** : 32.
1990. *Aphis punicae* : Ghosh, L.K., *Mem. Zool. surv. India*, **17**(3) :57.

Material examined : Many apterous viviparous females and nymphs.

Host plant : *Punica granatum* (Punicaceae).

Distribution : India : West Bengal (Darjiling); Himachal Pradesh; Manipur; Meghalaya Elsewhere : Africa; Europe; France; Italy; Moracco; Pakistan; Spain; Switzerland and U.S.S.R.

19. ***Aphis rubifolii*** Thomas

1879. *Aphis rubifolii* Thomas, *Rp. II Ent.*, **8** :160.
1990. *Aphis rubifolii* : Ghosh, L.K., *Mem. Zool. surv. India*, **17** (3) : 62.

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

Host plants : *Rubus ellipticus, Rubus* sp. (Rosaceae).

Distributon : India : West Bengal (Darjiling) ; Uttar Pradesh. Elsewhere : Nepal; North America.

Genus 4. ***Indiaphis*** Basu

1969. *Indiaphis* Basu, A.N., *Orent. Insects*, **3** : 175.
Type species : *Indiaphis crassicornis* Basu, 1969

20. ***Indiaphis crassicornis*** Basu

1969. *Indiaphis crassicornis* Basu, A.N. *Orient. insects*, **3** : 175.
1980. *Indiaphis crassicornis* : 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. :150.

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

Host plant : *Rhododendron* spp.(Ericaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh, Himachal Pradesh.

Genus 5. ***Toxoptera*** Koch

Key to the species of genus ***Toxoptera*** Koch

Apterous viviparous females:

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 sparsly 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 b.d III; siphunculi heavily imbricated; cauda with 25-36 hairs ..... *citricidus* (Kirk.)

Alate viviparous females:

1(2) Siphuncuil 0.46-0.64 times as long as cauda and 0.04-0.05 times as long as body; p.t. 2.42 -3.34 times as long as base of segment VI; longest hair on segment III about 1.60-2.50 tims as long as b.d.III; segment III with 9-13 secondary rhinaria; 8th abdominal tergite with 3-6 hairs .... *odinae*

2(1) Siphunculi 1.08-1.86 times as long as cauda and 0.11-0.8 times as long as body; p.t. 2.87-6.08 times as long as base of segment VI; antennae 0.72-0.9 times as long as body; longest hair on segment III about 0.85-1.55 times as long as b.d.III 3

3(4) The three hairs on first tarsal segments nearly similar in length; segment III with 4-14 circular secondry rhinaria in a row and distrbuted over entire length and segment IV usuallay without but sometimes with 1-6 similar rhnaria; cauda with 11-17 hairs ..... *aurantii*

4(3) Lateral hairs on first tarsal segments much reduced; segment III with 16-21 and IV with 0-4 circular secondary rhinaria; cauda with 26-38 hairs ..... *citricidus*

21. *Toxoptera aurantii* (Boyer de Fonscolombe)

1841. *Aphis aurantii* Boyer de Fonscolomble, *Annals. Soc. ent. Fr.* **10** :178.
1976. *Toxoptera aurantii* (Boyer de Fonscolombe); Mondal, Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(4) :536.

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

Host plants : Extremely polyphagous, infesting plants belonging to Acanthaceae, Amaranthaceae, Anacardiaceae, Anonaceae, Apocynaceae, Araceae, Berberidaceae, Betulaceae, Caesalpineae, Caprifoliaceae, Compositae, Cucuribtaceae, Euphorbiaceae, Fagaceae, Gramineae, Hypercaceae, Juglandaceae, Lauraceae, Lytharceae, Magnoliaceae, Malvaceae, Melastomaceae, Liliaceae, Moraceae, Myrsinaceae,Myrtaceae, Nyctaginaceae, Papilionaceae, Piperaceae, Rhamnaceae, Rosaceae, Rubiaceae, Santalaceae, Sapindaceae, Simaronbacae, Solanaceae, Sterculaceae, Straceae, Ternstrominaceae, Theaceae,Vaccinaceae, Zapotaceae,

Distribution : India : West Bengal (almsot all districts) and all over India. Elsewhere : Virtually cosmopolitan.

22. *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 : Many apterous, alate viviparous females and nymphs.

Host plants : Plants belonging to Anacardiaceae, Berberidaceae, Caesalpineae, Caprifoliaceae, Caryophyllaceae, Compositae, Cruciferae, Fagaceae, Juglandaceae, Lauraceae, Loranthaceae, Magnoliaceae, Moraceae, Myrsinaceae, Passifloraceae, Rosaceae, Rubiaceae, Solanaceae, Ternstromiaceae, Urticaceae.

Distribution : India : West Bengal (almost all districts) and all over India. Elsewhere : Ethiopia ; Fij; Hawaii; Japan; Java; Korea; Malaysia; Nepal; New Guinea; New South Wales; New Zerland; Philippines; Queensland; Sabah; Sarawak; South America; South Australia; Sri Lanka; Sumatra; Taiwan; Thailand; Victoria and West Australia;

23. *Toxoptera odinae* (van der Goot)

1917. *Toxoptera odinae* van der Goot, *Contr. Faune Indes neerl.*, **1** (3) 113.
1976. *Toxoptera odinae* (van der Goot); Mondal, Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects,* **10**(4) :537.

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

Host plants :Plants belonging to Anacardiaceae, Araliaceae, Berberidaceae, Caesalpinae, Carprifoliaceae, Compositae, Cucurbitaceae, Cyperaceae, Ericaceae, Fagaceae, Gramineae. Lythraceae, Magnoliaceae, Malvaceae, Moraceae, Myrsinaceae, Papilionaceae, Polygonacae,Rhamnaceae, Rosacee, Rubiaceae, Rutaceae, Santalaceae, Solanaceae, Sterculaceae, Storaceae, Ternstroemiaceae, Verbenaceae, Vitaceae.

Distribution : India : West Bengal (Almost all districts) and all over 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) Suphunculus 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; secondaary rhinaria in alatae protuberant ..... ***Melanaphis***

6(5) Sphunculus rather long; secondary rhinaria in alate normal 7

7(8) Cauda pale, medially constricted, usully with 4 medial hairs; Alate with Media of forewing twice branched; hind with with 1 oblique vein ..... ***Hysteroneura***

8(7) Cauda not as above; alate with Media of fore wings once-branched; hind wing with 2 oblique veins ..... ***Schizaphis***

Genus 6. *Hyalopterus* Koch

1854. *Hyalopterus* Koch die pl. *Aphiden*, **1** : 16.
Type species : *Aphis pruni* Geoffroy, 1762

24. *Hyalopterus pruni* (Geoffroy)

1762. *Aphis pruni* Geoffroy, Historie Abergee des Insects qui 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 alaate viviparous females and nymphs.

Host plants : Phargmitis sp. *Poa*, sp. (Gramineae) and *Prunus* sp (Rosaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Manipur; Meghalaya; Karnataka; Nagaland; Tamil Nadu; Uttar Pradesh. Elsewhere : Africa; Afganistan; Cyprus; Iraq; Italy; Pakistan; Spain; United Kingdom and Yugoslavea.

Genus 7. *Hysteroneura* Davis

1919. *Hysteroneura* Davis, *Canad. Ent.*, **51** :263.
Type species : *Siphonophora setariae* Thomas, 1878.

25. *Hysteroneura setariae* (Thomas)

1878. *Siphonophora setariae* Thomas, Bull III. St. *Lab. naat. Hist.*, **2** : 5.
1980. *Hysteronerua setariae* (Thomas);Raychaudhuri. D.N., Ghosh, M. R. and Basu, R.C., *In* Aphids of North East India and Bhutan ; 61.

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

Host plant : Uuidentified spp. of Gramineae *and Prunus* sp. (Rosaceae).

Distribution : India : West Bengal (Darjiling and all other districts) and all over India . Elsewhere: Africa; America; China; Eastern Islands; Fiji; Hawaii; Japan; Korea; Malaysia; Nepal; New Guinea; Philppines; Soloman Islands; Taiwan; Thailand and Vietnam.

Genus 8. *Melanaphis* van der Goot

1917. *Melanaphis* van der Goot, *Contr. Fauna Indes. Neerl.*, **1**(3) ; 60
Type species : *Aphis bambusae* Fullaway, 1919.

Key to the speciis of the genus ***Melanaphis*** van der Goot

Apterous viviparous females

1(2) Mid femora with shorter hairs, longest one being more than midwidth of femora 3

2(1) Mid femora with longer hairs, longest one being more than midwidth of femora 7

3(4) Siphunculi shorter than basal width; dorsal abdominal hairs short.... ....*vandergooti* Raychaudhuri & Banerjee

4(3) Siphunculi shorter than basal width; dorsal abdominal hairs short.....5

5(6) Longest hair on aneterior abdominal tergites shorter than or at most as long as b.d. III; cauda usually with 9-17 hairs .....*sacchari* (Zehntner)

6(5) Longest hair on anterior abdominal tergites always longer than b.d. III; cauda with 4-5 hairs..... .....*bambusae* (Fullaway)

7(8) Cauda with 4-6 hairs; subgenital plate with 4-7 hairs on anterior half ....*meghalayensis bengalensis* Raychaudhuri and Banerjee

Alate viviparous females :

1(2) Ultimate rostral segment about 1.09 times as long as h.t. 2; secondary rhinaria on segment III 14-28, on IV never less than 7 but may be upto 13, on V 0-4, arranged irregularly on segment IIIand IV .....*bambusae* (Fullaway)

2(1) Ultimate rostral segment never longer than h.t. 2 (0.06-0.09); segment III with 6-16 secondary rhinaria and IV without or with 2-6 rhinaria usually in a row .....*sacchari*

26. *Melanaphis bambusae* (Fullaway)

1910. *Aphis bambusae* Fullaway, *Rep. Hawaii agric. Ex. Stn.* (1909) : 335
1974. *Melanaphis bambusae* (Fullaway); Raychaudhuri, D.N. and Banerjee C., *Orient Insects*, 8(3) : 372.

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

Host plant : *Bambusa* spp. (Gramineae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Sikkim. Elsewhere : Australia; China; Egypt; Hawaii; Japan; Java; Malaysia and Taiwan.

27. *Melanaphis mghalayensis bengalesis* Raychaudhuri and Banerjee

1974. *Melanaphis megthalayesis bengalensis* Raychaudhuri,D.N. and Banerjee,C.,*Orient.Insects*,8(3): 377.
1980. *Melanaphis mghalayensis bengalensis*: Raychaudhuri, D.N., Ghosh. M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 65.

Material examined : Many apterous viviparous males ad nymphs.

Host plant : Unidentified Grass (Gramineae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

29. *Melanaphis sacchari* (Zehntner)

1897. *Aphis sachaari* Zehntner, *Archl Suikerind Ned. Ind.*, **5** : 551.
1974. *Melanaphis sacchari* (Zehntner);Raychaudhuri,D.N. and Banerjee, C., *Orient. Insects,* 8(3) ; 379.

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

Host plants : Rthraxon ciliaris, Pennisetum spp. *Saccharum officinarum* and *Sorghum vulgare* (Gramineae).

Distribution : India : West Bengal (Darjiling and other districts) all over India Elsewhere : Virtually cosmopolitan but not known from Europe.

30. *Melanaphis vandergooti* Raychaudhuri and Banerjee

1914. *Melanaphis vandergooti* Raychaudhuri, D.N. and Banerjee, C., *Orient. Insects*, 8(3) : 382.
1980. *Melanaphis vandergooti* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 66

Material examined : 5 apterous viviparous females and 1 nymph.

Host plant : Oryza sativa (Gramineae)

Distribution : India : West Bengal (Darjilling).

Genus 9. *Rhopalosiphum* Koch

1854. *Rhophalosiphum* Koch, Die pflanzen. *Aphiden*, **1** : 23
Type species : *Aphis nymphaeae* Linnaeus, 1761.

Key to the species of genus ***Rhopalosiphum*** Koch: Apterous viviparous females

1(2) Antennae 5- segmented ; abdominal dorsum densely covered with long and fine hairs .... *rufiabdominalis* (Sasaki)

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

3(4) Procesrus tesminalis about 2-5 times as long as VI; body about 10-15 times as long as siphunculi .....*maidis* (Fitch)

4(3) Procesus terminalis 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 disstinctly swollen distally; dorsal; abdominal hairs fine.....*nymphaeae* (Linn.)

6(5) Siphunculi rather cylindrical; dorsal abdominal haris with blunt apices .....*padi* (Linn.)

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; dorsal abdominal hairs long and fine and longest of these on 7th and 8th tergites about 2.10-2.38 times as long as and 2.25-3.85 times as long as b.d III respectively; body about 6.90-9.90 times as long sphunculi; segment III with 11-30, IV with 1-8 and V with 3-8 secondary rhinaria .....*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; abdominal dorsum with blunt and fine hairs; body about 12.0-18.0 times as long as siphunculi; segment III with 11-28, IV with 1-12 and V with 1-5 secondary rhinaria .....*maidis*

4(3) Processus terminalis never less than 3.0 times as long as and 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 spihunculi .....*padi*

6(5) Siphunculi with a basal cylndrical 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 IIIwith 14-27. IV with 0-6 and Vwith 2-8 secondary rhinaria .....*nymphaeae*

31. *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 : Many apterous and alate viviiparous females and nymphs.

Host plants : Plants belonging to Cyperaceae, Gramineae and Rosaceae.

Distribution : India : West Bengal (Darjiling and almost all districts) and throughout India. Elsewhere : Virtually cosmopolitan.

32. ***Rhopalosiphum nymphaeae*** (Linnaeus)

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 and Bhutan : 69.

Material examined : 4 apterous and 6 alate viviparous females and nymphs.

Distribution : India (Calcutta , Darjiling) and all over India . Elsewhere : Virtually cosmopolitan.

33. ***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 plants : Plants belonging to families Cyperaceae, Gramineae and Polygonaceae.

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Himachal Pradesh; Meghalaya and Sikkim. Elsewhere : Virtually cosmoolitan.

34. ***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 Bau, R.C., *In* Aphids of North East India and Bhutan : 71.

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

Host plants : Plants belonging to Ericaceae, Fagaceae, Gramineae, Papilionaceae and Rosaceae.

Distribution : India : West Bengal (Darjiling and all other districts) and throughout India. Elsewhere: Virtually cosmopolitan.

Genus 10. *Schizaphis* Borner

1931. *Schizaphis* Borner, *anz. schadlingsk.*, **7** : 10.
Type species : *Aphis graminum* Rondani, 1847

Key to the species of the genus ***Schizaphis*** Borner

1(2) Cauda dark, constricted at about its middle and with a bulbous apex; sphunculs never more than 2 times as long as cauda ..... ? *punjabipyri* (Das)

2(1) Cauda elongate , rather pale, not constricted as above; siphunculi usually mor e than 2 times as long as the cauda ..... *graminum* (Rondani)

35. *Schizaphis graminum* (Rondani)

1852. *Aphis graminum* Rondarni, *Nouv. Ann. Sci. Naat., bolonga, 6(3) ; 10.*
1980. *Schizaphis grminum* (Rondani): Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* aphids of North East India and Bhutan : 72.

Material examined : Many apterous viviparous females and nymphs.

Host plant: Uidentified plant of Gramineae.

Distribution : India : West Bengal (Darjiling), Meghalaya and all over India. Elsewhere : Virtually cosmopolitan.

36. *Schizahis ? 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 apterous and 5 alate viviparous females and nymphs; 2 alate males.

Host plant : *Cynodon dactylon* (Gramineae); *Pyrus communis* (Rosaceae).

Distribution : India : West Bengal (Darjiling); Himachal Pradesh; Meghalaya. Elsewhere : Pakistan.

Remarks : Due to nonavailability of authentic comparable material as well as published literature the material could not be identified upto specific level.

Basu, R.C.and Raychaudhuri, D.N. (1980) reported the alate male of this species with (?)from the State West Bengal.

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, constrictid at very base ..... ***Acutosiphon***

2(1) Siphumculi varously 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) Postsiphucular 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 21

11(12) Siphunculi very short; caauda rather oval ..... ***Cryptosiphum***

12(11) Siphunculi subcylindrcal, longer than wide 13

13(14) Siphunculi stout and distinclty reticulated, the reticulation formed of isodiametrical cells at least on apical 0.20 portion ..... ***Hillerislambersia***

14(13) Siphunculi not reticulatd as above 15

15(16) Siphunculi about 4-6 times as long as cauda with inconspicous apical flange.***Amphicercidus***

16(15) Siphunculi at most twice as long as cauda and with a distinct apical flange 17

17(18) Head with spinal tubercles; venter of head rather smooth ..... ***Dysaphis***

18(17) Head without such spinal tubercles; venter of head rather smooth 19

19(20) Siphunculi stout, somewhat conical, dorsal abdominal hairs at most twice as long b.d.III ..... ***Brachycaudus***

20(19) Siphunculi rather slender, cylindrical; dorsal abdominal hairs nevre less than twice as long as b.d.III ..... ***Oedisiphum***

21(22) Spinules in transverse rows present on second tarsal segment 23

22(21) Spinules in transverse rows absent on second trasal segment 29

23(24) Ultimate rostral segment with spinules in transverse rows; head with a median frontal primnence; hind tibae of nymphs spinulose ..... ***Pseudoacyrthosiphon***

24(23) Ultimate rostral segment without such spinules 25

25(26) First tarsal segment with 5 hairs; ultimate rostral segment about 1.5 times as long as h.t. 2 and with 9-12 secondary hairs ..... ***Masonaphis***

26(25) First tarsal segment with 3 hairs 27

27(28) Siphunculi cylindrical; u.r.s. less hairy; apterae without secondary rhinaria on antennal segment III; mid-thoracic furca sessile ..... ***Neoacyrothosiphon***

28(27) Siphunculi distinctly swollen; u.r.s.hairy; apterae with secondary rhinaria on antennal segment III; midthoracic furca stalked ..... ***Amphorophora***

29(30) Some of the scondary hairs on u.r.s. as long as or longer than primary hairs 31

30(29) Secondary hairs on u.r.s. usually much shorter than primary hairs 35

31(32) Ultimate rostral segment extends beyond 2nd abdominal segment, about twice as long as ht.2 and with many secondary hairs ..... ***Paczoskia***

32(31) Ultimate rostral segment rather shorter, almost upto 1.5 times as long as h.,t 2, with less secondary hairs 33

33(34) Siphunculi rticulatd with isodiametrical cells; secondary rhinaria protuberant; dorsal;abdominal hairs normal in shape ..... ***Macrosiphoniella***

34(33) Siphunculi not reticulated; secondary rhinaria not protuberant; dorsal abdominal hairs fan-shaped ..... ***Pleotrichophorus***

35(36) Siphunculi reticulated 37

36(35) Siphunculi not reticulated but somtimes a few interconnecting striae present near the apical flange 45

37(38) Siphuncul weakely to strongly swollen; only postsiphuncular scleirtes present ..... ***Taiwanomyzus***

38(37) Siphunculi cylindrical 39

39(40) Aperae 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 spinoplural area ..... ***Macromyzus***

40(39) Apterae without secondary rhinaria 41

41(42) Siphunculi reticulated with somewhat transversely elongate cells; head in apterae with spinules on dorsum .....***Perillaphis***

42(41) Siphunculi reticulated with isodiametrical cells 43

43(44) 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***

44(43) Secondary rhinaria on antennal segment III protuberant; F.T.C. usually 5,5,5; abdominal dorsum usually with hair-bearing sclerites .....***Uroleucon***

45(46) Siphunculi warty 47

46(45) Siphunculi not warty 53

47(48) Siphunculi tapering to a point at apex and with an oblique porte situeted much based to apex .....***Acutosiphon*** (See also 1(2)

48(47) Siphunculi never as above 49

49(50) Primary rhinaria in apterae star-shaped,in alate with finger-like processi; antennal tubercles high with a long finger-like projection; spiracular projection; spgracular pores on 6th and 7th tergites longer than those on 1-5 tergites .....***Akkaia***

50(49) Primary rhinaria not a above; spriacular pores normal 51

51(52) Spiracles on 6th and 7th segments larger than those on other abdominal segments; caudal apex reticulated .....***Myzakkaia***

52(51) Spiracles on 6th and 7th segments not different from those on other abdominal segments; siphunculus slightly narrow at apex with apical pore .....***Vesiculaphis***

53(54) Dorsal aabdominal hairs with apices like an opened fan; u.r.s. stiletto-shaped; apterae without secondary rhinaria, alate with such rhinaria on antennal segment III, IV and sometimes also on V; siphunculi slightly clavate near apex .....***Coloradoa***

54(53) Dorsal abdominal haris not as above 55

55(56) Dorsum of abdomen in apterae with a reticulae paattern 57

56(55) Dorsum of abdomen in apterae without such pattern 61

57(58) Siphunculi with a preapical circumcission; apterae with secondary rhinaria on antennal segment III ..... ***Sinomegoura***

58(57) Siphunculi without preapical circumcission; rhinaria usually absent in aptrae 59

59(60) Dorsal abdominal hairs in apterae with widely expanded apices; siphunculi puffed near apex and densely spinulose ..... ***Pentalonia***

60(59) Dorsal abdominal hairs in apterae short ad blunt,not as above; siphunculi not with spinular imbrications ..... ***Micromyzus***

61(62) Head in apterae with processi either at middle or on lateral frontal tubercles 63

62(61) Head in apterae without such process 67

63(64) Head in apterae with small processi at middle; antennal segment I with inwardly directed hair bearing angular projection ..... ***Tuberoaphis***

64(63) Head in apterae without median processi as abovee 65

65(66) Head in apterae rugose; primary rhinaria nonciliated; abdominal dorsum aerolated; dorsaee hairs pointed ..... ***Tubrocephalus*** (see also 69(70)

66(65) Head in apterae densely warty dorsally and ventrally; primary rhinaria strongly ciliated ..... ***Diphorodon***

67(68) Segmnt I usually with finger-like projection from the inner apex, sometime such projection less developed; apterae without secondary rhinaria 69

68(67) Segment I never with such projction 71

69(70) Primary rhinaria nonciliated; ocular tubercles indistinct; abdominal dorsum in apterae areolated with spinules ..... ***Tuberocephalus*** (see also 65(66)

70(69) Primary rhinaria cilated; ocular tubercles distinct; abdominal dorsum in apterae pale and smooth ..... ***Matsumuraja***

71(72) Apterae mostly with secondary rhinaria; sometimes antennal segment III in apterae incrassate near base and then scondary rhinaria may be absent 73

72(71) Apterae without secondary rhinaria 87

73(74) Dorsum of head in apterae covered with warts or spinules 75

74(73) Dorsum of head in apterae usually not as above but may be slightly wrinkled 79

75(76) Antennae shorter than body; siphunculi nearly cylindrcal; postsiphuncular sclerites absent; dorsum of head in aptera with rounded warts ..... ***Indomyzus***

76(75) Antennae as long as or longer than body 77

77(78) Apterae with a horseshoe-shaped patch on abdominal dorsum; median frontal prominence in apterae absent ..... ***Neomyzus*** (see also 123(122)

78(77) Aptera without such patch ; median frontal prominence low but distinct ..... ***Neomegouropsis***

79(80) Apterae without any median frontal prominence 81

80(79) Apterae with median frontal prominence 83

81(82) Frontal sinus usually `V'-shaped in apterae possessing secondary rhinaria restricted only near base of antennal segment III ..... ***Acyrthosiphon***

82(81) Frontal sinus not as above; scondary rhinaria in apterae distributed ovr basal 0.7 portion of antennal segment III; abdominal dorsum in apterae smooth, variably pigmented byt aways with a pale area in front of siphunculi ..... ***Impatientinum***

83(84) Dorsal body hairs thick with spatulate to capitate apices arising from strong tuberculate sockets ..... ***Cryptomyzus***

84(83) Dorsal body hairs never as above; siphunculi cylindrical or sub-cylindrical 85

85(86) Cauda bears 2-4 very short hairs near apex; wing veins slightly bordered or blackish ..... ***Rhodobium***

86(85) Caudal hairs more or less of equal length; wing veins rather normal ..... ***Metopolophium***

87(88) Dorsum of head in aptera usually smooth or may be slightly wrinkled 89

88(87) Dorsum of head in apterae spinulose or warty 107

89(90) Dorsal abdominal hairs in apterae with distinct capitate apices ..... ***Capitophorus***

90(89) Dorsal abdominal hairs in apterae not with capitate apices 91

91(92) Siphnuculi shorter than cauda 93

92(91) Siphunculi longer than cauda 99

93(94) Siphunculi barrel-shaped, dorsum of abdomen in apterae with pigmented transvrse segmntal bands; cauda triangular ..... ***Brevicoryne***

94(93) Siphunculi usually not barrel-shaped; if so,cauda not triangular 95

95(96) Mid thoracic furca in apterae with separate arms 97

96(95) Mid thoracic furca in apterae with a broad base ..... ***Hayhurstia***

97(98) Siphunculi with preapical circumcission and an apical flange; wing veins normal ..... ***Hyadaphis***

98(97) Siphunculi without preapical circumcission and apical flange,wing veins thick and bordered brown ..... ***Semiaphis***

99(100) Dorsal abdominal hairs long with acute apices; siphunculi without a flange at apex ..... ***Indiaphis***

100(99) Dorsal abdominal hairs short and not with acute apices 101

101(102) Siphunculi with a distinct preapical circumcission; alate with tubrculate secondary rhinaria; abdominal dorsum pale ..... ***Subovatomyzus***

102(101) Siphunculi without pre-apical cricumcission 103

103(104) Midthoracic furca in apterae sissile; alate with secondaary rhinaria on antennal sgment III, IV and sometimes also on V ..... ***Lipaphis***

104(103) Midthoracic furca in apterae with separate arms 105

105(106) Siphunculi cylindrical; alate with secondary rhinaria only on antennal segment III ..... ***Pseudaphis***

106(105) Siphunculi distinctly clavate on about distal half; alatae with secondary rhinaria on antennal, sgment III and IV and sometimes also on V and VI ..... ***Liosomaphis***

107(108) Pore in siphunculi obliquely placed and siphunculi often with hairs 109

108(107) Pore in siphunculi not obliquly placed and siphunculi without hairs 111

109(110) Siphunculi devoid of apical flange; dorsum of head spinulose ..... ***Xenomyzus***

110(109) Siphunculi with distinct apical flange; hind wing with one oblique vein ..... ***Tricosiphonaphis***

111(112) Medan frontral prominece distinct in apterae 113

112(111) Mdian frontal prominenc absent i n apterae 115

113(114) Siphunculi without preapical circumcission; alatae with secondary rhinaria only on antennal segmentIII; primary rhinaria non-ciliated ..... ***Aulacorthum***

114(113) Siphunculi with preapical circumcission; alatae with secondary rhinaria on antnnal segment III-V; primary rhiaria ciliated ..... ***Neohyalomyzus***

115(116) Dorsal abdominal hairs in apterae on low but distinct tuberculate bases; siphunculi densely imbricated ..... ***Eumyzus***

116(115) Dorsal abdominal hairs in apterae never as above 117

117(118) Antennal segment I in apterae with ineer apices scabrous and strongly angulated inward; abdominal dorsum wrinkled; siphunculi swollen on the inner margin at about its middle .... ***Hyalomyzus***

118(117) Antennal segment III in apterae with inern apices neither scbrous nor angulated as above;abdominal dorsum usually smooth, without postsiphuncular sclerite 119

119(120) Siphuncui in apterae subcylindrical, smooth, shout; cauda semiglobular or subpentagonal; alatae with numerous strongly protuberant secondary rhinaria on a.s. III-V ..... ***Brachymyzus***

120(119) Siphunculi and cauda in apterae never as above; alate usually with secondary rhinaria on a.s. III and IV 121

121(122) Alate with secondary rhinaria somwhat protuberant; dorsum of abdomen in apterae completely pale or completely dark ..... ***Myzus***

122(121) Alaate with secondary rhinaria not protuberant; dorsum of abdomen in apterae with a broad horseshoe-shaped patch ..... ***Neomyzus***

Genus 11. ***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.

37. ***Acutosiphon obliquoris*** Basu, Ghosh and Raychaudhuri

1970. *Acutosiphon obliquoris* Basu, R.C., Ghosh A.K. and Raychaudhuri, D.N. *Orient.Insects,* 10 (2) :269.

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

Host plants : Carex filicina and *arex* sp. (Cyperaceae), *Cotula* sp. (Compositae)

Distribution : India : West Bengal (Darjiling), Himachal Pradesh; Meghalaya; Kumayon Himalayas; SIkkim; Uttar Pradesh. Elsewhere : Nepal ; Pakistan.

Genus 12 ***Acrythosiphon*** Mordvilko

1914. *Acrythosiphon* Mordvilko, *Fauna Russie*, **1** : 85.
Type species: *Aphis pisi* Kaltenbach, 1843 (=Aphis pisum Harris, 1776).

38. ***Acrythosiphon pisum*** (Harris)

1776. *Aphis pisum* Harris, *Exposit English Insects, London* : 66.
1958. *Acrythosiphon pisum* (Harris) : Basu, A.N. and Banerjee, S.N., *Indian agriculturist*, **2** (2) : 89.

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

Host plants : Pisum sativum, Pisum sativum, Pisum sp., *Vicia fava* (Papilionaceae)

Distribution : India : West Bengal (all over the state particularly in hilly region),Arunachal Pradesh; Assam; North West India; Rajasthan; Uttar Pradesh; Tamil Nadu and Virtually cosmopolitan.

Gnus 13. ***Akkaia*** Takahashi

1919. *Akkaia* Takahashi, *Insect World*, **23** (12): 439.
Type species : *Akkaia polygoni* Takahashi 1919

Key to the species of the genus ***Akkaia*** Takahashi

Apterous viviparous females :

1(2) Finger-like projection on the lateral frontal tubercle short, at most up to 0.50 times as long as antennal segment I;h.t. much longer, about twice as long as base of terminal segment .... *bengalensis*

2(1) Finger-like projection on lateral frontal tubercle much longer, about 1.50 times a long as antennal segment I; p.t. about as long as base of terminal segment ..... *neopolygoni*

39 ***Akkaia bengalensis*** Basu

1967. *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. (Polygonacae).

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya; Sikkim and Tamil Nadu.

40. ***Akkaia neopolygoni*** Ghosh, M.R.,Ghosh, A.K. and Raychaudhuri

1973. *Akkaia neopolygoni* Ghosh, M. R., Ghosh, A.K. and Raychaudhuri, D.N., *Orient.Insects* **4** : 377
1980. *Akkaia neopolygoni* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Taxonomy of the aphids of North East India and bhutan. The Zoological Society Publication, : 94.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Polygonum sp. (Polygonacae).

Distribution : India : West Bengal (Darjiling), Arunachal Pradesh and Sikkm.

Genus 14. ***Amphicercidus*** Oestlund,

Rep. St. Ent. Minn., 19 : 126.
Type species : *Aphis pulverulens* Gillette, 1911.

41. ***Amphicercidus indicus*** Hille Ris Lambers and Basu

1966. *Amphicercidus indicus* Hille Ris Lambers and Basu, A.N., *Ent .Ber .Amst.*, **28** :12.
1980. *Amphicercidus indicus*: Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Taxonomy of th aphids of North East India and Bhutan, The Zoological Socieity Publ., : 95.

Material examined : 1 Apterous viviparous female only

Host plant : Lonicera glabrata (Carprifoliaceae).

Distribution : India : West Bengal : (Darjiling).

Genus 15. ***Amphorophora*** Buckton

1876. *Amphorophora* Buckton, *Monogr. Br. Aphides, London*, **1** : 187
Type species : *Amphorophora ampullata* Buckton

42. ***Amphorophora ampullata bengalensis*** Hille Ris Lambes and Basu

1966. *Amphorophora ampullata bengalensis* Hille Ris Lambers and Basu, A.N., *Ber. Amst.*, **26** : 14.
1190. *Amphorophora ampullata bengalensis* : Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient.Insects*, 4(2) : 195.

Material examined : Many apterous, alate viviparou females ad nymphs.

Host plants : Fern (Pterydophytes), *Pteris aguilina* (Pteridaceae) *Asplenium* sp. (Aspleniaceae), *Athyrium* sp., *Polypodium* sp. (Polypodiaceeae).

Distribution : India : West Bengal (Darjiling) Arunachal Pradesh; Himachal Pradesh; Meghalaya and Sikkim.

Remarks : Ghosh, A.K., Banerjee, H. and Raychauduri, D.N. (1971) described the apterous oviparous morph of this species from Arunachal Pradesh (Rahung at 3260m.). The species was originally described from the State of West Bengal.

Aulacorthum Mord.

1914. *Aulacorthum* Mordvilko, *Fauna Russie*, **1** : 68
Type species : *Aphis solani* Kaltenbach, 1843

Key to the species of the genus ***Aulacorthum*** Mordvilko :
Apterous viviparous females :

1(2) F.T.C. 4,4,4; body hairs short; u.r.s almost as long as h.t.2 ..... *fagopyri*

2(1) F.T.C. 3,3,3 3

3(4) Dorsum of head without spinulees; antennal segment III shortr than p.t., flagellum pale except apices of segment which are dark and imbricated; flagellar hairs short, with 1-2 rows of interconnecting striae near apex ..... *rhamni*

4(3) Dorsum of head with spinules 5

5(6) Antennal segment III longer than p.t., u.r.s. about as long as h.t. 2, antennae and femora more or less uniformly dark ..... *magnoliae*

6(5) Antennal segment III usually shorter than or at most as long as p.t 7

7(8) Head black; abdominal segment 7 with transverse pigmented bands or dorsum; antennal segment III dark only at apex,a.s IV and V dark at base and apex ..... *nipponicum*

8(7) Head rather pale; cauda and siphunculi dark; antennae more or less uniformly cloured brown ... . *solani*

Alate viviparous females

1(2) Ultimate rostral segment as long as to atmost 1.20 times as long as h.t. 2 3

2(1) Ultimate rostral segment longer, 1.25-1.33 times as long as h.t.2 5

3(4) Siphunculi distinctly swollen on inner margin at about distal 0.50 portion; antennal segment III usualluy with 16-21 secondary rhinaria; cauda usually with 7-8 hairs ..... *magnoliae*

4(3) Siphunculi cylindrical; antennal segment III with 10-14 secondary rhinaria; cauda with 6 hairs . ..... *solani*

5(6) Longest hair on 8th tergite longer (0.75-1.10 times) than b.d III; antennal segment III with 11-14 secondry rhinaria ..... *rhamni*

6(5) Longest hair on 8th tergite shorter (about 0.6 times as long as b.d III); antennal segment III with 9-22 secondary rhinaria ..... *nipponicum*

16. Genus *Aulacorthum* Mordvilko

1914. *Aulacorthum* Mordvilko, *Faune Russie*, **1** : 68
Type species : *Aphis solani* Kaltenbach, 1843

43. *Aulacorthum fagopyri* Ghosh and Raychaudhuri

1972. *Aulacorthum (Aaulacorthum) fagopyri* Ghosh; A.K. and Raychaudhuri, D.N, *Proc. zool. Soc., Calcutta*, **25** : 94
1980. *Aulacorthum fagopyri* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., Tazonomy of the Aphids of the North east India and Bhutan, The zoological Society Publ. : 106.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Fagopyrum cymosum (polygonaceae)

Distribution : India : West Bengal : (Darjiling)

44. *Aulacorthum magnoliae* (Essig and Kuwana)

1918. *Rhopalosiphu magnoliae* Essig and Kuwana, *Proc. Calif. Acad. Sci.*, **8** : 59.
1972. *Aulacorthum magnoliae* : Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, **6**(3) :334

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

Host plants : Cucurbita maxima, Cucurbita moschata, Cucurbita pepo, Luffa acutangula, Secheum eduli (Cucurbitaceae)

Distribution : India : West Bengal (Darjiling), Himachal Pradesh: Meghalaya: Sikkim. Elsewhere: Japan; Korea and Taiwan.

45. *Aulacorthum nipponicum* (Essig and Kuwana)

1918. *Macrosiphum nipponicum* Essig and Kuwana, *Proc. Calf. Acad. Sci.* **8** : 59
1968. *Aulacorthum nipponicum* (Essig & Kuwana) : Basu, A.N., *Orient. Insects*, **3** (4) : 357.

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

Host plant : Paderia foetida (Rubiaceae)

Distribution : India : West Bengal : (Darjiling); Arunachal Pradesh ; Himachal Pradesh; Meghalaya; Nagaland; Sikkm; Elsewhere : China; Japan, Korea and Taiwan.

46. ***Aulacorthum rhamni*** Ghosh, Ghosh and Raychaudhuri.

1970. *Aulacorthum rhamni* Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N. *Orient. Insects* , 4(40 : 379.
1980. *Aulacorthum rhamni* : Raychaudhuri, D.N., Ghosh, M.R and Basu , R.C., *In* Taxonomy of the Aphids of North East India and Bhuttan, The Zooogical Soceity Publ. : 105.

Material examined : Many apterous, alate viviaparous fmales and nymphs.

Host plant : Rhamnus nepalensiis (Rhamnaceae).

Distribution : India : West Bengal : (Darjiling); Arunachal Pradesh; Himachal Pradesh ; Meghalaya and Sikkim.

47. ***Aulacorthum solani*** (Kaltenbach)

1843. *Aphis solai* Kaltenbach, *Monogr. Pl. Zen. Lause*, :15.
1969. *Aulacorthum solani* (Kaltenbach) : Basu, A.N., *Orient. Insects*, 3(4) : 357.

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

Host plants : Nicotiana tabacum.,
Solanum tuberosum. Solanum sp. (Solanaceae), *Poa* sp. (Gramineae).

Distributon : India : West Bengal (almost all districts of West-Bengal), widely distributed in India and virtually cosmopolitan.

Genus 17. ***Brachycaudus*** van der Goot

1913. *Brachycudus* van der Goot. *Tijdschr. Ent.*, **56** : 97.
Type species : *Aphis mysotidis* Koch, 1854

48. ***Brachycaudus helichrysi*** (Kaltenbach)

1183. *Aphis helicrysi* Kaltenbach, Mongr. *Pfl. zer. Lause*, : 102
1972. *Brachycaudus helichrysi* (Kaltenbach); Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects* **6**(3) : 336.

Material examined : Many apterous and alate viviparous females; many alate males and nymphs.

Host plants : Extremely polyphagous species infesting plants mostly belonging to families Amaranthaceae, Apocynaceae, Boragnaceae, Capparidaceae, Caprifoliaceae, Euphorbiaceae, Fagaceae, Labiatae, Loganiaceae, Malvaceae, Myrsinacea, Oxalidaceae, Papilionaceae, Passifloraceae, Polygonaceae, Puniceae, Rosaceae, Rubiaceae, Saxifragaceae, Scrophulariacae, Solanaceae, Styracae, Ternstomiaceae and Verbenaceae.

Distribution : India : West Bengal : (almost all Districts and throughout India). Cosmopolitan.

Genus 18. ***Brachymyzus*** Basu

1964. *Brachymyzu* Basu, A.N., *J. Linn. soc.* (Zool.), **45** : 223.
Type species : *Brachymyzus jasmini* Basu, 1964

49. ***Brachymyzus jasmini*** Basu

1964. *Brachymyzus jasmni* Basu, A.N., *J. Linn. soc.* (Zool.), **45** : 225.
1980. *Bachymyzus jasmini* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Tazonomy of th Aphids of North East India and Bhutan, The Zoological Society Publ. : 109.

Material examined : 2 apterous viviparous females and 2 nymphs

Host plant : Jasminum humile (Oleaceae).

Distribution : India : West Bengal (Darjiling); Sikkim.

Remarks : Basu A.N. (1964) described the alate viviparous morph of th species from Darjiling district, West Bengal which could not be studied due to nonavailabiity of the material.

Mondal, P.K., Agarwala , B.K. and Raychaudhuri, D.N. (1978) described the apterous oviparous females and alate males of the species from Sikkim.

Genus 19. ***Brevicoryne*** van der Goot

1915. *Brevecoryne* van der Goot. 1915. *Beiter. Kernt. Holland*
Type species : *Aphis brassicae* Linnaeus, 1758.

50. ***Brevicoryne brassicae*** (Linnaeus)

1758. *Aphis brassicae* Linnaeus, *Syst. Nat.* (10th ed.).**1**:452.
1980. *Brevicoryne brassicae* (Linnaeus), Raychaudhuri, D.N., Ghosh, M.R., Basu, R.C., *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society publ. : 111.

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

Host plants : Beta vulgaris (Chnopodiaceae) : *Bassica campestris, brassica napus, Brassica oleracea, Capsella bursapestoris, Cardamine hirsuta and Raphanus sativa* (Cruciferae).

Distribution : India : West Bengal (Darjiling and almost all other Districts) and virtually Cosmopolitan.

Remarks : Mostly occur during winter season in plain and almost throughout the year in hilly regions.

Genus 20. ***Capitophorus*** van der Goot

1913. *Caapitophorus* van der Goot, *Tijdschr. Ent.*, **56** : 84
Type species : *Aphis carduina* Walker, 1850.

Key to the species and subspecies of the genus ***Capitophours*** van der Goot

1(2) Spinal and pleural hairs on dorsum of abdomen duplicated 3

2(10 Spinal and pleural hairs on dorsum of abdomen not duplicated 5

3(4) Dorsal cephalic hairs very long (2.4-4.2 times as long as b.d. III); hairs on antennal segment III about 0.7-1.2 times as long as b.d. III .....*formosartemisiae*

4(3) Dorsal cephalic hairs shorter (1.6-2.2 times as long as b.d III); hairs on antennal segment III 0.25-0.33 times as long as b.d. III .....*himalayensis*

5(6) Spinal hairs on abdominal dorsum almost of equal length on all segments., longest one on anterior tergites 1.35-2.45 times as long as b.d II 7

6(5) Spinal hairs on abdominal dorsum gradually become longer cauded 9

7(8) Spinal hairs nearly as long as the marginal hairs and on normal bases, longest ne 1.30-1.60 times as long as b.d.III .....*polygoni*

8(7) Spinal hairs about twice as long as marginal ones and these are on strong tuberculate bases, longest one 1.8-2.4 times as long as b.d III .....*indicus*

9(10) Spinal hairs longer (0.7-1.1times as long as b.d III); hairs on antennal segment III 0.25-0.38 times as long as b.d III;u.r.s 1.05-1.2 times as long as h.t 2 .....*hippophaes mitegoni*

10(9) Spinal hairs rather shorter (0.15-0.2 times as long as b.d III); hairs on antnnal segment III 0.114-0.25 times as long as b.d III; u.r.s 0.8-1.0 times as long as h.t 2 .....*hppophaes javanicus*

51. ***Capitophorus formosartemisiae*** (Takahashi)

1921. *Myzzus formosatertemisiae* 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, viviparous females and nymphs.

Host plants : Artemesia spp. (Compositae)

Distribution : India : West Bengal : (Darjiling); Arunachal Pradesh; Meghalaya; Sikkim; Uttar Pradesh. Elsewhere : Bhutan; South East Asian countries.

52. *Capitophorus himalayensis* Ghosh, Ghosh and Raychaudhuri

1971. *Capitophorus himalayensis* Ghosh, A.K., Ghosh, M.R and Raychaudhuri, D.N. *Orient. Insects*, **5**(3) :325.
1976. *Capitophorus himalayensis* : Basu, R.C. and Raychaudhuri, D.N., *Ibid.*, **110**(4) :572.

Material examined : Apterous vivparous females and nymphs.

Host plant : Unidentified plant of Polygonaceae.

Ditribution : India : West Bengal (Darjiling).

53. *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.

Host plants : Polygonum alatum, Polygonum barbaatum, Polygonum hydopiper, Polygonum paniculatum, Polgonum spp. (Polygonaceae)

Distribution : India : West Bengal : (Darjiling) : Arunachal Pradesh; Himachal Pradesh; Manipur; Meghlaya; Sikkim. Elsewhere : Australia; China; Europe; Japan; Java; korea; New Zealand; Pakistan and Taiwan.

Remarks : The species is usually found in hilly regions and infest plants mostly belonging to family Polygonaceae.

54. *Capitophorus hippophaes mitegoni* Eastop

1956. *Capitophorus hippophaes mitegoni* Eastop, *Entomologist*, **89** : 9
1976. *Capitophorus hippophaes mitegoni* ; Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*. **10**(4) : 575.

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

Host plant : Polygonum sp. (Polygonaceae)

Distribution : India : West Bengal (Calcutta, Darjiling), Himachal Pradesh; Meghalaya; Sikkim. Elsewhere : Africa; Australia

55. *Capitophorus indicus* Ghosh and Raychaudhuri

1968. *Capitophorus hippophaes indica* Ghosh, A.K. and Raychaudhuri, D.N. *Ann. ent. soc. Am.*, **63** : 752.
1976. *Capitophorus indica* Ghosh A.K. and Raychaudhuri, D.N., *Orient . Insects*, **10**(4) : 752.

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

Host plants : Polygonum moli, Polygonum orentalis, Polygonum peniculatum, Polygonum sp. (Polygonaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Meghalaya; Sikkim and Uttar Pradesh.

Remarks : This species was originally described by Ghosh , A.K. and Raychaudhuri, D.N. (1968) as Capitophours hippophaes Indica. Later, Basu, R.C. and Raychaudhuri,D.N. (1976) considered it as a distinct species.

56. ***Capitophorus polygoni*** Ghosh and Raychaudhuri

1971. *Capitophorus polygoni* Ghosh , A.K., Ghosh, M.R and Raychaudhuri, D.N., *Orient. Insects*, 5(3) : 326

Material examined : 8 apterous and 2 alate viviparous females and nymphs.

Host plant : Polygonum sp. (Polygonaceae)

Distribution : India : West Bengal (Darjiling)

Genus 21 ***Cavariella*** del Guercio

1911. *Cavariella* del Guercio, *Redia*, 7 : 323.
Type species : *Aphis pastinaceae* Linnaeus, 1758

Key to the species of the genus ***Cavariella*** del Guercio

Apterous viviparous females

1(2) Ultimate rostral segment long, about 1.5 times as long as h.t. 2; p.t. also about 1.5 times as long as base of ultimate segment ..... *biswasi*

2(1) Ultimate rostral segment short, usually shorter than h.t.2 3

3(4) Siphunculi narrow at base distincutly swollen on apical 0.50 portion; p.t. 1.5-2.0 times width of siphunculi at base 5

4(3) Siphunculi not narrow at base, stout ad almost barrel-shaped; p.t. nearly as long width of siphunculi at base ..... *salicicola*

5(6) Cauda with 6-9 hairs; siphunculi almost flangeless, about 0.15 times as long as body ..... *nigra*

6(5) Cauda with at most 5 hairs; siphunculi with a distinct apical flange, about 0.17-0.20 times as long as body ..... *aegopodi*

Alate viviparous females

1(2) Ultimate rostral segment about 11.50 times as long as h.t. 2 : secondary rhinaria present only on antennal segment III ..... *biswasi*

2(1) Ultimate rostral segment shorter than to atmost 1.2 times as long as ht. 2; secondary rhinaria present on antennal segment III and IV and somtimes also on V 3

3(4) Secondary rhinaria distributed as : antennal segment III 48-65, IV 9-16, V 2-6; cauda with 7-9 hairs ..... *nigra*

4(3) Secondary rhinaria distributed as : Antennal segment III 23-32, IV 3-6, V 0-2; cauda at most with 5 hairs ..... *salicicola*

57. *Cavariella aegopodi* (Scopoli)

1763. *Aphis aegopodi* Scopoli, *Ent. Cariolica* , : 137.
1980. *Cav ariella aegopodi* (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.

Host plant : Salix babylonica (Salicaceae)

Distribution : India : West Bengal (Darjilng); Arunachal Pradesh; Himachal Pradesh; Jammu and Kashmir; Manipur; Meghalaya and Uttar Pradesh. Elsewhere :America; Australia; Europe; Japan; Korea; Middle East; New Zealand and Rhodesia

58. *Cavariella biswasi* Ghosh, Basu and Raychaudhuri

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. and Basu, R.C. *In* Taxonomy of the aphids of North East India and Bhutan, The Zoological Soceity, Calcutta : 245

Material examined : many apterous and 2 alate vivaparous females and nymphs.

Host plants : *Salix babylonica, Salix elegans* (Salicaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

59. *Cavariella nigra* Basu

1964. *Cavariella nigra* Basu, A N. *J. Linn. soc.* (Zool.), **45** : 240.
1980. *Cavariella nigra* : 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 : 122.

Material examined : 5 apterous and 2 alate viviparous females and nymphs.

Host plant : Salix elegans (Salicaceae)

Distribution : India: West Bengal (Darjiling); Himachal Pradesh.

Remarks : The species was orginally described from Darjilng District, West Bengal by Basu, A.N.(1964) with apterous and alate viviparous morphs. Later, Ghosh, L.K (1986) described the apterous oviparous sexual morph from Simla, Himachal Pradesh.

60. *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.

Host plant : Salix sp. (Salicaceae)

Distribution : India : West Bengal (Darjiling) Himachal Pradesh; Manipur; Meghalaya. Elsewhere: China; Japan ; Korea and Taiwan.

Genus 22. *Coloradoa* Wilson

1910. *Coloradoa* Wilson, *Ann. ent. Soc. Am.*, **33** :328
Type species : *Aphis rufomaculata* Wilson, 1908

61. *Coloradoa rufomaculata* (Wilson)

1908. *Aphis rufomaculata* Wilson, 1908. *Ent. News.*, **19** : 261
1980. *Coloradoa ruformaculata* (Wilson), Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoologial Socieity. Calcutta, : 125.

Material examined : Many apterous viviparous females and nymphs.

Host plants : Artemesia vulgaris, Artemesia sp. Chrysanthemum sp. (Compositae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Himachal Pradesh; Maharashtra; Meghalaya; Nagaland; Uttar Pradesh. Elsewhere : Virtually cosmopolitan.

Genus 23. ***Cryptosiphum*** Buckton

1879. *Cryptosiphum* Buckton, *Monogr. Br. aphids*, **2** :144
Type species : *Cryptosiphum artemisiae* Buckton, 1879

62. ***Cryptosiphum artemsiae*** Buckton

1879. *Cryptosiphum artemisiae* Buckton, *Mongor. Br. aphides*, **2** : 145.
1968. *Cryptosiphum artemisiae* : Basu, A.N., *Orient. Insects* **3**(4) : 358.

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

Host plant : Artemesia vulgaris (composita).

Distribution :India : West Bengal (Darjiling); Arunachal Pradesh; Meghalaya; Sikkim. Elsewhere: China; Europe; Japan; Korea and Taiwan

Genus 24. ***Diphorodon*** Borner

1931. *Diphorodon* Borner, *anz. schadlingsk*, **7** : 9.
Type species : *Phorodon cannabis*, Passerini, 1860

63. ***Diphorodon cannabis*** (Borner)

1860. *Phorodon cannabis* Paasserini, *Gli. afidi. Parma*, : 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 Soceity, Calcutta, : 134.

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

Host plant : *Cannabis sativa* (Moraceae)

Distribution : India : West Bengal (Darjiling); Himachal Pradesh Kashmir; Manipur; Meghalaya; Nagaland; South India Elsewhere : Europe; Japan; Pakistan.

Genus 25. ***Dysaphis*** Borner

1931. *Dysaphis* Borner *Anz. schaldingsk.* **7** : 9.
Type species : *Aphis agelicae* Koch, 1854

64. ***Dysaphis multisetosa*** Basu

1979. *Dysaphis multisetosa* Basu, A.N., *Orient. Ineects*, **3** : 173.
1980. *Dysaphis multisetosa* : Raychauchuri, D.N., Ghosh, M.R. and Basu, R.C. Taxonomy of the Aphids of North East India and Bhutan, The Zoological society Calcutta, : 135.

Material examined : Nil

Host plant : Pyrus communis (Rosaceae).

Distribution : India : West Bengal (Darjiling)

Remarks : The species was desctribd by Basu, A.N. (1969) from Darjiling District, West Bengal on apterous and alate viviparous morphs. But the material was not availabvle for present study and hence reported from published record

Genus 26. ***Eumyzus*** Shinji

1929. *Eumyzus* Shinji, *Lansania*, 1 : 111.
Type species : *Aphis impaatiensae* Shinji, 1934

65. ***Eymyzus darjeelingensis*** Basu and Raychaudhuri

1974. *Eumyzus darjeelingensis* Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **8** : 491.
1985. *Eumyzus darjeelingensis* : Chakrabarti and Bhattachaarya, *Systematic Entomology*, **10** : 389.

Material examined : 5 apterous and 2 alate viviparous females.

Host plant : Hydrangea paniculate (Saxifragaceae)

Distribution : India : West Bengal (Darjiling); Uttar Pradesh.

Remarks: The species was origanally dscribed from Darjiling District of West Bengal. Chakrabarti and Bhattacharya (1985) rreported the species for the first time from North West India

Genus 27. ***Hayhurstia*** del Guercio

1971. *Hayhurstia deformans* del Guercio, 1917 (=*Aphis atriplicis* Linnaeus, 1761)

66. ***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.

Host plant: Chenopodium album (Chenopodiaceae)

Distribution : India : West Bengal (Darjling); Arunachal Pradesh; Himachal Pradesh; Meghalaya; South India; Uttar Pradesh. Elsewhere : China; Europe; Japan ; Korea; Middle East; North America and Taiwan.

Genus 28. ***Hillerislambersia*** Basu

1967. *Hillerislambersia* Basu, A.N., *Bull. Ent.*, **8**(2) : 5.
Type species : *Hillerislambersia darjeelingi* Basu, 1967

67. ***Hillerislambersia darjeelingi*** Basu

1967. *Hillerislambersia darjeelingi* Basu, A.N., *Bull. ent.*, **8**(2) : 5.
1980. *Hillerismbersia darjeelingi* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoolotigal society, Calcutta; 142.

Material examined : Many apterous and 2 alate viviparous females and nymphs.

Host plants : Lonicera sp. (Cornaceae): *Holboela litifolia* and *Rhododendron* sp. (Ericaceae).

Distribution : India : West Bengal (Darjiling).

Genus 29. ***Hyadaphis*** Kirkaldy

1904. *Hyadaphis* Kirkaldy. *Entomologist*, **37** : 279.
Type species : *Aphis xylosite* Schrank, 1901 (=*Siphoc coryne foeniculi* Passerini, 1860)

68. ***Hyadaphis coriandri*** (Das)

1918. *Brevicoryne coriandri* Das, *Mem. 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 : Many apterous and alate viviparous females and nymphs.

Host plants : Coriandrum sativum and *Foeniculum vulgaris* (Umbelliferae)

Distribution : India : West Bengal (Darjiling); Bihar; Himachal Pradesh; Manipur;Meghalaya; Sikkim; South India ; Uttar Pradsh. Elsewhere : Egypt; Nigeria ; Pakistan and South Africa.

Genus 30. ***Hyalomyzus*** Richards

1958. *Hyalomyzus* Richards, *Flo Ent.*, **41**(4) : 169.
Type species : *Myzus eriobotryae* Tissot, 1935

69. ***Hyalomyzus ? sensoriatus*** (Mason)

1940. *Myzus sensoriatus* Mason, *Mis, Publs. U.S. dep. Agric.*, (371) : 19.
1980. *Hyalomyzus ? sensoriatus* (Mason); Basu, R.C., Ghosh, M.R. and Raychaudhuri, D.N. *Entomon* **1**(1) : 59.

Material examined : 2 apterous viviparous females and nymphs.

Host plant : Unidentified.

Distribution : India : West Bengal (Darjiling). Elsewhere : U.S.A.

Genus 31. ***Hyperomyzus*** Borner

1933. *Hyperomyzus* Borner, *Kline Mitt. Blattlaus* : 2.
Type species : *Aphis lactucae* Linnaeus, 1758.

70. ***Hyperomyzus carduellinus*** (Theobald)

1915. *Rhopalosiphum Cardullinus*Thobald, *Bull. ent. Rex.*,**6**:113.
1980. *Hypermyzus 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 Soceity, Calcutta :147.

Material examined : Many apterous and alate viviparous femals and nymph.

Host plants : Ageratum sp., *Echinops* Sp., *Gynura nepalensis, Hypocharis radiata, Sonchus arvensis, Sonchus asper, Sonchus olraca* (Compositae) : *Emilia sonchifloia* (Euphorbiaca) and *Schima wallichii* (Ternstromiaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh , Assam; Hmachal Pradesh; Jammu and Kashmir; Manipur, Meghalaya; Nagaland; Sikkim; South India; Uttar Pradesh. Elsewhere : Africa; Australia; Fiji; Indonesia; Java; Nepal; New Zealand; Taiwan and Uganda.

Genus 32. ***Impatientinum*** Mordvilko

1914. *Impatientinum* Mordvilko, F*aunna Russi, Insecta, Hem.*, **1**:72.
Type species : *Impatietinum fuscum* Mordvilko, 1928.

71. ***Impatientium impatiens*** (Shinj)

1922. *Tuberosiphum impatiens* Shinji, *Zool, Marg., Tokyo*, **34** : 789.
1980. *Impatientnum impatiens* (Shinji), 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 : 149.

Material examined: Many apterous viviparous females and nymphs, 1 apterous oviparous female.

Host plants : Impatients sp. (Balsaminaceae ; *Smilax* sp. (Liliaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Sikkim. Elsewhere : Japan ; Korea and Taiwan.

Remarks : Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. (1971) described the apterous oviparous sexual morph of this species from the Darjiling district of West Bengal.

Genus 33. ***Indomyzus*** Ghosh,Ghosh and Raychaudhuri

1971. *Indomyzus* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, 5(3) : 329.
Type species : *Indomyzus sensoriatus* Ghosh, Ghosh and Raychaudhuri, 1971.

72. ***Indomyzus sensoriatus*** Ghosh, Ghosh and Raychaudhuri

1971. *Indommyzus sensoriatus* Ghosh, A.K.., Ghosh., M.R. and Raychaudhuri, D.N., *Orient. Insects*, 5(3) : 329.
1980. *Indomyzus sensoriatuus* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Taxonomy of the Aphds of North East India and Bhutan, The Zoological Society, Calcutta, : 152.

Material examined : 6 apterous viviparoous females.

Host plant : Unidentified.

Distribution : India : West Bengal (Darjling).

Genus 34. ***Liosomaphis*** Walker

1868. *Liosomaphis* Walker, *Zoologist*, 2(3) : 119.
Type species : *Aphis berberidis* Kaltenbach, 1843

73. ***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 the Aphids of North East India and Bhutan, The Zoological Society, Calcutta, : 159.

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

Host plants : Berberis umbellata, Berberis wallichiana, Berberis sp. (Berberidaceae)

Distribution : India : West Bengal (Darjiling); Himachal Pradesh ; Meghalaya; Uttar Pradesh. Elsewhere : Nepal.

Genus 35. ***Lipaphis*** Mordvilko

1928. *Lipaphis* Mordvilko, *Key to the Russian Insects* : 200 (In Russian)
Type species : *Aphis erysmi* Kalltenbach, 1843

74. ***Lipaphis erysimi*** (Kaltenbach)

1843. *Aphis erysimi* Kaltenbach, *Mon. fam. pfl...* :99.
1980. *Lipaphis erysimi* (Kaltenbach) : Raychaudhuri, D.N., Ghosh , M.R., and Raychaudhuri, D.N., *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta, 191.

Material examined : Many apterous and alate viviparous females and nymphs ; 1 apterous oviparous female.

Host plants : Drymeria cardata (Caryophyllaceae); *Calendula* sp., *Emilia sonchifolia, Lactuca sativa* (Compositae); *Brassica* spp., *Iberis aimara, Nasturtium indicum, Raphanus sativus* (Cruciferae)

Distribution : India : West Bengal : (Calcutta, Darjiling District and almost all other districts); Arunachal Pradesh; Assam; Bihar; Himachal Pradesh; Manipur; Meghalaya; Nagaland; Rajasthan; Sikkim; South India; Tripura; Uttar Pradesh. Elsewhere : Bhutan; Nepal and virtually cosmopolitan.

Remarks: Phalak (1968) reported apterous oviparous female morph of this species from Kalimpong in Darjiling District of West Bengal.

Genus 36. *Macromyzella* Ghosh, Basu and Raychaudhuri

1977. *Maccromyzella*, Ghosh, M.R., Basu, R.C. and Raychaudhuri D.N. *Orient Insects*, **11**(4) : 582.
Type species : *Macromyzus polypodicola* (Takahashi) (=*Myzus plypodicola* Takahashi, 1921)

75. *Macromyzella polypodicola* Ghosh, Basu and Raychaudhuri

1921. *Myzus polypodicola* Takahashi, *Aphiddae of Formosa*, **1** : 21.
1980. *Macromyzella polypodicola* (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 : 16.

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

Host plants : Asplenium esculentum and *Asplenium* sp. (Aspleniaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh. Elsewhere : Japan; Sumatra ; Taiwan.

Genus 37. *Macromyzus* Takahashi

1960. *Macromyzus* Takahashi, *Kontyu*, **28** : 225.
Type species : *Myzus woodwardiae* Takahashi, 1921

Key to the subgenera of Genus *Macromyzus* Takahashi

1(2) Apterae without any secondary rhinaria on segment III; spinopleural patches on dorsum of abdomen with tubercls ..... ***Macromyzus*** s.s.

2(1) Apterae with secondary rhinaria on segment III and sometimes also on segment IV, spinopleural patches on dorsum of abdomen without any tubercle ..... ***Anthracosiphoniella***

76. *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 Zoologcal Society, Calcutta :165.

Material examined : Many apterous and alate viviparous females and nymphs; 4 apterous females.

Host plant : Asplenium auriculatum, Asplenium esculentum, Asplenium odientum (Aspleniaceae); *Cheilenthus varies, Dicheria lata, Nephrodium moli and Polypodium* sp. (Polypodiaceae).

Distribution : India : West Bengal (Drjiling); Arunachal Pradesh ; Meghalaya, Sikkim. Elsewhere: Japan, Nepal, Taiwan.

Remarks : Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. (1972) described the apterous oviparous morph of this species from Lebong, West Bengal.

76a. *Macromyzus (Anthracosiphoniella) maculatum* (Basu)

1969. *Anthracosiphoniella maculatum* Basu, *Orient. Insects*, **3** : 169.
1980. *Macromyzus (Anthracosiphoniella) maculatum* (Basu), 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 : 166.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Asplenium esculentum (Aspleniaceae) and some unidentified ferns.

Distribution : India : West Bengal (Darjiling); Meghalaya.

77. *Macromyzus manoji* Raha and Raychaudhuri

1978. *Macromyzus manoji* Raha and Raychaudhuri, D.N., *Entomon.*, **3**(1) : 113.

Material examined : Many apterous viviparous females, 1 alate vivparous female and several nymphs.

Host plant : Chilnthus alate, Dicheria varies (Polypodiacae), *Asplenium esculentum* (Aspleniaceae).

Distribution : India : West Bengal (Darjiling); Sikkim..

Remarks : Ghosh A.K., Ghosh, M.R. and Raychaudhuri, D.N. (1970, 1972) reported these specimens as *Macromyzus woodwardiae* (Takahashi). Later, Raha and Raychaudhuri, D.N. (1978) described this species as new after re-examining these material which were wrongly reportd earlier.

M. manoji differs from *M. woodwardiae* in the Siphunculi cylindrical, apex pale and flangeless

(Siphunculi uniformly dark brown, gradually narrower towards apex and with well developed flange in *wodwardiae*)

Genus 38. ***Macrosiphoniella*** del Guercio

1911. *Macrosiphonella* del Guercio, *Redia*, **7** : 331.
Type species : *Siphonophora atra* Ferrari, 1872

Key to the species of the Genus ***Macrosiphoniella*** del Guercio

Apterous viviparous females :

1(2) Hind tibiae with a row of thick spines on inner margin; siphunculi stout and long (about 0.25 times as long as body) ..... *spinepes*

2(1) Hind tibiae without such spines, siphunculi not as above. 3

3(4) Siphunculi as long as to longer than cauda and reticulted at most at distal half 5

4(3) Siphunculi always shorter than cauda and reticulated beyond half 7

5(6) Ultimate rostral segment as long as to 1.25 times as long as h.t. 2; cauda wiith 23-29 hairs; tibiae dark at base and apex, rest pale ..... *kalimpongense*

6(5) Ultimate rostral segment shorter than h.t. 2; p.t. shorter than antennal segmment III; cauda with atmost 15 hairs, tibiae brown at apex, rest pale; siphunculi pale near base, rest brown..... ..... *grandicauda*

7(8) Secondary rhinaria on antennal segment III never less than 10, may be upto 17; antesiphuncular sclerite well developed; dorsal abdominal hairs usually on sclerotiic base ..... *sanborni*

8(7) Secondary rhinaria on antennal segment III at most 9; antesiphuncular sclerite not well developed; dorsal abdominal hairs not on sclerotic base 9

9(10) Flagellum entirely beack; the very base of femora pale, rest dark brown, tibiae entirely dark; cauda with 14-18 hairs ..... *yomogifoliae*

10(9) Flagellum rather pale to brownish but never black; femora pale at basal 0.2-0.4 portion, rest brownish; tibiae not as above; cauda with 9-14 hairs ..... *pseudoartemesiae*

78. ***Macrosiphoniella grandicauda*** Takahashi and Moritsu

1963. *Macrosiphoniella grandicauda* Takkahashi and Moritsu *Mushi*, **37**:9.
1976. *Macrosiphoniella grandicauda* : Basu, C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(2) : 299.

Material examined : 2 apterous viviparous females.

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh. Elsewhere : Japan.

79. ***Macrosiphoniella kalimpongensis*** Basu and Raychaudhuri

1976. *Macrosiphoniella kalimpongensis* Basu, R.C. and Raychaudhuri, D.N.,*Orient. Insects*, **10**(2):299.
1980. *Macrosiphoniella kalimpongensis* : 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 : 171.

Material examined : Many apterous and 2 alate viviparous females and nymphs.

Host plant : Artemesia spp. (Compositae)

Distribution : India : West Bengal (Darjiling) Elsewhere : China

80. ***Macrosiphoniella pseudoartemesiae*** Shinji

1933. *Macrosiphoniella pseudoartemesiae* Shinji, *Kontyu*, **7** (5 &6) : 216.
1976. *Macrosiphonella pseudoartemisie* : Basu, R.C., and Raychaudhuri, D.N. *Orient. Insects*, **10**(2) : 302.

Material examined : Many apterous and alate viviparous females and nymphs ; 6 apterous oviparous females.

Host plants : Antemesia vulgaris, Artemesia spp. (Compositae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim; South India; Uttar Pradesh. Elsewhere : Bhutan; China; Japan; Korea.

81. ***Macrosiphoniella sanborni*** (Gillette)

1908. *Macrosphum sanborni* Gillette, *Can. ent.*, 40:65.
1976. *Macrosiphoniella sanborni* (Gillette); Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*. **10**(2):305.

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

Host plants : Chrysanthemum indicum, Chrysathemum sp. (Compositae).

Distribution : India : West Bengal (Darjiling and all other Districts) and all over India. Elsewhere: Virtually cosmopolitan.

82. ***Macrosiphoniella spinepes*** Basu

1967. *Macrosiphoniella spinepes* Basu, A.N., *Bull. Ent.*, **8**:151.
1976. *Macrosiphoniella spinepes* : Basu, R.C. and Raychaudhuri, D.N.*Orient. Insects*, **10**(2) : 304.

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

Host plants : Artemesia vulgaris, Artemesia spp. (Compositae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim.

83. *Macrosiphoniella yomogifoliae* (Shinji)

1922. *Macrosiphum yomogifoliae* Shinji, *Zool. Mag., Tokyo*, **34** (407):788
1976. *Macrosishoniella yomogifoliae* (Shinji): Basu, R.C. and Raychaudhuri, D.N.,*Orient.Insects*. **10**(2):305.

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

Host plants : Artemesia vulgaris, Artemesia spp. (Compositae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Meghalaya; Sikkim; South India; Uttar Pradesh. Elsewhere : China; Japan; Korea; Malayasia and Taiwan.

Genus 39. *Macrosiphum* Passerini

1980. *Macrosphum* Paserini, *Gl Afdi, Parma* ; 27
Type species : *Aphis rosae* Linnaeus, 1758.

Key to the subgenera of the genus *Marcosiphum* 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) First tarsal segment III never less than 0.50 times as long as diiameter of the segment .. ***Sitobion***

4(4) 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 the genus *Macrosiphum* Passerini

Apterous viviparous females :

1(2) F.T.C. 4,4,4 3

2(1) F.T.C. 3,3,3 5

3(4) Head, thorax and abdomen dorsally spinulose; siphunculi short, subequal to cauda .... *microspinulosum*

4(3) Head, thorax and abdomen dorsally smooth; longer hairs on antennal segment III 0.73-0.82 times as lomg as b.d.III ..... *pseudoluteum*

5(6) Hind tibiae with a row of short spine-like hairs; u.r.s. with 4 secondary hairs; antennal segment III with 12-19 secondary rhinaria ..... *spinotibium*

6(5) Hind tibiae without spine-like hairs 7

7(8) Spinules present at least on the venter of head 9

8(7) Spinules absent both ventrally and dorsally 13

9(10) Antennal segment III with secondary rhinaria distributed at most upto basal half 11

10(9) Antennal segment III with secondary rhinaria distributed over its entire length; femora sparsely spinulose distally on venter; u.r.s with 8 secondary hairs ..... *plectranthi*

11(12) Utimatee rostal segment shorter than h.t. 2; siphunculi uniformly dark ..... *fagopyri*

12(11) Utimat rostal segment longer than h.t.2; siphunculi dark only at the middle, rest pale ..... *aulacorthoides*

13(14) Processus terminalis shorter than antennal segment III 15

14(13) Processus termnalis longer than antennal segment III 19

15(16)Secondary rhinaria scattered over the entire length of antennal segment III ; siphunculi dark and antesiphuncular sclerite usually present ..... *rosae*

16(15) Secondary rhinaria fewer on antennal segment III and never distributed over entire length 17

17(18) Hairs on abdominal dorsum always shorter than b.d. III; siphunculi slender 0.20-0.30 times as long as body ..... *rosaeiformis*

18(17) Hairs on abdominal dorsum always longer than b.d. III; siphunculi stouter, 0.19-0.21 times as body ..... *pachysiphon*

19(20) Dorsum of abdomen without central patch 21

21(22) Dorsal abdominal hairs very short (at most upto 12/u) 23

22(21) Dorsal abdominal hairs rather long (never less than 18/u) 29

23(24) Caudal hairs short with blunt apices; p.t.6.5-7.5 times as long as base of antennal segment VI; siphunculi 0.2-0.3 times as long as body ..... *lambersi*

24(23) Caudal hairs at least near base long with acute apices 25

25(26) Apical hairs on cauda with blunt apex and much shorter than basal hairs with fine apices ..... *takahashii*

26(25) Apical hairs on cauda with subacute to acute apices, about as long as basal ones 27

27(28) Antesiphuncular sclerite absent; flagellum brown; cauda constricted medially ..... *akebiae*

28(27) Antesiphuncular sclerite present, flagellum dark; cauda not constricted medially ..... *mimosae*

29(30) Antennal segment III imbricated throughout its entire length ..... *sikkimensis*

30(29) Antennal segment III rather smooth excepting very base imbricated throughout its entire length ..... *miscanthi*

Alate viviparous females :

1(2) Tibiae with a row of short spine-like hairs; antennal segment III with 16-20 secondary rhinaria ..... *spinotibium*

2(1) Hind tibiae without such hairs 3

3(4) Secondary rhinaria on antennal segment III numerous and distributed irregularlly; cauda pale with 13-15 hairs; siphunculi dark ..... *rosae*

4(3) Secondary rhinaria on antennal segment III fewer and arranged in row 5

5(6) Longest hair on antennal segment III not less than 0.60 times as long as b.d. III; antennal segment III with 20-25 secondary rhinaria; 8th teigite with 6 hairs; siphunculi dark and imbricated, caudal hairs 15-20 ..... *pachysiphon*

6(5) Longest hair on antennal segment III never more than 0.55 times as long as b.d. III 7

7(8) Processus terminails shorter than antennal segment III containing 15-25 secondary rhinaria; caudal hairs usually 8 ..... *rosaeiformis*

8(7) Proceasus terminialis longer than antennal segment III 9

9(10) Lateral frontal tubercles low and without spinules ventrally; secondary rhinaria (9-14) distributed over 0.70 portion of antennal segment III; caudal hairs 7-9 ..... *miscanthi*

10(9) Lateral frontal tubercles appreciably high and with or without spinules ventrally 11

11(12) Antennal segment III with 6-10 secondary rhinaria; 8th tergite with 4 hairs; cauda pale, bearing 7-10 hairs ..... *sikkimensis*

12(11) Antennal segment III with 12-15 secondary rhinaria; 8th tergite with 5-6 hairs; cauda rather dark bearing 9 hairs ..... *indicum*

84. *Macrosiphum (Macrosiphum) aulacorthoides* David, Narayanan and Rajasingh

1970. *Macrosiphum aulacorthoides* David, Narayanan and Rajaisingh, *Orient. Insects, 4(4) : 420.*
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 : Many apterous viviparous females and nymphs.

Host plants : Ajuga macrosperma (Labiatae); *Rubus* sp. (Rosaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Meghalaya; Sikkim.

85. *Macrosipum (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 : Many apterous and alate viviparous females and nymphs.

Host plant : Rosa sp, *Rubus ellipticus, Rubus lasiocarpus, Rubus rosaefolia* (Rosaceae).

Distributon : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Manipur; Meghalaya ; Sikkim; Uttar Pradesh. Elsewhere : Pakistan.

86. *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 : Many apterous and alate viviparous females and nymphs.

Host plants : Roa americana, Rosa cania, Rosa macrophylla and *Rosa* spp. (Rosaceae).

Distribution : India : West Bengal (Darjiling); Manipur ; Mghalaya; Sikkim; South India; Uttar Pradesh. Elsewhere : Virtually cosmopolitan.

87. ***Macrosiphum (Macrosiphum) spinotibium*** Ghosh, Ghosh and Raychaudhuri.

1970. *Macrosiphum (Macrosiphum) spinotibium* Ghosh, Ghosh 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 ast India and Bhutan, The Zoological Society, Calcutta : 182.

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

Host plants : Artemesia spp. and other identified plants (Compositae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradessh ; Manipur; Meghalaya; Sikkim.

88. ***Macrosiphum (Neomacrosiphum) microsipinulosum*** David, Narayanan and Rajasing

1972. *Macrosiphum (Sitobion) microspinulosum* David, Narayanan and Rajasingh, *Orient. Insects*, 6:37.
1980. *Macrosiphum (Neomacrosiphum) microspinulosum* : Raychaudhuri, D.N., Ghosh, M.R. Basu, R.C., *In* Taxonomy of the aphids of North East India and Bhutan, The Zoological Society, Calcutta,:182.

Material examined : Nil

Host plant : Arthrazon lansifolius (Graminae)

Distribution : India : West Bengal (Darjiling)

Remarks : This species was described by David, Narayanan and Rajasingh (1972) on a single apterous viviparous female from the Darjiling District of West Bengal. The material was not available for the present study. Hence reported from the published literature.

89. ***Macrosiphum (Neomacrosiphum) pseudoluteum*** (Ghosh)

1969. *Sitobion pseudoluteum* Ghosh, *Proc. zool. Soc., Calcutta*, 22 : 125.
1980. *Macrosiphum (Neomacrosiphum) pseudoluteum* (Ghosh) : 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 : 183.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Medenvillia sp. (Apocynaceae) : *Cymbidium ebornum, Cymbidium elegans* (Orchidaceae).

Distribution : India : West Bengal (Darjiling); Sikkim.

90. ***Macrosiphum (Sitobion) akebiae*** Shinji

1935. *Macrosiphum akebiae* Shinji, *Kontyu*, 9:243.
1980. *Macrosiphum (Sitobion) akebiae* : Raychaudhuri, D.N.,Ghosh, M.R. and Basu, R.C., *In* Taxonomy of Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 183.

Material examined : Unidentified plant of Gramineae.

Distribution : India : West Bengal (Darjiling).

Remarks : Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. (1971) reported the specimens as *Macrosiphum avenae akebiae*. It is now revealed that *akebiae* and *avenae* are two distinct species due to pronounced differences between them. Miyazaki (1971) also consiered them as distinct species.

91. *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 : Fagopyrum sp., *Fagopyrum cymosum* (Polygonaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya.

92. *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.

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

Host plants : Cymbidium sp., *Cymbidium insifolium, Cymbidium luteum, Cymbidium tracyanum, Dendrobium densifolium, Dendrobium longcornum, Dendrobium* sp., *Eria bambusifolia, Otochilus porecta* (Orchidaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Meghalaya; Sikkim.

93. *Macrosiphum (Sitobion) lambersi* David

1966. *Macrosiphum lambersi* David, *Indian J.Ent.*, **18**:5.
1980. *Macrosiphum (Sitobion) lambersi* : 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.

Material examined : 1 apterous viviparous female and three nymphs.

Host plant : Unidentified.
Distribution : India : West Bengal (Darjiling); south India.

94. *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 : Mimosa pudica (Momosae)

Distribution : India : West Bengal (Darjiling); Meghalaya.

95. *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* Aphid of North East India and Bhutan : 185.

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

Host plant : Andropogon sp., *Avena sativa, Elusine indica, Poa* sp. *Poa annua, Triticum vulgare, Zea mays* (Gaminеae); *Crepis japonica, Helianthus annus* (Compositae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Manipur; Meghalaya; Nagaland; Sikkim; Uttar Pradesh. Elsewhere : Australia, China; England and Taiwan.

96. *Macrosiphum (Sitobion) plectraanthi* Ghosh, Ghosh and Raychaudhuri

1970. *Macrosiphum (Sitobion) plectranthi* Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects,* 4(4):32.
1980. *Macrosiphum (Sitobon) plectranthi* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 185.

Material examined : Many apterous viviparous females and nymphs.

Distribution : India : West Bengal (Darjiling); Meghalaya.

97. *Macrosiphum (Sitobion) rosaeformis* Das

1918. *Macrosiphum rosaeformis* Das, *Mem. Indian Mus.*, **6**(4) : 158.
1980. *Macrosiphum (Sitobion) rosaeformis* : 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 plants : Rosa cania, Rosa macrophylla, Rosa moschata, Rosa spp. and *spirarea corymbose* (Rosaceae).

Distribution : India : West Bengal (Darjiling and other Districts); Arunachal Pradesh; Assam; Bihar; Manipur; Meghalaya; Nagaland; Sikkim; South India; Uttar Pradesh. Elsewhere : Africa; Japan; Taiwan.

98. *Macrosiphum (Sitobion) sikkimensis* Ghosh and Raychaudhuri

1968. *Macrosiphum (Sitobion) smilacicola sikkimensis* Ghosh, A.K. and Raychaudhuri, D.N., *Ann. ent. Soc. Am.*, **61** : 753.
1980. *Macrosiphum (Sitobion) sikkimensis* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 187.

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

Host plant : Smilax sp. (Liliacae)

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim.

99. *Macrosiphum (Sitobion) takahashii* Eastop

1959. *Macrosiphum (Sitobion) takahashii* Eastop *Entomologist*, **92** : 104.
1980. *Macrosiphum (Sitobion) takahashii* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C.*In* Aphids of North East India and Bhutan : 188.

Material examined : 4 apterous viviparous females and 4 nymphs..

Distribution : India : West Bengal (Darjiling); Sikkim; South India. Elsewhere : Africa; Japan; Taiwan.

Genus 40 *Masonaphis* Hille Ris Lambers

1939. *Masonaphis* Hille Ris Lambers, *Temminckia*, 4:122.
Type species : *Macrosiphum rhododendri* Wilson, 1918.

100. *Masonaphis (Neomasonaphis) anaphilidis* Basu

1954. *Masonaphiis anaphilidis* Basu, A.N., *J.Linn.Soc.*, (Zool.), **45** :229.
1980. *Masonaphis (Neomasonaphis) anaphilidis*: Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 190.

Material examined : Many apterous viviparous females and nymphs.

Host plants : Anaphis tripinervis, Artemesia sp., *Seneco scandens* (Composite).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh ; Himachal Pradesh; Sikkim; Uttar Pradesh. Elsewhere : Bhutan.

Genus 41. *Matsumuraja* Schumacher

1921. *Matsumuraja* Schumacher, *Zool. Anz.*, 53:86.
Type species : *Acanthaphis rubi* Matsumura, 1918.

Key to the species of the Genus *Matsumuraja* Schumacher

1(2) Abdominal dorsum with finger-like process at least marginally in each antespihuncular segment, antennae always 5-segmented; p.t. about 1.18-1.48 times as long as base of last segment; no spinal tuberculate structure on abdominal tergum; 8th abdominal tergite with 2 hairs, each about 0.50-0.70 times as long as b.d. III ..... *urticae* Ghosh, Ghosh and Raychaudhuri

2(1) Abdominal dorsum without any finger-like process; antennae 6-segmented 3

3(4) Ultimate rostral segment short about 0.84 times to as long as ht. 2; p.t. about 1.20-2.0 times as long as base of last antennal segment; hairs on abdominal dorsum minute, those on anterior tergites about 0.20 times as long as b.d III .....*nuditerga* Hille Ris Lambers

4(3) Ultimate rostral segment about 1.05-1.27 times as long as h.t 2; p.t. about 2.20-2.84 times as long as base of last antennal segment; hairs on abdominal dorsum long and distinct, those on anterior tergites about 0.20 times as long as b.d. III .....*Capitophoroides* Hille Ris Lambers

101. *Matsumuraja capitophoroides* Hille Ris Lambres

1966. *Matsumuraja capitophoroides* Hille Ris Lambrs, *Tijdschr. Ent.*, **109**:215
1980. *Matsumuraja capitophroides* : 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 : 192.

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

Host plants : Polygonum serrulatum (Polygonaceae); *Rubus ellipticus, Rubus macilentus* and *Rubus rosaefilius* (Rosaceae).

Distribution : India : West Bengal (Darjiling) ; Arunachal Pradesh; Manipur; Meghalaya; Sikkim; Uttar Pradesh. Elsewhere : Nepal and Pakistan.

102. *Matsumuraja nuditerga* Hille Ris Lambers

1965. *Matsumuraja nuditerga* Hille Ris Lambers, *Tijdschr. Ent.*, **108**:201
1980. *Matsumuraja nuditerga* : Raychaudhuri, D.N.,Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 192.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Pilea sp. (Urticaceae).

Distribution : India : West Bengal (Darjiling). Elsewhere : Japan.

103. *Matsumuraja urticae* Ghosh, Ghosh and Raychaudhuri

1971. *Matsumuraja urticae* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. *Orient Insects*, **5**(2) : 216.
1980. *Matsumuraja urticae* : Raychaudhuri, D.N.Ghosh, M.R. and Basu. R.C., *In* Aphids of North East India and Bhutan : 193.

Material examined : 5 apterous viviparous females and 7 nymphs.

Host plant : Unidentified plant of Urticaceae.

Distribution : India : West Bengal (Darjiling).

Genus 42. ***Metopolophium*** Mordvilko

1914. *Metopolophium* Mordvilko, *Faune Russie*, **1**:82.
Type species : *Aphis dihorda* Walker, 1848.

Key to the species of ***Metopolophium*** Morvdvilko

1(2) First tarsal segment of fore leg with 4 or 5 hairs, when with 4 hairs other tarsal segment with 4 or 3 hairs and when with 5 hairs other tarsal segment with 4 hairs .....*Neometopolophium*

2(1) First tarsal segment of fore leg never with more than 3 hairs, as also other tarsal segments 3

3(4) Anterior dorsal hairs on abdomen at most upto 0.50 times a long as b.d. III .....
.....*Metopolophium* s.s.

4(3) Anterior dorsal hairs on abdomen always more than 0.50 times as long as b.d. III and sometimes even longer than the mentioned diamter .....*Microlophium*

Key to the species of Subgenus ***Metopolophium*** Mordvilko

1(2) Ultimate rostral segment usually shorter than h.t. 2 and bears 6-9 secondary hairs; segment III with 1-5 secondary rhinaria 3

2(1) Ultimate rostral segment equal to or slightly longer than h.t. 2 and bears 14-16 hairs; segment III with 22-25 secondary rhinaria .....*malvae* (Mosley) Gr.

3(4) Siphuncula brown longer than segmnt III, flagellum dark brown distally ? .....
.....*caraganae* (Cholodkovsky)

4(3) Siphunculi pale shorter than segment III, flagellum pale .....*rubi* (Narz.)

104. ***Metopolophium (Metopolophium)? caraganae*** (Cholodkovsky)

1907. *Siphonohora caraganae* Cholodkovsky, *Rev. Russie Ent.*, **7** :87.
1975. *Metopolophium (Metopolophium)? caraganae* (Cholodkovsky), Raychaudhuri, D.N.,Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 121.

Material examined : 1 apterous viviparous female.

Host plant : Cajnus cajan (Papilionaceae).

Distribution : India : West Bengal (Darjiling). Elsewhere : Germany ; Holland; Poland and Russia

105. *Metopolophium (Metopolophium) malvae* (Mosley) Group

1841. *Aphis malvae* Mosley, *Gardners Chron Land.*, **1**:684.
1975. *Metopolophium (Metopolophium) malvae* (Mosley), Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *Proc. zool .Soc. Calcutta*, **28** : 122.

Material examined : 4 alatoid (Intermediate forms) and 2 apterous nymphs.

Host plant : Germanium (Geraniaceae)

Distribution : India : West Bengal (Darjiling).

106. *Metopolophium (Metopolophium) rubi* (Narzikulov)

1957. *Acrythosiphon rubi* Narzikulov, *Ent. Obozr.*, **36**:673.
1975. *Metopolophium (Metopolophium) rubi* (Narzikulov), Raychaudhuri, D.N.Ghosh, M.R. and Basu, R.C., *Proc. zool Soc., Calcutta* **28**:124.

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

Host plants :Rumex sp. (Polygonaceae); *Rubus ellipticus, Rubus* sp. and an unidentified plant (Rosaceae).

Distribution : India : West Bengal (Darjiling); Sikkim. Elsewhere : Bhutan ; U.S.S.R.

107. *Metopolophium (Metopolophium) darjeelingensis* Ghosh

1907. *Metopolophium (Metopolophinum) darjeelingensis* Ghosh, L.K., *Bull. Ent.*, **11**(2) : 116.
1985. *Metopolophium (Metopolophinum) darjeelingensis* : *Mem Zool. surv. India*, **16**(3) : 47.

Material examined : 7 apterous viviparous females.

Host plant : Hypericum sp. (Hypericaceae)

Distribution : India : West Bengal (Darjiling)

108. *Metopolophium (Microlophium) darjeelingense* Raychaudhuri, Ghosh and Basu

1975. *Metopolophium (Microlophiium) darjeelingense* Raaychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *Proc. zool. Soc., Calcutta*, 28 : 125.
1980. *Metopolophium (Microlophium) darjeelingense*: Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 198.

Material examined : 5 apterous viviparous females and 3 nymphs.

Host plant : Unidentified plant of Acanthaceae

Distribution : India : West Bengal (Darjiling).

109. ***Metopolophium (Neometopolophium) davidi*** Raychaudhuri, Ghosh and Basu

1975 *Metopolophium (Neometopolophium) davidi* Raychaudhuri, D.N., Ghosh., M.R. and Basu, R.C. *Proc. zool Soc., Calcutta*, **28** : 128.

1980. *Metopolophium (Neometopolophium) davidi* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhuan : 200.

Material examined : 9 apterous viviparous females and 11 nymphs.

Host plant : Hypericum sp. (Hypericaceae)

Distribution : India : West Bengal (Darjiling).

Genus 43. ***Micromyzus*** van der Goot

1917. *Micromyzus* van der Goot, *Contr. Fauna Indes neerl.*, **1**(3) : 52.
Type species : *Micromyzus nigrum van* der Goot, 1917.

Key to the species of the Genus ***Micromyzus*** van der Goot

Apterous viviparous females :

1(2) Ultimate rostral segment shorter than to as long as h.t. 2 and with a pair of secondary hairs; dorsum of abdomen blackish but pale near antesiphuncular area ..... *granotiae*

2(1) Ultimate rosral segment always longer than h.t. 2 aand with 2-6 secondary hairs 3

3(4) Antennae always much shorter than body, siphunculi 0.15-2.0 times as long as body; p.t. 3.0-3.80 times as long as base of last antennal segment; u.r.s. rather long may be upto twice as long as h.t. 2; F.T.C.3,3,2 ..... *kalimpongensis*

4(3) Antennae as long as or longer than body; p.t. longer than segment III and 4.50-6.0 times as long as base of last antennal segment; siphunculi about 0.23-0.30 times as long as body 5

5(6) Femora with normal imbricaions, dorsum of head sprasely spinulose ; u.r.s. 1.25-1.42 times as long as h.t. 2 and with at most 6 secondary hairs; cauda dark and bears 6-7 hairs of variable lengths ..... *nigrum* van der Goot

6(5) Femora with spinulose imbrications; dorsum of head densely spinulose; u.r.s. 1.25-1.50 times as long as h.t. 2 and with 5-7 secondry hairs; cauda pale, with 6 hairs of similar lengths .... *judenkoi* Carver

Alate viviparous females :

1(2) Ultimate rostral segment very long, about 1.60-2.60 times as long as h.t. 2; segment III with 17-30, IV with 10-20 and V with 2-9 secondary rhinaria distributed irregularly over entire length of segments ; p.t. about 2.50-4.20 times as long as base of last antennal segment ....*kalimpongensis* Basu

2(1) Ultimate rostal segment atmost 1.40 times as long as h.t.2; secondary rhinaria usually present on segment III, sometimes a few also on segment IV, p.t. 4.50-6.20 times as long as base of last antennal segment; segment III with 14-19 and IV with 0-5 secondary rhinaria; u.r.s. 1.20-1.35 times as long as h.t. 2; siphunculi about 0.21-0.23 times as long as body; cauda about 0.40-0.45 times as long as siphunculli .....*nigrum*

110. *Micromyzus granoitae* Ghosh, Ghosh and Raychaudhuri

1970. *Micromyzus granoitae* Ghosh, A.K. Ghosh, M.R. and Raychaudhuri, D.N. *Orient. Insects*, 4(2) : 199.
1980. *Micromyzus granoitae* : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 204.

Material examined : 6 apterous viviaparous females and 4 nymphs.

Host plant : Granotia sp. (Compositae).

Distribution : India : West Bengal (Darjiling).

111. *Micromyzus judenkoi* Carver

1965. *Micromyzus judenkoi* Carver, *Proc. R. ent. Soc. Lond.*, (B) **34** : 114.
1980. *Micromyzus judenkoi* : Raychaudhuri, D.N. Ghosh. M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 204.

Material examined : Many apteorus viviparous females and nymphs.

Host plants : Chelianthes compositor (Sinopleridaceae); *Asplenium* sp. (Asplenaceae).

Distribution : India : West Bengal (Darjiling); Himachal Pradesh; Uttar Pradesh. Elsewhere : Australia; Sri Lanka.

112. *Micromyzus kalimpongenis* Basu

1967. *Micromyzus kalimpongensis* Basu, A.N., *Bull. Ent.*, **8** : 152.
1980. *Micromyzus kalimpongensis* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 205.

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

Host plants : Hedychium cornarium (Zingiberaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

113. *Micromyzus nigrum* van der Goot

1917. *Micromyzus nigrum* van der Goot, *Contr. Faune Indes neerl.*, **1**(3) : 53.
1964. *Micromyzus nigrum* : Basu, A.N., *Orient, Insects*, **3**(4) : 363.

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

Host plant : An unidentified species of Fern.

Distribution : India : West Bengal (Darjiling).

Genus 44. *Myzakkaia* Basu

1969. *Myzakkaia* Basu, A.N. *Orient. Insects*, **3** : 177.
Type species : *Myzakkaia himalayensis* Basu, 1969

Key to the species of the genus *Myzakkaia* Basu

Apterous viviparous females

1(2) Abdominal tergite 7 with a large spinal tubercle about as wide as length of cauda; hairs on lateral frontal tubercles and basal segments of antennae very minute (3-7/u); antennae 0.60-0.80xbody ..... *himalayensis* Basu

2(1) Abdominal tergite 7 without any tubercle; hairs on lateral frontal tubercles and basal segment of antennae long (10-21/u); antennae 0.57-0.61 x body ..... *polygonicola* Basu

114. *Myzakkaia himalayensis* Basu

1969. *Myzakkaia himalayensis* Basu, A.N., *Orient, Insects*, **3** : 177.
1980. *Myzakkaia himalayensis* : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C., *In* North East India and Bhutan : 207.

Material examined : Nil

Host plants : Polygonum alatum, Polygonum sp. (Polygonaceae).

Distribution : India : West Bengal (Darjiling).

Remarks : Basu, A.N. (1969) described the species from Darjiling District of West Bengal with apterous viviparous female morphs, but the material was not available for the present study, Hence, reported from literature.

115. *Myzakkaia polygonicola* Basu

1969. *Myzakkaia polygonicola* Basu, A.N., *Orient, Insects*, **3** : 179.
1980. *Myzakkaia polygonicola* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 207.

Material examined : Nil

Host plant : Polygonum runcinatum (Polygonaceae).

Distribution : India : West Bengal (Darjiling).

Remarks : Since the materials was not available for study it is reported from published literature.

Genus 45. *Myzus* Passerini

1860. *Myzus* Passerini, *Gli Afidi* Fabricius, 1775.

Key to the species of the Genus *Myzus* Passerini

APTERAE :

1(2) Ultimate rostral segment short with obtuse apex, about 0.70-0.80 x ht. 2; Siphunculi with a distinct flange, pale excepting the apical 0.25 portion which is somewhat brownish; segment 1 much wider than long; body pale ..... *maculocorpus* Basu and Raychaudhuri

2(1) Ultimate rostral segment somewhat long, nearly as long as to 1.65 x h.t. 2 3

3(4) Tergite 7 slightly and subgenital plate strongly produced posteriorly, the latter nearly triangular ..... *siegesbeckicola* Strand

4(3) Tergite 7 and subgenital plate normal 5

5(6) Dorsal abdominal hairs long with fine apices; abdominal dorsum and venter with strong spinulose striae; siphhnculi and cauda dark brown; siphunculi about 0.09 to at most 0.12 x body and about 2.45-1.88 x cauda; nymphs with spinulose hind tibiae .... *Peptotrichus* David, Rajasingh and Narayanan

6(5) Dorsal abdominal hairs short with Myzine-type of apices 7

7(8) Siphunculi never exceeding 0.06-0.08 x body and slightly shorter to just longer than cauda; nymphs with spinules on hind tibiae ..... *brevisiphon* Basu

8(7) Siphunculi never less than 0.10 x body and at least 1.50 x cauda 9

10(9) Siphunculi usually cylindrical, but may sometimes be tapering or very weakly swollen on inner margin just before apical flange 15

10/9 Siphunculi strongly clavate 11

11(12) Distance between 6th and 7th spiracles distinctly longer than that between 5th and 6th; siphunculi about 0.22-0.26 x body; nymphs without spinules on hindtibiae ..... *persicae* (Sulzer)

12(11) Distance between 6th and 7th spiracles distinctly shorter than that between 5th and 6th; siphunculi at most 0.18 x body 13

13(14) Tergite 8 with 4 hairs; antennae always longer than body; u.r.s. 1.40-1.60 x h.t.2 ..... *ascalonicus* Doncaster

14(13) Tergite 8 with 2 hairs; antennae shorter than to almost as long as body; u.r.s. 1.25-1.35 x h.t.2 ..... *cymballariellus* Stroyan

15(16) Siphunculi as long as or longer than width of head across outer margin of eyes 17

16(15) Siphunculi distinctly shorter than width of head across outer margin of eyes 23

17(18) Processus terminalis longer than segment III which is constricted at base; u.r.s. as long as or slightly longer than h.t. 2; nymphs with spinules on hind tibiae ..... *ranunculinus* (Walker)

18(17) Processus terminalis shorter than to as long as segment III which is not narrowed basally; u.r.s. 1.25-1.50 x h.t. 2 19

19(20) Siphunculi bent outward at apex, roughly imbricated, smooth just below flange, pale excepting very dusky apex; antennae roughly imbricated; distance between 6th and 7th spiracles same as that between 5th and 6th; hind tibiae of nymphs with a few spinules ..... *dycei* Carver

20(19) Siphunculi cylindrical, either completely dark or pale on basal 0.50 portion and rest darker; hind tibiae of nymphs strongly spinulose 21

21(22) Distance between 6th and 7th spiracles much more than that between 5th and 6th; u.r.s. 1.40-1.50 x h.t. 2 ; body pale ..... *filicis* Basu

22(21) Distance between 6th and 7th spiracles much less than that between 5th and 6th; u.r.s. 1.20-1.30 x h.t. 2; body dark ..... *umefoliae* (Shinji)

23(24) Dorsum of head uniformly spinulose or warty 25

24(23) Dorsum of head spinulose or warty only laterally leaving a broad median area free from such spinules or warts 29

25(26) Antennae longer than body; siphunculi 0.20-0.22 x body; dorsal abdominal hairs on anterior tergites at most 0.35 x b.d. III; abdominal dorsum with large dark median sclerite ....*lefroyi* Basu and Raychaudhuri

26(25) Antennae much shorter than body; siphunculi 0.15-0.18 x body ; dorsal abdominal hairs on anterior tergites at least 0.70 x b.d. III 27

27(28) Processus terminalis longer than segment III and siphunculi about 2.60-3.0 x base of 1st antennal segment; with normal imbrications .....*manoji* Basu and Raychaudhuri

28(27) Processus terminalis shorter than both segment III and siphunculi, and at most 2.50 x base of last antennal segment; siphunculi strongly imbricated .....*cerasi* (Fabricius)

29(30) Ultimate rostral segment usually as long as h.t. 2, sometics slightly longer (1.05); dorsum of abdomen pale but usually with segmentally arranged dark patches; nymphs with hind tibiae strongly spinulose .....*ornatus* Laing

116. *Myzus ascalonicus* Doncaster

1946. *Myzus ascalonicus* Doncster, *Proc. R. ent. Soc. Lond.*, (B) **15** : 27.
1980. *Myzus ascalonicus* : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India Bhutan : 211.

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

Host plants : Chrysanthemum sp., *Ganphalium luteoalbum, Hypochoeris radicata* (Compositae).

Distribution : India : West Bengal (Darjiling); Himachal Pradesh; Meghalaya; Uttar Pradesh. Elsewhere : America; Australia; Canada; Europe; Far East and New Zealand.

117. *Myzus brevisiphon* Basu

1969. *Myzus brevisiphon* Basu, A.N., *Orient. Insects*, **3** : 180.
1976. *Myzus brevisiphon* : Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(1) : 98.

Material examined : 3 apterous viviparous females and 2 nymphs.

Host plants : Polygonum capitatum, Polygonum sp. (Polygonaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Uttar Pradesh.

Remarks : This species sharply differs from other species under the genus by the very short siphunculi. The species is also a remarkable for it's small size. The species was originally described by Basu, A.N. (1969) with apterous viviparous female, subsequently Ghosh, A.K. (1974) reported alate viviparous females and alate male from Shillong, Meghalaya. Chakrabarti and Raychaudhuri, D.N. (1975)

also reported alate viviparous females and alate males from Almora, Uttar Pradesh.

118. *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 : Many apterous viviparous females and nymphs.

Host plants : Sambucas javanika (Capridoiceae); *Artemesia* sp. (Compositae); *Rubia cordifolia* (Rubiaceae).

Distribution : India : West Bengal (Darjiling); Himachal Pradesh; Meghalaya; Sikkim; Uttar Pradesh.

119. *Myzus cymballariellus* Stroyan

1967. *Myzus (Sciamyzus) cymballariellus* Stroyan, *Proc. R. ent. Soc. Lond.* (B) : 186 = *Myzus (Sciamyzus) cymballariellus* Stroyan 1954).
1976. *Myzus cymballeriellus* : Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects* **10**(1) : 99.
1985. *Myzus (Sciamyzus) cymballariellus* Stroyan : Agarwala and Ghosh, *Mem. Zool. Surv. India*, **16**(3) : 49.

Material examined : Many apterous viviparous females and nymphs.

Host plants : Solanum sp. (Solanaceae); *Hypochoeris radicata* (Compositae); *Spriagea* sp. Rosaceae)

Distribution : India : West Bengal (DArjiling); Himachal Pradesh; Meghalaya. Elsewhere : Australia; England; New Zealand; South Africa.

120. *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 : Many apterous and alate viviparous females and nymphs.

Host plant : Polygonum sp. (Polygonaceae); *Urtica diocea, Urtica parvicolia, Urtica* sp. (Urticaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Meghalaya; Sikkim. Elsewhere : Australia; China; Japan; Nepal.

121. *Myzus filicis* Basu

1969. *Myzus filicis* Basu, A.N., *Orient. Insects*, **3**(2) 181.

1976. *Myzus filicis* : Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects.* **10**(1) : 100.

Material examined : 5 apterous viviparous females and 8 nymphs.

Host plant : Unidentified fern.

Distribution : India : West Bengal (Darjiling).

122. *Myzus lefroyi* Basu and Raychaudhuri

1976. *Myzus lefroyi* Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects,* **10**(1) : 101.
1980. *Myzus lefroyi* : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 214.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Unidentified Fern.

Distribution : India : West Bengal (Darjiling).

123. *Myzus leptotrichus* David, Rajasingh and Narayanan

1972. *Myzus leptotrichus* David, Rajasingh and Narayanan. *Orient. Insects,* **6**(1) : 39.
1976. *Myzus leptotrichus* : Basu, R.C. and Raychauhduri, D.N. *Orient. Insects,* **10**(1) : 103.

Material examined : Many apterous viviparous females and nymphs.

Host plants : *Polygonum barbatum, Polygonum runcinatum* (Polygonaceae).

Distribution : India : West Bengal (Darjiling).

124. *Myzus maculocorpus* Basu and Raychaudhuri

1976. *Myzus maculocorpus* Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects,* **10**(1) : 103.
1980. *Myzus maculocorpus* : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 215.

Material examined : 4 apterous viviparous females and 2 nymphs.

Host plant : Unidentified

Distribution : India : West Bengal (Darjiling).

125. *Myzus manoji* Basu and Raychaudhuri

1976. *Myzus manoji* Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects,* **10**(1) : 104.

1980. *Myzus manoji* : Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 215.

Material examined : 4 apterous viviparous females.

Host plant : An unidentified plant.

Distribution : India : West Bengal (Darjiling).

126. *Myzus ornatus* Laing

1932. *Myzus oratus* Laing, *Ent. mon. Mag.*, **68** : 52.
1976. *Myzus ornatus* : Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*, **10**(1) : 107.

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

Host plant : Extremely polyphagous.

Distribution : India : West Bengal (almost all the districts of the State) and all over India. Elsewhere: Virtually cosmopolitan.

Remarks : *Myzus ornatus* is characterised by typical ornamentation on the dorsum of abdomen of apterae. But examination of large samples collected from different hosts at different seasons reveals that the pattern is variable.

127. *Myzus persicae* (Sulzer)

1776. *Aphis persicae* Sulcaer, *Abgekurtze Gesch., Insecklen* : 105.
1976. *Myzus persicae* (Sulzer) : Basu, R. C. and Raychaudhuri, D.N. *Orient, Insects*, **10**(1) : 107.

Material examined : Many apterous and alate viviparous.

Distribution : India : West Bengal (all districts of the State) and throughout India. Elsewhere : Virtually cosmopolitan.

128. *Myzus ranunculinus* (Walker)

1852. *Aphis ranunculinus* Walker, *List specimens Hempiterous insects Br. Mus.*, **4** : 1046.
1976. *Myzus ranunculinus* (Walker), Basu, R. C. and Rauchaudhuri, D.N. *Orient. Insects*, **10**(1) : 108.

Material examined : 2 apterous viviparous females.

Host plant : Unidentified plant of Urticaceae

Distribution : India : West Bengal (Darjiling). Elsewhere : Europe; Japan.

129. *Myzus siegesbeckicola* Strand

1923. *Myzus siegesbeckicola* Strand, *Act. Univ. Lativnsis*, **20** : 22.
1876. *Myzus siegesbeckicola* : Basu, R.C. and Raychaudhuri, D.N. *Orient. Insects*, **10**(1) : 108.

Material eamined : Many apetorous and alate viviparous females and nymphs.

Host plants : Eupatorium odoratum, Montana bipinnathfida and I*egebeckia orientalis* (Compositae).

Distribution : India : West Bengal (Darjiling); Meghalaya. Elsewhere : Japan, Korea, Sumatra and Taiwan.

130. *Myzus umifoliae* (Shinji)

1924. *Akkaia umifoliae* (Shinji), *Zool. Mag. Tokyo*, **36** : 348.
1976. *Myzus umifoliae* (Shinji), Basu, R.C and Raychaudhuri, D.N., *Orient. Insects* **10**(1) : 109.

Material examined : 2 apterous viviparous females.

Host plant : Galium aparine (Euphorbiaceae).

Distribution : India : West Bengal (Darjiling); Uttar Pradesh. Elsewhere : Japan.

Genus 46. *Neoacyrthosiphon* Tao

1963. *Neoacyrthosiphon* Tao, *Pl. Prot. Bull. Taiwan*, **5**(3) : 189.
Type species : *Acrythosiphon taihesanum* Takahashi, 1935

Key to the species and sub-species of the Genus ***Neoacyrthosiphon*** Tao

1(2) Ultimate rostral segment about 0.89-0.91 times as long as ht. 2 and bears only 2 secondary hairs; longest hair on cephalic dorsum shorter than b.d. III; about 0.60-0.72 times as long as segment III ..... *taiheisanum ovlifoliae*

2(1) Ultimate rostral segment about 1.30-1.60 times as long as h.t.2, as and bears 4-8 secondary hairs; longest hair on cephalic dorsum 2.30-5.0 times b.d.III; longer than segment III 3

3(4) Hairs on abdominal dorsum with subacute to acuminate apices and placed on brown sclerotic broad tubercles, the longest one on anterior tergites about 4.10-5.30 times as long as b.d. III; 7th tergite with 4 hairs; u.r.s. with 8 secondary hairs ..... *setosum*

4(3) Hairs on abdominal dorsum with incrassate apices and placed on pale tubercles, the longest one on anterior tergites upto 2.0 times as long as b.d. III; 7th tergite with 2 hairs; u.r.s. with 4 secondary hairs ..... *rhododendri*

131. *Neoacyrthosiphon rhododendri* Ghosh and Raychaudhuri

1970. *Neoacyrthosiphon rhododendri* Ghosh, M. Ghosh, A.K. and Raychaudhuri, D.N. *Orient. Insects*, 4(4) : 386.
1980. *Neoacyrthosiphon rhododendri* : Raychaudhuri.D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 220.

Material examined : 5 apterous and 1 alate vivaparous female and nymphs.

Host plants : *Chenopodium* sp. (Chenopodiaceae); *Artemesia* sp. (Compositae); *Rubus ellipticus*, Rubus reticulata (Rosaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim; Uttar Pradesh.

Genus 48. *Neomegouropsis* Ghosh, Basu and Raychaudhuri

1977. *Neomegouropsis* Ghosh, M. R. Basu, R. C. and Raychaudhuri, D.N. *Orient. Insects*, **11** : 584.
Type species : *Megouropsis doarsis* Ghosh and Raychaudhuri, 1969

Key to the species of the genus ***Neomegouropsis*** Ghosh, Basu and Raychaudhuri

Apterous viviparous female :

Dorsal cephalic hairs as long as or slightly longer than b.d. III; u.r.s. slightly longer than ht2 ..... *cajane*

Dorsal cephalic hairs distinctly shorter (only about 0.67 x b.d. III); u.r.s. shorter (0.70 - 0.80 times) ..... *dooarsis*

Alate viviparous female :

U.r.s. slightly longer than ht2; a.s. III with 9-12 secondary rhinaria arranged in a row along entire length ..... *cajanae*

U.r.s. 0.70-0.80 x ht2; a.s. III with 4-5 secondary rhinaria on basal half ..... *dooarsis*

135. *Neomegouropsis cajanae* (Ghosh and Raychaudhuri)

1970. *Megoura cajanae* Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, 4 : 385.
1980. *Neomegouropsis cajanae:* Ghosh, M. Ghosh, A.K. and Raychaudhuri, D.N. *In* Aphids of North East India Bhutan : 225.

Material examined : Many apterous and alate viviparous females and nymphs; one apterous oviparous female.

Host plants : Cajanus cajan, Desmodium trifolium (Papilionaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Manipur; Meghalaya.

Remarks : Ghosh, M. R., Ghosh, A. K. and Raychaudhuri, D.N. (1970) described apterous oviparous morph of the species from Darjiling district of West Bengal.

136. *Neomegouropsis dooarsis* (Ghosh and Raychaudhuri)

1969. *Megouropsis dooarsis* Ghosh, A. K. Raychaudhuri, D. N., *Ann. ent. Soc. Am.*, **62** : 952.
1980. *Neomegouropsis dooarsis* (Ghosh and Raychaudhuri) : Raychaudhuri D.N. Ghosh, M. R. and Basu, R. C., *In* Aphids of North East India and Bhutan : 226.

Material examined.: Many apterae, alatae and nymphs.

Host plants : Indiogofera dosua, I. teysmanni (Papilionaceae)

Distribution : India : West Bengal (N. Bengal); Himachal Pradesh; Uttar Pradesh.

Genus 49. *Neomyzus* van der Goot

1915. *Neomyzus* van der Goot, *Beiter. Kennt. Blattlause* : 7.
Type species : *Siphonophora circumflexa* Buckton, 1876

Key to the Subgenera of the Genus *Neomyzus* van der Goot

1(2) First tarsal segment with 4 hairs, 2 of these blunt and much thicker than others ..*Paraneomyzus*

2(1) First tarsal segment with 3 hairs of uniform thickness and with fine apices .....*Neomyzus*

Key to the species of the Genus *Neomyzus* van der Goot

Apterous viviparous females :

1(2) First tarsal segment with 4 hairs, 2 of these being short, stout and blunt; femora with spinules on inner margins; major part of segments III and IV, siphunculi and cauda pale; .....*dicentrae*

2(1) First tarsal segments with 3 hairs nearly of same shape and size, forefemora either with spinules or at least with scaly imbrications on surface 3

3(4) Siphunculi distinctly clavate on distal 0.50 portion, thoracic and abdominal dorsum rugose and with broken patches .....*dendrobii*

4(3) Siphunculi usually cylindrical, may sometimes be slightly swollen distally on inner margin; femora with a few scaly imbrications on distal end; head, antennae, siphunculi and cauda dark; flagellum with prominent scaly imbrications all over .....*circumflexus*

Alate viviparous females :

1(2) First tarsal segment with 4 hairs; antennae shorter to longer than body; p.t. about 3.0-5.0 times as long as base of last antennal segment and always shorter than segment III; siphunculi about 0.20-0.25 times as long as body, sub-cylindrical and almost flangeless ..... *dicentrae*

2(1) First tarsal segment with 3 hairs 3

3(4) Processus terminalis shorter than segment III; antennae as long as to longer than body; siphunculi distinctly clavate on distal 0.50 portion, about 0.17-0.23 times as long as body; segment IV with 6-7 secondary rhinaria; u.r.s. nearly as long as h.t. 2 ..... *dendrobii*

4(3) Processus terminalis longer than segment III; antennae about 1.20-1.30 times as long as body; siphunculi cylindrical, about 0.15-0.22 times as long as body; segment IV with 1-5 secondary rhinaria; u.r.s. about 1.20 times as long as h.t. 2 ..... *circumflexus*

137. *Neomyzus (Neomyzus) circumflexus* Buckton

1876. *Siphonophora circumflexa* Buckton, *Mongr. Br. Aphids* **1** : 30.
1980. *Neomyzus (Neomyzus) circumflexus :* Buckton; Raychauhdhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 229.

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

Host plants : Extremely polyphagous infesting the plants under the families Amaranthaceae, Chenopodiaceae, Commelinaceae, Compositae, Convolvulaceae, Cucurbitaceae, Euphobiaceae, Malvaceae, Moraceae, Nyctaginaceae, orchidaceae, Oxalidaceae, Papilionaceae, Passifloraceae, Plantaginaceae, Polygonaceae, Rosaceae, Rubiaceae, Rutaceae, Saxifragacae, Scrophulariaceae, Solanaceae, Straceae, Ternstroemiaceae and Urticaceae.

Distribution : India : West Bengal (almost all districts;) Arunachal Pradesh; Assam; Bihar; Himachal Pradesh; Manipur; Meghalaya; Nagaland; Sikkim; South India; Uttar Pradesh. Elsewhere : Virtually cosmopolitan.

138. *Neomyzus (Neomyzus) dendrobii* (Basu)

1969. *Aulacorthum (Neomyzus) dendrobii* Basu, A.N. *Orient. Insects.* **3** : 171.
1980. *Neomyzus (Neomyzus) dendrobii* (Basu); Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 229.

Material examined : 6 apterous viviparous females, 1 alate viviparous female and nymphs.

Host plant : Dendrobium sp. (Orchidacee)

Distribution : India : West Bengal (Darjiling).

139. *Neomyzus (Paraneomyzus) decentrae* (Basu)

1967. *Aulacarthum (Neomyzus) decentrae* Basu, A.N., *Bull. Ent.*, **8** : 3.
1980. *Neomyzus (Paraneomyzus) decentrae* : (Basu), Raychaudhuri, D. N., Ghosh, M. R. and Basu, R. C. *In* Aphids of North East India and Bhutan : 230.

Material examined : 2 apterous viviparous females and nymphs.

Host plant : An unidentified plant.

Distribution : India : West Bengal (Darjiling).

Remarks : Basu, A.N. (1967) described alate viviparous females of this species but the material was not available for study and thereofre, has been keyed from the published literature.

Genus 50. *Oedisiphum* van der Goot

1971. *Odeisiphum* van der Goot, *Contr. Faune Ides Neerl.*, **1** : 112.
Type species : *Oedisiphum compositanum* van der Goot, 1917.

140. *Oedisiphum soureni* Basu

1964. *Oedisiphum soureni* Basu, A.N., *J. Linn. Soc.* (Zool.), **45** : 238.
1980. *Oedsiphum soureni* : Raychaudhuri, D.N., Ghosh, M. R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 231.

Material examined : 4 apterous viviparous females and nymphs.

Host plants : Anaphilis subumbelata, Anaphilis triplinervis and *Anaphilis* sp. (Compositae).

Distribution : India : West Bengal (Darjiling); Uttar Pradesh. Elsewhere : Nepal.

Genus 51. *Paczoskia* Mordvilko

1914. *Paczoskia* Mordvilko, Faune Rossii, 1 : 63.
Type species : *Paczoskia paczoskii* Mordvilko, 1919.

141. *Paczoskia budhium* Banerjee, Ghosh and Raychaudhuri

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* Aphids of North East India and Bhutan : 234.

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

Host plants : Blumea sp., *Innula cappa* and *Innula* sp. (Compositae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Uttar Pradesh.

Genus 52. *Pentalonia* Coquerel

1859. *Pentalonia* Coquerel *Ann. Soc. ent. Fr.*, **3** : 259.
Type species : *Pentalonia nigronervosa* Coquerel, 1859

142. *Pentalonia nigronervosa* Coquerel

1980. *Pentalonia nigronervosa* : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 235.

Material examined : Many apterous and alate viviparous females and nymphs; 1 apterous a viparous female.

Host plants : Musa paradiscia, Musa sapientinum, Musa sp. (Musaceae); *Curcuma domestica* (Zingiberaceae).

Distribution : India : West Bengal (Darjiling, 24-Parganas(North) and other districts); Arunachal Pradesh; Assam; Bihar; Himachal Pradesh; Manipur; Meghalaya; Nagaland; Orissa; Sikkim; Uttar Pradesh. Elsewhere : Virtually cosmopolitan.

Remarks : Bhanotar and Ghosh, L.K. (1969) reported apterous oviparous female of this species from Rautara, 24 Parganas (North) of West Bengal State.

Genus 53. *Perillaphis* Takahashi

1965. *Perillaphis* Takahashi, *Insecta matsum.*, **27** : 101.
Type species : *Macrosiphum perillae* Shinji, 1924.

143. *Perillaphis perillae* (Shinji)

1924. *Macrisiphum 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; 1 alate male and 5 apterous oviparous females.

Host plants : Perilla fructocens, Perilla ochimoides and *perilla* sp. (Labiatae).

Distribution : India : West Bengal (Darjiling); Arunachal pradesh; Meghalaya. Elsewhere : Japan, Taiwan.

Remarks : Ghosh, A. K., Ghosh, M. R. and Raychaudhuri, D.N. (1972) described the alate male and

apterous oviparous females of this species from the Darjiling District of West Bengal as *Aulacorthum (Perillaphis) perillae* (Shinji).

Genus 54. ***Pleotrichophorus*** Borner

1930. *Pleotrichophorus* Borner, *Arch. Klass. Phyl. Ent.*, **1** : 138.
Type species : *Aphis glandulosa* Kaltenbach, 1846

144. ***Pleotrichophorus glandulosus*** (Lattenbach)

1846. *Aphids glandulosa* Kaltenbach, *Stettin. ent. Ztg.*, **7** : 170.
1980. *Pleotrichophorus glandulosus* (Kaltenbach) : Raychaudhuri, D. N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 239.

Material examined : Many apterous viviparous females and nymphs.

Host plants : Artemesia spp. (Compositae)

Distribution : India : West Bengal (Darjiling); Uttar Pradesh. Elsewhere : Bhutan; China; Europe; Japan; Korea nd Taiwan.

Genus 55. ***Pseudaphis*** Hille Ris Lambers

1954. *Pseudaphis* Hille Ris Lambers, *Bull. Lab. Zool. gen. agr. Portici*, **33** : 1172.
Type species : *Macrosiphum sijui* Eastop, 1953

145. ***Pseudaphis ? abyssinica*** Hille Ris Lambers

1954. *Pseudaphis abyssinica* Hille Ris Lambers, *Bull. Lab. Zool. gen. Agr. Portici,* **33** : 173.
1980. *Pseudaphis ? abyssinica* Hille Ris Lambers, *Bull. Lab. Zool. gen. Agr. Portici,* **33** : 173.

Material examined : 2 alate viviaparous females.

Host plant : Crex filicina (Cyperaceae).

Distribution : India : West Bengal (Darjiling). Elsewhere : Africa.

Remarks : Ghosh, A. K., Ghosh, M. R. and Raychaudhuri, D.N. (1970) reported the species only by alate viviparous females from Darjiling District of West Bengal. In view of having only alate forms and not being able to compare with the type, the species is reported here with (?) since it slightly differs from the original description.

Genus 56. ***Pseudoacyrthosiphon*** Ghosh and Raychaudhuri

1969. *Pseudoacyrthosiphon* Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects*, **3** : 94.
Type species : *Macrosiphum holsti* Takahashi, 1935

Key to the Sub-genera of the Genus (***Pseudoacyrthosiphon***) Ghosh and Raychaudhuri

1(2) First tarsal segments with 4 hairs .....***Pseudoacyrthosiphon***

2(1) First tarsal segment with 3 hairs .....***Anacyrthosiphon***

146. ***Pseudoacyrthosiphon (Pseudoacyrthosiphon) holsti*** Takahashi

1935. *Macrosiphum holsti* Takahashi, *Kanowia*, **14** : 318.
1980. *Pseudoacyrthosiphon (Pseudoacyrthosiphon) holsti* (Takahashi) : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 242.

Material examined : 2 apterous viviparous females.

Host plant : Rhododendron arboreum (Ericaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim.

Elsewhere : Japan and Taiwan.

147. ***Pseudoacyrthosiphon (Anacyrthosiphon) takahashii*** (Ghosh)

1969. *Neoacyrthosiphon (Pseudoacyrthosiphon) takahashi* Ghosh, A.K., *Proc. zool. Soc.* Calcutta, 22 : 121.
1980. *Pseudoacyrthosiphon (anacyrthosiphon) takahashi* (Ghosh); Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 243.

Material examined : 3 apterous viviparous females and nymphs.

Host plant : Anemone rivularis (Ranunculaceae); *Rhododendron arboreum* (Ericaceae).

Distribution : India : West Bengal (Darjiling); Uttar Pradesh.

Remarks : Chakrabarti, Ghosh, A.K. and Raychaudhuri, D.N. (1972) and Chakrabarti and Raychaudhuri, D.N. (1975) described apterous oviparous female and alate males of this species from Almora District of Uttar Pradesh.

Genus 57. ***Rhodobium*** Hille Ris Lambers

1947. *Rhodobium* Hille Ris Lambers, *Temminckia*, **7** : 300.
Type species : *Macrosiphum rosaefolium* Thebald, 1915.

148. ***Rhodobium porosum*** (Sanderson)

1901. *Myzus 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 plants : Rosa cania, Rosa macrophylla, Rosa sp. (Rosaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya; South India. Elsewhere : Virtually cosmopolitan.

Remarks : Basu, A.N. (1968) reported apterous and alate viviparous females of this species from Darjiling District of West Bengal. But the alate material was not available for present study.

Genus 58. ***Semiaphis*** van der Goot

1913. *Semiaphis* van der Goot, *Tijdschr. Ent.*, **56** : 105.
Type species : *Aphis carotae* Koch, 1854 (=*Aphis dauci* Fabricius, 1775)

149. ***Semiaphis heraclei*** (Takahashi)

1921. *Brachycolus hercauli* Takahashi, *Aphididae of Formosa*, **1** : 60.
1980. *Semiaphis heraclei* (Takahashi); Rychaudhuri, 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 : Unidentified plant of Rosaceae.

Distribution : India : West Bengal (Darjiling); Meghalaya. Elsewhere : China, Hawaii; Japan; Korea; Sumatra and Taiwan.

Remarks : Takahashi (1924) has corrected the spelling of the species as heraclei instead of heraculi as described earlier.

Genus 59. ***Shinjia*** Takahashi

1938. *Shinjia* Takahashi, 1938, *Tenthrodo*, **2** : 6.
Type species : *Microtarsus pteridifoliae* Shinji, 1929.

150. ***Shinjia pteridifoliae*** Shinji

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.

Host plants : Athyrium macrocorpus, Athyrium sp., *Polypodium* sp. (Polipodiaceae); *Pteris acullina, Pteris* sp. (Pteridaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Meghalaya; Sikkim; Uttar Pradesh. Elsewhere : Australia; China; Japan; Korea and Nepal.

Genus 60. *Sinomegoura* Takahashi

1961. *Sinomegoura* Takahashi, *Kontyu*, **28** : 228.
Type species : *Acyrthosiphon photiniae* Takahashi, 1936

Key to the species of the Genus *Sinomegoura* Takahashi

Apterous viviparous females :

1(2) Cauda dark; siphunculi much shorter than to at most 1.10 times as long as cauda 3

2(1) Cauda pale; siphunculi never shorter than cauda, about 1.20-1.50 times as long as cauda; u.r.s. about 1.50 times as long as h.t. 2; antennae pale; hairs on dorsum of head about 0.50 times as long as and those on segment III about 0.30-0.35 times as long as b.d.III; cauda with 10-18 hairs ...*photinae*

3(4) Cauda with 12-14 hairs; siphunculi brown; antennae brown to dark brown; antennae brown to dark brown, always longer than the body; polygonal reticulation on body distinct and consicuous ....*citricola*

4(3) Cauda at most with 7 hairs; siphunculi pale excepting the brownish apex; antennae pale; polygonal reticulation on body very distinct .....*rhododendri*

151. *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 plants : Polyphagus investing the plants of the families Betulaceae, Compositae, Euphorbiaceae, Lauraceae, Magnoliaceae, Moraceae, Myrsinaceae, Nyctaginaceae, Rosaceae, Rubiaceae, Rutaceae, Ternstromiaceae and Vitaceae.

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Bihar; Himachal Pradesh; Manipur; Meghalaya; Sikkim. Elsewhere : Australia, China; Japan; Nepal; New Guinea; Philippines; Singapore; Sumatra and Taiwan.

152. *Sinomegoura photinae* (Takahashi)

1936. *Acyrthosiphon photinae* Takahashi, *Lingman 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 : Photinia integrifolia and *Photinia* sp. (Rosaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim. Elsewhere : China and Japan.

153. *Sinomegoura rhododendri* (Takahashi)

1937. *Acyrthosiphon rhododendri* Takahashi, *Philipp. J. Sci.*, **73** : 8.
1983. *Sinomegoura rhododendri* (Takahashi) : Chakrabarti, Mandal and Raha, Zoological Journal of Linaean Society, 78 : 359.

Material examined : Many apterous viviparous females and nymphs.

Host plants : Rhododendron arboreum, Rhododendron sp. (Ericaceae) *Wendlandia* sp. (Rubiaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya. Elsewhere : Japan.

Genus 61. *Subovatomyzus* Basu

1964. *Subovatomyzus* Basu, A.N., *J. Linn. soc. (Zool.)*, **45** : 241.
Type species : *Subovatomyzus leucosceptri* Basu, 1964.

154. *Subovatomyzus leucosceptri* Basu

1964. *Subovatomyzus leucosceptri* Basu A.N., *J. Linn. Soc. (Zool.)*, **45** : 241.
1980. *Subovatomyzus leucosceptri* : Raychaudhuri D.N., Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 255.

Host plants : Leucosceptrum canum, Leucosceptrum cosmium, Leucosceptrum sp. (Labiatae); *Innula cappa, Vernonia* sp. (Compositae).

Distribution : India : West Bengal (Darjiling).

Genus 62. *Taiwanomyzus* Tao

1963. *Taiwanomyzus* Tao, *Pl. Prot. Bull., Taiwan*, **5** : 179.
Type species : *Myzus montanus* Takahashi, 1925

155. *Taiwanomyzus darjeelingensis* Ghosh, Basu and Raychaudhuri

1977. *Taiwanomyzus darjeelingensis* Ghosh, M.R. Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **11**(4) : 585.
1980. *Taiwanomyzus darjeelingensis* : Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East and Bhutan : 257.

Material examined : 4 apterous viviparous females and 3 nymphs.

Host plant : Astilbe rivularis (Saxifragaceae).

Distribution : India : West Bengal (Darjiling).

Genus 63. *Tricaudatus* Narzikulov

1957. *Tricaudatus* Narzikulov, *Ent. Oborz.*, **36** : 683.
Type species : *Rhapalosiphoninus polygoni* Narzikulov 1953.

156. *Tricaudatus polygoni* (Narzikulov)

1953. *Rhopalisiphonius polygoni* Narzikulov, *Ivz. Akad. Nauk., tadzhik*, SSR, (4) 62.
1980. *Tricaudatus polygoni* (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 plants : Polygonum chinensis, Polygonum molle, sp. (Polygonaceae) *Spirea bela, Spirea* sp. (Rosacae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Meghalaya; Sikkim; Uttar Pradesh. Elsewhere : Japan; Korea; Taiwan and U.S.S.R.

Chakrabarti and Raychaudhuri D.N. (1974) did not recognise this species. It is also treated here as the main species, *Tricaudatus polygoni* (Narzikyov).

Genus 64. *Trichosiphonaphis* Takahashi

1922. *Trichosiphonaphis* Takahashi, *Proc. ent. Soc. Wash.*, **24** : 205.
Type species : *Myzus polygoniformosanus* Takahashi, 1921.

157. *Trichosiphonaphis gerbarea* Ghosh and Raychaudhuri

1972. *Trichosiphonaphis gerbarea* 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 nymph.

Host plants : Gerbera macrophylla, Gerbera sp. (Compositae); *Polygonum serrulatum, Polygonum* sp. (Polygonaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

Genus 65. *Tuberaphis* Tseng and Tao

1938. *Tuberaphis* Tseng and Tao, *Jt. W. China Border Res. soc.*, **10** : 207.
Type species : *Tuberaphis hydrangeae* Tseng and Ta, 1938.

158. *Tuberaphis hydrangea digitata* Hille Ris Lambers and Basu

1966. *Tuberaphis hydrangea digitata* Hille Ris Lambers and Basu, A.N., *Ent. Bericht. Amst.*, **26** : 31.
1980. *Tuberaphis hydrangea digitata* : Raychaudhuri, D.N. Shosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 264.

Material examined : 3 apterous and 6 alate viviparous females.

Host plants : Rubus sp. (Rosaceae) *Hydrangea robusta* (Saxigragaceae).

Distribution : India : Wast Bengal (Darjiling).

Remarks : Ghosh, A. K., Ghosh, M. R. and Raychaudhuri, D.N. (1973) described *Matsumuraja indica* as a new species which was later synonymised with *Tuberaphis hydrangea digitata* by Ghosh, A.K. (1973).

Genus 66. *Tuberocephalu s* Shinji

1929. *Tuberocephalus* Shinji, *Lansania*, **1**(3) : 39.
Type species : *Tuberocephalus artemisiae* Shinji, 1929.

159. *Tuberocephalus sasaki* (Matsumura)

1917. *Myzus sasaki* Matsumura, *J. Col. Agric. Tohoku imp. Univ.*, **7** : 404.
1980. *Tuberocephalus sasaki* (Matsumuara) : 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 : Artemesia sp. (Compositae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim. Elsewhere : Japan.

Remarks : Basu, A.N. (1969) reported *Trichosiphoneilla sasaki* (Matsmura) from West Bengal, which according to Miyazaki (1977) is a synonym of *Tuberocephalus sasaki* (Matsmura).

Genus 67. *Uroleucon* Mordvilko

1914. *Uroleucon* Mordvilko, *Faune de la Russie*, **1** : 64.
Type species : *Aphis sonchi* Linnaeus, 1767 designated by Borner, 1930.

Key to the subgenera of the Genus ***Uroleucon*** Mordvilko

1(2) Caude pale ..... *Uroleucon* s.s.

2(1) Cauda dark ..... *Uroleucon (Uromelan)*

Key to the species and subspecies of the genus ***Uroleucon*** Mordvilko

Apterous viviparous females :

1(4) Cauda pale to pale brown 2

2(3) Segment III longer than segment IV and V taken together and with 55-72 secondry rhinaria distributed over its entire length; u.r.s. 0.90-1.0 times as long as h.t. 2; cauda with 12-14 hairs .. .. *formosana crepidis*

3(2) Segment III shorter than segment IV and V taken together and with only 16-31 secondary rhinaria; antennae longer than body; cauda with 20-30 hairs; longest hair on abdominal tergites 0.76-1.21 times as long as b.d. III ..... *sonchi*

4(1) Cauda dark 5

5(6) Ultimate rostral segment 1.01-1.15 times as long as h.t. 2 7

6(5) Ultimate rostral segment 1.44-1.54 times as long as as h.t. 2; segment III with 37-56 secondary rhinaria; cauda with about 7 hairs; longest hair on tergite 8 about 1.50-1.55 times as long as b.d. III ..... *lambersi* Ghosh, Basu and Raychaudhuri

7(8) Segment III with 33-45 secondary rhinaria; u.r.s. with 4-5 secondary hairs; cauda with 10-12 hairs ..... *gobonis*

8(7) Segment III with 79-91 secondary rhinaria; u.r.s. with about 8 secondary hairs; cauda with 16-17 hairs ..... *compositae*

Alate viviparous females :

1(2) Cauda pale 3

2(1) Cauda dark, bearing 12-14; segment III with about 80 secondary rhinaria ..... *compositae*

3(4) Segment III longer than IV and V taken together and with 72-96 secondary rhinaria and never less than 2.0 times as long as siphunculi ..... *formosanus crepidis*

4(3) Segment III shorter than segment IV and V taken togther and with at most 41 secondary rhinaria and nearly as long as siphunculi ..... *sonchi*

160. ***Uroleucon (Uroleucon) formosanus crepidis*** Ghosh, Ghosh and Raychaudhuri

1971. *Uroleucon formosanus crepidis* Ghosh, A.K. Ghosh, M.R. and Raychaudhuri, D.N. *Orient. Insects*, **5**(3) : 332.

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

Host plants : Crepis japonica, Emelia sonchifolia (Compositae).

Distribution : India : West Bengal (Darjiling) : Sikkim.

161. ***Uroleucon (Uremelan) gobonis*** (Matsumara)

1917. *Macrosiphum gobonis* Matsumura, *J. Coll. Agric. Tohoku imp. Univ.*, 7(6) : 395.
1980. * *Dactynotus (Uromelan) gobonis* (Matsumura): Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 132.

* The genus has been considered here as *Uroleucon* following Eastop and Hille Ris Lambers (1976).

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

Host plant : Carthamus sp. (Compositae)

Distribution : India : West Bengal (Darjiling). Elsewhere : China; Japan; Korea and Taiwan.

162. ***Uroleucon (Uromelan) lambersi*** Ghosh, Basu and Raychaudhuri

1977. *Dactynotus (Uromelan) lambersi* Ghosh, M.R., Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **11**(4) : 579.
1980. *Dactynotus (Uromelan) lambersi* : Raychaudhuri, D.N., Ghosh, M.R. Basu, R.C., *In* Aphids of North East India and Bhutan : 132.

Material examined : 2 apterous viviparous females.

Host plant : Unidentified plant of Compositae.

Distribution : India : West Bengal (Darjiling).

163. ***Uroleucon (Uroleucon) sonchi*** (Linnaeus)

1767. *Aphis sonchi* Linnaeus, *Syst. Nat.* (12th Ed.), **1** : 735.
1986. *Uroleucon sonchi* (Linnaeus) : Ghosh, L. K., *Zool. Surv. India*, Technical Monograph No. 16 : 131.

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

Host plant : *Sonchus* spp. *Emelia sonchifolia* (Compsitae)

Distribution : India : West Bengal (Darjiling and almost all districts) Himachal Pradesh; Manipur; Meghalaya; Sikkim; South India; Uttar Pradesh. Elsewhere : Africa; Australia, Egypt, Europe, South America.

164. *Uroleucon (Uromelan) compositae* (Theobald)

1915. *Datynotus compositae* Theobald, *Bull. ent. Res.*, **6** : 123.
1980. * *Dactynotus (Uromelan) comositae* Theobald: Raychaudhuri, D.N., Ghosh, M. R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 131.

* The genus has been considered here as *Uroleucon* following Eastop and Hille Ris Lambers (1976).

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

Host plant : Veonia roxburgii (Compositae)

Distribution : India : West Bengal (Darjiling); Meghalaya; South India. Elsewhere : Africa; Mauritius and Taiwan.

Genus 67. *Vesiculaphis* del Guercio, Redia, 7 : 463.

1911. *Vesiculaphis* del Guercio, *Redia*, **7** : 463.
Type species : *Toxoptera caricis* Fullaway, 1910.

Key to the species of the genus ***Vesiculaphis*** del Guercio

Apterous viviparous females :

1(2) Siphunculi distinctly swollen on inner margin at about its middle; ante and postsiphuncular sclerities present; 7th abdominal tergite with a brown transverse band ..... *rhododendri*

2(1) Siphunculi not swollen as above 3

3(4) Processus terminalis shorter than to at most as long as base of last antennal segment 5

4(3) Processus terminalis longer than and may be upto about 3.0 times as long as base of last antennal segment 9

5(6) Body about 4.01-4.65 mm long; u.r.s. 1.80-2.20 times as long as h.t. 2 ..... *grandis*

6(5) Body at most 2.25 mm long; u.r.s. 1.20-1.70 times as long as h.t.2 7

7(8) Segment III 2.30-2.60 times as long as p.t.; 8th tergite with posterior angle weekly produced caudad ..... *caricis*

8(7) Segment III about 3.0-5.0 times as long as p.t.; 8th tergite strongly produced caudad extending beyond base of cauda ..... *pieridis*

9(10) Ultimate rostral segment about 1.45-1.73 times as long as h.t. 2; longest hair on tergite 7 about 1.0-1.50 times as long as b.d. III; siphunculi pale ..... *kalimpongensis*

10(9) Ultimate rostral segment shorter than to at most as long as h.t.2 11

11(12) Dorsal body hairs minute and of 'myzine type' ..... *verbasci*

12(11) Dorsal body hairs moderately long with acuminate apices; and about 0.30-0.70 times as long as b.d. III ..... *kuwanis*

Alate viviparous females :

1(2) Media of fore wing once-branched 3

2(1) Media of the forewing twice-branched; segment III with 44-49, IV with 6-7 and V with 0-1 secondary rhinaria ..... *pieridis*

3(4) Body large (3.79-3.81 mm); abdomen membranous and with large number of roundish brown sclerities upto tergite 6 ..... *grandis*

4(3) Body small; abdomen without dorsal bands on anterior segments ..... *carisis*

165. *Vesiculaphis caricis* (Fullaway)

1910. *Taxoptera caricis* Fullaway, *Rep. Hawaii agric. Exp. Stn.*, (1919) : 32.
1980. *Vesiculaphis carisis* (Fullaway): Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 268.

Material examined : Nil

Host plant : Cyperus rotundus (Cyperaceae).

Distribution : India : West Bengal (Darjiling). Elsewhere : Hawai; Japan and Taiwan.

Remarks : Basu, A.N. (1969) reported apterous and alate viviparous females of this species from West Bengal. His material was, however, not available for the present study. The species has, therefore, been keyed from the published literature.

166. *Vesiculaphis grandis* Basu

1964. *Vesiculaphis grandis* Basu, A.N., *J. Linn. Soc., (Zool.)*, **45** : 235.
1983. *Vesiculaphis gandis* : Chakrabarti, Mondal and Raha, *Zoological Journal of the Linnaean Society*, **78** : 359.

Material examined : Nil.

Host plant : Rhododendron sp. (Ericaceae).

Distribution : India : West Bengal (Darjiling).

Remarks : Basu, A.N. (1964) described this new species from West Bengal with apterous and alate viviparous morphs. Due to non availability of the material, the species has been keyed here from published description provided by him.

However, the large body size is a unique distinctive character of the species.

167. *Vesiculaphis kalimpongensis* Ghosh, Basu and Raychaudhuri

1976. *Vesiculaphis kalimpongensis* Ghosh, M.R., Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, **10**(2) : 274.
1980. *Vesiculaphis kalimpongensis*: Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan : 269.

Material examined : 8 apterous viviparous females and 6 nymphs.

Host plant : Artemesia sp. (Compsitae).

Distribution : India : West Bengal (Darjiling); Assam.

168. *Vesiculaphis kuwanis* Ghosh, Basu and Raychaudhuri

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 apterous and alate viviparous females and nymphs.

Host plant : Unidentified plant.

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim.

169. *Vesiculaphis pieridis* Basu

1964. *Vesiculaphis pieridis* Basu, A.N., *J. Linn. Soc.* (Zool.), **45** : 237.
1990. *Vesiculaphis pieridis* : Agarwala and Mahapatra, *Orient. Insects*, **24** : 239.

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

Host plant : Pieris ovalifolia (Ericaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Uttar Pradesh.

Remarks : Agarwala and Mahapatra (1990) described oviparous female collected on *Pieris ovalifolia* infested by both separate and alatae from Darjiling which is the type locality of the species. The sexual male is yet to be known.

170. ***Vesiculaphis rhododendri*** Ghosh and Raychaudhuri

1972. *Vesiculaphis rhododendri* Ghosh, A.K. and Raychaudhuri, D.N., *Orient. Insects,* **6**(3) : 383.
1983. *Vesiculaphis rhododendri* : Chakrabarti, Mondal and Raha, *Zoological Journal of the Linnaean Society,* **78** : 359.

Material examined : 2 apterous viviparous females.

Host plant : Rhododendron sp. (Ericaceae).

Distribution : India : West Bengal (Darjiling).

171. ***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 plants : Polygonum alatum, Polygonum chinensis, Polygonum runicinatum (Polygonaceae); *Photinia* sp. (Rocacea).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Manipur; Meghalaya; Nagaland; Sikkim; Uttar Pradesh.

Genus 69. ***Xenomyzus*** Aizenberg

1935. *Xnomyzus* Aizenberg, *Zap. biol. Sta. Bolchera,* 7-8 : 152.
Type species : *Xenomyzus carticis* Aizenberg, 1935.

Key to the species of the genus ***Xenomyzus***

Apterous viviparous females :

1(2) Dorsal cephalic hairs about 0.23-0.30 times as long as b.d. III; p.t. about 4.20-4.60 times as long as base of last antennal segment; body 1.75-2.05 mm long; siphunculi dark brown and slightly swollen near apex ..... *polygoni* (van der Goot)

2(1) Dorsal cephalic hairs longer, about 0.55-0.85 times as long as base of last antennal segment; body 1.30 at most 1.55 mm long; siphunculi pale brown to brownish without any swelling near apex ..... *scabripes*

172. *Xenomyzus polygoni* (van der Goot)

1917. *Phordon polygoni* van der Goot, Contr. *Faune Indes neerl.*, **1**(3) : 44.
1980. *Xenomyzus polygoni* (van der Goot): Raychaudhuri, D.N., Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 275.

Material examined : 6 apterous viviparous females.

Host plants : Polygonum barbatum and *Polygonum* sp. (Polygonaceae).

Distribution : India : West Bengal (Darjiling).

173. *Xenomyzus scabripes* Basu, Ghosh and Raychaudhuri

1976. *Xenomyzus scabripes* Basu, R.C. Ghosh, M.R. and Raychaudhuri, D.N. *Entomon* **1**(1) : 64.
1980. *Xenomyzus scabripes* : Raychaudhuri, D. N. Ghosh, M.R. and Basu, R.C., *In* Aphids of North East India and Bhutan : 276.

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

Host plants : Polygonum alatum, Polygonum serrulatum, Polygonum spp. and *Rumex nepalensis* (Polygonceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Uttar Pradesh.

Tribe PTEROCOMMATINI

Genus 70. *Pterocomma* Buckton

1979. *Pterocomma* Buckton, *Monogr. Br. Aphides*, **2** : 142.
Type Species : *Pterocomma pilosa* Buckton, 1879

174. *Pterocomma* sp.

1980. *Pterocomma* sp.; Raychaudhuri, D.N. Ghosh, M.R. and Basu, R.C. *In* Aphids of North East India and Bhutan: 277.

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

Host plant : An unidentified plant of Bucklandiaceae.

Distribution : India : West Bengal (Darjiling).

Remarks : Due to non availability of relevant literature and authenticated comparable material it has not been possible to determine the specific status.

Subfamily CALLIPTERINAE

Genus 71. ***Betacallis*** Matsumura

1919. *Betacallis* Matsumura, *Trans. Sapporo nat. Hist. Soc.*, **7** : 110.
Type species : *Betacallis alnicolense* Matsumura, 1919

Key to the species of the Genus ***Betacallis*** Matsumura

1(2) Dorsal cephalic hairs about 1.20-1.50 times as long as b.d. III; segment III with 28-37 secondary rhinaria; u.r.s. about 1.10-1.20 times as long as h.t. 2; 8th tergite with 9-10 hairs; hairs on anterior abdominal tergites about 0.50 times as long as b.d. III ..... *quercihphaga*

2(1) Dorsal cephalic hairs about 0.70-0.80 times as long as b.d. III segment III with 18-22 secondary rhinaria; Ultimate rostral segment long and slender, and about 1.50-1.70 times as long as h.t. 2; hairs on anterior abdominal tergites about 0.70-0.80 times as long as b.d. III. 8th tergite with 8 hairs. ..... *prunicola*

175. ***Betacallis prunicola*** Basu, Ghosh and Raychaudhuri

1973. *Betacallis prunicola* Basu, R.C, Ghosh A. K. and Raychauchuri, D.N., *Proc. Zool. Soc., Calcutta*, **26** : 93.
1990. *Betacallis prunicola* : Ghosh, A. K. Fauna of India : *Aphidoidea*, Zoological Survey of India, pt. **4** : 21.

Material examined : Many alate viviparous females.

Host plant : Prunus cerasus (Rosaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Meghalaya; Manipur. Elsewhere : Philippines.

176. ***Betacallis quericiphaga*** Basu, Ghosh and Raychaudhuri

1760. *Betacallis querciphaga* Basu, Ghosh, M.R. and Raychaudhuri, *D.N. Orient. Insects*, **8** : 237.
1990. *Betacallis quercipahaga* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 4 : 24.

Material examined : Many alate viviparous females and nymphs.

Host plants : Quercus sp. (Fagaceae); *Prunus cerasus* (Rosaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya; Manipur; Sikkim. Elsewhere : Philippines.

Genus 72. ***Betulaphis*** Glendenning

1926. *Betulaphis* Glenenning, *R. Can., Ent.*, **58** : 96.
Type Species : *Betulaphis occidentalis* Glendenning, 1926

177. ***Betulaphis longicornis*** Quednau and Chakrabarti

1980. *Betulaphis longicornis* Quedanu and Chakrabarti, *Can. Ent.*, **112** : 8.
1990. *Betulaphis longicornis* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.5 : 38.

Material examined : 9 apterous viviparous females and 1 nymph.

Host plant : Betula utilis (Betulaceae) and *Rubus* sp. (Rosaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Uttar Pradesh.

Remarks : Raychaudhuri, D. N. Chakrabarti, S., Basu, R.C and Ghosh, A.K. (1980) in the Taxonomy of the Aphids of North East India and Bhutan reported these specimens as *Calaphis sensoriata* Quendau. Basu, A.N. (1969) reported the material of this species as *Callaphis* sp. Both are synonymised as *Betulaphis longicornis* Quendau & Chakrabarti by Chakrabarti (1988).

Genus 73. ***Chaitophorus*** Koch

1854. *Chaitophorus* Koch, *Die. Pflazenlause Aphiden* 1.
Type species : *Chaitophorus populeti* Panzer, 1805 (=*Chaitophorus populi*, 1854)

Key to the species of the genus ***Chaitophorus*** Koch

Apterous viviparous females

1(2) Caudal hairs 9; rostrum reaches hind coxae; abdominal dorsum smooth ..... *dorocola*

2(1) Caudal hairs 4-5; rostrum reaches midcoxae; dorsum of abdomen rugose ..... *indicus*

Alate viviparous females

1(2) A.S. III with 16-18 secondary rhinaria; a.s. III longer than a.s. IV, cauda with 9 hairs .. *dorocola*

2(1) A.S. III with 12-15 secondary rhinaria; a.s. IV shorter than a.s. IV; cauda with 7 hairs ... *indicus*

178. ***Chaitophorus dorocola*** Matsumura

1919. *Chaitophorus dorocola* Matsumura, *Trans. Sapporo nat. Hist.*, **7** : 113.
1980. *Chaitophorus dorocola* : Raychaudhuri, D.N., Chakrabarti, S., Basu, R.C. and Ghosh, A.K., *In* Taxanomy of the Aphids of North East India & Bhutan, The Zoological Society, Calcutta.

Material examined : 2 apterous and 2 alate viviparous females

Host plant : Unidentified

Distribution : India : West Bengal (Darjiling). Elsewhere : Japan.

179. ***Chaitophorus indicus*** Ghosh, Ghosh and Raychaudhuri

1970. *Chaitophorus indicus* Ghosh, A. K. Ghosh, M. R. and Raychaudhuri, D.N., *Orient. Insects*, **4** : 196.
1980. *Chaitophorus indicus* : Ghosh, A. K. Fauna of India, *Aphidoidea, Zool. Surv. India* pt. 1 : 34.

Material examined : Many apterous and alate viviparous females

Host plant : Populus sp. (Salicaceae) : Unidentified plant of Bucklandaceae.

Distribution : India : West Bengal (Darjiling).

180. ***Chaitophorus*** sp.

1977. *Chaitiphorus dorocola* Matsumura; Chakrabarti, *Orient Insects*, **11**(2) : 208.
1980. *Chaitophorus* sp., Ghosh, A. K., Fauna of India : *Aphidoidea, Zool, Surv. India* pt. 1 : 62.

Material examined : 2 apterous viviparous, and 2 alate viviparous females and nymphs.

Host plant : Populus sp. (Salicaceae).

Distribution : India : West Bengal (Darjiling).

Remarks : The material was reported by Chakrabarti (1977) as Chaitophorus dorocola Matsumura. Re-examination of the material reveals that the material deiffers from that of dorocol in many aspects, but due to paucity of sufficient material, it is presently treated as Chaitophorus sp.

Genus 74. ***Clethrobius*** Mordvilko

1928. *Clethrobius* Mordviko, *In* Philipjev. Key for identification of Russian Insects, 181.
Type species : *Cletnthrobius giganteus* (Cholodkovsky) - *Callipterus giganteus* Cholodkovsky

181. ***Clethrobius dryobius*** Chakrabarti and Raychaudhuri

1976. *Clethrobius dryobius* Chakrabarti and Raychaudhuri, D.N., *Orient. Insects*, **10** : 443.
1990. *Clethrobius* : Ghosh, A. K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 64.

Material examined : Many alate viviparous females.

Host plant : Rhus sp. (Anacardiaceae).

Distribution : India : West Bengal (Darjiling); Megalaya; Sikkim.

Genus 75. ***Cranaphis*** Takahashi

1939. *Cranaphis* Takahashi, *Philipp. J. Sci.*, **69** : 28.
Type species : *Myzocallis formosanus* Takahashi, 1924

182. *Cranaphis indica* Chakrabarti and Raychaudhuri

1976. *Cranaphis indica* Chakrabarti and Raychaudhuri, *D.N. Orient. Insects*, **10** : 446.
1990. *Cranaphis indica* : Ghosh, A. K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 73.

Material examined : 1 alate viviparous female and nymph.

Host plant : Aurandinaria sp. (Gramineae).

Distribution : India : West Bengal (Darjiling).

Genus 76. *Mesocallis* Matsumura

1919. *Mesocallis* Matsumura, *Trans. Sapporo nat. Hist. Soc.*, **7** : 103.
Type species : *Myzocallis sawashibae* Matsumura, 1917

183. *Mesocallis obtusirostris* Ghosh

1974. *Mesocallis obtusirostris* Ghosh, A.K., *Orient. Insects*, **8** : 428.
1990. *Mesocallis obtusirostris* : Ghosh, A.K., Fauna of India, *Aphiodoidea, Zool. Surv. India*, pt.5 : 120.

Material examined : Many alate viviparous females.

Host plants : Alnus nepalensis and *Betula alnoides* (Betulaceae)

Distribution : India : West Bengal (Darjiling).

Genus 77. *Neobetulaphis* Basu

1964. *Neobetulaphis* Basu, A.N., *J. Linn. Soc. (Zool.)*, **45** : 226.
Type species : *Neobetulaphis pusilla* Basu, 1964

Key to the species of the Genus *Neobetulaphis* Basu

Apterous viviparous females

1(2) Spinal and pleural hairs on abdomen long, about 1.80-2.50 times as long as b.d. III ..... *pusilla*

2(1) Spinal and pleural hairs on abdomen very minute, about 0.15-0.40 as long as b.d. III ..... *chaetosiphon*

Alate viviparous females

1(2) Longest hair on anterior abdominal tergites about 2.0 times as long as b.d. III; abdomen with a blackish brown quadrangular patch on tergites 4-6; segment III with 20-25 secondary rhinaria .. .. *pusilla*

2(1) Longest spinal hair on anterior abdominal tergites about 1.1-1.4 times as long as b.d. III; abdomen pale without a dark dorsal patch; segment III with 16-18 secondary rhinaria .....*chaetosiphon*

184. ***Neobetulaphis chaetosiphon*** Quednau and Chakrabarti

1980. *Neobetulaphis chaetosiphon* : Ghosh, A.K., Fauna of India : *Aphiodoidea, Zool. Surv. India*, pt.5 : 135.

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

Host plants : Rhus nepalensis (Anacardiaceae); *Betula* sp., *Betula alonides*, *Betula utilis* (Betulaceae); *Quercus* sp. (Fagaceae).

Distribution : India : West Bengal (Darjiling); Sikkim.

185. ***Neobetulaphis pusilla*** Basu

1964. *Neobetulaphis pusilla* Basu, A.N., *J. Linn. Soc. (Zool.)*, **45** : 223.
1990. *Neobetulaphis pusilla* : Ghosh, A. K. Fauna of India : *Aphiphoidea, Zool. Surv. India*, pt. 5 : 143.

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

Host plants : Rhus semialata (Anacardiaceae), *Alnus nepalensis, Alnus utilis* (Betulaceae)

Distribution : India : West Bengal (Darjiling); Sikkim.

Genus 78. ***Neocranaphis*** Ghosh

1990. *Neocranaphis* Ghosh, A.K., Fauna of India : *Aphiodoidea, Zool. Surv. India*, pt. 5 : 148.
Type species : *Shivaphis arundinariae* Takahashi, 1940

186. ***Neocranaphis bambusicola*** (David, Rajasingh and Narayanan)

1970. *Cranaphis bambusicola* David, Rajasingh and Narayanan, *Orient. Insects*, 4 : 407.
1990. *Neocranaphis bambusicola* (David, Narayanan and Rajasingh); Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.5 : 149.

Material examined : 2 alate viviparous females, 1 alatoid nymph and 1 apterous oviparous female.

Host plant : Bambusa sp. (Gramineae)

Remarks : This species was originally described under *Cranaphis*, Eastop and Hille Ris Lambers (1976) placed it in *Shivaphis*, Ghosh, A.K. (1990) erected the new genus *Neocranaphis* and placed it under this new genus. Apterous oviparous females of this species was reported by David, Rajasingh and Narayanan (1970) under the name *Cranaphis bambusicola* David, Rajasingh and Narayanan.

Genus 79. ***Periphyllus*** van der Hoeven

1863. *Periphyllus* van der Hoeven, *Tijdschr Ent.*, **6** : 7.
Type species : *Periphyllus testudo* van der Hoeven, 1863

Key to the species of the Genus ***Periphyllus*** van der Hoeven

Apterous viviparous females

1(2) Body large, over 3.00 mm long; p.t. about 0.50 times as long as a.s. III; siphunuculus 1.3-1.4 times as long as ht2 ..... *californiensis*

2(1) Body small, 1.5-2.2 mm. long; p.t. 0.60-0.74 times as long as a.s. III; siphunuculus 1.1-1.3 times as long as ht2 ..... *bengalensis*

Alate viviparous females

1(2) Body at most 2.50 mm long; hairs on frons 0.125-0.180 mm long; a.s. III with 28-36, IV with 2-6 secondary rhinaria; siphunculi dark brown, reticulated over distal 0.65-0.75 portion ..... *bengalensis*

2(1) Bodyover 3 mm long; hairs on frons 0.22-0.26 mm long; a.s. III with 35-41, IV with 5-8 secondary rhinaria; siphunculi dark, reticulated over 0.66 portion ..... *himalayensis*

187. ***Periphyllus bengalensis*** Ghosh and Raychaudhuri

1972. *Perphyllus bengalensis* Ghosh, A. K. and Raychaudhuri, D.N. *Proc. zool. Soc., Calcutta,* **25** : 29.
1980. *Perphyllus bengalensis* : Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India,* pt. 1 : 73.

Material examined : 5 apterous and 4 alate viviparous females.

Host plant : Acer sp. (Sapindaceae).

Distribution : India : West Bengal (Darjiling).

188. ***Periphyllus californiensis*** Shinji

1917. *Periphyllus californiensis* Shinji, *Ent. News,* **28** : 61.
1980. *Periphyllus californiensis* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India,* pt. 1 : 76.

Material examined : 1 apterous viviparous female.

Host plant : Acer sp. (Sapindaceae)

Distribution : India : West Bengal (Darjiling). Elsewhere : Australia; Canada; China; England; Holland; Japan and U.S.A.

Remarks : *Periphyllus testudinaceus* (Pernie) reported by Raychaudhuri, D.N., Chakrabarti, S. Basu, R.C. and Ghosh, A.K. (1980) has been considered as *Perphyllus califoriensis* Shinji by Ghosh, A. K. (1980).

189. *Periphyllus himalayensis* Chakrabarti

1977. *Periphyllus himalensis* Chakrabarti, *Orient. Insects*, **11**(2) : 216.
1980. *Perphyllus californiensis* : Ghosh, A. K. Fauna of India : *Aphidoidea, Zool. surv. India*, pt 1 : 80.

Material examined : 1 alate viviparous female and 1 nymph.

Host plant : Acer sp. (Sapindaceae)

Distribution : India : West Bengal (Darjiling). Elsewhere : Australia; Canada; China; England; Holland; Japan and U.S.A.

Remarks : *Periphyllus testudinaceus* (Fernie) reported by Raychaudhuri, D.N. Chakrabarti, S. Basu, R.C. and Ghosh, A. K. (1980) has been considered as *Periphyllus californiensis* Shinji by Ghosh, A. K. (1980).

189. *Periphyllus himalayensis* Chakrabarti

1977. *Periphyllus himalayensis* Chakrabarti, *Orient. Insects*, **11**(2) : 216.
1980. *Periphyllus californiensis* : Ghosh A. K., Fauna of India : *Aphidoidea, Zool. surv. India*, pt. 1, : 80

Material examined : 1 alate viviparous female and 1 nymph

Host plant : Acer sp. (Sapindaceae).

Distribution : India : West Bengal (Darjiling).

Genus 80. *Shivaphis* Das

1918. *Shivaphis* Das, *Mem. Indian Musuem*, **6** : 245.
Type species : *Shivaphis celti* Das, 1918

190. *Shivaphis celti* Das

1918. *Shivaphis celti* Das, *Mem. Indian Mus.*, **6** : 246.
1990. *Shivaphis celti* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 195.

Material examined : Many alate viviparous females and nymphs.

Host plants : Centis tetrandra (Ulmaceae).

Distribution : India : West Bengal (Darjiling); Assam; Himachal Pradesh; Jammu and Kashmir; Manipur; Meghalaya; Sikkim; South India; Uttar Pradesh. Elsewhere : Nepal; Sri Lanka; Japan; Korea and Taiwan.

Genus 81. ***Subtakecallis*** Raychaudhuri and Pal

1974. *Subtakecallis* Raychaudhuri, D.N. and Pal, *Orient. Insects*, **8** : 95.
Type species : *Cranaphis pilosa* David, Raja Singh and Narayanan, 1970.

Key to the species of the genus ***Subtakecallis*** Raychaudhuri and Pal

Alate viviparous females

1(2) Spinal hairs on abdomen long, those on 1st abdominal tergite not less than b.d. III; p.t. about 0.24-0.27 times as long as base of segment VI ..... *pilosa*

2(1) Spinal hairs on abdomen short, those on 1st abdominal tergite at most as long as b.d. III; p.t. about 0.55 times as long as base of segment VI ..... *brevisetosus*

191. ***Subtakecallis brevisetosus*** Raychaudhuri and Pal

1974. *Subtakecallis brevisetosus* Raychaudhuri, D.N. and Pal, *Orient. Insects*, **8** : 96.
1990. *Subakecallis brevisetosus* : Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.5 : 206.

Material examined : 2 alate viviparous females.

Host plant : Bamboo (Gramineae)

Distribution : India : West Bengal (Darjiling).

192. ***Subtakecallis pilosa*** (David, Rajasingh and Narayanan)

1970. *Cranaphis pilosa* David, Rajasingh and Narayanan, *Orient. Insects*, **4** : 409.
1990. *Subtakecallis pilosa* (David, Rajasingh and Narayanan): Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 209.

Material examined : Many alate viviparous females.

Host plant : Bamboo (Gramineae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

Genus 82. *Taiwanaphis* Takahashi

1934. *Taiwanaphis* Takahashi, *Stylops*, **3** : 36.
Type species : *Taiwanaphis descasernii* Takahashi, 1934

193. *Taiwanaphis kalipadi* (Raychaudhuri and Ghosh)

1964. *Paracallipterus kalipadi* Raychaudhuri, D.N. and Ghosh, A. K. *Zool. Meded Leiden*, **39** : 260.
1990. *Taiwanaphis kalipadi* (Raychaudhuri and Ghosh) : Ghosh, A. K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 222.

Material examined : 15 apterous viviparous females.

Host plant : Anona squamosa (Anonaceae).

Distribution : India : West Bengal (Darjiling).

Genus 83. *Takecallis* Matsumura

1971. *Takecallis* Matsumura, *J. Coll. Agric. Tohoku imp. Univ.*, **7** : 373.
Type species : *Takecallis bambusae* Matsumura, 1917 (=*Takecallis arundicolens* (Clerke), 1903

194. *Takecallis arundinariae* (Essig)

1971. *Myzocallis arudinariae* Essig., *Univ. Calif. Publs. Ent.*, **1** : 308.
1990. *Takecallis arundinariae* (Essig.) : Ghosh, A. K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 232.

Material examined : Many alate viviparous females.

Host plant : Bamboo (Gramineae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Himachal Pradesh; Meghalaya. Elsewhere : Europe; North America and Far Eastern Countries.

Genus 84. *Taoia* Quednau

1973. *Taoia* Quednau, *Can, Ent.*, **105** : 217.
Type species : *Euceraphis chaunsinensis* Tao, 1969

195. *Taoia indica* (Ghosh and Raychaudhuri)

1972. *Euceraphis indica* Ghosh, A.K. and Raychaudhuri,D.N., *Orient. Insects*, **6** : 373.
1990. *Taoia indica* (Ghosh and Raychaudhuri): Ghosh, A. K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 244.

Material examined : Many apterae, alate viviparous females; apterous oviparous females and apterous males.

Host plants : Anlus nepalensis and *Betula* sp. (betulaceae)

Distribution : India : West Bengal (Darjiling); Manipur; Meghalaya; Sikkim. Elsewhere : Nepal.

Remarks : Ghosh, A. K. Ghosh, M. R. and Raychauduri, D.N. (1971) reported apterous oviparous female morph of this species under the name *Euceraphis chauansinensis* Tao. Subsequently, Ghosh, A.K. and Raychaudhuri D.N. (1972) reported apterous male of the this species under the name *Euceraphis indica* Ghosh and Raychaudhuri from the State of West Bengal.

Genus 85. *Tinocallis* Matsumura

1919. *Tinocallis* Matsumura, *Trans. Sapporo nat. Hist. Soc.*, **7** : 100.
Type species : *Tinocallis ulmiparvifoliae* Matsumura, 1919

Key to the species of the genus *Tinocallis* Matsumura

Alate viviparous females

1(2) Segment ÎII with 19-28 secondary rhinaria; p.t. as long as base of segment VI; spinal tubercles on segments 1-4 small and separated at base; prothorax with paired spinal tubercles; u.r.s. about as long as h.t.;2, wing veins normal, veins sometimes clouded at tips; radial sector fanily indicated ..... *distinctus*

2(1) Segment III with or not more than 12 secondary rhinaria 3

3(4) Spinal tubercles on abdominal segments separate; prothorax with spinal tubercles; p.t. about 1.33 times as long as base of segment VI; segment III with 5-12 secondary rhinaria; veins of forewing with pigmented border; wings held roof-like in repose ..... *himalayensis*

4(3) Spinal tubecles at least on segment 2 united at base; prothorax without spinal tubercles; p.t. at most about as long as base of segment VI; segment III with 6-8 secondary rhinaria; forewing pingmented at least on anal area and sometimes along margin; wings held horizontally in repose ..... *kahawaluokalani*

Apterous oviparous females :

1(2) P.t. longer than base of segment VI and o.50 times as long as segment III; Antennae as long as body ..... *himalayensis*

2(1) P.t. at most as long as base of segment VI and about 0.33 times as long as segment III; Antennae shorter than body ..... *distinctus*

196. *Tinocallis distinctus* Ghosh, Ghosh and Raychaudhuri

1970. *Tinocallis distincta* Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N. *Orient. Insects* **5** : 218.
1990. *Tinocalis distinctus* : Ghosh, A.K., Fauna of India : *Aphoidoidea, Zool. Surv. India*, pt.5 : 265.

Material examined: Many alate viviparous females, 1 apterous oviparous female and 4 alate males.

Host plant : Unidentified plant

Distribution : India : West Bengal (Darjiling).

Remarks: Ghosh, M.R., Ghosh, A.K. and Raychaudhuri, D.N. (1970) reported apterous oviparous females of this species. Subsequently, Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. (1971) reported alate males of it from the State of West Bengal. It is therefore, assumed that the species enjoys holocyclic life cycle at least in the Darjiling district of the State.

197. *Tinocallis himalyensis* Ghosh, Ghosh and Raychaudhuri

1971. *Tinocallis himalayensis* Ghosh, A.K. Ghosh, M.R. and Raychaudhuri, *D.N. Orient. Insects* **5**(2) : 218.
1990. *Tinocalis himalyensis* : Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.5 : 269.

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

Host plant : Peltophorum felraginium (Caesalpinae)

Distribution : India : West Bengal (Darjiling); Sikkim.

Remarks: Apterous oviparous female morph of this species was described by Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. (1971) from West Bengal.

198. *Tinocallis kahawaluokalani* (Kirkaldy)

1907. *Myzocallis kahawaluokalani* Kirkaldy, *Proc. Hawaii ent. Soc.*, **1** : 101.
1990. *Tinocallis kahawaluokalani* (Kirkaldy); Ghosh, A.K. Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.5 : 274.

Material examined : Many alate viviparous females.

Host plant : Lagerstroemia indica (Lauraceae).

Distribution : India : West Bengal (Darjiling); Assam; Kerala. Elsewhere : Formosa; Hawaii; Japan; North America.

Genus 86. *Tinocalloides* Basu

1969. *Tinocalloides montanus* Basu, A.N., *Orient. Insects*, **3** : 367.
Type species : *Tinocalloides montanus* Basu, 1969.

199. *Tinocalloides montanus* Basu

1969. *Tinocalloides maontanus* Basu, *Orient. Insects*, **3** : 367.
1990. *Tinocalloides montanus* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.5 : 287.

Material examined: Many alate viviparous females; 4 apterous oviparous females and 1 alate male.

Host plant : Prunus sp. and *Prunus cerasus* (Rosaceae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Himachal Pradesh; Manipur; Meghalaya; Sikkim.

Remarks: Basu, A.N. (1969) described apterous oviparous and alate morph of this species from the Darjiling District of West Bengal.

Genus 87. *Trichaitophorus* Takahashi

1937. *Trichaitophorus* Takahashi, *Annotnes zool. jap.*, **16** : 17.
Type species : *Trichaitophorus aceris* Takahashi, 1937.

200. *Trichaitophorus recurvispinus* Hille Ris Lambers and Basu

1966. *Trichaitophorus recurvispinus* Hille Ris Lambers and Basu, A.N. *Ent. Bericht. Amst.* **26** : 29.
1990. *Trichaitophorus recurvispinus* : Raychaudhuri, D.N., Chakrabarti, S., Basu, R.C. and Ghosh, A.K., *In* Taxonomy of the Aphids of North East India and Bhutan : 311.

Material examined : Nil.

Host plant : Actinidia callosa (Ctinidiaceae)

Distribution : India : West Bengal (Darjiling).

Remarks : Hille Ris Lambers and Basu, A.N. (1966) described the species from the State of West Bengal but the material was not available for study.

Genus 88. *Yamatocallis* Matusumura

1917. *Yamatocallis* Matsumura, *J. Coll. Agric. Hokkaido Imp. Univ.*, **7** : 366.
Type species : *Yamatocallis nirayamnae* Matsumura, 1917.

201. *Yamatocallis obscura* (Ghosh, Ghosh and Raychaudhuri)

1970. *Meghalophylaphis obscura* Ghosh, M.R. Ghosh, A.K. and Raychaudhuri D.N., *Orient. Insects*, **4** : 383.
1990. *Meghalophyllaphis obscura* (Ghosh, Ghosh and Raychaudhuri): Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 5 : 316.

Material examined : 6 alate viviparous females

Host plant : Unidentified

Distribution : India : West Bengal (Darjiling).

Subfamily GREENIDEINAE

Key to the Tribes of Subfamily Greenideinae

1(2) Body of apterae with processi; eyes in apterae usually of 3 facets when multifaceted eyes reduced; alate when present with Media of forewing once-branched and hindwing with one or two oblique veins, and when with two oblique veins, empodial hair leaf-like with apex obliquely truncated (*Sumatraphis*); siphunculi usually with very few hairs ..... Cervaphidini

2(1) Body of apterae without any process; eyes always multifaceted; alate usually with normal wing venation, seldom ventation reduced; apical tibial hairs almost different from other tibial hairs; siphunculi always densely hairy ..... Greenideini

Key to the genera of the Tribe Cervaphidini

1(2) Cauda transversely oval with a median style; body with a pair of processi on each of tergites 7 and 8; in alatae these are somewhat reduced; eyes in apterae multifacted but reduced ..... ***Anomalosiphum***

2(1) Cauda transversely oval and without a median stylus; eyes in apterae 3-faceted 3

3(4) Only one pair of hair-bearing supracaudal processi on 7th tergite, these in alatae reduced; siphunculi appear as short truncate cones; hind wingin alate very much reduced; F.T.C. 3,3,3 ..... ***Schoutedenia***

4(3) Body with many processi; F.T.C. 5,5,5 5

5(6) Siphunculi long, about 0.22-0.45 times as long as body with a pre-apical circumcision and a few transverse striae near apex; apterae with many processi; some of which branched, these in alate very much reduced and look like small tubercles; in apterae dorsal body hairs with swollen or dagger-shaped apices, these in alate blunt, alatae with circular, slightly proturberant secondary hinaria . ..... ***Cervaphis***

6(5) Siphunculi short, at most upto 0.12 times as long as body, 4-5 rows of interconnecting striae near apex; abdomen with only unbranched marginal process which gradually become longer caudad; body rugose; antennae in apterae 4-segmented and in alatae 5-segmented ..... ***Sumatraphis***

Genus 89. *Anomalosiphum* Takahashi

1934. *Anomalosiphum* Takahashi, *Stylops*, **3** : 54.
Type species : *Anomalosiphum pithecolobi* Takahashi, 1934

202. *Anomalosiphum indigoferae* Ghosh, Ghosh and Raychaudhuri

1971. *Anomalosiphum indigoferae* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, **5** : 202.
1980. *Anomalosiphum indigoferae* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxomony of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 317.

Material examined : Many apterous and alate viviparous females.

Host plant : Phyllanthus sp. (Euphorbiaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Sikkim.

Genus 90. *Cervaphis* van der Goot

1917. *Cervaphis* van der Goot, *Contr. Fauna Indes neerl.*, **1** (3) : 148.
Type species : *Cervaphis schouteniae* van der Goot, 1917.

203. *Cervaphis rappardi indica* Basu

1961. *Cervaphis rappardi indica* Basu, A.N., *Curr. Sci.*, **30** : 390.
1980. *Cervaphis rappardi indica* : Raychaudhuri, D.N. and Chatterjee, M., *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta: 319.

Material examined : Nil.

Host plant : Cajanus indica (Papilionaceae)

Distribution : India : West Bengal (Darjiling); Assam.

Remarks : Basu, A.N. (1961) described this subspecies from Darjiling District of West Bengal but the material was not available for the present study.

Genus 91. *Schoutedenia* Rubsaamen

1905. *Schoutedenia* Rubsaamen, *Marceilla*, **4** : 19.
Type species : *Schoutedenia ralumensis* Rubsaamen, 1905

204. *Schoutedenia lutea* (van der Goot)

1917. *Setaphis lutea* van der Goot, *Contr. Faune Indes neerl*, **1**(3) : 154.
1980. *Schoutedenia lutea* (van der Goot); Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 320.

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

Host plant : Glochidion sp. *Phylanthus emlica* (Euphorbiaceae) *Spirea corymbosa* (Rosaceae) and *Boehmeria polystachia* (Utricaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Bihar; Himachal Pradesh; Meghalay; South India; Tripura. Elsewhere : Africa; Australia and Indonesia.

Genus 92. ***Sumatraphis*** Takahashi

1935. *Sumatraphis* Takahashi, *Miscnea zool. Sumatra.*, **97** : 3.
Type species : *Sumatraphis celti* Takahashi, 1935

205. ***Sumatraphis celti*** Takahashi

1935. *Sumatraphis celti* Takahashi, *Miscnea zool. Sumatra*, **97** : 3.
1980. *Sumatraphis celti* : Raychaudhuri, D.N. and Chatterjee, M., *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta; 322.

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

Host plant : Sida sp. (Malvaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

Tribe GREENIDEINI

Key to the genera of the Tribe Greenideini

1(2) Cauda transversely oval with a medial stylus; siphunculi in apterae reticulated with transversely elongated cells, either near the very base or over its entire length except the tip which is densely spinulose, in alate such reticulation present over entire length ..... ***Greenidea***

2(1) Cauda transversely oval but never with a median stylus; siphunculi in apterae never reticulated as above 3

3(4) Rostrum with blunt apex; segments 4 and 5 of rostrum not distinctly divided; media in forewing once-or twice-branched, hindwing with or without oblique veins; F.T.C. 7,7,7 or 5,5,5; hindtibiae with or without stridulatory ridges ..... ***Greeideoida***

4(3) Rostrum with pointed apex; segments 4 and 5 of rostrum distinctly divided by a narrow intersegmental membrane 5

5(6) Hairs on dorsum of abdomen and on siphunculi in apterae of very different lengths so that some appear thorny and some very long with different apices (never capitate); secondary rhinaria in alatae transversely elongated; antennae 6-segmented ..... ***Holotrichosiphum***

6(5) Dorsal abdominal hairs and hairs on siphunculi never so different as above; secondary rhinaria in alatae circular to transversely oval 7

7(8) Siphunculi in apterae barrel-shaped, small; dorsal abdominal hairs minute to moderately long with blunt or slightly expanded apices; sometimes shorter hairs with subacute apices; antennae 5-segmented .....***Brevitrichosiphon***

8(7) Siphunculi in apterae elongated and more usually cigar-shaped 9

9(10) Hind tibiae with stridulatory ridges appearing as transverse cuts; flagellar hairs either all long and fine and arising from all directions or longer hairs on flagellum directed inwards and stouter hairs mostly directed outwards.....***Mollitrichosiphum***

10(9) Hind tibiae without stridulatory ridges; antennae 5- or 6-segmented .....***Eutrichosiphum***

Genus 93. ***Brevitrichosiphon*** Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Brevitrichosiphon* Raychaudhuri, D.N. Ghosh, M.R, Banerjee, M. and Ghosh, A.K., *Kontyu*, **41** : 54.
1980. *Brevitrichosiphon mukherjee* Raychaudhuri, D.N., and Chatterjee, *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 325.

Material examined : 7 apterous viviparous females and 2 nymphs.

Host plant : Unidentified.

Distribution : India : West Bengal (Darjiling); Meghalaya.

Genus 94. ***Eutrichosiphum*** Essig and Kuwana

1918. *Eutrichosiphum* Essig and Kuwana, *Proc. Calif. Acad, Sci.*, **8** : 97.
Type species : *Trichosiphum pasaniae* Okajima, 1908.

Key to the subgenera of the genus ***Eutrichosiphum*** Essig and Kuwana

1(2) Antennae 5-segmented .....***Eutrichosiphum***

2(1) Antennae 6-segmented 3

3(4) Hairs on the siphunculi fine and more or less of similar lengths .....***Paratrichosiphum***

4(3) Some of the hairs on siphunculi with fine apices, some with furcated apices, the later may extend upto basal 0.70 portion of siphunculi .....***Neoparatrichosiphum***

Key to the species and subspecies of the genus ***Eutrichosiphum*** Essig

Apterous viviparous females :

1(2) Abdominal dorsum smooth either completely or at least medially 3

2(1) Abdominal dorsum entirely spinulose 5

3(4) Siphunculi about 0.40-0.47 times as long as body and about 6.0-8.0 times as long as its maximum width ..... *quercifoliae*

4(3) Siphunculi about 0.25 times as long as body and about 4.10 times as long as its maximum width, body darker ..... *taoi*

5(6) Segment III with fewer hairs (10-12); shorter dorsal abdominal hairs more frequent; siphunculi rather short and stout ..... *sankari*

6(5) Segment III more hairy (20-22); shorter dorsal abdominal hairs less frequent, segment 4 of rostrum about 5.50-6.10 times as long as segment 5; longest dorsal abdominal hair on anterior tergites always less than 3 times as long as b.d. III ..... *pasaniae pseudopasaniae*

207. ***Eutrichosiphum (Eutrichosiphum) pasaniae pseudopasaniae*** Szelegiewicz

1968. *Eutrichosiphum pseudopasaniae* Szelegiewicz, *Annals zool. Warsz*, 25 : 466.
1980. *Eutrichosiphum (Eutrichosiphum) pasaniae pseudopasaniae* Szelegiewicz Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 331.

Material examined : Many apterous and alate viviparous females.

Host plants : An unidentified plant of Euphorbiaceae; *Quercus* sp. (Fagaceae); *Maesa indica* (Myrinaceae) and *Schima wallichi* (Ternstroemiaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya. Elsewhere : Vietnam..

208. ***Eutrichosiphum (Eutrichosiphum) quercifoliae*** Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Eutrichosiphum (Eutrichosiphum) quercifoliae* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, *A.K. Kontyu*, 41 : 57.
1980. *Eutrichosiphum (Eutrichosiphum) quercifoliae* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 332.

Material examined : Many apterous, viviparous females and nymphs; 2 alate oviparous females.

Host plant : Quercus sp. (Fagaceae).

Distribution : India : West Bengal (Darjiling).

Remarks : Raychaudhuri, D.N., Ghosh, M.R., Barnerjee, M. and Ghosh, A.K. (1973) described alate oviparous morph of this species from the Darjiling District of West Bengal.

209. ***Eutichosiphum (Eutrichosiphum) sankari*** Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Eutrichosiphom (Eutrichosiphum) sankari* Raychaudhuri, Ghosh, Banerjee and Ghosh A.K., *Kontyu*, **41** : 58.
1980. *Eutrichosiphon (Eutrichosiphum) sankari* : Raychaudhuri, D.N., and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 332.

Material examined : 6 apterous viviparous females and 1 nymph.

Host plant : An unidentified plant.

Distribution : India : West Bengal (Darjiling).

210. ***Eutrichosiphum (Eutrichosiphum) taoi*** Ghosh, Basu and Rauchaudhuri

1970. *Eutrichosiphum taoi* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects.*, **4** : 68.
1980. *Eutrichosiphum (Eutricosiphum) taoi* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N.; Raychaudhuri; D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta 334.

Material examined : 8 apterous viviparous females and nymphs.

Host plant : Quercus sp. (Fagaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya; Nagaland.

211. ***Eutrichosiphum (Neoparatrichosiphum) raychaudhuri*** (Ghosh)

1969. *Paratrcichosiphum (Neopartrichosiphum) raychaudhuri* Ghosh, A.K., *Proc. zool. Soc., Calcutta*, **22** : 124.
1980. *Eutrichosiphum (Neopartrichosiphum) raychaudhuri*: Ghosh A.K., Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 335.

Material examined : Many apterous and alate viviparous females.

Host plants : Alnus nepalensis (Betulaceae) and *Quercus* sp. (Fagaceae).

Distribution : India : West Bengal (Darjiling); Sikkim.

212. ***Eutrichosiphum (Paratrichosiphum) alnicola*** (Basu)

1967. *Paratrichosiphum alnicola* Basu, *A.N., Bull. Ent.*, **18** : 14.
1980. *Eutrichosiphum (Paratrichosiphum) alnicola* (Basu); Raychaudhuri, D.N. and Chatterjee, M., *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 336.

Material examined : Many apterous and alate viviparous females.

Host plants : Alnus nepalensis (Betulaceae).

Distribution : India : West Bengal (Darjiling); Sikkim.

213. ***Eutrichosiphum (Paratrichosiphum) tattakanum*** (Takahashi)

1925. *Greenidea tattakana* Takahashi, *Aphididae of Formosa*, **4** : 30.
1980. *Eutrochosiphum (Paratrichosiphum) tattakanum* (Takahashi), *Aphididae of Formosa*, **4** : 30.

Material examined : Nil.

Host plant : Quercus sp. (Fagaceae)

Distribution : India : West Bengal (Darjiling); Himachal pradesh. Elsewhere : Taiwan.

Remarks : The material was not available for study and hence not included in key.

Genus 95. ***Greenidea*** Schouteden

1905. *Greenidea* Schouteden, *Spolia zeylon.*, **2** : 181.
Type species : *Siphonphora artocarpi* Westwood, 1890.

Key to the subgenera of the genus ***Greenidea*** Schouteden

1(2) Siphunculi in apterae distinctly reticulated on one surface near the very base and sometimes indistinctly so further beyond ..... ***Trichosiphum***

2(1) Siphunculi of apterae distinctly reticulated on both surfaces throughout the length 3

3(4) Flagellum distinctly reticulated and imbricated ..... ***Neogreenidea***

4(3) Flagellum not reticulated but with normal imbrications 5

5(6) Hind tibiae with stridulatory ridges in the form of transverse cuts ..... ***Paragreenidea***

6(5) Hind tibiae witout any transverse cuts ..... ***Greenidea***

Key to the species of the subgenus ***Greenidea***

Apterous viviparous females :

1(2) Siphunculi shorter than to as long as hind tibiae and about 0.24-0.61 times as long as body 3

2(1) Siphunculi longer than hind tibiae 7

3(4) Ultimate rostral segment (4+5) about 1.60-2.0 times as long as h.t. 2 and sihpunculi about 0.24-0.36 times as long as body, both femora and tibiae imbricated and with spinulose striae, siphunculi about 4.50-6.10 times as long as its maximum width ..... *ficicola*

4(3) Ultimate rostral segment (4+5) never less than 2.0-2.50 times as long as h.t. 2 and siphunculi about 0.40-0.61 times as long as body 5

5(6) Segment III about 1.94-1.97 times as long as u.r.s. (4+5); siphunculi at most upto about 0.40 times as long as body and upto 3.50 times as long as u.r.s. (4+5) ..... *neoficicola*

6(5) Segment III about 2.50-.260 times as long as u.r.s. (4+5); siphunculi about 0.41-0.61 times as long as body and about 3.60-6.20 times as long as u.r.s. (4+5) ..... *longirostris*

7(8) Siphunculi about 16.00-20.00 times as long as maximum width and about 7.70-11.00 times as long as u.r.s. (4+5) ..... *longicornis*

8(7) Siphunculi about 11.00-14.00 times as long as its maximum width and 2.10-5.75 times as long as u.r.s. (4+5) ..... *photiniphaga*

214. *Greenidea (Greenidea) ficicola* Takahashi

1921. *Greenidea ficicola* Takahashi, *Aphidoidea of Formosa*, 1 : 66.
1980. *Greenidea (Greenidea) ficicola* Takahashi; Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 341.

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

Host plants : Duabanga sonneratoides (Lythraceae) and *Ficus* sp.(Moraceae)

Distribution : India : West Bengal : (Darjiling); Sikkim; Tamil Nadu; Uttar Pradesh. Elsewhere : Australia; East China; Indonesia; Malaysia; Russia and Taiwan.

215. *Greenidea (Greenidea) longicornis* Ghosh, Ghosh and Raychaudhuri

1970. *Greenidea longicornis* Ghosh, M.R., Ghosh, A. K. and Raychaudhuri, D.N., *Orient. Insects*, 4 : 380.
1980. *Greenidea (Greenidea) longicornis* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 342.

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

Host plants : Engelhardtia sp. (Juglandaceae) and an unidentified plant.

Distribution : India : West Bengal (Darjiling); Sikkim.

216. *Greenidea (Greenidea) longicornis* Basu

1969. *Greenidea longirostris* Basu, *A.N., Orient. Insects*, **3** : 358.
1980. *Greenidea (Greenidea) longirostris* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the aphids of North East India and Bhutan, The Zoological Society, Calcutta : 342.d

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

Host plants : Quercus sp. (Fagaceae), *Schima wallichi* (Ternstromeiaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya and Sikkim.

217. *Greenidea (Greenidea) neoficicola* Ghosh, Ghosh and Raychaudhuri

1970. *Greenidea neoficicola* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri D.N., *Orient. Insects*, **4** : 197.
1980. *Greenidea (Greenidea) neoficicola* : Raychaudhuri, D.N. and Chatterjee, M., *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 343.

Material examined : 5 apterous viviparous females.

Host plant : Unidentified plant.

Distribution : India : West Bengal (Darjiling).

218. *Greenidea (Greenidea) photiniphaga* Raychaudhuri

1973. *Greenididea photiniphaga* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, **41** : 61.
1980. *Greenidea (Greenidea) photiniphaga* : Raychuadhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 343.

Material examined : 6 apterous and 5 alate viviparous females and nymphs.

Host plant : Photinia sp. (Rosaceae)

Distribution : India : West Bengal (Darjiling).

Key to the subgenus *Neogreenidea*

Apterous viviparous females :

1(2) Segments 4+5 of rostrum about 1.60-1.80 x h.t.2 and segment 4 about 3.80-4.70 x segment 5; siphunculi about 0.23-0.28 x body and about 5.25-6.00 x its maximum width; body more or less sclerorised 3

2(1) Segment 4+5 of rostrum about 2.67 x h.t.2 and segment 4 about 7.00 x segment 5; siphunculi about 0.41 x body and about 11.65 x its maximum width ..... *querciphaga*

3(4) Longest hair on segment III and on anterior abdominal tergites upto about 4.00 x b.d. III; p.t. nearly as long as (0.90 times) segment III; cauda with a distinct long stylus; siphunculi pale brown ....*ayyari*

4(3) Longest hair on antennae and on anterior abdominal tergites about 5.24-6.87 x b.d. IIII p.t. slightly longer (1.20 times) than segment III; caudal stylus very short; siphunculi dark brown ....*longisetosa*

219. ***Greenidea (Neogreenidea) ayyari*** Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Neogreenidea) ayyari* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, **41** : 63.
1980. *Greenidea (Neogreenidea) ayyari* : Raychaudhuri, D.N. and Chatterjee, *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 343.

Material examined : 2 apterous viviparous females and 2 nymphs.

Host plant : Unindentified plant.

Distribution : India : West Bengal (Darjiling).

220. ***Greenidea (Neogreenidea) longisetosa*** Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Neogreenidea) longisetosa* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, **41** : 63.
1980. *Greenidea (Neogreenidea) longisetosa* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 344.

Material examined : 6 apterous viviparous females and 2 nymphs.

Host plant : Unindentified plant.

Distribution : India : West Bengal (Darjiling).

221. ***Greenidea (Neogreenidea) querciphaga*** Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Neogreenidea) querciphaga* Raychaudhuri, D.N., Ghosh, M.R. Banerjee, M. and Ghosh, A.K., *Kontyu*, **41** : 64.
1980. *Greenidea (Neogreenidea) querciphaga* Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 344.

Material examined : 3 apterous and 2 alate viviparous females and nymphs.

Host plant : Quercus sp. (Fagaceae).

Distribution : India : West Bengal (Darjiling).

222. *Greenidea (Paragreenidea) symplocosis* Ghosh, Basu and Raychaudhuri

1969. *Greenidea (Paragreenidea) symplocosis* Ghosh, A.K., Basu, R.C. and Raychaudhuri, D.N., *Orient. Insects*, 3 : 248.
1980. *Greenidea (Paragreenidea) symplocosis*: Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 344.

Material examined : Many apterous and alate viviparous females.

Host plant : Prunus cerasoides (Rosaceae); *Eurya* sp. (Ternstromiaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim.

Key to the species of the subgenus ***Greenidea (Trichosiphum)***

Apterous viviparous females

1(2) Tibiae smooth at least on basal 0.50 portion; basal 0.50 portion of segment III also smooth, other segment imbricated 3

2(1) Tibiae imbricated; segment III imbriacted entirely 7

3(4) Processus terminalis longer than segment III ..... *anonae*

4(3) Processus terminalis shorter than segment III 5

5(6) Hairs on dorsum of abdomen rather thin and scanty, hairs on hind tibiae spiny or peg-like ..... *spinotibium*

6(5) Hairs on abdominal dorsum and on tibiae normal, hairs on flagellum, dorsum of abdomen long and mostly fine; longest hair on segment III about 3.50-4.20 x b.d. III ..... *gigantea*

7(8) Siphunculi shorter than width of head including outermargin of eyes; ultimate rostral segment (4+5) about 3.0 x h.t. 2 ..... *quericola*

8(7) Siphunculi longer than width of head including outer margin of eyes 9

9(10) Processus terminalis distinctly shorter than segment III ..... *schoutedeni*

10(9) processus terminalis as long as or distinctly longer than segment III ..... *formosana*

223. *Greenidea (Trichosiphum) anonae* (Pergande)

1906. *Trichosiophum anonae* Pergande, *Ent. News*, 17 : 208.
1980. *Greenidea (Trichosiphum) anonae* (Pergande): Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 345.

Material examined : Many apterous viviparous females.

Host plants : Artabotrys sp. (Anonaceae); *Antidesma* sp. (Euphorbiaceae) *Symplocos thisifolia* (Styraceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Central India. Elsewhere : Indonesia; Japan and Malaysia.

224. *Greenidea (Trichosiphum) bucktoni* Ghosh, Basu and Raychaudhuri

1970. *Greenidea (Trichosiphum) bucktoni* Ghosh, A.K., Basu, RC. and Raychaudhuri, D.N., *Orient. Insects*, 4 : 69.
1980. *Greenidea (Trichosiphum) bucktoni* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the aphids of North East India and Bhutan, The Zoological Society, Calcutta : 345.

Material examined : Many apterous viviparous females.

Host plants : Duabanga sonneratioides (Lythraceae), *Villebrunea integrifolia* (Urtaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya; Sikkim; Uttar Pradesh.

225. *Greenidea (Trichosiphum) formosana heeri* Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Trichosiphum) formosana heeri* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, *A.K. Kontyu*, 41 : 66.
1980. *Greenidea (Trichosiphum) formosana heeri* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India Bhutan, The Zoological Society, Calcutta : 345.

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

Host plants : Duabanga sonneratioides (Lythraceae); *Fiscus* sp. (Moraceae), *Euginia tetragona*, *Psidium guajava* (Myrtaceae) and *Rhammus* sp. (Rhamnaceae).

Distribution : India : West Bengal (Darjiling) Sikkim; South India; Uttar Pradesh. Elsewhere : Nepal.

226. *Greenidea (Trichosiphum) gigantia* Ghosh and Raychaudhuri

1972. *Greenidea (Trichosiphum) gigantia* Ghosh, A.K. and Raychaudhuri, D.N. *Proc. zool. Soc., Calcutta*, 25 : 97.
1980. *Greenidea (Trichosiphum) gigantia* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India Bhutan, The Zoological Society, Calcutta ; 346.

Material examined : 3 apterous viviparous females.

Host plant : Unidentified plant.

Distribution : India : West Bengal (Darjiling).

227. *Greenidea (Trichosiphum) schoutedeni* Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidea (Trichosiphum) schoutedeni* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K., *Kontyu*, **41** : 67.
1980. *Greenidea (Trichosiphum) schoutedeni* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 347.

Material examined : 25 apterous viviparous females and many nymphs.

Host plant : Duabanga sonneratioides (Lythraceae).

Distribution : India : West Bengal (Darjiling); Sikkim.

228. *Greenidea (Trichosiphum) spinotibium* Chatterjee and Raychaudhuri

1977. *Greenidea (Trichosiphum) spinotibium* Chatterjee, M. and Raychaudhuri D.N. *Orient. Insects*, **11** : 263.
1980. *Greenidea (Trichosiphum) spinotibium* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 348.

Material examined : 5 apterous viviparous females.

Host plant : Unidentified plant.

Distribution : India : West Bengal (Darjiling).

Genus 96. *Greenideoidea* van der Goot

1917. *Greenideoidea* van der Goott, *Contr. Faune Indes neerl*, **1**(3) : 142.
Type species : *Greenideoidea elongata* van der Goot, 1917

Key to the subgenera of the genus *Greenideoidea* van der Goot

1(2) First tarsal segments with 7 ventral hairs; antennae 6-segmented; hind tibiae without stridulatory ridges; alate when present with media of forewing twice-branched, hind wing with 2 obliaue veins ..... ***Neogreenideoidea***

2(1) First tarsal segments with 5 ventral hairs; antennae 5-segmented; hind wing with 1 oblique vein ..... ***Pentatrichosiphum***

229. *Greenideoidea (Neogreenideoidea) bengalensis* Raychaudhuri and Chatterjee

1977. *Greenideoidea (Neogreenideoidea) bengalensis* Raychaudhuri, D.N. and Chatterjee, M., *Orient. Insects*, **5** : 105.
1980. *Greenideoidea (Neogreenideoidea) bengalensis* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 350.

Material examined : 9 apterous viviparous females.

Host plant : Unidentified plant.

Distribution : India : West Bengal (Darjiling).

Key to the species of the subgenus ***Pentatrichosiphum***

1(2) Longest hair on segment III 0.50-0.66 x b.d. III and that on anterior abdominal tergites about 1.30-2.20 x mentioned diameter; Siphunculi about 0.24-0.33 x body ..... *lambersi*

2(1) Longest hair on segment III about 2.80-3.70 x b.d. III and that on anterior abdominal tergites about 4.30 x mentioned diamter; siphunculi about 0.44-0.67 x body ..... *luteum*

230. ***Greenideoidea (Pentatrichosiphum) ? lambersi*** Basu

1964. *Greenideoidea lambersi* Basu, A.N., *J. Zool. Soc. (Zool.)*, **45** : 232.
1980. *Greenideoidea (Pentatrichosiphum) ? lambersi* Basu, A.N., Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 351.

Material examined : One alate viviparous female.

Host plant : Premora sp. (Verbenaceae).

Distribution : India : West Bengal (Darjiling).

Remarks : In view of the scanty material at disposal the specific determination was not possible and the species is reported with (?) mark.

231. ***Greenideoidea (Pentatrichosiphum) luteum*** (Basu)

1969. *Pentatrichosiphum luteum* Basu, A.N., *Orient. Insects*, **3** : 183.
1980. *Greenideoidea (Pentatrichosiphum) luteum* (Basu): Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 351.

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

Host plants : Quercus sp. (Fagaceae), *Lindera* sp., *Litsea polyantha* (Lauraceae); *Buddleja* sp. (Leguminosae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

Genus 97. ***Holotrichosiphon*** Raychaudhuri

1956. *Holotrichosiphon* Raychaudhuri, *Zool. Verh., Leiden*, **31** : 75.
Type species : *Holotrichosiphon heterotrichus* Raychaudhuri, 1956.

Key to the species of ***Holotrichosiphum*** Raychaudhuri

1(2) Longest hair on segment III and anterior abdominal tergites up to about 1.60 x b.d. III, shortest hair on anterior abdominal tergites about 0.50 x mentioned diameter; dorsal abdominal hairs scanty ..... ***dubius***

2(1) Longest hair on segment III and anterior abdominal tergites about 2.30 and 2.50 x b.d. III respectively, shortest hair on anterior abdominal tergites about 0.33 x mentioned diameter; dorsal abdominal hairs rather numerous ..... ***rusellae***

232. ***Holotrichosiphum dubius*** (van der Goot)

1917. *Trichosiphum dubium*, van der Goot, Rec. *Indian, Mus.*, **13** : 168.
1980. *Holotrichosiphum dubius* (van der Goot): Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 352.

Material examined : 3 apterous viviparous females.

Host plants : Quercus dealbata and *Quercus glauca* (Fagaceae).

Distribution : India : West Bengal (Darjiling). Elsewhere : Taiwan.

233. ***Halotrichosiphum rusellae*** Ghosh, Ghosh and Raychaudhuri

1971. *Holotrichosiphum rusellae* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. Insects*, **5** : 213.
1980. *Holotrichosiphum russellae* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 353.

Material examined : 12 apterous, 2 alate viviparous females and nymphs.

Host plants : Quercus dealbata and *Quercus* sp. (Fagaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya.

Genus 98. ***Mollitrichosiphum*** Suenaga

1934. *Mollitrichosiphum* Suenaga, *Bull. Kagoshima imp. Coll. Agric., For.*, **1** : 798.
Type species : *Trichosiphum tenuicorpus* Okajima, 1908.

Key to the subgenera of the genus ***Mollitrichosiphum*** Suenaga

1(2) Antennal hairs numerous, more or less similar length and pointed in all directions, radial sector nearly straight ..... ***Mollitrichosiphum***

2(1) Long and short hairs occur intermingled on antennae and longer hairs mainly directed inwards, radial sector curved; antennae 6-segmented ..... ***Metatrichosiphon***

Key to the species of the subgenus ***Mollitrichosiphum***

Apterous viviparous females :

1(2) Antennae about as long as body; p.t. about 1.60-1.70 x base of segment VI; siphunculi about 0.79-0.83 x body; segment 4 of rostrum about 5.30 x segment 5 ..... *tenuicorpus*

2(1) Antennae at most up to about 0.73 x body; p.t. about 1.40 x base of segment VI; siphunculi up to about 0.60 x body; segment 4 of rostrum about 4.20 x segment 5 ..... *shinji*

Key to the species of the subgenus ***Metatrichosiphon***

Apterous viviparous females :

1(2) Siphunculi about 0.77-0.95 x body; longest hair on segment III about 5.50-6.50 x b.d. III .... *alni*

2(1) Siphunculi about 0.47-0.55 x body; abdominal dorsum locally spinulose, siphunculi about 9.0-12.0 x its maximum width; tergite 7 with only 2 hairs ..... *nandi,*

234. ***Mollitrichosiphum (Mollitrichosiphum) shinji*** Raychaudhuri, Ghosh Banerjee and Ghosh

1973. *Mollitrichosiphum (Mollitrichosiphum) shinji* Raychaudhuri, D.N., Ghosh, M.R., Banerjee, M. and Ghosh, A.K. *Kontyu*, **41** : 70.
1980. *Millirichosiphum (Mollitrichosiphum) shinji* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 355.

Material examined : 1 apterous viviparous female.

Host plant : Quercus sp. (Fagaceae)

Distribution : India : West Bengal (Darjiling).

235. ***Mollitrichosiphum (Mollitrichosiphum) tenuicorpus*** (Okajima)

1908. *Trichosiphum tenuicorpus* Okajima, *Bull. Coll. Agric. Tokyo imp. Univ.*, **8** : 22.
1980. *Mollitrichosiphum (Mollitrichosiphum) tenuicorpus* (Okajima); Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 355.

Material examined : Man apterous, alate viviparous females and nymphs, a few alate oviparous females.

Host plant : astenospermum sp., *Quercus* sp. (Fagaceae).

Distribution : India : West Bengal (Darjiling); Sikkim. Elsewhere : Indonesia and Taiwan.

236. *Mollitrichosiphum (Metatrichosiphon) alni* Ghosh, Ghosh and Raychaudhuri

1910. *Mollitrichosiphum (Metatrichosiphum) alni* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N., *Orient. insects*, **4** : 200.
1980. *Mollitrichos.phum (Metatrichosiphon) alni* : Raychaudhuri, D.N. and Chatterjee, M. *In* Taxonomy of the aphids of North East India and Bhutan, The Zoological Society, Calcutta : 356.

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

Host plants : Alnus nepalensis and *alnus* sp. (Betulaceae).

Distribution : India : West Bengal (Darjiling); Sikkim.

237. *Mollitrichosiphum (Metatrichosiphon) nandii* Basu

1964. *Mollitrichosiphum (Metatrichosiphon) nandii* Basu, *A.N., J. Linn. Soc. (Zool.)*, **45** : 233.
1980. *Mollitrichosiphum (Metatrichosiphon) nandii* : Raychaudhuri, D.N. and Chatterjee M. *In* Taxonomy of the Aphids of North East India and Bhutan, The Zoological Society, Calcutta : 357.

Material examined : Many apterous and alate viviparous females.

Host plants : Alnus nepalensis (Betulaceae); *Prunus cerasodes* (Rosaceae)

Distribution : India : West Bengal (Darjiling); Sikkim.

Subfamily HORMAPHIDINAE

Key to the genera of the Subfamily Hormaphidinae

1(2) Frons usually with frontal processi 3

2(1) Frons without frontal processi 17

3(4) Subanal plate entire; frontal processi on head long and mutually placed for apart; apterae with numerous wax procs ..... ***Ceratoglyphina***

4(3) Subanal plate slightly indented to distinctly bilobed 5

5(6) Marginal wax cells in apterae absent between eyes and antennae 7

6(5) Marginal wax cells in apterae usually present between eyes and antennae ..... ***Cerataphis***

7(8) Head with a median and 2 laterally placed frontal processi, apparently like short blunt tubercles; presiphuncular abdominal segmnet 8 with wax pores ..... ***Tuberaphis***

8(7) Head with frontal processi looking like horns 9

9(10) One dorsoapical hair on 2nd tarsal segments in apterae with swollen apices and other shorter with normal apices; tergite 8 with distinct wax gland cells ..... ***Pseudoregma***

10(9) Two dorso apical hairs on 2nd tarsal segments in apterae with swollen apices 11

11(12) Aggrgated wax gland cells present on tegite 8 and on margin of abdomen in apterae 13

12(11) Aggregated wax gland cells absent 15

13(14) Marginal wax gland cells on abdomen transversely oval and arranged in a row ..... ***Astegopteryx***

14(13) Marginal wax gland cells on abdomen rounded or irregularly shaped ..... ***Ceratovacuna***

15(16) Body dark brown with scattered wax pores; frontal horns in nymphs short with rounded apices. ..... ***Chaitoregma***

16(15) Body pale brown, apparently without any wax pores; frontal horns in nymphs short, thick and conical ..... ***pseudoastegopteryx***

17(18) Body in apterae aleurodiform with a row of marginal wax cells encircling entire body ..... ***Aleurodaphis***

18(17) Body never aleurodiform 19

19(20) Head fused with only prothorax; siphunculi on elevated cones; cauda knobbed; subanal plate bilobed ..... ***Glyphinaphis***

20(19) Head fused with the thoracic segments; siphunculi when present, ring-like 21

21(22) Siphunculi absent; legs without tarsi ..... ***Hemipodaphis***

22(21) Siphunculi present; abdominal tergite 8 tiwiht 4-6 hairs; cauda somewhat semioval, broader than long 23

23(24) Abdominal segment (2-7) separated from prosona and with numerous short to long fine hairs besides submarginal ones ..... ***Euthoraphis***

24(23) Abdominal segments (2-7) sometimes only laterally separated from prosona or consolidated and without any fine hair 25

25(26) Prosoma consolidated with abdominal segments (2-7); dorsal hairs triangular; tergite 8 with 2 hairs ..... ***Sinonipponaphis***

26(25) Prosoma usually laterally separated from abdominal segments (2-7); dorsalhairs never triangaular 27

27(28) Abdominal segments (2-7) with 6 pairs of submarginal hairs, but without any posteromedial hairs at the hind end; tergite 8 with 2-4 hairs ..... ***Thoracaphis***

28(27) Abdominal segments (2-7) with a pair of posteromesial hairs at the hind end besides 6 pairs of submarginal hairs; tergite 8 with 4-8 hairs ..... ***Nipponaphis***

Genus 99. *Aleurodaphis* van der Goot

1917. *Aleurdaphis* van der Goot, *Contr. Fauna Indes neerl.*, 1(3) : 240.
Type species : *Aluerodaphis blumae* van der Goot 1917

238. *Aleurodaphis blumeae* van der Goot

1917. *Aleurodaphis blumae* van der Goot, *Faune Indes neerl.*, 1(3) ; 240.
1988. *Aleurodaphis blumae* : Ghosh, A.K. Fauna of India : *Aphidoidea Zool. Surv. India*, pt. 4 : 245.

Material examined : 7 apterous viviparous females and 6 nymphs.

Host plants : Cynoglossum wallichi (Boraginaceae); *Lantana camera* (Verbenaceae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Meghalaya. Elsewhere : Indonesia; Japan; Korea and Taiwan.

Genus 100. *Astegopteryx* Karsch

1890. *Astegopteryx* Karsch, *Ber. dt. bot. Ges.*, 8 : 51.
Type species : *Astegopteryx styracophila* Karsch, 1890

239. *Astegopteryx minuta* (van der Goot)

1917. *Oregma minuta* van der Goot, *Contr. Faune Indes neerl.*, 1(3) : 201.
1988. *Astegopteryx minuta* van der Goot; Ghosh, A.K. *Fauna India ,Homoptera : Aphidoidea*, pt. 4 : 274.

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

Host plant : Unidentified bamboo (Gramineae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Manipur; Meghalaya; Nagaland; Sikkim; South India. Elsewhere : Indonesia.

Genus 101. *Cerataphis* Lichtenstein

1882. *Cetraphis* Lichtenstein, *Annls. Soc. ent. Fr.*, 6(2) : LXXV.
Type species : *Coccus lataniae* Boisduval, 1868.

240. *Cerataphis lataniae* (Boisduval,)1867.

1967. *Cocous lataniae* Boisduval, *Essai Ent. hort.*, Paris :355
1934. *Aphis palmae* Ghensquiere, *J. Ann. de Geonbloux* **40** : 34.
1988. *Cerataphis palmae* (Ghesquiere); Ghosh, A. K. *Fauna of India Homoptera : Aphidoidea*, pt. 4 : 294.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Arcea catechu (Palmae).

Distribution : India : West Bengal (Darjiling); Karnataka; Kerala; Tamil Nadu. Elsewhere : Sri Lanka; Thailand; Malaysia; Papua; Solomon Island; Fiji; Tropical Africa; British Guinea; Colombia; Dominica; Puerto Rico; Jamaica & Trinidad.

Remarks : Raychaudhuri, D.N., Ghosh, M.R., Pal, P.K. and Ghosh, A.K. (1980) in Aphids of North East India and Bhutan reported the material as *Cerataphis ? variabilis* Hille Ris Lambers.

Genus 102. *Ceratoglyphina* van der Goot

1917. *Ceratoglyphina* van der Goot, *Contr. Faune Indes neerl.*, **3** : 235.
Type species : *Ceratoglyphina bambusae* van der Goot, 1917

241. *Ceratoglyphina bambusae bengalensis* Ghosh

1972. *Ceratoglyphina bambusae bengalensis* : Ghosh, L. K. *Orient. Insects*, **6** : 301.
1988. *Ceratoglyphina bambusae bengalensis* : Ghosh, A. K. *Fauna of India Homoptera* : *Aphidoidea*, pt. 4 : 300.

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

Host plant : Bambusa sp. (Gramineae)

Distribution : India : West Bengal (Darjiling); Assam; Manipur; Sikkim; North West India.

Remarks : This species is strictly a monophagous one. In the State of West Bengal it infests only bamboo.

Genus 103. *Ceratavacuna* Zehntner

1897. *Ceratovacuna* Zehntner, *Meded Profestn Cost-Java* (N.S.) 37 : 29.
Type species : *Ceratavacuna lanigera* Zehntner, 1987.

Key to the species of the genus *Ceratavacuna* Zhenter

Apterous viviparous females :

1(2) Dorsum of abdomen lacking spinal and pleural wax gland cell groups 3

2(1) Dorsum of abdomen with spinal wax gland cell groups at least on anterior segments, pleural cell groups may or may not be present 7

3(4) Wax gland cells on 8th abdominal tergite arranged in a transverse row ..... *indica*

4(3) Wax gland cells on 8th tergite arranged irregularly 5

5(6) Dorsal cephalic hairs upto about 4.00 x and longest hair on a.s. III about 1.80-2.00 times as long as b.d. III; flagellum with dense spinulose imbrications; wax gland cell groups on distinct chitinized areas ..... *spinulosa*

6(5) Dorsal cephalic and flagellar hairs shorter; former upto about 1.20-2.50 times as long as and latter on a.s. III about 0.90-.100 times as long as III nearly smooth; wax gland cell group areas pale .. .. *lanigera*

7(8) Hairs iwith normal and swollen apices occur intermingled on dorsum of abdomen; longest hair on segment III at most upto as long as b.d. II ..... *silvestrii*

8(7) Hairs on dorsum of abdomen with only fine apices; longest hair on segment III about 1.00-2.20 times as long as b.d. III ..... *perglandulosa*

Alate viviparous females

1(2) Ultimate rostral segment about 0.62-0.77 times as long as h.t. 2; pterostigma pale ..... *silvestrii*

2(1) Ultimate rostral segment about 0.49-0.5 times as long as long as h.t. 2; pterostigma dark brown ..... *lanigera*

242. *Ceratovacuna indica* Ghosh, Pal and Raychaudhuri

1976. *Ceratovacuna indica* Ghosh, M.R. Pal, P. K. and Raychaudhuri, D.N., *Proc. Zool. soc., Calcutta*, 27 : 96.
1988. *Ceratovacuna indica* : Ghosh, A.K., *The Fauna of India and adjacent countries* (Homoptera : Aphidoidea) pt. 4 : 312.

Material examined : 8 apterous viviparous females.

Host plant : Bambusa sp. (Gramineae)

Distribution : India : West Bengal (Darjiling).

243. *Ceratovacuna lanigera* Zehnter

1897. *Ceratovacuna lanigera* Zehnter, *Meded Peofestn Oost. Java*, (N.S.) 37 : 29.
1988. *Ceratovacuna lanigera* : Ghosh, A.K., *Fauna India* : (Homoptera : Aphidoidea) pt. 4 : 315.

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

Host plant : Saccharum officinarum (Gramineae).

Distribution : India : West Bengal (Darjiling); Assam; Sikkim; Tripura; Uttar Pradesh. Elsewhere: Formosa; Indonesia; Japan; Philippines and Sri Lanka.

244. *Ceratovacuna perglandulosa* Basu, Ghosh and Raychaudhuri

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., *Fauna of India* : (Homoptera : Aphidoidea), pt. 4 : 321.

Material examined : Many apterous viviparous females and nymphs.

Host plants : Saccharum officinarum and *Bambusa* sp. (Gramineae)

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Meghalaya; Sikkim.

245. *Ceratovacuna silvestrii* (Takahashi)

1927. *Oregma silvestrii* Takahashi, *Bull. Lab. Zool. gen. R. scuola agric. Portici*, **20** : 148.
1988. *Ceratovacuna silvestrii* (Takahashi) : Ghosh, A.K., *Fauna of India* : (Homoptera : Aphidoidea), pt. 4 : 325.

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

Host plant : Bambusa sp. (Gramineae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Assam; Manipur; Meghalaya; Sikkim; Tripura.. Elsewhere : China.

246. *Ceratovacuna spinulosa* Ghosh and Raychaudhuri

1972. *Ceratvacuna spinulosa* Ghosh, A.K. and Raychaudhuri, D.N., *Proc. zool. soc., Calcutta*, **25** : 103.
1988. *Ceratovacuna spinulosa* : Ghosh, A.K., *Fauna of India (Homoptera : Aphidoidea)* p.t. 4 : 332.

Material examined : 2 apterous viviparous females.

Host plant : Ischne album (Gramineae).

Distribution : India : West Bengal (Darjiling) : Manipur; Meghalaya.

Genus 104. *Chaitoregma* Hille Ris Lambers and Basu

1966. *Chaitoregma* Hille Ris Lambers and Basu, A.N., *Ent. Ber. Amst.*, **26** : 15.
Type species : *Oregma tattakana* Takahashi, 1925.

247. ***Chaitoregma tattakana*** (Takahashi)

1925. *Oregma tattakana* Takahashi, *Aphididae of Formosa*, **4** : 47.
1988. *Chaitoregma tattakana* (Takahashi); Ghosh, A. K., *Fauna India : (Homoptera : Aphidoidea)*, pt.4 : 338.

Material examined : 1 apterous viviparous female and 1 nymph.

Host plant : Arundinaria sp. (Graminae)

Distribution : India : West Bengal (Darjiling). Elsewhere : Formosa.

Genus 105. ***Glyphinaphis*** van der Goot

1917. *Glyphinaphis* van der Goot, *Contr. Faune Indes. neerl.*, **1**(3) : 232.
Type species : *Glyphinaphis bambuse* van der Goot, 1917

248. ***Glyphinaphis bambusae*** van der Goot

1917. *Glyphinaphis bambusae* van der Goot, *Contr. Faune Indes neerl.*, **1**(3) : 232.
1988. *Glyphinaphis bambusae* : Ghosh, A.K., Fauna India, *(Homoptera : Aphidoidea)*, pt. 4 : 349.

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

Host plant : Bamboo (Gramineae).

Distribution : India : West Bengal (Darjiling); Arunachal pradesh; Manipur; Meghalaya; Sikkim. Elsewhere : Indonesia.

Genus 106. ***Pseudoastegopteryx*** Ghosh, Pal and Raychaudhuri

1976. *Pseudoastegopteryx* Ghosh, M.R., Pal, P.K. and Raychaudhuri, D.N. *Proc. zool. Soc., Calcutta*, **27** : 109.
Type species : *Pseudoastegopteryx himalayensis* Ghosh, Pal and Raychaudhuri, 1976.

249. ***Pseudoastegopteryx himalayensis*** Ghosh

1976. *Pseudoastegopteryx himalayensis* Ghosh, M.R. Pal, P.K. and Raychaudhuri, D.N. *Proc. zool. Soc., Calcutta*, **27** : 109.
1988. *Pseudoastegopteryx himalayensis* : Ghosh, A. K. *Fauna India (Homoptera : Aphidoidea)*, pt.4 : 355.

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

Host plant : Unidentified Bamboo (Gramineae).

Distribution : India : West Bengal (Darjiling); Sikkim; Nagaland; Manipur.

Genus 107. *Pseudoregma* Doncaster

1966. *Pseudoregma* Doncaster, *Entomologists*, **99** : 159.
Type species : *Oregma bambusicola* Doncaster, 1919.

Key to the species of the Genus *Pseudoregma* Doncaster

Apterous viviparous females

1(2) Distinct wax gland cell groups absent; Head and body with numerous small wax pores, those on abdomen grouped in marginal and spino-pleural sclerotic region; frontal horns short, bluntly conical; ultimate rostral segment upto 0.75 times as long as second segment of hind tarsus ..... *bucktoni*

2(1) Distinct wax gland cell groups always present but variably distributed over body; frontal horns short, rounded or long and slender 3

3(4) Wax gland groups present on cephalothorax and abdomen, (marginal and spino-pleural), sometimes these may be ill-developed on anterior tergites or on head; frontal horns short, rounded at apex; ultimate rostral segment 0.45-0.60 times as long as second segment of hind tarsus ..... *panicola*

4(3) Marginal wax gland cell groups always present on postiphuncullar tergites of abdomen; meso-and metathorax and anterior tergites often with dark sclerotes, often bearing wax pores; frontal horn stout, sharply pointed at apex, curved outward, 1.3-1.7 times as long as antennal segment II and with 6-8 hairs; dorsal cephalic hairs 1.1-1.2 times as long as b.d. III; body upto 4.0 mm long ..... *alexandri*

Alate viviparous females :

1(2) Dorso-apical hairs on second tarsal segment with funnel-shaped apices. Frontal horns small, blunt; antennae 0.32-3.49 times as long as body, segment III distinctly longer than IV+V taken together u.r.s. 0.06 mm long, ht2 0.10 mm long ..... *panicola*

2(1) Dorso-apical hairs of two types; one with expanded apex other with normal apex; u.r.s. 0.08-0.018 mm long; ht2 0.198 mm long; cauda with about 12 hairs; body 2.2-2.8 mm ..... *bucktoni*

250. *Pseudoregma alexandri* (Takahashi)

1924. *Oregma alexandri* Takahashi, *Aphididae of Formosa*, **3** : 81.
1988. *Pseudoregma alexandri* (Takahashi); Ghosh, A.K., Fauna India *(Homoptera : Aphidoidea)*, pt.4 : 366.

Material examined : Many apterous, viviparous females and nymphs.

Host plant : Unidentified plant of Bamboo (Gramineae).

Distribution : India : West Bengal (Darjiling); Manipur; Meghalaya; Nagaland and Sikkim. Elsewhere : Nepal, Taiwan.

Remarks : Raychaudhuri, D.N., Ghosh, M.R., Pal, P.K. and Ghosh, A.K. (1980) reported the material as *Paraor. gma alexandri* (Takahashi).

251. *Pseudoregma bucktoni* Ghosh, Pal and Raychaudhuri

1976. *Pseudoregma bucktoni* Ghosh, M.R., Pal P.K. and Raychaudhuri, D.N., *Proc. zool. Soc., Calcutta*, **27** : 113.
1988. *Pseudoregma bucktoni* : Ghosh, A. K., Faua of India *(Homoptera : Aphidoidea)*, pt. 4 : 373.

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

Host plant : Unidentified Bamboo (Gramineae).

Distribution : India : West Bengal (Darjiling); Karnataka; Manipur; Meghalaya; Sikkim; Tamil Nadu. Elsewhere : Sri Lanka, Taiwan and Vietnam.

252. *Pseudoregma panicola* (Takahashi)

1918. *Oregma panicola* Takahashi, *Aphididae of Formosa*, **1** : 90.
1988. *Pseudoregma panicola* (Takahashi); Ghosh, A.K., Fauna India : *(Hompotera : Aphidoidea)*, pt. 4 : 386.

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

Host plant : Unidentified Grass (Gramineae).

Distribution : India : West Bengal (Darjiling); Arunachal Pradesh; Manipur; Meghalaya; Sikkim; Tamil Nadu. Elsewhere : Africa; Australia; Cuba; Formosa; Japan; Mauritius; Pureto Rico; New Zealand.

Remarks : Raychaudhuri, D.N., Ghosh, M.R., Pal, P.K. and Ghosh, A.K. (1980) reported the material as *Neoceratovacuna panicicola* (Takahashi).

Genus 108. *Euthoracaphis* Takahashi

1938. *Euthoracaphis* Takahashi, *Tenthredo*, **2** : 14.
Type species : *Thoracaphis umbelluariae* Essig, 1932.

253. *Euthoracaphis heterotricha* Ghosh and Raychaudhuri

1973. *Euthoracaphis heterotricha* Ghosh, A.K. and Raychaudhuri, D.N., *Kontyu*, 41 : 156.
1980. *Euthoracaphis heterotricha* : Ghosh, A.K., Fauna of India *(Homoptera : Aphidoidea)*, Pt. 4 : 139.

Material examined : 15 apterous, 2 alate viviparous females and a few nymphs.

Host plant : Unidentified.

Distribution : India : West Bengal (Darjiling).

Genus 109. ***Hemipodaphis*** David, Narayanan and Rajasingh

1971. *Hemipodophis* David, Narayanan and Rajasingh, *Orient Insects*, **5** : 559.
Type species : *Hemipodaphis monstrata* David, Narayanan and Rajasingh.

254. ***Hemipodaphis monstrata*** David, Narayanan and Rajasingh

1971. *Hemipodaphis monstrata* David, Narayanan and Rajasingh, *Orient. Insects*, **5**(4) : 560.
1988. *Hemipodaphis monstrata* : Ghosh, A.K., Fauna of India *(Homoptera : Aphidoidea)* pt. 4 : 148.

Material examined : Nil

Host plant : Unidentified

Distribution : India : West Bengal (Darjiling).

Remarks : David, Narayanan and Rajasingh (1971) described the species from the State of West Bengal but the material was not available for the present study.

Genus 110. ***Nipponaphis*** Pergande

1906. *Nipponaphis* Pergande, *Ent. News.*, **17** : 205.
Type species : *Nipponaphis distychii* Pergande, 1906

Key to the subgenera of the Genus ***Nipponaphis*** Pergande

1(2) Dorsal hairs long and thick, arising from somewhat tuberculate bases; prosoma lacking a pair of posteromesial hairs at hind end ..... ***Pseudonipponaphis***

2(1) Dorsal hairs fine, of variable length, not arising from tubercle bases; posteromesial hairs on prosoma present ..... ***Nipponaphis*** s.s.

Key to the species of the Subgenus ***Nipponaphis*** (***Pseudonipponaphis***) Ghosh and Raychaudhuri

1(2) Prosoma completely separated from fused abdominal segments (2-7); only 4th and 5th pair of submarginal hairs much shorter than others. All dorsal hairs thick, except those one on lateral perpendicular areas ..... *Nipponaphis (P) machiliphaga*

2(1) Prosoma incompletely separated from fused abdominal segments (2-7); Dorsal hairs upto 1.25 times as long as antennae, submarginal hairs of variable lengths, first three pairs equal to and last three pairs 0.60 times as long as the antennae; short fine hairs mixed with thick hairs occur on dorsum of prosoma ..... *Nipponaphis (P) himalayensis*

255. *Nipponaphis manoji* Ghosh and Raychaudhuri

1973. *Nipponaphis manoji* Ghosh, A.K. and Raychaudhuri, D.N., *Kontyu*, **41** : 481.
1988. *Nipponaphis manoji* : Ghosh, A.K., Fauna India *(Homoptera : Aphidoidea)*, pt. 4 : 183.

Material examined : Many apterous, 4 alate viviparous females and many nymphs.

Host plants : Litsea corymbosa, Litsea polyantha (Lauraceae).

Distribution : India : West Bengal (Darjiling).

256. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh and Raychaudhuri

1973. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh, A.K. and Raychaudhuri, D.N., *Kontyu*, **41** : 483.
1988. *Nipponaphis (Pseudonipponaphis) himalayensis* : Ghosh, A.K., Fauna India *(Homopotera : Aphidoidea)*, pt. 4 : 176.

Material examined : 6 apterous and 3 alate viviparous females and nymphs.

Host plants : Litsea polyantha and *Machilus* sp. (Lauraceae).

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya.

257. *Nipponaphis (Pseudonipponaphis) machiliphaga* Takahashi

1959. *Nipponaphis machiliphaga* Takahashi, *Akitu*, **8** : 49.
1988. *Nipponaphis (Pseudonipponaphis) machiliphaga* (Takahashi); Ghosh, A.K., Fauna India *(Homoptera : Aphoidoidea)*, pt. 4 : 180.

Material examined : 2 apterous viviparous females and nymphs.

Host plant : Litsea polyantha (Lauraceae).

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya. Elsewhere : Japan.

Genus 111. *Sinonipponaphis* Tao

1966. *Sinonipponaphis* Tao, Q.J. *Taiwan Mus.*, **19** : 175.
Type species : *Astegteryx formosona* Takahashi, 1927

258. *Sinonippponaphis halboelliae* (Ghosh and Raychaudhuri)

1980. *Nipponaphis holboelliae* Ghosh, A.K. and Raychaudhuri, D.N. *Kontyu*, **41**(4) : 480.
1988. *Sinonipponaphis holboelliae* (Ghosh and Raychaudhuri), Ghosh, A.K. Fauna India *(Homoptera : Aphidoidea)*, pt. 4 : 216.

Material examined : 8 apterous viviparous females.

Host plant : Holboeilla latofilia (Lauraceae).

Distribution : India : West Bengal (Darjiling).

Genus 112. ***Tuberaphis*** Takahashi

1933. *Tuberaphis* Takahashi, *Stylops*, **2** : 27.
Type species : *Tuberaphis coreanus* Takahashi, 1933.

Key to the species of the genus ***Tuberaphis*** Takahashi

Apterous viviparous females

1(2) Body large 2.6-2.7 mm long; marginal hairs on abdomen fine, upto 0.075 mm long; ultimate rostral segment 0.13-0.14 mm long, 8th tergite with fine hairs, upto 0.066-0.076 mm long; antennal segment III 0.26-0.28 mm long, bearing fine hairs; pale intersegmental areas hardly discernible on anterior tergites ..... *indica*

2(1) Body small, 1.3-.19 mm long; marginal hairs variable; hairs on abdomen upto 0.100 mm long and hairs on 8th tergite upto 0.117 mm long; abdominal dorsum dark with distinct marginal wax glands; ultimate rostral segment with 2 accessory hairs; hairs on legs upto 0.033-0.040 mm long ..... *loranthi*

259. ***Tuberaphis indica*** Ghosh and Raychaudhuri

1971. *Tuberaphis indica* Ghosh, A.K., Ghosh, M.R. and Raychaudhuri, D.N. *Orient. Insects*, **5** : 331.
1988. *Tuberaphis indica* : Ghosh, A.K., Fauna India *(Homoptera : Aphidoidea)* pt. 4 : 401.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Unidentified tree (Rosaceae).

Distribution : India : West Bengal (Darjiling).

260. ***Tuberaphis loranthi*** (van der Goot)

1917. *Oregma loranthi* van der Goot, *Contr. Faune Indes neerl.*, **1**(3) : 194.
1988. *Tuberaphis loranthi* (van der Goot); Ghosh, A.K., Fauna India *(Homoptera : Aphidoidea)*, pt.4 : 405.

Material examined : 2 apterous viviparous females and 4 nymphs.

Host plant : Unidentified.

Distribution : India : West Bengal (Darjiling); Meghalaya. Elsewhere : Indonesia.

Remarks : Raychaudhuri, D.N., Ghosh, M.R., Pal, P.K. and Ghosh, A.K. (1980) reported the material as *Neotuberaphis bengalensis* Pal and Raychaudhuri.

Subfamily LACHNINAE

Tribe LACHNINI

Key to the genera of the Tribe Lachnini

1(2) Rostrum much longer than body, when extended ..... ***Stomaphis***

2(1) Rostrum shorter than body 3

3(4) Abdominal dorsum with a large spinal tubercle on tergite 4 ..... ***Tuberolachnus***

4(3) Abdominal dorsum without tubercle on tergite 4 5

5(6) Forewings with pterostrigma elongate; radial sector little curved or straight 7

6(5) Forewings with pterostigma rather short and blunt; radial sector usually curved; hin legs much elongated; hair bases without sclerities ..... ***Lachnus***

7(8) Ocular tubercles absent in the eyes of adults; M in forewing of alate much paler and thinner than other veins, may be once-or twice branched ..... ***Nippolachnus***

8(7) Ocular tubercles distinct in the eyes of adults; M in forewings twice-branched; hairs on flagellum and dorsum of abdomen fine or thick, those on flagellum shorter or longer than b.d. III ..... ***Pyrolachnus***

Genus 113. *Lachnus* Burmeister

1835. *Lachnus* Burmeister, *Handb. Ent.*, **2** : 91.
Type species : *Aphis ruboris* Linnaeus, 1758.

261. *Lachnus tropicalis* (van der Goot)

1916. *Pterochlorus tropicalis* van der Goot, *Rec. Indian Mus.*, **12** : 3.
1982. *Lachnus tropicalis* (van der Goot) : Ghosh, A.K. Fauna of India : Aphidoidea, *Zool. Surv. India*, pt. 2 : 91.

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

Host plants : Quercus dealbata, Quercus sp. (Fagaceae).

Distribution : India : West Bengal (Darjiling) and almost all other states.

Genus 114. *Nippolachnus* Matsumura, 1917

1917. *Nippolanchus* Matsumura, *J. Coll. Agric. Taihoku imp. Univ.* 7 :328
Type species : *Nippolanchus pyri* Matsumura, 1917.

Key to the species of the genus *Nippolachnus* Matsumura

1(2) Legs in apterae blackish; dorsal cephalic hairs shorter (2.7-2.8 times as long as b.d. III) ..... *himalayensis*

2(1) Legs in apterae pale; dorsal cephalic hairs longer (5-6.5 times as long as b.d. III) 3

3(4) Ultimate rostral segment with about 20 accessory hairs; hairs on hind tibiae 1.7-1.8 times as long as the diameter at the middle of the hind tibiae ..... *piri*

4(3) Ultimate rostral segment with 9-14 accessory hairs; hairs on hind tibiae twice as long as the diameter at the middle of hind tibiae ..... *bengalensis*

Alate viviparous females

1(2) Abdomen without dorsal sclerotic areas; antennae with 40-60 scattered secondary rhinaria on segment III and 10-11 similar rhinaria on segment IV ..... *himalayensis*

2(1) Abdomen with dorsal sclerotic pattern; antennae with 5-12 secondary rhinaria arranged in a row on segment III and 0-5 similar rhinaria on segment VI 3

3(4) Marginal sclerites absent on anterior abdominal segment; eyes dark; processus terminalis upto 0.33 times as long as base of segment VI and bearing only terminal setae; u.r.s. with 9-14 accessory hairs ..... *bengalensis*

4(3) Marginal brown sclerities present irregularly on anterior abdominal segments, segment 8 with a brown sclerotic dorsal band; eyes pale; processus terminalis 0.45-0.57 times as long as base of antennal segment VI and bearing a few hairs besides terminal setae; u.r.s. with 18-20 accessory hairs ..... *piri*

262. *Nippolachnus bengalensis* Basu and Hille Ris Lambers

1968. *Nippolachnus bengalensis* Basu, A.N. and Hille Ris Lambers, *Ent. Ber. Amst.*, **28** : 9.
1982. *Nippolachnus bengalensis* : Ghosh, A.K., Fauna India : *Aphidoidea, Zool. Surv. India*, pt.2 : 112.

Material examined : 3 apterous, 2 alate viviparous females and 1 nymph.

Host plant : Eriobotyra dubia (Rosaceae).

Distribution : India : West Bengal (Darjiling).

263. *Nippolachus himalayensis* (van der Goot)

1917. *Lachnus himalayensis* van der Goot, *Rec. India Mus.*, **13** : 180.
1982. *Nippolanchus himalayensis* (van der Goot), Ghosh, A.K., Fauna India : *Aphidoidea, Zool. Surv. India*, pt. 2, 115.

Material examined : 3 apterous viviparous, 3 alate females and many nymphs.

Host plant : Eriobotya petiolata (Rosaceae).

Distribution : India : West Bengal (Darjiling).

Remarks : Basu, A.N. and Hille Ris Lambers (1968) described the specimens as *Nippolachnus erioboytrae* Basu and Hille Ris Lambers.

264. *Nippolachnus piri* Matsumura

1916. *Nippolachnus piri* Matsumura, *J. Coll. Agric., Teihoku im. Univ.*, **7** : 382.
1982. *Nippolachnus piri* : Ghosh, A.K., Fauna India : *Aphidoidea, Zoll. Surv. India*, pt. 2 : 118.

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

Host plants : Pyrus communis, Pyrus sp. (Rosaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya. Elsewhere : Japan; Korea and Taiwan.

Genus 115. *Pyrolachnus* Basu and Hille Ris Lambers

1968. *Pyrolachnus* Basu, A.N. and Hille Ris Lambers, *Ent. Ber., Amst.*, **28** : 13.
Type species : *Lachnus* Buckton, 1899.

265. *Pyrolachnus pyri* (Buckton)

1899. *Lachnus pyri Buckton, Indian Mus. Notes*, **4** : 274.
1982. *Pyrolachnus pyri* (Buckton); Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.2 : 131.

Material examined : 4 apterous and 4 alate viviparous females.

Host plant : Pyrus sp. (Rosaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya; Uttar Pradesh and Sri Lanka.

Genus 116. ***Stomaphis*** Walker

1870. *Stomaphis* Walker, *Zoologist*, 2(5) : 2000.
Type species : *Aphis quercus* Linnaeus.

266. ***Stomaphis mordvilkoi*** Hille Ris Lambers

1933. *Stomaphis mordvilkoi* Hille Ris Lambers, *Stylops*, **2** : 199.
1982. *Stamaphis mordvilkoi* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 2 : 136.

Material examined : 2 apterous oviparous females.

Host plant : Juglans regia (Juglandaceae).

Distribution : India : West Bengal (Darjiling).

Genus 117. ***Tuberolachnus*** Mordvilko

1968. *Tuberolachnus* Mordvilko, *Ezheg. zool. Muz.*, **13** : 374.
Type species : *Aphis viminalis* Boyer de Fonscolombe, 1841 (=*Aphis saligna* Gmelin, 1790).

Key to the species of the genus ***Tuberolachnus*** Mordvilko

Apterous viviparous females :

1(2) Abdominal dorsum pale; dorsal abdominal tubercle about 0.60 times as long as its basal width; rostral segment 4 about 3.50-3.70 times as long as segment 5 ..... *salignus*

2(1) Abdominal dorsum with sclerotic brown patches; dorsal abdominal tubercles less than 0.50 times as long as its basal width; rostral segment about 2.65-2.85 times as long as segment 5 .... *(Tuberolachniella) sclerata*

267. ***Tuberolachnus salignus*** (Gmelin)

1790. *Aphis salignus* Gmelin, *Syst. Nat.* (13 ed.), **1** : 2209.
1984. *Tuberolschnus salignus* (Gmelin) : Ghosh,A.K., Fauna of India : *Aphidoidea, Zool. surv. India*, pt. 2 : 140.

Material examined : 11 apterous, 2 alate viviparous females and many nymphs.

Host plants : Salix babylonica, Salix sp. (Salicaceae).

Distribution : India : West Bengal (Darjiling); Meghalaya.

268. ***Tuberolachnus (Tuberlachniella) scleratus*** Hille Ris Lambers and Basu

1966. *Tuberlachnus (Tuberolachniella) sclerata* Hille Ris Lambers and Basu, A.N., *Ent. Bert Amst.*, **26** : 34.

1982. *Tuberlachnus (Tuberolachniella) scleratus* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India,* pt. 2 : 144.

Material examined : 7 apterous viviparous females and 7 nymphs

Host plants : Eriobotrya dubia and *Eriobotrya peltata* (Rosaceae)

Distribution : India : West Bengal (Darjiling); Meghalaya.

Subfamily PEMPHIGINAE

Key to the Tribes of the Subfamily Pemphiginae

1(2) Siphunculi present in the form of cones or as rings usually surrounded by a few hairs; Tarsi in apterae 1-2 segmented; wax glands present, composed of a row of cells surrounding a central space; Media of forewings once-branched or simple ..... Eriosomatini

2(1) Siphunculi absent or hardly discernable, without surrounding hairs; Tarsi in apterae usually 2-segmented; wax glands may be present or absent, if present not as above; Media of forewings usually simple 3

3(4) Wax glands absent or indistinct in apterae, never with hair; u.r.s. with 2-20 accessory hairs; secondary rhinaria in alate round, oval or transversely oval ..... Fordini

4(3) Wax gland groups inconspicuous in apterae, each bearing a hair; u.r.s. with a few or without accessory hairs; secondary rhinaria in alate strongly transverse and narrow ..... Pemphigini

Type species : *Aphis ulmi* Linnaeus

Key to the subgenera and species of the Genus ***Tetraneura*** Hartig

1(2) First instar nymph with tarsal claws equal and shorter than the tarsal segments ... *Tetraneura* s.s.

2(1) First instar nymph with tarsal claws varaible, but never shorter than the tarsal segments 3

3(4) Tarsal claws unequal, at least in hind legs of embryos ..... *(Indotetraneura) basui*

4(3) Tarsal claws never unequal on the same tarsal segment ..... *(Tetraneurella) nigriabdominalis*

Subgenus ***TETRANEURA*** s.s.

Key to the species of subgenus ***Tetraneura*** s.s.

Apterous viviparous females :

1(2) 8th tergite with 4-6 hairs; Antennae 5-6 segmented; subanal plate with 4-10 hairs; head with a distinct pair of was plates; dorsal cephalic hairs upto 1-2.5 times as long as b.d. III .... *radicicola yezoensis* group

2(1) 8th tergite with 9-14 hairs; Antennae 4-segmented, sub-anal plate with upto 18 hairs 3

3(4) Dorsal cephalic hairs numerous, fine flagellate, 80-90/u long; abdominal dorsum with numerous long, flagellate hairs on anterior tergites 5.4-6.7 times as long as b.d. III .....*multisetosa*

4(3) Dorsal cephalic hairs about 8-10, 30-40/u long; abdominal dorsum never extremely pubescent, with hairs of variable length .....*kalimpongensis*

Alate viviparous

1(2) Ultimate rostral segment about 1.30-1.75 times as long as h.t. 2 and with 15-25 secondary hairs; segments II and III with 13-22 and 17-28 hairs respectively; longest flagellar hairs about 2.50-3.25 times as long as b.d. III; F.T.C. 4,2,2 .....*radicicola/yezoensis* group

2(1) Ultimate rostral segment at most 0.75 times as long as h.t. 2 and with 6-8 secondary hairs; segment II and III with 3-7 and 3-13 hairs respectively; longest flagellar hair at most 1.50 times as long as b.d. III; F.T.C. 3,2,2 or 3,3,2 3

3(4) 8th tergite with only 2 hairs; segment III with 8-13 hairs; secondary rhinaria on segments III, IV and V. with 11-15, 2-4 and 7-12 respectively .....*nigriabdominalis*

4(3) 8th tergite with 4 hairs; segments III with 3-7 hairs; secondary rhinaria on segments III, IV and V with 11-14, 2-4 and 4-7, if 5 segmented, segments III and IV with 14-17 and 5-9 secondary rhinaria respectively .....*basui*

269. *Tetraneura (Indotetraneura) basui* Hille Ris Lambers

1970. *Tetraneura (Tetraneurella) basui* Hille Ris Lambers, *Bull. Zool. agr. Bchi.*, **2** : 44.
1984. *Tetraneura (Indotetraneura) basui* Hille Ris Lambers, Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 3, 86.

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

Host plant : Paspalum commensoni, Capillipidium sp., *Elusine indica, Oryza sativa* and unidentified Grmineae.

Distribution : India : West Bengal (Darjiling); Manipur; Nagaland and Sikkim.

270. *Tetraneura (Tetraneura) kalimpongensis* Raychaudhuri, Pal and Ghosh

1978. *Tetraneura kalimpongensis* Raychaudhuri, D.N. Pal, P. K. and Ghosh, A. K., *Entomon* **3** : 255.
1984. *Tetraneura kalimpongensis* : Ghosh, A.K., Fauna of India, *Aphidoidea, Zool. Surv. India,* pt. 3 : 99.

Material examined : Many apterous viviparous females and nymphs.

Host plants : Pennisetum sp. and *Saccharum officinarum* (Gramineae).

Distribution : India : West Bengal (Darjiling).

271. *Tetraneura (Tetraneura) multisetosa* Raychaudhuri, Pal and Ghosh

1978. *Tetraneura multisetosa* Raychaudhuri, D.N., Pal, P.K. and Ghosh, A.K., *Entomon*, **3** : 257.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Cappilipidium parviflorum, Imperata cylindrica and other unidentified plants (Gramineae).

Distribution : India : West Bengal (Darjiling).

272. *Tetraneura (Tetraneurella) nigriabdominalis* (Sasaki)

1899. *Schizoneura nigrabdominallis* Sasaki, *Handb. insect pests of crops in Japan* : 435.
1984. *Tetraneura (Tetraneurella) nigriabdominalis* (Sasaki) : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 3 : 111.

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

Host plants : Erachiaris remoasa, Capillipidium sp., *Cynodon* sp. *Echinochlora colonum, Eluceine coracana, Eleucine indica, Oryza sativa, Paspalum conjugatum, Setaria glauca* and *Setaria pallide-fisca* (Gramineae).

Distribution : India : West Bengal (Darjiling); Arunachal pradesh; Assam; Manipur; Meghalaya; Nagaland; Sikkim. Elsewhere : Africa; Australia; Jamaica; Japan; Malaysia; New Guinea; Pakistan; Philippines; Sri Lanka and U.S.S.R.

273. *Tetraneura radicicola* Strand *yezoensis* Matsumura group

1929. *Tetraneura radicicola* Strand, *Latb. Univ. Rak.*, **20** : 22.
1984. *Tetraneura radicicola* Strand *yezoensis* Matsumura group; Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 3 : 125.

Material examined : Many apterous, 12 alate viviparous females and nymphs.

Host plants : Capillipidium sp., *Echinochlora crusgalli, Elucine corocana, Eragrostis gangetica, Triticum vulgare* and *Setaria glauca* (Gramineae).

Distribution : India : West Bengal (Darjiling); Assam; Manipur. Elsewhere : Australia; California; Japan; Malaysia; Nepal; Philippines; Sri Lanka and Taiwan.

Remarks : This root infesting species has been considered under *Tetraneura radicicola* Strand *yezoensis* Matsumura group since the material has been found to share characters of both the species. As a result, determination could not be made and hence, the material has been considered as group.

Tribe PEMPHIGNI

Key to the genera of the Tribe Pemphigni

1(2) Secondary rhinaria in alate reticulated; head rounded; wax glands subcircular to oval, each with a seta and composed of 30-45 pores in cluster. Rostrum reaches hind coxae ..... ***Formosaphis***

2(1) Secondary rhinaria in alatae, narrow, transverse and never as above 3

3(4) A.S. III may be with a denticle near the base; mesonotum with paired median wax glands; secondary rhinaria ciliated; antennal segments III-VI with secondary rhinaria in alatae ..... ***Prociphilus***

4(4) A.S. III never with a denticle; mesonotum with distinct or indistinct wax glands or absent; p.t. normal; wax gland plates normally distinct; siphunculi ring like, usually present in alatae, secondary rhinaria nonciliated; hairs inconspicuous; u.r.s. without accessory hairs ... ***Pemphigus***

Genus 119. ***Formosaphis*** Takahashi

1925. *Formosaphis* Takahashi, *Aphididae of Formosa*, **4** : 52.
Type species : *Formosaphis micheliae* Takahashi, 1925.

274. ***Formosaphis micheliae*** Takahashi

1925. *Formosaphis micheliae* : Takahashi, *Aphididae of Formosa*, **4** : 52.
1984. *Formosaphis micheliae* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India,* pt. 3 : 178.

Material examined : Many apterous and 4 alate viviparous females and many nymphs.

Host plants : Mangolia cambelli, Mangolia stellata, Michelia champaka (Magnoliaceae).

Distribution : India : West Bengal (Darjiling); Manipur. Elsewhere : Formosa, Japan.

Genus 120. ***Pemphigus*** Hartig

1893. *Pemphigus* Hartig, *Jber. Forstwise. forstl-naturk. im Jahre* 1836 u. 1837, **1** : 645.
Type species : *Aphis bursaria* Linnaeus, 1758

275. ***Pemphigus vulgaris*** Raychaudhuri, Ghosh and Pal

1978. *Pemphigus vulgaris* Raychaudhuri, D.N., Pal, P. K. and Ghosh, A.K., *Entomon*, **3** : 250.
1984. *Pemphigus vulgaris* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 3 : 237.

Material examined : 7 apterous viviparous females and 4 nymphs.

Distribution : India : West Bengal (Darjiling); Sikkim.

Genus 121. ***Prociphilus*** Koch

1857. *Prociphilus* Koch, *Die Pflazenlause Aphiden* : 279.
Type species : *Aphis bumeliae* Schrank, 1801.

276. ***Prociphilus micheliae*** Hille Ris Lambers

1933. *Prociphilus micheliae* Hille Ris Lambers, *Stylops*, **2** : 197.
1984. *Prociphilus micheliae* : Ghosh, A.K., Fauna of India, *Aphidoidea, Zool. Surv. India*, pt. 3 : 264.

Material examined : 4 alate viviaporus females.

Host plant : Michelia champaka (Magnoliaceae).

Distribution : India : West Bengal (Darjiling); Himachal Pradesh; Jammu and Kashmir.

Tribe FORDINI

Key to the genera of the Tribe Fordini

1(2) Primary and secondary rhinaria non-ciliated; marginal wax glands on abdominal tergites 1-5 absent in alate 3

2(1) Primary and secondary rhinaria variably ciliated; marginal wax glands on abdominal tergites 1-5 present in alate 5

3(4) Antennae 5 segmented in both apterae and alatae; rhinaria with sclerotised rim; F.T.C. 5,5,4 ..... ***Smynthurodes***

4(3) Antennae 5 or 6 segmented in apterae; 6-segmented in alatae; rhinaria without sclerotized rim; FT.C. 6,6,6 ..... ***Forda***

5(6) Head not reticulated in apterae; u.r.s. with 0-4 secondary hairs; cauda and anal plate not united but with a mdian depression ..... ***Asiphoniella***

6(5) Head often reticulated in apterae; u.r.s. with 2-12 secondary hairs 7

7(8) Dorsal hairs on head in apterae broadened at apices, blunt in alatae; F.T.C. usually 3,3,3; secondary rhinaria in alate non-ciliated ..... ***Geoica***

8(7) Dorsal hairs on head in apterae never as above; secondary rhinaria in alatae ciliated ..... ***Chaetogeoica***

Genus 122. ***Asiphoniella*** Theobald

1922. *Asiphoniella* Theobald, *Bull, Soc. ent. Egypte*, **7** : 76.
Type species : *Asiphoniella dactylonii* Theobald, 1922

277. ***Asiphoniella cynodonti*** (das)

1918. *Pemphigus (?) cynodonti* Das, *Mem. Indian Mus.*, **6** : 153.
1984. *Asiphoniella cynodonti* (Das), Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.3 : 338.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Cynodon dactylon (Gramineae).

Distribution : India : West Bengal (Darjiling). Elsewhere : Iran; Pakistan.

Genus 123. ***Chaetogeoica*** Remaudiere and Tao

1957. *Chaetogeocia* Remaudiere and Tao, *Revue, Path. veg. Ent. agric. Fr.*, **36** : 226.
Type species : *Pemphigella foliodentata* Tao, 1947.

Key to the species of the genus ***Chaetogeoica*** Ramaudiere and Tao

Apterous viviparous females :

1(2) Dorsal abdominal hairs long and arranged in longitudinal rows, smaller caudad; marginally usually 2-4 hairs, rarely 1; margin of abdomen withdistinct wax plates ..... *graminiphaga*

2(1) Dorsal abdominal hairs arranged irregularly, almost uniform in size, smaller and fine; marginally 3-6 hairs; margin of abdomen without wax plates ..... *polychaeta*

278. ***Chaetogeoica graminiphaga*** Raychaudhuri, Pal and Ghosh

1978. *Chaetogeocia graminiphaga* Raychaudhuri, D.N. Pal, P.K. and Ghosh, M.R., *Entomon*, 3(2) : 242.
1984. *Chaetogeocia graminiphaga* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.3 : 359.

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

Host plants : Callipedium perviflorum, Eleusine indica, Polypogon fugax and many unidentified plants (Gramineae).

Distribution : India : West Bengal (Darjiling); Manipur; Sikkim.

279. ***Chaetogeoica polychaeta*** Raychaudhuri, Pal and Ghosh

1978. *Chaetogoecia polychaeta* Raychaudhuri, D.N. Pal, P.K. and Ghosh, M.R., *Entomon*, 3(2) : 245.
1984. *Chaetogeocia polychaeta* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt. 3 : 366.

Material examined : Many apterous viviparous females and nymphs.

Distribution : India : West Bengal (Darjiling); Manipur.

Genus 124. ***Forda*** von Heyden

1837. *Forda* von Heyden, *Ent. Beitr. Mus. senckenb.*, **2** : 291.
Type species : *Forda formicaria* von. Heyden, 1837.

280. ***Forda marginata*** Koch

1857. *Forda marginata* Koch, *Pflzenlanse Aphiden* : 237.
1984. *Forda marginata* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.3, 372.

Material examined : Many apterous viviparous females and nymphs.

Host plant : Triticum vulgare, Imperata arundinaceae and many unidentified plants (Gramineae).

Distribution : India : West Bengal (Darjiling). Elsewhere : Central Asia; Europe; Israel; Lebanon; Syria; Turkey and U.S.S.R.

Remarks : Raychaudhuri, D.N., Pal, P.K. and Ghosh, M.R. (1978) reported the material as *Forda trivalis* Lomardi.

Genus 125. ***Geocia*** Hart

1984. *Geoica* Hart, *Rep. Ill. St. Ent.*, **18** : 101.
Type species : *Geoica squamosa* Hart, 1837

Key to the species

Apterous viviparous females :

1(2) Processus terminalis about 0.14-0.28 times as long as segment III and about 0.19-0.36 times as long as base of last antennal segment; longest hair on tergite 8 about 2.75-4.20 times as long as b.d. III; F.T.C. 3,3,3 ..... *lucifuga*

2(1) Processus termialis about 0.50-0.75 times as long as segment III and about 0.40-0.65 times as long as base of last antennal segment; longest hair on tergite 8 about 1.30-1.65 times as long as b.d. III; F.T.C. 3,3,2 ..... *sikkimensis*

281. *Geoica lucifuga* (Zehntner)

1898. *Tetraneura lucifuga* Zehntner, *Arcf Suikind, Ned. en. Ned - Indie*, **6** : 555.
1984. *Tetraneura lucifuga* (Zehntner) : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India*, pt.3 : 420.

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

Host plants : Cynodon dctylon, Oryza sativa, Paspalum commessonii and many other unidentified plants (Gramineae).

Distribution : India : West Bengal (Darjiling); Assam; Manipur; Sikkim. Elsewhere : Africa; Australia; Bokhara (U.S.S.R); China; Egypt; Indonesia; Ghana; Israel; Pakistan; Philippines, Rhodesia; Sierra; Loene; Sri Lanka and Taiwan.

282. *Geocia sikkimensis* Raychaudhuri, Pal and Ghosh

1978. *Geocia sikkimensis* Raychaudhuri, D.N., Pal, P.K. and Ghosh, M.R. *Entomon*, **3** : 248.
1984. *Geoica sikkimensis* : Ghosh, A.K., Fauna of India : *Aphidoidea, Zool. Surv. India,* pt.3 : 396.

Material examined : 3 apterous viviparous females and 4 nymphs.

Host plant : Polypogon fugax (Graminae).

Distribution : India : West Bengal (Darjiling); Sikkim.

Genus 126. *Smynthurodes* Westwood

1849. *Smynthurodes* Westwood, *Gadrners' Chroncle*, **27** : 420.
Type species : *Smynthurodes betae* Westwood, 1849.

283. *Smynthurodes betae* Westwood

1849. *Smynthurodes betae* Westwood, *Gardners' Chroncle* **27** : 420.
1984. *Smynthurodes betae* : Ghosh, A.K., Fauna of India : Aphidoidea, *Zool. Surv. India*, pt.3 : 406.

Material examined : 4 apterous viviparous females and a few nymphs.

Host plant : Cynodon dactylon and other unidentified plants (Gramineae)

Distribution : India : West Bengal (Darjiling); South India. Elsewhere : America; Africa; Crimea (U.S.S.R); Cyprus; Egypt; England; Holland; Iran and New Zealand.

Table - I. Number of aphid genera and species under different subfamilies of Aphididae from West Bengal

Aphid subfamilies	Genera	Species/Sub-species
APHIDIDAE		
Anoeciinae	2	8
Aphidinae	67	165
Pterocommatinae	1	1
Callipterinae*	18	27
Greenideinae	10	36
Hormaphidinae	14	23
Lachninae	5	8
Pemphiginae	9	15
Total	126	283

* Chaitophorinae + Drepanosiphinae

THE CHART SHOWING DISTRICT WISE DISTRIBUTION OF SEPCIES KNOWN FROM WEST BENGAL

Name of the Species	Darjiling	Jalpaiguri	Koch-Bihar	West Dinajpur	Maldah	Murshidabad	Birbhum	Nadia	Bardhaman	Puruliya	Bankura	Haora	Hugli	24-Parganas (N)	24-Parganas (S)	Medinipur	Calcutta
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Tribe : ANOECIINI																	
Genus : *Anoecia* Koch																	
1. *Anoecia radiciphaga* Pal and Raychaudhuri	+																
Genus : *Aiceona* Takahashi																	
2. *Aiceona longisetosa* Ghosh and Raychaudhuri	+																
3. *Aiceona pallida* Ghosh and Raychaudhuri	+																
4. *Aiceona paraosugii* Ghosh, Ghosh and Raychaudhuri	+																
5. *Aiceona pseudosugii* David, Sekhon and Bindra	+																
6. *Aiceona retipennis* David, Narayanan and Rajasingh	+																
7. *Aiceona robustiseta* Ghosh and Raychaudhuri	+																
8. *Aiceona titabarensis* Raychaudhuri and Ghosh	+																
Tribe : APHIDINI																	
Genus : *Aphis* Linnaeus																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
9. *Aphis citricola* Patch	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10. *Aphis craccivora* Koch	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
11. *Aphis fabae* Scopoli	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12. *Aphis glycines* Matsumura	+																
13. *Aphis gossypi* iGlover	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
14. *Aphis kurosawai* Takahashi	+																
15. *Aphis longisetosa* Basu	+																
16. *Aphis nasturtii* Kaltenbach	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
17. *Aphis nerii* Boyer de Fonscolombe	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
18. *Aphis punicae* Passerini	+																
19. *Aphis rubifolii* Thomas	+																
Genus : *Indiaphis* Basu																	
20. *Indiaphis crassicornis* Basu	+																
Genus : *Toxoptera* Koch																	
21. *Toxoptera aurantii* Boyer de Fonscolombe	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
22. *Taxoptera citricidus* (Kirkaldy)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
23. *Taxoptera odinae* (van der Goot)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus : *Hyalopterus* Koch																	
24. *Hyalopterus pruni* (Geoffroy)	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Genus : *Hysteronaura* Davis																	
25. *Hysteroneura setariae* (Thomas)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus *Melanaphis* van der Goot																	
26. *Malanaphis bambusae* (Fullaway)	+																
27. *Melanaphis meghalayensis bengalensis* Raychaudhuri and Banerjee	+																
28. *Melanaphis meghalayensis meghalyensis* Raychaudhuri and Banerjee	+																
29. *Melanaphis sacchari* (Zehnter)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
30. *Melanaphis vandergooti* Raychaudhuri & Banerjee	+																
31. *Rhopalosiphum maidis* (Fitch)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
32. *Rhopalisiphum nymphaeae* (Linnaeus)	+														+		+
33. *Rhopalisiphum padi* (Linnaeus)	+																
34. *Rhopalosiphum rufiabdominalis* (Sasaki)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus *Schizaphis* (Borner)																	
35. *Schizaphis graminum* (Rondani)	+																
36. *Schizaphis ? punjabipyri* (Das)	+																
Tribe : MACROSIPHINI																	
Genus : *Acutosiphon* Basu Ghosh and Raychaudhuri																	
37. *Acutosiphon obliquoris* Basu, Ghosh and Raychaudhuri	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Genus : *Acyrthosiphon* Mordvilko																	
38. *Acyrthosiphon pisum* (Harris)	+	+					+				+	+	+	+		+	
Genus *Akkaia* Takahashi																	
39. *Akkaia bengalensis* Basu	+																
40. *A. neopolygoni* Ghosh, Ghosh and Raychaudhuri	+																
Genus *Amphicercidus* Oestlund																	
41. *Amphicercidus indicus* Hille Ris Lambers and Basu	+																
Genus *Amphorophora* Buckton																	
42. *Amphophora ampullata bengalensis* Hille Ris Lambers and Basu	+																
Genus *Aulacorthum* (Mordvilko)																	
43. *A. fagopyri* Ghosh & Raychaudhuri																	
44. *Aulocorthum magnoliae* (Essig and Kuwana)	+																
45. *A. nipponicum* (Essig and Kuwana)	+																
46. *A. rhamni* (Ghosh, Ghosh and Raychaudhuri)																	
47. *Aulacorthum solani* (Kaltenbach)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus *Brachycaudus* van der Goot																	
48. *Bachycaudus helichrysi* (Kaltenbach)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus *Brachymyzus* Basu																	
49. *Brachymyzus jasmini* Basu	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
50. *Brevicoryne brassicae* (Linnaeus)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus *Capitophorus* van der Goot																	
51. *Capitophorus formosartemisiae* (Takahashi)	+																
52. *C. himalayensis* Ghosh, Ghosh and Raychaudhuri	+																
53. *C. hippophaes javanicus* (Hille Ris Lambers)	+																
54. *C. hipopphaes mitegoni* Eastop	+																
55. *C. indicus* Ghosh and Raychaudhuri	+																
56. *C. polygoni* Ghosh, Ghosh and Raychaudhuri	+																
Genus *Cavariella* del Guerico																	
57. *Cavariella aegopodii* (Scopoli)	+																
58. *C. biswasi* Ghosh, Basu and Raychaudhuri	+																
59. *C. nigra* Basu	+																
60. *C. salicicola* (Matsumura)	+																
Genus *Coloradoa* Wilson																	
61. *Coloradoa rufomaculata* (Wilson)	+			+													
62. *Cryptosiphum artemisiae* Buckton	+																
Genus *Diphorodon* (Borner)																	
63. *Diphorodon cannabis* (Passerini)	+																
Genus *Dysaphis* Borner																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
64. *Dysaphis multisetosa* Basu	+																
Genus *Eumyzus* Takahashi																	
65. *Eumyzus darjeelingensis* Basu and Raychaudhuri	+																
Genus *Hayhurstia* del Guerico																	
66. *Hayhursita atriplicis* (Linnaeus)	+																
Genus *Hillerislambersia* Basu																	
67. *Hillerislambersia darjeelingi* Basu	+																
Genus *Hyadaphis* Kirkaldy																	
68. *Hyadaphis coriandri* (Das)	+	+										+		+			
Genus *Hyalomzus* Richards																	
69. *Hyalomyzus ? sensoriatus* (Mason)	+																
Genus *Hyperomyzus* Mordvilko																	
70. *Hyperomyzus carduellinus* (Theobald)	+																
Genus *Impatientinum* Mordvilko																	
71. *Impatientinum impatiensae* (Shinji)	+																
Genus *Indomyzus* Ghosh, Ghosh and Raychaudhuri																	
72. *Indomyzus sensoriatus* Ghosh, Ghosh and Raychaudhuri	+																
Genus *Liosomaphis* Walker																	
73. *Liosomaphis himalayensis* Basu	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Genus *Lipaphis* Mordvilko																	
74. *Lipaphis erysimi* (Kaltenbach)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus *Macromyzella* Ghosh, Basu and Raychaudhuri																	
75. *Macromyzella polypodicola* (Takahashi)	+																
Genus *Macromyzus* Takahashi																	
76. *Macromyzus woodwardiae* Takahashi	+																
76a. *M. manoji* Raha & Raychaudhuri	+																
77. *M. (Anthracosiphoniella) maculatum* (Basu)	+																
Genus *Macrosiphoniella* del Guercio																	
78. *Macrosiphoniella grandicauda* Takahashi & Moritsu	+																
79. *M. kalimpongense* Basu and Raychaudhuri	+																
80. *M. pseudoartemisiae* Shinji	+																
81. *M. sanborni* Gillette	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
82. *M. spinipes* Basu	+																
83. *M. yomogifolioae* (Shinji)	+																
Genus *Macrosiphum* Passerini																	
84. *Macrosiphum aulocorthoides* David, Narayanan & Rajasingh	+																
85. *M. (Macrosiphum) pachysiphon* Hille Ris Lambers	+																
86. *M. (Mrosae)* (Linnaeus)	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
87. *Macrosiphum (Macrosiphum) spinotibium* Ghosh, Ghosh and Raychaudhuri	+																
88. *M. (Neomacrosiphum) microspinulosum* David, Rajasingh and Narayanan	+																
89. *M. (N.) pseudoluteum* (Ghosh)	+																
90. *M. (Sitobion) akebiae* (Shinji)	+																
91. *M. (S.) fagopyri* Ghosh and Raychaudhuri	+																
92. *M. (S.) indicum* (Basu)	+																
93. *M. (S.) lambersi* David	+																
94. *M. (S.) mimosae* Ghosh Basu and Raychaudhuri	+																
95. *M. (S.) miscanthi* (Takahashi)	+																
96. *M. (S.) plectranthi* Ghosh, Ghosh and Raychaudhuri	+																
97. *M. (S.) rosaeformis* (Das)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
98. *M. (S.) sikkimensis* Ghosh and Raychaudhuri	+																
99. *M. (S.) takahashii* Hille Ris Lambers	+																
Genus *Masonaphis* Hille Ris Lambers																	
100. *Masonaphis (Neomasonaphis) anaphalidis* Basu	+																
Genus *Matsumuraja* Schumacher																	
101. *Matsumuraja capitophorides* Hille Ris Lambers	+																
102. *M. nuditerga* Hille Ris Lambers	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
103. *M. urticae* Ghosh, Ghosh and Raychaudhuri	+																
104. *Metopolophium (Metopolophium) ? caraganae* (Cholodkovsky)	+																
105. *M. (M.) malvae* (Mosley) group	+																
106. *M. (M.) rubi* (Narzikulov)	+																
107. *M. (Metapolophinum) darjeelingensis* Ghosh	+																
108. *M. (Microlophium) darjeelingense* Raychaudhuri Ghosh and Basu	+																
109. *M. (Neometopolophium) davidi* Raychaudhuri, Ghosh and Basu	+																
Genus *Micromyzus* van der Goot																	
110. *Micromyzus granotiae* Ghosh, Ghosh and Raychaudhuri	+																
111. *M. judenkoi* Carver	+																
112. *M. kalimpongensis* Basu	+																
113. *M. nigrum* van der Goot	+																
Genus *Myzakkaia* Basu																	
114. *Myzakkaia himalayensis* Basu	+																
115. *M. polygonicola* Basu	+																
Genus *Myzus* Passerini																	
116. *Myzus ascalonicus* Doncaster	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
117 *M. brevisiphon* Basu	+																
118. *M. cerasi* (Fabricius)	+																
119. *M. cymbalariae* Stroyan	+																
120. *M. dycei* Carver	+																
121. *M. filicis* Carver	+																
122. *M. lefroyi* Basu and Raychaudhuri	+																
123. *M. leptotrichus* David, Rajasingh and Narayanan	+																
124. *M. maculocorpus* Basu and Raychaudhuri	+																
125. *M. manoji* Basu and Raychaudhuri	+																
126. *M. ornatus* Laing	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
127. *M. persicae* (Sulzer)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
128. *M. ranunculinus* (Walker)	+																
129. *M. siegebeckicola* Strand	+																
130. *M. umefoliae* (Shinji)	+																
Genus *Neoacyrthosiphon* Tao																	
131. *Neoacyrthosiphon rhododendri* Ghosh, Ghosh and Raychaudhuri	+																
132. *N. setosum* Hille Ris Lambers and Basu	+																
133. *N. taihesianum ovalifoliae* Ghosh, Ghosh and Raychaudhuri	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Genus *Neohyalomyzus* Basu, Ghosh and Raychaudhuri																	
134. *Neohyalomyzus raoi* (Hille Ris Lambers)	+																
Genus *Neomegourpsis* Ghosh, Basu and Raychaudhuri																	
135. *Neomegouropsis cajanae* Basu and Raychaudhuri	+																
136. *N. dooarsis* (Ghosh and Raychaudhuri)																	
137. *Neomyzus circumflexus* (Buckton)	+	+		+									+	+		+	
138. *N. dendrobii* (Basu)	+																
139. *N. (Paraneomyzus) dicentrate* (Basu)	+																
Genus *Oedisiphum* van der Goot																	
140. *Oedisiphum soureni* Basu	+																
Genus *Paczoskia* Mordvilko																	
141. *Paczoskia budhium* Banerjee, Ghosh and Raychaudhuri	+																
Genus *Pentalonia* Coquerel																	
142. *Petalonia nigronervosa* Coquerel	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Genus *Perillaphis* Takahashi																	
143. *Perillaphis perillae* (Shinji)	+																
Genus *Pleotrichophorus* Borner																	
144. *Pleotrichophorus* Hille Ris Lambers	+																
Genus *Pseudaphis* Hille Ris Lambers																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
145. *Pseudaphis abyssinica* (Hille Ris Lambers)	+																
Genus *Pseudoacyrthosiphon* Ghosh and Raychaudhuri																	
146. *Pseudoacyrthosiphon (Pseudoacyrthosiphon) holsti* (Takahashi)	+																
147. *P. (Anacyrthosiphon) takahashii* (Ghosh)	+																
Genus *Rhodobium* Hille Ris Lambers																	
148. *Rhodobium porosum* (Sanderson)	+																
Genus *Semiaphis* van der Goot																	
149. *Semiaphis heraclei* (Takahashi)	+																
Genus *Shinjia* Takahashi																	
150. *Shinjia pteridifoliae* (Shinji)	+																
Genus *Sinomegoura* Takahashi																	
151. *Sinomegoura citricola* van der Goot	+																
152. *S. photinae* (Takahashi)	+																
153. *S. rhododendri* (Takahashi)	+																
Genus *Subovatomyzus* Basu																	
154. *Subovatomyzus leucosceptri* Basu	+																
Genus *Taiwanomyzus* Tao																	
155. *Taiwanomyzus darjeelingensis* Ghosh, Basu and Raychaudhuri	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Genus *Tricaudatus* Narzikulov																	
156. *Tricaudatus polygoni* (Narzikulov)	+																
Genus *Tricosiphonaphis* Takahashi																	
157. *T richosiphonaphis gerberae* Ghosh and Raychaudhuri	+																
Genus *Tuberoaphis* Tseng and Tao																	
158. *Tuberoaphis hydrangeae digitata* Hille Ris Lambers and Basu	+																
Genus *Tuberocephalus* Shinji																	
159. *Tuberocephalus sasaki* (Matsumura)	+																
Genus *Uroleucon* Mordvilko																	
160. *Uroleucon (Uroleucon) formosanus crepidis* Ghosh, Ghosh and Raychaudhuri	+																
161. *U. (U.) gobonis* (Matsumura)	+																
162. *U.(U.) lambersi* Ghosh, Basu and Raychaudhuri	+																
161. *U. (U.) sonchi* (Linnaeus)				+	+	+											
164. *U. (Uromelan) compositae* (Theobald)	+																
Genus *Vesiculaphis* del Guercio																	
165. *Vesiculaphis caricis* (Fullaway)	+																
166. *V. grandis* Basu	+																
167. *V. Kalimpongensis* Ghosh, Basu and Raychaudhuri	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
168. *V. kuwanis* Ghosh, Basu and Raychaudhuri	+																
169. *V. pieridis* Basu	+																
170. *V. rhododendri* Ghosh and Raychaudhuri	+																
171. *V. verbasci* Chowdhury, Basu, Chakrabarti and Raychaudhuri	+																
Genus *Xenomyzus* Aizenberg																	
172. *Xenomyzus polygoni* (van der Goot)	+																
173. *X. scabripes* Basu, Ghosh and Raychaudhuri	+																
Tribe PTEROCOMMATINI																	
Genus *Pterocomma* Buckton																	
174. *Pterocomma* sp.	+																
Genus *Betacallis* Matsumura																	
175. *Betacallis prunicola* Basu, Ghosh and Raychaudhuri	+																
176. *B. querciphaga* Basu, Ghosh and Raychaudhuri	+																
Genus *Betulaphis* Glendenning																	
177. *Betulaphis longicornis* Quednau and Chakrabarti	+																
Genus *Chaitophorus* Koch																	
178. *Chaitophorus dorocola* Matsumura	+																
179. *C. indicus* Ghosh, Ghosh and Raychaudhuri	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
180. *Chaitophorus* sp.	+																
Genus *Clethrobius* Mordvilko																	
181. *Clethrobius dryobius* Chakrabarti and Raychaudhuri	+																
Genus *Cranaphis* Takahashi																	
182. *Cranaphis indica* Chakrabarti and Raychaudhuri	+																
183. *Mesocallis obtusirostris* Ghosh	+																
Genus *Neobetulaphis* Basu																	
184. *Neobetulaphis chaetosiphon* Quednau	+																
185. *N. pusilla* Basu	+																
Genus *Neocranaphis* Ghosh																	
186. *Neocranaphis bambusicola* (David, Rajasingh and Narayanan)	+																
Genus *Periphyllus* van der Hoven																	
187. *Periphyllus bengalensis* Ghosh and Raychaudhuri	+																
188. *P. californiensis* Shinji	+																
189. *P. himalayensis* Chakrabarti	+																
Genus *Shivaphis* Das																	
190. *Shivaphis celti* Das	+																
Genus *Subtakecallis* Raychaudhuri and Pal																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
191. *Subtakecallis brevisetosus* Raychaudhuri & Pal	+																
192. *S. pilosa* (David, Rajasingh and Narayanan)	+																
Genus *Taiwanophis* Raychaudhuri and Ghosh																	
193. *Taiwanaphis kalipadi* (Raychaudhuri & Ghosh)	+																
194. *Takecallis aurundinariae* (Essig)	+																
Genus *Taoia* Quednau																	
195. *Taoia indica* Ghosh and Raychaudhuri	+																
196. *Tinocallis distinctus* Ghosh, Ghosh and Raychaudhuri	+																
197. *T himalayensis* Ghosh, Ghosh and Raychaudhuri	+																
198. *T. kahawalvokalani* (Kirkaldy)	+																
Genus *Tinocalloides* Basu																	
199. *Tinocalloides montanus* Basu	+																
Genus *Trichaitophorus* Takahashi																	
200. *Trichaitophorus recurvispinus* Hille Ris Lambers and Basu	+																
Genus *Yamatocallis* Matsumura																	
201. *Yamatocallis obscurus* (Ghosh, Ghosh and Raychaudhuri)	+																
Genus *Anomalosiphum* Takahashi																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
202. *Anomalosiphum indigoferae* Ghosh, Ghosh and Raychaudhuri	+																
Genus *Cervaphis* van der Goot																	
203. *Cervaphis rappardi indica* Basu	+																
Genus *Schoutdenia* Rubsaamen																	
204. *Schoutedenia lutea* (van der Goot)	+																
Genus *Sumatraphis* Takahashi																	
205. *Sumatraphis celti* Takahashi	+																
Tribe GREENIDEINI																	
Genus *Brevitrichosiphon* Raychaudhuri, Ghosh, Banerjee and Ghosh																	
206. *Brevitrichosiphon mukerjii* Raychaudhuri, Ghosh, Banerjee and Ghosh	+																
Genus *Eutrichosiphum* Essig and Kuwana																	
207. *Eutrichosiphum (Eutrichosiphum) passaniae pseudopassaniae* Szelegiewicz	+																
208. *E.(E.) quercifoliae* Raychaudhuri, Ghosh Banerjee and Ghosh	+																
209. *E.(E.) sankari* Raychaudhuri Ghosh, Banerjee and Ghosh	+																
210. *E.(E.) taoi* Ghosh, Basu and Raychaudhuri	+																
211. *E.(Neoparatrichosiphum)* Raychaudhuri(Ghosh)	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
212. *E. (Paratrichosiphum) alnicola* (Basu)	+																
213. *Eutichosiphum (Paratrichosiphum) tattakanum* (Takahashi)	+																
Genus *Greenidea* Schouteden																	
214. *Greenidea (Greenidea) ficicola* Takahashi	+																
215. *G.(G.) longicornis* Ghosh, Ghosh and Raychaudhuri	+																
216. *G. (G.) longirostris* Basu	+																
217. *G.(G.) neoficicola* Ghosh Ghosh and Raychaudhuri	+																
218. *G.(G.) photiniphaga* Raychaudhuri, Ghosh, Banerjee and Ghosh	+																
219. *G. (Neogreenidea) ayyari* Raychaudhuri, Ghosh, Banerjee and Ghosh	+																
220. *G.(N.) longisetosa* Raychaudhuri, Ghosh, Banerjee and Ghosh	+																
221. *G.(N.) querciphaga* Raychaudhuri, Ghosh, Banerjee and Ghosh	+																
222. *G. (Paragreenidea) symplocosis* Ghosh, Basu and Raychaudhuri	+																
223. *G. (Trichosiphum) anonae* (Pergande)	+																
224. *G.(T.) bucktoni* Ghosh, Basu and Raychaudhuri	+																
225. *G.(T.) formosona heeri* Raychaudhuri, Ghosh, Banerjee and Ghosh	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
226. *G.(T.) gigantea* Ghosh and Raychaudhuri	+																
227. *Greenidea (Trichosiphum) schoutedeni* Raychaudhuri, Ghosh, Banerjee and Ghosh	+																
228. *G.(T.) spinotibium* Chatterjee and Raychaudhuri	+																
Genus *Greenideoidea* van der Goot																	
229. *Greenideoidea (Neogreenideoidea) bengalensis* Raychaudhuri and Chatterjee	+																
230. *G.(P.) ? lambersi* Basu	+																
231. *G. (Pentactrihosiphum) luteum* Basu	+																
Genus *Holotrichosiphom* Raychaudhuri																	
232. *Holotrichosiphon dubius* (van der Goot)	+																
233. *H. russellae* Ghosh, Ghosh and Raychaudhuri	+																
Genus *Mollitrichosiphum* Suenaga																	
234. *M.(M.) shinjii* Raychaudhuri Ghosh, Banerjee and Ghosh	+																
235. *Mollitrichosiphum (Mollitrichosiphum) tenuicorpus* (Okajima)	+																
236. *M. (Metatrichosiphum) alni* Ghosh, Ghosh and Raychaudhuri	+																
237. *M. (M.) nandii* Basu	+																
Tribe CERATIPHIDINI																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Genus *Aleurodaphis* van der Goot																	
238. *Aleurodaphis blumeae* van der Goot	+																
Genus *Astegopteryx* Karsch																	
239. *Astegopteryx minuta* (van der Goot)	+																
Genus *Cerataphis* Lichtenstein																	
240. *Cerataphis palmae* (Ghesquire)	+																
Genus *Ceratoglyphina* van der Goot																	
241. *Ceratoglyphina bambusae bengalensis* Ghosh	+																
Genus *Certovacuna* Zehntner																	
242. *Ceratovacuna indica* Ghosh, Pal and Raychaudhuri	+																
243. *C. lanigera* Zehntner	+																
244. *C. perglandulosa* Basu, Ghosh and Raychaudhuri	+																
245. *C. silvestri* (Takahashi)	+																
246. *C. spinulosa* Ghosh and Raychaudhuri	+																
Genus *Chaitoregma* Hille Ris Lambers and Basu																	
247. *Chaitoregma tattakana* (Takahashi)	+																
Genus *Glyphinaphis* van der Goot																	
248. *Glyphinaphis bambusae* van der Goot	+																
Genus *Pseudoastegopteryx* Ghosh, Pal and Raychaudhuri																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
249. *Pseudoastegopteryx himalayensis* Ghosh, Pal and Raychaudhuri	+																
Genus *Pseudoregma* Doncaster																	
250. *Pseudoregma alexandri* (Takahashi)	+																
251. *P. bucktoni* Ghosh, Pal and Raychaudhuri	+																
252. *P. panicola* (Takahashi)	+																
Tribe NIPPONAPHIDINI																	
Genus *Euthoracaphis* Takahashi																	
253. *Euthoracaphis heterotricha* Ghosh and Raychaudhuri	+																
Genus *Hemipodaphis* David, Narayanan and Rajasingh																	
254. *Hemipodaphis monstrata* David, Narayanan and Rajasingh	+																
Genus *Nipponaphis* Pergande																	
255. *Nipponaphis (Nipponaphis) manoji* Ghosh & Raychaudhuri	+																
256. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh and Raychaudhuri	+																
257. *N. (P.) machiliphaga* Takahashi	+																
Genus *Sinonipponaphis* Tao																	
258. *Sinonipponaphis holboelliae* (Ghosh and Raychaudhuri)	+																

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
259. *Tuberaphis indica* Ghosh, Ghosh and Raychaudhuri	+																
260. *T. loranthi* (van der Goot)	+																
Tribe LACHNINI																	
Genus *Lachnus* Burmiester																	
261. *Lachnus tropicalis* van der Goot	+																
Genus *Nippolachnus* Matsumura																	
262. *Nippolachnus bengalensis* Basu and Hille Ris Lambers	+																
263. *N. himalayensis* (van der Goot)	+																
264. *N. pyri* Matsumura	+																
Genus *Pyrolachnus* Basu and Hille Ris Lambers																	
265. *Pyrolachnus pyri* (Buckton)	+																
Genus *Stomaphis* Walker																	
266. *Stomaphis mordvilkoi* Hille Ris Lambers	+																
Genus *Tuberolachnus* Mordvilko																	
267. *Tuberolachnus saligna* (Gmelin)	+																
268. *T. (Tuberolachniella) scleratus* Hille Ris Lambers and Basu	+																
Tribe ERIOSOMATINI																	

	Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Genus *Tetraneura* Hartig																	
269.	*Tetraneura (Indotetraneura) basui* Hille Ris Lambers	+																
270.	*T. (Tetraneura) kalimpongensis* Raychaudhuri, Pal and Ghosh	+																
271.	*T.(T.) multisetosa* Raychaudhuri, Pal and Ghosh	+																
272.	*T.(T.) radicicola yezoensis* Group	+																
273.	*T. (Tetraneurella) nigriabdominalis* (Sasaki)	+																
	Tribe PEMPHIGINI																	
	Genus *Formosaphis* Takahashi																	
274.	*Formosaphis micheliae* Takahashi	+																
	Genus *Pemphigus* Hartig																	
275.	*Pemphigus vulgaris* Raychaudhuri, Pal and Ghosh	+																
	Genus *Prociphilus* Koch																	
276.	*Prociphilus micheliae* Hille Ris Lambers	+																
	Tribe FORDINI																	
	Genus *Asiphoniella* Theobald																	
277.	*Asiphoniella cynodonti* (Das)	+																
	Genus *Chaetogeocia* Remaudiere and Tao																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
278. *Chaetogeocia graminiphaga* Raychaudhuri, Pal and Ghosh	+																
279. *C. polychaeta* Raychaudhuri, Pal and Ghosh	+																
Genus *Forda* V. Heyden																	
280. *Forda marginata* Koch	+																
Genus *Geocia* Hartig																	
281. *Geocia lacifuga* (Zehnter)	+																
282. *G. sikkimensis* Raychaudhuri, Pal and Ghosh	+																
Genus *Smynthuroides* Westwood																	
283. *Smynthuroides betae* Westwood	+																

SUMMARY AND CONCLUSION

A retrospect of the work reveals that a total of 283 species of aphids belonging to 126 genera distributed over 7 subfamilies of the family Aphididae occur in the State of West Bengal. The family Aphididae as understood here, includes Anoeciinae, Aphidinae, Callipterinae, Greenideinae, Hormaphidinae, Lachninae and Pemphiginae.

A break up of the species and subspecies known so far from West Bengal has been given with following table (Vide page No. ...).

A look into hostplant association clearly depicts polyphagism for some of these species and host restriction for quite a few.

A critical analysis of the data reveals that aphids of W.B. constitute about 7% of the total species known from the world, 25% of the species from the oriental (1015 spp. in 253 genera : Agarwala and Ghosh, A.K. 1985) and 36% of the species from the Indian fauna. Of the 283 species so far known from West Bengal., 16 species constituting 6% are endemic origin.

In conclusion, it may be said that West Bengal 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 West Bengal with special reference to eastern Himalaya (Darjiling) helped these insects to represent 7% of world fauna and 36% of Indian fauna.

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INSECTA : HOMOPTERA : COCCOIDEA

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INTRODUCTION

Coccid insects of Bengal, or for that matter India, received attention since a long time ago. Kerr (1782) described the lac coccid *Coccus lacca* in these words, "The Gum Lacca of this country is principally found upon the uncultivated mountains on both sides of the Ganges ..... The present price in Dacca is about twelve shillings the hundred pounds weight, although it is brought from the distant country of Assam" The referred mountains seem to be of Chhota Nagpur and Santhal Parganas, and these alongwith Dacca as well as Assam belonged to the then Bengal. Later Watt (1896, 1908), Green (1900-1919), Lefroy (1908), Misra (1919, 1924) and Fletcher (1919, 1921) have reported some other coccid species from this area.

After independence a number of workers from the State itself have made significant contributions on the subject. These include N. Dutt and co-workers (1948-1964), G.M. Das and co-workers (1948-1962), S.N. Banerjee (1956, 1965), Banerjee & A.N. Basu (1956), A.C. Basu and co-workers (1963, 1969), and S.K. Ghose and co-workers (1961-1988). The most significant paper on the coccids of economic importance of W. Bengal, by Ghose (1961), deals with 42 species under 32 genera and 9 families, while Ghose (1963) has reported further 4 species under 2 genera in another family (Tachardiidae). Thus, a total of 46 species under 34 genera in 10 families are known from the State before the present study. This may be seen against the total known coccids from the Indian region, i.e. 624 species under 208 genera in 15 families (Varshney, 1985).

The present study is based on the following resources : (i) old collections in the holdings of Zoological Survey of India, Calcutta; (ii) local collections made by the author in Distts. Calcutta, Haora, Nadia, North and South 24-Parganas; (iii) collections made by the author in Distt. Darjiling in an extensive survey carried out in Mar.-Apr. 1981; and (iv) from the published literature, which provided majority of the records. Literature on the coccids occurring in Bihar (Ali, 1968, 1968a), Orissa (Varshney & Moharana, 1987) and Bangladesh (Chowdhury & Ullah, 1984, 1985; M. Ali, 1980) have also been consulted for comparison. However, some of the old collections in Z.S.I. holdings, labelled as "from Bengal" and which are from such areas that fall now outside the State of West Bengal, e.g. Parasnath Hill or Purnea, have been excluded from the present report.

For the methodology of collection and slide preparation, Varshney (1985) may be seen.

The following number of taxa are reported in the present paper :

Family	No. of genera	No. of species
1. Monophlebidae	5	9
2. Ortheziidae	1	1
3. Tachardiidae	2	5
4. Eriococcidae	1	1
5. Dactylopiidae	1	1
6. Pseudococcidae	17	20
7. Aclerdidae	1	1
8. Asterolecaniidae	2	3
9. Cerococcidae	1	2
10. Coccidae	10	18
11. Diaspididae	23	38
	64	**99**

Besides there are 8 species identified upto genus level only.

GENERAL MORPHOLOGY

The life cycle of a coccid insect can be simply put as : egg - nymph - adult male/female. Eggs are usually laid beneath the female body or in a waxy ovisac. They develop into nymphs which are mobile. A nymph has 3 pairs of legs, one pair of antennae, a sucking tube (proboscis) and minute eyes. There are different types of setae, pores and processes on different parts of body, varying from group to group, e.g. a nymph of aclerdids, confined to grasses, is illustrated here (fig. 1). Nymphs crawl over tender branches of their host plant, select a feeding site and then settle there.

Adult male has a normal insect structure comprising of head, thorax and abdomen, 3 pairs of legs, one pair of antennae, simple eyes, but with or without only one pair of wings. However, the male is not having functional mouth parts, thus, lives a very short life. They are generally not available for study and so not used for identification purpose. The following account thus, by and large deals with the female.

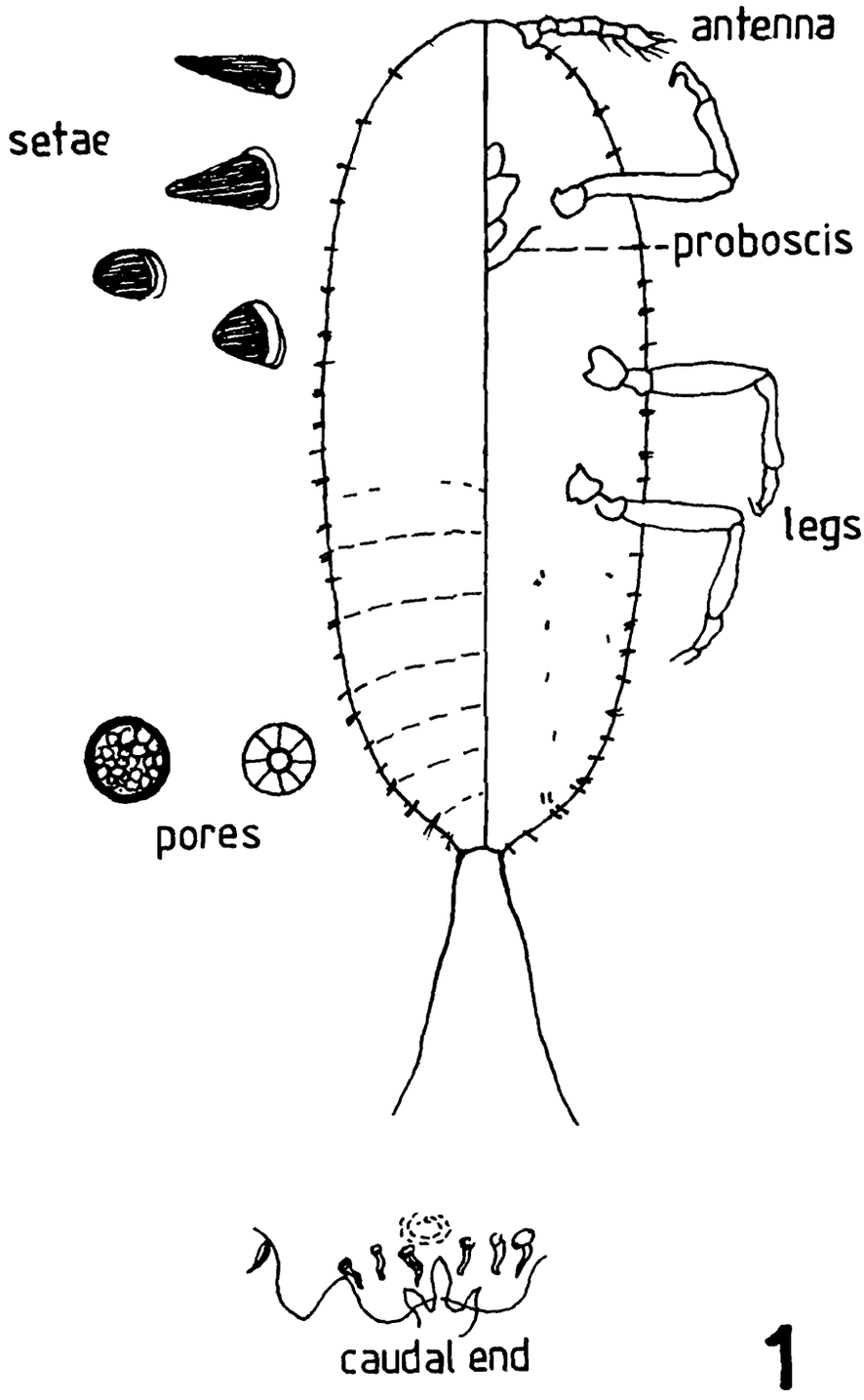

Fig. 1 A nymph of Aclerdid coccids, showing body parts.

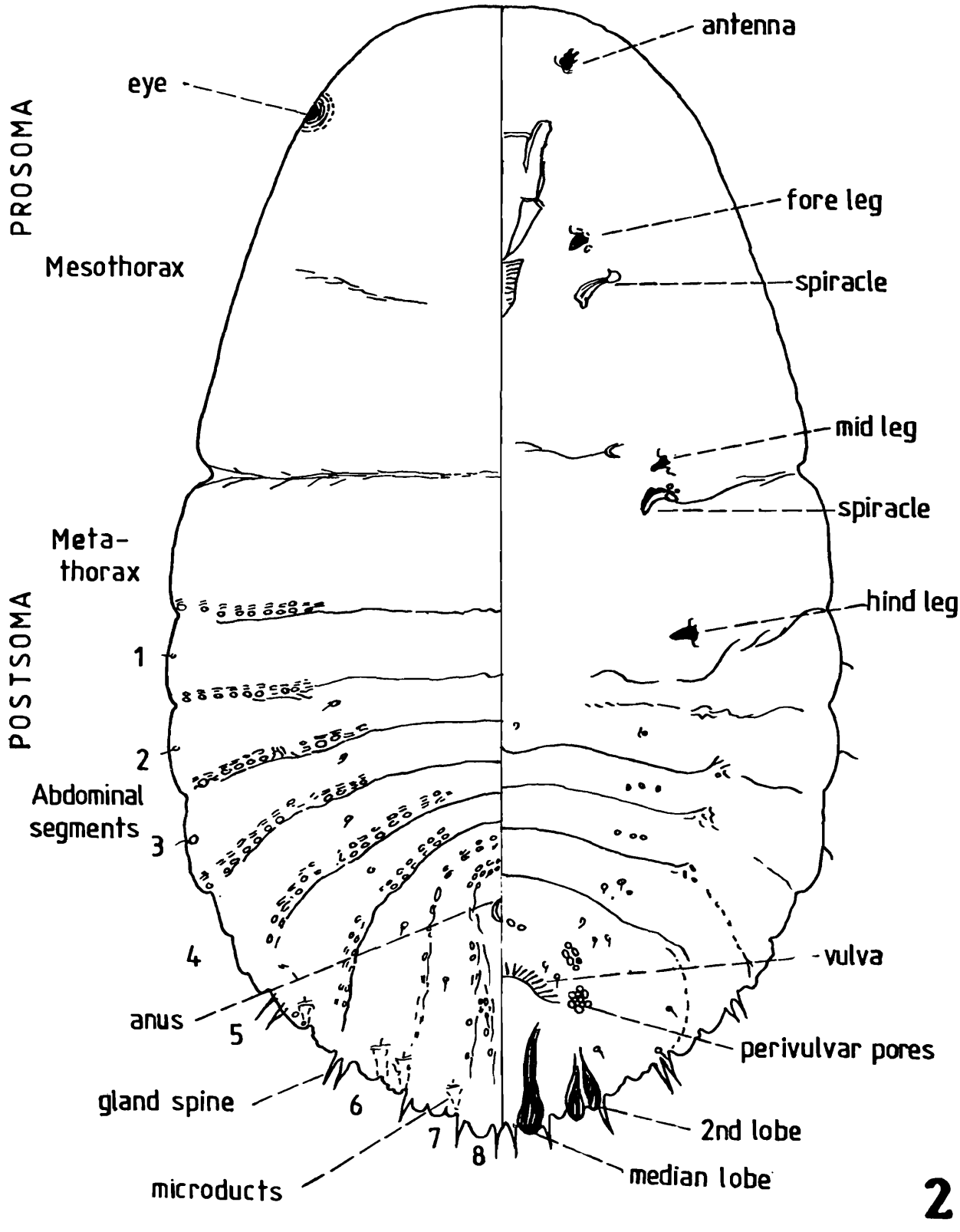

Fig. 2 A female of Diaspid coccids, showing general morphology

Adult coccids are small to minute bodies, with exceptional 'giant mealy bugs' which exceed 1 cm. size. All are as a rule draped with a covering, secreted by insect itself. This covering may be either a waxy coating, hard armoured scale or a resinous cell (also called a test or puparium), or a white mealy powder (fine wax filaments) which covers wholly or partially the body.

Both untreated dry specimens (in situ) as well as slide mounted specimens are required for the indentification of taxa and comparative study.

Morphologically a female coccid body is highly modified structure from normal insect appearance. It is round or oval mass, often flat or convex, in which head and thorax are fused into one, merging with even abdomen sometimes. All females are apterous Antennae may be 1-13 segmented. Legs, when present, have 1-2 segmented tarsi, bearing a single claw. The body generally leads a stationary life fixed to the plant surface. However, monophlebid and pseudococcid females are able to move slowly. All are plant sap suckers, hence, possess a long thread like proboscis as mouth parts.

An adult female takes different shapes and structures in different families (see the Key to Families given below). The general morphology of a diaspid female, the largest family, is illustrated in fig. 2 (after Ferris). The body is divided into prosoma and postsoma While the former has head and pro- and meso-thorax in it, the latter has meta-thorax and the abdomen. In prosoma, the minute antennae are in front. On ventral side, oral lobes and proboscis lie in the center, surrounded on each side by a reduced foreleg and a thoracic (anterior) spiracle . On the metathorax are middle and hind leg, another (posterior) spiracle and pores. Abdomen is 8 segmented. Its pygidium has anus and vulvar openings, pores and processes, supported by various type of setae, ducts and pore-clusters. In diaspids, abdominal spiracles are absent. The margin of postsoma has various lobes; the shape, location and setal arrangement of which are toxonomically examined.

In some diaspids, the body gets much sclerotized and lobes become conspicuous. Pygidial margin is serrated and characteristic. Antennae and anterior spiracle shapes are also considered. Rao & Chatterjee (1950) have shown peculiarities of the recognition characters in San Jose group of diaspids. In living condition, a diaspid scale (hard waxy test) is circular, oval or oblong, often thin and pale, generally dull coloured, rough or smooth, on the top of which one or two nymphal exuviae are embedded. The waxy ovisac in some cases is much extended.

In pseudococcids (mealybugs), the body is oval, antennae and legs are well developed, and long marginal setae are found on certain segments and anal lobes. Various type of pores (trilocular, multilocular, etc.), cerarii and ducts are present, though minute.

In dactylopiids (cochineal insects), quinquelocular pores and short cylindrical seta are encountered on the derm. Antennae are developed but legs are not. In eriococcids the marginal setae are in group of 3, tarsal claw is without tooth, antennae and legs are developed, and dorsal anal lobe is sclerotized with a pair of long seta. In tachardiids (lac insects), the legs are absent, antennae vestigial, respiratory processes (branchia) developed having either funnel shaped dimples or pseudospines on their apical plates. A dorsal glandular spine is also characteristic. Abdomen is protruded as conical tube having 10 anal setae. In asterolecaniids, the marginal quinquelocular pores and 8-shaped geminate pores on margin are characteristic. Legs and antennae are absent; the body is somewhat circular or oval. A small pair of anal or apical

lobe with setae is found on anal end. In aclerdids also, legs are absent, but minute antennae are present. Shape of anal tube and spiracles and shape and arrangement of various setae are considered.

Coccids (sensu str.) are soft scale insects. Its female has a remarkable character of having an anal cleft along median line of hind part of body. Upon it lie a pair of triangular opercular plates. Antennae are developed. Legs developed in some, but degnerated in other genera. Various type of setae are found on the derm and at margin. In margarodids, which include primitive families, the abdominal spiracles are present, anal ring is distinct or reduced, antennae developed, and eyes with or without stalk. These coccids are referred as 'ground pearls' and some taxa have fossorial forelegs. These are often large size specimens, hence referred as 'giant'.

NOTE : Here a note may be added. The identification of a coccid genus or species in our country at present is somewhat difficult for various reasons, foremost being the paucity of comparable authentically identified specimens in Indian laboratories. The descriptions and illustrations of taxonomic characters, in many cases, are not available to the Indian worker, as the literature is very scattered which is often not easily available. He is further handicapped by lack of proper training in the processing methodology etc. Besides, holdings of this group in various museum of our country are poor. These all factors, in one way or another, distract a worker to take up this field of research.

KEY TO FAMILIES OCCURRING IN WEST BENGAL
(Based on Females)

1. Abdominal spiracles present; when absent then fore-legs stout and fossorial 2

\- Abdominal spiracles absent; fore-legs not modified 3

2. Body covered with white powdery wax; setigerous anal ring absent .....MONOPHLEBIDAE

\- Body partly or completely covered with white or greyish wax plates; setigerous anal ring present ....ORTHEZIIDAE

3. Abdominal segments fused to form distinct pygidium; body covered with flat hard shield like scale having a few exuviae .....DIASPIDIDAE

\- Pygidium absent; test (scale) of body without exuviae 4

4. Posterior end of abdomen with anal cleft; openings of wax glands not geminate (8-shaped) 5

Posterior end of abdomen without anal cleft; wax gland opening geminate (8-shaped)when present 6

5. Anal opening covered with 2 plates (with exception in strongly sclerotized kidney shaped female); body usually convex .....COCCIDAE

\- Anal opening covered with one plate; body flat .....ACLERDIDAE

6. Abdomen not produced as anal tube; anal opening at the end of body 7

- Abdomen narowed and produced as anal tube; legs and antennae vestigial or absent; body enclosed in a cell (test) ..... TACHARDIIDAE

7. Wax gland opening paired 8-shaped; body covered with thin or thick paraffin like membrane 8

Wax gland openings absent or not paired 8-shaped; antennae with 9 or less segments, often reduced or absent 9

8. Anal plate shield like present; cribriform plates present; tubular ducts with large terminal filament; cephalothorax and venter with rows of 8-shaped pores ..... CEROCOCCIDAE

Anal plate absent; cribriform plates absent; tubular ducts without terminal filament; 8-shaped pores absent on cephalothorax but present on dorsal and labial margin ..... ASTEROLECANIIDAE

9. Anal ring present; body covered with powdery wax 10

- Anal ring absent; body not cylindrical; ducts of wax glands minute, arising from centre of cluster of sessile pores ..... DACTYLOPIIDAE

10. Dorsal gland organs and 3-celled glands absent ..... ERIOCOCCIDAE

- Dorsal gland organs and 3-celled glands present; anal ring with 4 or more setae .... PSEUDOCOCCIDAE

SYSTEMATIC ACCOUNT

Family I. MONOPHLEBIDAE

Genus *Drosicha* Walker, 1858

1. *Drosicha stebbingii* (Green)

1902. *Monophlebus stebbingii* Green *in* Stebbing, *Dept. Notes Ins. Forestry,* **1** : 135.
1928. *Drosicha stebbingii* : Morrison, *Tech. Bull. U.S. Dept. Agr.*, **52** : 169.

Material examined : Collected on *Ficus bengalensis*, from the Indian Botanic Gardens, Shibpur, in June 1979, coll. R.K. Varshney.

Host plants : Polyphagous. On mango, citrus, *Pyrus, Prunus, Butea, Ficus* etc.

Distribution : India : West Bengal (Darjiling and Haora distt.), Bihar, Haryana, Himachal Pradesh, Madhya Pradesh, Rajasthan and Uttar Pradaesh. Also in Pakistan.

Remark : Common on mango and citrus in the State (Nath, 1972; Varshney, 1984).

Genus ***Icerya*** Signoret, 1875

2. ***Icerya*** sp.

Material examined : Collected from Samsing forest (500 m.) on litchi (Sapindaceae), citrus (Rutaceae) and jamun (Laurineae); from Dungra basti near Kalimpong, on batavi nibu; and from W. Bengal Sikkim border near Rangpo, on orange; all in Mar. - Apr. 1981; coll. R.K. Varshney.

Host plants : *Citrus, Litchi* and *Syzygium.*

Distribution : India : West Bengal (Darjiling distt.).

3. ***Icerya aegyptiaca*** (Douglas)

1890. *Crossotosoma aegyptiacum* Douglas, *Entomologist's mon. Mag.*, **26** : 79.
1894. *Icerya aegyptiaca* : Newstead, *Indian Mus. Notes*, **3** (5) : 27.

Material examined : In spirit collections as follows : (i) Calcutta, Museum coll., Regd. No. 4711/13; (ii) Calcutta, donor E.C. Cotes, Regd. No. 5542/13; (iii) Two bottles, Calcutta, on inflorescence of Sago palm, coll. W.C. Hossar, Regd. No. 7098/16; (iv) on *Ficus bengalensis*, Museum compound, Calcutta, 8.04. 1910 (this material now not traceable); and (v) dry as well as spirit collection, from Murti Line, in Samsing forest, on mango, 29.3.1981, coll. R.K. Varshney.

Host plants : Highly polyphagous. Pest on many fruit trees.

Distribution : India : West Bengal (widely), Bihar, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and Tripura. Also in many other countries.

Remarks : Noted on *Gracinia* sp. in the Botanical Garden, Shibpur, Haora; and on *Solidago* sp. in the Indian Museum compound, Calcutta (Ali, 1970). In Samsing forest, the author observed its heavy infestation mixed with other coccid and coccinellid species.

4. ***Icerya formicarum*** Newstead

1897. *Icerya formicarum* Newstead, *Entomologist's mon. Mag.*, **33** : 169.

Host plants : Polyphagous. Favourite host *Casuarina equisetifolia* (Rao, 1951).

Distribution : India : West Bengal ("Rangtong"), Andhra Pradesh, Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, North-Eastern States, Orissa, Tamil Nadu and Uttar Pradesh. Also in other countries.

5. ***Icerya purchasi*** Maskell

1879. *Icerya purchasi* Maskell, *Trans. Proc. New Zealand Instt.*, **11** (1878) : 221.

Material examined : One lot from Mamring (300 m.) near Rangpo (W. Bengal-Sikkim border), on a creeper shrub, 5.4. 1981, coll. R.K. Varshney.

Host plants : Highly polyphagous. Rao & Cherian (1944) have listed its host plants in Nilgiri and Kodaikanal. Rao (1951) had added 14 more plants.

Distribution : India : West Bengal (Darjiling distt.), Karnataka, Kerala, Maharashtra, Orissa, Sikkim and Tamil Nadu. Widely distributed in all parts of the world.

Remarks : This is first record from West Bengal. Ali (1970) has given the page number of original reference of this species erroneously.

6. *Icerya seychellarum* (Westwood)

1855. *Dorthezia seychellarum* Westwood, *Gard. Chron. Agr. Gaz.*, **51** : 830.
1903. *Icerya seychellarum* : Fernald, *Cat. Coccidae of World* : 27.

Host plants : Polyphagous. A potential pest in view of its capability of attacking valuable fruit trees (Rao, 1951).

Distribution : India : West Bengal ("Rangtong"), Andaman Is., Assam, Karnataka, Kerala, Madhya Pradesh, Maharashtra, North-Eastern States, Orissa and Tamil Nadu. Also in other countries.

Remarks : Reported from Bangladesh (Chowdhury & Ullah, 1984). Green collection in the British Museum (Nat. Hist.), London, contains specimens from *Rosa* sp. in Andaman Is. (Rao, 1951).

Genus *Labioproctus* Green, 1922

7. *Labioproctus poleii* (Green)

1896. *Walkeriana poleii* Green, *Indian Mus. Notes*, **4** : 6.
1922. *Labioproctus poleii* : Green, *Coccidae of Ceylon*, pt. 5 : 453.

Host plants : *Citrus* spp., *Dalbergia stipulacea, Ficus religiosa, Gardenia florida, Litsea polyantha, Mangifera indica, Ocimum* sp., *Psidium guajava, Solanum melongena, Vitex negunda* etc.

Distribution : India : West Bengal (Darjiling and Jalpaiguri distt.), Assam, Karnataka and Orissa. Also in Sri Lanka and Indonesia.

Remarks : This is a "giant mealy bug" and a prolific breeder. It is sometimes a major pest of orange orchards in Darjiling distt. (Ghose, 1961; Nath, 1972). It caused much damage in various areas of this district (Basu et al., 1969). Its biology and control have been studied by Ghose (1965).

Genus *Perissopneumon* Newstead, 1900

8. *Perissopneumon phyllanthi* (Green)

1923. *Monophlebus (Drosicha) phyllanthi* Green, *Ann. Mag. nat. Hist.*, (9) **12** : 168.
1950. *Perissopneumon phyllanthi* : Rao, *Proc. R. ent. Soc. Lond.*, (B) **19** : 114.

Host plants : *Gossypium* sp. in Calcutta Occurring also on some other plants.

Distribution : India : West Bengal (Calcutta), Andhra Pradesh, Karnataka and Kerala. Also in Pakistan and Sri Lanka.

9. ***Perissopneumon tamarinda*** (Green)

1908. *Monophlebus tamarindus* Green, *Mem. Dept. Agr. India,* (Ent.) **2** : 17.
1950. *Perissopneumon tamarinda* : Rao, *Proc.R. ent. Soc. Lond.,* (B) **19** : 114.

Host plants : *Tamarindus indica* and some other plants.

Distribution : India : West Bengal (Calcutta), Andhra Pradesh and Uttar Pradesh. Also in Pakistan.

Genus ***Walkeriana*** Signoret, 1876

10. ***Walkeriana ?compacta*** Green

1896. *Walkeriana compacta* Green, *Indian Mus. Notes,* **4**(1) : 6.

Material examined : One lot from Rangpo (W. Bengal- Sikkim border), ex guava, 6.4.1981, coll. R.K. Varshney.

Host plant : *Psidium guajava* (Myrtaceae) ("Ambak" in Nepali).

Distribution : India : West Bengal (Darjiling distt.). Earlier known from Sri Lanka.

Remarks : A mixed infestation of three species of coccids was observed in this case. The specific identification requires confirmation.

Family II. ORTHEZIIDAE

Genus ***Orthezia*** Bosc d'Antic, 1784

11. ***Orthezia insignis*** Browne

1887. *Orthezia insignis* Browne, *J. Quekett Micros. Club,* (2) **3** : 169.

Material examined : Collected on *Clerodendron infortunatum, Lantana, Duranta* and some wild bushes, from Samsing forest (500 m.) near Siliguri, and Kalimpong; in March-April 1981, coll. R.K. Varshney.

Host plants : *Lantana* sp., *Gardenia florida, Clerodendron* sp., *Hibiscus* sp., *Ixora* sp., etc. It is a pest on *Citrus* spp. in South India but not in Darjiling district (Nath, 1972).

Distribution : India : West Bengal (Darjiling and Jalpaiguri distt.), Karnataka, Sikkim and Tamil Nadu. Also in Sri Lanka, China and Singapore.

Remarks : Author observed its heavy infestations in Samsing forest and Kalimpong hills in North Bengal and also in Rangpo-Singtam lower areas in Sikkim (Varshney, 1984). This species is useful for controlling *Lantana* weed, but is a pest for some cultivated plants.

Family III. TACHARDIIDAE
(Syn. Lacciferidae)

Genus ***Kerria*** Targioni Tozzetti, 1884

12. ***Kerria albizziae*** (Green)

1911. *Tachardia albizziae* Green, *J. Econ. Biol.*, **6** : 32.
1966. *Kerria albizziae* : Varshney, *Indian J. Ent.*, **28** (1) : 117.

Host plant : *Croton caudatum* in W. Bengal (Green, 1908).

Distribution : India : West Bengal (Darjiling distt.), Bihar and Uttar Pradesh. Also in Sri Lanka.

Remarks : Recorded from Darjiling in the State by Green (1908) stating that Sir George Watt collected it and deposited in the Indian Museum, Calcutta. Varshney (1977) shows a record of another species *K. indicola* (Kapur) from West Bengal, suspecting that the place "Jamunia" may be in the State.

13. ***Kerria chinensis chinensis*** (Mahd.)

1923. *Lakshadia chinensis* Mahdihassan, *J. Sci. Asso. Maharaja College Vizianagaram*, **1** (2 - 3) : 98.
1966. *Kerria chinensis* : Varshney, *Indian J. Ent.*, **28** (1) : 117.

Host plants : *Mallotus philippinensis, Alchornea tiliaefolia, Ficus religiosa* etc.

Distribution : India : West Bengal (Darjiling distt.), Assam and Meghalaya. Also in Bhutan, Burma (now renamed as Myanmar) and Nepal.

Remark : Ghose (1963) reported it in the State, from Mongowa forest and adjoining areas in Darjiling district.

14. ***Kerria fici fici*** (Green)

1903. *Tachardia fici* Green, *Indian Mus. Notes*, **5** (3) : 97.
1966. *Kerria fici* : Varshney, *Indian J. Ent.*, **28**(1) : 117.

Host plants : *Samanea saman, Peltophorum inermis, Ficus lacor, F. rumphii, F. religiosa, F. bengalensis* and *Ziziphus mauritiana.*

Distribution : India : West Bengal (24 Parganas distt.), Bihar, Delhi, Jammu & Kashmir, Madhya Pradesh, Rajasthan, Tamil Nadu and Uttar Pradesh. Also in Pakistan, Thailand and China.

Remark : Recorded from the State by Ghose (1963).

15. ***Kerria lacca lacca*** (Kerr)

1782. *Coccus lacca* Kerr, *Phil. Trans. R. Soc. Lond.*, **71**(2) : 374.
1884. *Kerria lacca* : Targioni-Tozzetti, *Ann. Agr. Italy* : 410.

Material examined : In dry collection : (i) *Laccifer lacca* Oken, Calcutta, Botanical Gardens, on *Enterolobium saman* Pr., Nov. 1959, coll. D. Chatterjee; (ii) from Rangpo (W. Bengal Sikkim border), on *Ficus bengalensis*, 6.4.1981, coll. R.K. Varshney.

Host plants : *Ziziphus mauritiana, Butea monosperma, Ficus* spp., etc. A large number of host plants are recorded (Roonwal et al., 1958; Varshney & Teotia, 1967).

Distribution : India : West Bengal (widely), Andhra Pradesh, Assam, Bihar, Karnataka, Orissa , Tamil Nadu, Uttar Pradesh, etc. Also in other countries.

Remarks : This species is cultivated for lac production in Birbhum, Bankura, Maldah, Medinipur, Murshidabad and Puruliya districts (Ghose, 1963).

Genus ***Paratachardina*** Balachowsky, 1950

16. ***Paratachardina theae*** (Green)

1907. *Tachardia decorella* var. *theae* Green *in* Green & Mann, *Mem. Dept. Agr. India,* (Ent.) **1** (5) : 348.
1968. *Paratachardina theae* : Varshney, *Proc. 55th Indian Sci. Congr.* (3) : 489.

Host plants : *Cinchona calisaya, Ficus religiosa, Thea* [= *Camellia*] *sinensis, Mallotus philippinensis, Psidium guajava, Mangifera indica*, etc.

Distribution : India : West Bengal (Calcutta and Darjiling distt.), Assam and Sikkim. Also in China, Hong Kong and Taiwan.

Remarks : Originally recorded on tea plant from Assam and Darjiling by Green & Mann (1907). Chamberlin (1923) reported it from Calcutta, and Ghose (1963) from Kalimpong. Records of other countries are from Varshney (1977).

Family IV. ERIOCOCCIDAE

Genus ***Eriococcus*** Targioni Tozzetti, 1868

17. ***Eriococcus araucariae*** Maskell

1878. *Eriococcus araucariae* Maskell, *Trans. Proc. New Zealand Inst.*, **9** : 218.

Host plant : *Araucaria cookii.*

Distribution : India : West Bengal (Calcutta, in quarantine), and South Indian States. Also in Sri Lanka.

Remark : This coccid was found on seedlings of *Araucaria* brought from Bangalore to Calcutta for export (Ghose, 1961).

Family V. DACTYLOPIIDAE

Genus ***Dactylopius*** Costa, 1835

18. ***Dactylopius indicus*** (Green)

1908. *Coccus indicus* Green, *Mem. Dept. Agr. India,* (Ent.) **2** : 28.
1912. *Dactylopius indicus* : Green, *J. Econ. Biol.*, **7** : 79.

Host plant : Prickly pear (*Opuntia monocantha*).

Distribution : India : West Bengal (Barddhaman, Calcutta and Hugli distt.), Andhra Pradesh, Bihar, Himachal Pradesh, Orissa and Tamil Nadu.

Remarks : Reported from Calcutta (Misra, 1924). It infests and destroys prickly pear weed, hence used for that's control. Also used for its brilliant purple dye in body, hence called 'cochineal insect'.

Family VI. PSEUDOCOCCIDAE

Genus ***Adelosoma*** Borchsenius, 1948

19. ***Adelosoma phragmitidis*** Borchsenius

1948. *Adelosoma phragmitidis* Borchsenius, *Akad. Nauk.dok. USSR*, (n.s.) **63** : 584.

Host plant : *Phragmites karka.*

Distribution : India : West Bengal (Calcutta distt.). Also in Pakistan and Tadjakistan (Central Asia).

Remark : Its collection has been reported from the Salt Lake area near Calcutta (Ali, 1970).

Genus ***Antonina*** Signoret, 1875

20. ***Antonina graminis*** (Maskell)

1897. *Sphaerococcus graminis* Maskell, *Entomologist's mon. Mag.*, **33** : 244.

1903. *Antonina graminis* : Fernald, *Cat. Coccidae of World* : 121.
1908. *Antonina indica* Green, *Mem. Dept. Agr. India*, (Ent.) **2** (2) : 27.

Host plants : On base of stems, beneath leaf-sheaths, roots and nodes of grasses.

Distribution : India : West Bengal (Haora distt.), Bihar, Delhi, Karnataka, Orissa, Tamil Nadu and Uttar Pradesh. Also in other countries.

Remarks : First record from the State on "hariali" grass collected by H.M. Lefroy (Green, 1908). Also on *Cynodon dactylon* in the Botanical Garden, Shibpur, near Calcutta (Ali, 1968).

21. ***Antonina maritima*** Green

1922. *Antonina maritima* Green, *Coccidae of Ceylon*, **5** : 396.

Host plants : On *Panicum* sp. and other grasses.

Distribution : India : West Bengal (Calcutta, Darjiling and Haora distt.) and Tamil Nadu. Also in Sri Lanka.

Remarks : It is found on grasses which are often submerged by the tides in river Hooghly, at Botanical Garden, Shibpur, near Calcutta (Ali, 1968).

Genus ***Birendracoccus*** Ali, 1975

22. ***Birendracoccus saccharifolii*** (Green)

1908. *Dactylopius saccharifolii* Green, *Mem. Dept. Agr. India*, (Ent.) **2** : 23.
1961. *Pseudococcus saccharifolii* : Ghose, *Indian Agric.*, **5** (1) : 62.
1975. *Birendracoccus saccharifolii* : Ali, *Dr. B. S. Chauhan Comm. Vol.* : 280.

Host plant : Sugarcane leaves.

Distribution : India : West Bengal (Hugli and 24-Parganas distt.), Andhra Pradesh, Bihar, Delhi, Haryana and Uttar Pradesh. Also in Nepal.

Remark : Causes severe damage to younger plants of sugarcane (Ghose, 1961).

Genus ***Brevennia*** Goux, 1940

23. ***Brevennia rehi*** Lindinger

1943. *Ripersia rehi* Lindinger, *Arb. Morph. Taxon. Ent.*, **10** : 152.
1973. *Brevennia rehi* : Miller, *Proc. ent. Soc. Washinton*, **75** (3) : 372.

Host plants : Leaves of paddy (*Oryza sativa*). Also on sugarcane and other grasses.

Distribution : India : West Bengal (widely including Bankura, Jalpaiguri, Medinipur, Murshidabad, Nadia and 24-Parganas distt.), Andhra Pradesh, Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and Tamil Nadu. Also in many other countries.

Remarks : First report from the State by Banerjee (1956). Both '*Ripersia oryzae*' and '*Ripersia sacchari*' of Ghose (1961) refer to this species.

Genus ***Cataenococcus*** Ferris, 1955

24. ***Cataenococcus theaecola*** (Green)

1907. *Dactylopius theaecola* Green *in* Green & Mann, *Mem. Dept. Agr. India*, (Ent.) **1** (5) : 347.
1961. *Cataenococcus theaecola* : Das & Ganguli, *Indian J. Ent.*, **23**(4) : 255.

Host plants : On the bark of the roots of tea (*Thea chinensis*). Found upto one foot below the ground surface level (Das & Ganguli, 1961).

Distribution : India : West Bengal (Darjiling distt.) and Assam.

Remark : First recorded by Watt & Mann (1903) on tea bushes in Darjiling.

Genus ***Coccidohystrix*** Lindinger, 1943

25. ***Coccidohystrix insolita*** (Green)

1908. *Phenacoccus insolitus* Green, *Mem. Dept. Agr. India*, (Ent.) **2** : 26.
1961. *Centrococcus insolitus* : Ghose, *Indian Agric.*, **5**(1) : 59.
1970. *Coccidohystrix insolita* : De Lotto, *Ent. Mem. Dept. Agr. Union S. Africa*, **20** : 2.

Host plants : Brinjal *(Solanum melongena)*, stored potato *(S. tuberosum)*, *Adhatoda vascica*, *Datura fastuosa*, *Croton sparsiflorus*, etc.

Distribution : India : West Bengal (widely), Andhra Pradesh, Bihar, Goa, Gujarat, Haryana, Kerala, Orissa and Uttar Pradesh. Also in other countries.

Remarks : A severe pest on brinjal plant, almost throughout the year. Experiments on its control were made by Banerjee & Basu (1956).

Genus ***Dysmicoccus*** Ferris, 1950

26. ***Dysmicoccus brevipes*** (Cockerell)

1893. *Dactylopius brevipes* Cockerell, *Entomologist*, **26** : 267.
1950. *Dysmicoccus brevipes* : Ferris, *Atlas of Scale insects of N. America*, **5** : 59.

Material examined : From Berhampore, on mulberry, donor N.G. Mukherjee (in wet colln.), Regd.

No. 5073-74/13, as *D. bromeliae*. (However, out of 3 bottles, 2 are now not traceable).

Host plants : On pineapple (*Ananas comosus*), mango, mulberry, etc. It is a pest on pineapple and occasionally reported on sugarcane and paddy.

Distribution : India : West Bengal (Calcutta and Murshidabad distt.), Andhra Pradesh, Karnataka, Kerala, Orissa and Tripura. Also in Bangladesh and other countries.

Remarks : First record from the State was made under the name *Pseudococcus (Dysmicoccus) bromeliae*, from Berhampore on mulberry (Cotes, 1894). Its material was also intercepted in quarantine at Calcutta (Ali, 1970).

Genus ***Ferrisia*** Fullaway, 1923

27. ***Ferrisia virgata*** (Cockerell)

1893. *Dactylopius virgatus* Cockerell, *Entomologist*, **26** : 178.
1923. *Ferrisia virgata* : Fullaway, *Proc. Hawaii. Ent. Soc.*, **5** : 311.

Material examined : Collected (i) on *Rosa indica* at Baruipur (24-Parganas) in Nov. 1977; (ii) on *Croton* sp. from Dumdum airport area in Dec. 1977, Regd. No. 706-716/H 15; and (iii) on *Nerium odorum* at Park Street, Calcutta, in March 1974, Regd. No. 720-728/H 15; all coll. B.N. Das & R.K. Varshney. Also in spirit collection (iv) on *Plumeria* sp., Calcutta, coll. F.H. Gravely, Regd. No. 6179/20; and (v) on *Cassia siamea*; Zoological Garden, Alipore, Calcutta, coll. F.H.G. 17.04.10, Regd. No. 7096/16.

Host plants : Highly polyphagous; mainly on garden plants (Das, 1948; Das et al., 1948; Basu & Chatterjee, 1963; Ghose & Paul, 1972; Varshney, 1984).

Distribution : India : West Bengal (very widely), Andhra Pradesh, Bihar, Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, North-Eastern States, Orissa, Tamil Nadu and Uttar Pradesh. Also in many other countries.

Remarks : A pest on custard apple (*Annona squamosa*) in Krishnanagar, Nadia and 24-Parganas distt., and on jute (*Corchorus clitorius*). It occurs in all districts of W. Bengal , except Northern hilly region (Ghose, 1961).

Genus ***Kiritshenkella*** Borchsenius, 1948

28. ***Kiritshenkella sacchari*** (Green)

1900. *Ripersia sacchari* Green, *Indian Mus. Notes*, **5** : 37.
1970. *Kiritshenkella sacchari* : Williams, *Bull. ent. Res.*, **60**(1) : 145.

Host plant : Sugarcane (*Saccharum officinarum*).

Distribution : India : West Bengal (Calcutta distt.), Andhra Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Tamil Nadu and Uttar Pradesh. Also in other countries.

Genus ***Maconellicoccus*** Ezzat, 1958

29. ***Maconellicoccus hirsutus*** (Green)

1908. *Phenacoccus hirsutus* Green, *Mem. Dept. Agr. India*, (Ent.) **2** : 25.
1958. *Maconellicoccus hirsutus* : Ezzat, *Bull. Soc. Ent. Egypte*, **42** : 380.

Host plants : On different parts of jute, cotton, mulberry, *Ficus, Hibiscus, Tectona* and other plants (Misra 1919, 1924; Dutt et al., 1951; Dutt & Kundu, 1960; Ghose, 1961, 1971, 1972; Ali, 1970 and Varshney, 1984).

Distribution : India : West Bengal (Bankura, Barddhaman, Calcutta, Maldah, Murshidabad, Nadia and West Dinajpur distt.), Andaman Is., Andhra Pradesh, Bihar, Delhi, Karnataka, Kerala, Orissa, Punjab, Tamil Nadu and Uttar Pradesh.

Remarks : A severe pest of mulberry, causing 'tukra' disease in it; of jute causing abnormalities in anterior portions; and of ramie causing stunted disease.

Genus ***Nipaecoccus*** Sule, 1945

30. ***Nipaecoccus viridis*** (Newstead)

1894. *Dactylopius viridis* Newstead, *Indian Mus. Notes*, **3**(5) : 25.
1970. *Nipaecoccus viridis* : Ali, *Indian Mus. Bull.*, **5** (2) : 113.
1972. *Nipaecoccus vastator* (Maskell) : Nath, *Bull. Ent.*, **13**(1) : 6.

Material : From Siliguri, on unknown host, coll. N. Annandale, registered as *Dactylopius nipae*. [This old collection is now misplaced].

Host plants : Polyphagous (Dutt & Ganguli, 1956; Ali, 1957; Ghose, 1961 and Nath, 1972).

Distribution : India : West Bengal (widely), Andhra Pradesh, Bihar, Delhi, Goa, Himachal Pradesh, Karnataka, Kerala, Maharashtra , North-Eastern States, Orissa, Tamil Nadu and Uttar Pradesh. Also in other countries.

Remarks : A pest on jackfruit (*Artocarpus integra*) (Ghose, 1961) and on 'die back' affected oranges (Nath, 1972).

Genus ***Novonilacoccus*** Ghosh & Ghose, 1987

31. ***Novonilacoccus oryzae*** Ghosh & Ghose

1987. *Novonilacoccus oryzae* Ghosh & Ghose, *Proc. zool. Soc., Calcutta*, **36** (1983) : 39.

Host plant : On both surfaces of leaves and mostly within the leaf sheaths of paddy plant (*Oryza sativa*).

Distribution : India : West Bengal (Nadia distt.). Known from its original report from Kalyani only.

Genus ***Planococcoides*** Ezzat & McConnell, 1956

32. ***Planococcoides bengalensis*** Ghosh & Ghose

1988. *Planococcoides bengalensis* Ghosh & Ghose, *Environ. Ecol.*, **6**(3) : 604.

Host plants : On branches of *Ficus bengalensis* and *Mangifera indica.*

Distribution : India : West Bengal (Nadia distt.). Known from its original report from Kalyani only.

Genus ***Planococcus*** Ferris, 1950

33. ***Planococcus lilacinus*** (Cockerell)

1905. *Pseudococcus lilacinus* Cockerell, *Proc. Davenport Acad. Sci.*, **10** : 128.
1950. *Planococcus lilacinus* : Ferris, *Atlas of Scale insects of N. America*, **5** : 164.

Host plants : *Litchi chinensis, Ficus indica, Achras sapota, Tamarindus indica, Punica granatum, Theobroma cacao, Citrus* sp. etc.

Distribution : India : West Bengal (Haora and Nadia distt.), Andhra Pradesh, Karnataka, Kerala, Orissa and Tamil Nadu. Also in other countries.

Remark : First record of this species from the State was by Misra (1924) on sapota from Shibpur.

34. ***Planococcus citri*** (Risso)

1813. *Dorthesia citri* Risso, *Ann. Mus. d'hist. Nat.*, **20** : 416.
1950. *Planococcus citri* : Ferris, *Atlas of Scale insects of N. America*, **5** : 164.

Host plants : Known as Citrus mealy bug, this species occurs on all species of *Citrus*. Maximum infestation observed on *C. medica* (Nath, 1972). Also occurs on other plants.

Distribution : India : West Bengal (Darjiling distt.), Karnataka, Kerala and Tamil Nadu. Also in Bangladesh, Pakistan, Sri Lanka and other countries in tropical and subtropical zones.

Genus ***Pseudococcus*** Westwood, 1840

35. ***Pseudococcus*** sp.

Material examined: One lot ex Kadam (Euphorbiaceae) from Rangpo (W. Bengal - Sikkim border), 6.4.1981, coll. R.K. Varshney.

Host plant : *Anthocephalus cadamba.*

Distribution : India : West Bengal (Darjiling distt.).

36. ***Pseudococcus citriculus*** Green

1922. *Pseudococcus citriculus* Green, *Coccidae of Ceylon*, **5** : 377.

Host Plants : *Citrus reticulata, C. sinensis* and other *Citrus* spp.

Distribution : India : West Bengal (Darjiling distt.). Also in Bangladesh, Sri Lanka, the Middle East and U.S.A.

Remark : So far this species is reported in India from the higher altitudes of Darjiling district only (Nath, 1972).

37. ***Pseudococcus longispinus*** (Targioni-Tozzetti)

1867. *Dactylopius longispinus* Targioni-Tozzetti, *Mem. Soc. Ital. Sci. Nat.*, **3**(3) : 75.
1903. *Pseudococcus longispinus* : Fernald, *Cat. Coccidae of World* : 104.
1970. *Pseudococcus adonidum* (Linn.) : Ali , *Indian Mus. Bull.*, **5**(2) : 116.

Host plants : Polyphagous. On crotons, coconut, palymyra palm, coffee, citrus, lantana etc.

Distribution : India : West Bengal (Calcutta and Darjiling distt.), Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. Also in Sri Lanka and many other countries.

Remark : Recorded on croton in Calcutta (Ayyar, 1921) and on citrus in Kalimpong (Dutt, 1948).

Genus ***Rastrococcus*** Ferris, 1954

38. ***Rastrococcus iceryoides*** (Green)

1908. *Phenacoccus iceryoides* Green, *Mem. Dept. Agr. India*, (Ent.) **2** : 26.
1954. *Rastrococcus iceryoides* : Ferris, *Microrent.*, **19** : 55.

Host plants : On branches, leaves and fruits of mango (*Mangifera indica*), *Ficus bengalensis* and other plants.

Distribution : India : West Bengal (Calcutta, Murshidabad and 24-Parganas distt.), Andaman Is., Andhra Pradesh, Bihar, Gujarat, Kerala, Maharashtra, Orissa, Tamil Nadu and Uttar pradesh. Also in Bangladesh and Sri Lanka.

Remarks : Nath (1972) reported that specimens identified as 'near' this species attained pest status on different *Citrus* spp. in Darjiling district.

Genus ***Saccharicoccus*** Ferris, 1950

39. ***Saccharicoccus sacchari*** (Ckll.)

1895. *Dactylopius sacchari* Cockerell, *J. Trinidad Field Nat. Club*, **2** : 195.
1950. *Saccharicoccus sacchari* : Ferris, *Atlas of Scale insects of N. America*, **5** : 217.

Host plant: On different parts of sugarcane (*Saccharum officinarum*) plant. Its clusters occur round the nodes hidden by leaf-sheaths.

Distribution : India : West Bengal (Barddhaman, Calcutta, Hugli, Nadia and West Dinajpur distt.), Andhra Pradesh, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh. Also in other countries. Everywhere in sugarcane areas only.

Family VII. ACLERDIDAE

Genus ***Aclerda*** Signoret, 1874

40. ***Aclerda distorta*** Green

1909. *Aclerda distorta* Green, *Coccidae of Ceylon*, **4** : 290.

Host plant : Within leaf-sheaths of bamboo (*Dendrocalamus* sp.).

Distribution : India : West Bengal (Darjiling distt.) and Tamil Nadu. Also in Sri Lanka.

Remark : Recorded in the State from high reaches of Pedong, 1371 m (Ghose, 1961).

Family VIII. ASTEROLECANIIDAE

Genus ***Asterolecanium*** Targioni-Tozzetti, 1868

41. ***Asterolecanium*** sp.

Material examined : One lot from Darjiling, on tea plant, August 1981, coll. Dr. S.M. Mukherjee; in wet colln., and on slide, Regd. No. 884/H15. (Varshney, 1984).

Host plant : Tea (*Thea chinensis*).

Distribution : India : West Bengal (Darjiling distt.) and Tripura.

42. ***Asterolecanium minutum*** Takahashi

1930. *Asterolecanium minutum* Takahashi, *Rep. Formosa Govt. Res. Inst., Dept. Agr.*, **48** : 10.

Host plants : *Arundinaria gloucescens* and *Bambusa tulda.*

Distribution : India : West Bengal (Calcutta distt.) (Russell, 1941 vide Ali, 1970). Also in Thailand, Vietnam, China and Taiwan.

43. ***Asterolecanium pseudomiliaris*** Green

1922. *Asterolecanium pseudomiliaris* Green, *J. Bombay nat. Hist. Soc.*, **28** : 1036.

Host plant Leaves of *Bambusa.*

Distribution : India : West Bengal (Calcutta distt.) (Russell, 1941 vide Ali, 1970), and Assam. Also in Sri Lanka, Malaysia, Vietnam, China and Taiwan.

Remark : Ali (1970) has erroneously written this species as '*pseudomillaris*'.

Genus ***Bambusaspis*** Cockerell, 1902

44. ***Bambusaspis solenophoroides*** (Green)

1896. *Planchonia solenophoroides* Green, *Indian Mus. Notes*, **4** (1) : 6.
1902. *Asterolecanium (Bambusaspis) solenophoroides* : Cockerell, *Entomologist*, **35** : 114.

Host plants : Leaves of *Arundinaria* sp. and bamboo. It is a minute and inconspicuous species occurring on the under surface of foliage.

Distribution : India : West Bengal (North Bengal). Also in Sri Lanka.

Remark : Recorded from North Bengal by Barlow (1896).

Family IX. CEROCOCCIDAE

Genus ***Cerococcus*** Comstock, 1882

45. ***Cerococcus ficoides*** Green

1899. *Cerococcus ficoides* Green, *Entomologist's mon. Mag.*, **35** : 225.

Host plant : Tea. Rare occurrence.

Distribution : India : West Bengal (Jalpaiguri distt.) and Assam. Also recorded in Taiwan.

Remark : First record from the State was by Watt & Mann (1903) on tea in the Duars.

46. *Cerococcus indicus* (Maskell)

1897. *Eriococcus paradoxus* var. *indicus* Maskell, *Trans. Proc. New Zealand Instt.*, **29** : 318.
1908. *Cerococcus hibisci* Green, *Mem. Dept. Agr. India*, (Ent.) **2** : 19.
1910. *Cerococcus indicus* : Green, *J. Econ. Biol.*, **5** : 5.

Material examined : (i) One lot from Barrackpur, on jute (mesta), 1972, coll. R.L. Tripathi, on slides, Regd. No. 9373/H 7; (ii) several examples, from the Forest department garden, near Kalyani Railway Station, on two species of *Hibiscus*, 30.8.1979, coll. R.K. Varshney, in wet collection and on slides.

Host plants : Species of *Hibiscus, Gossypium, Tephrosia, Coffea, Solanum*, etc. (Lefroy, 1908; Ghose, 1961; Varshney, 1984).

Distribution : India : West Bengal (Barddhaman, Calcutta, Nadia, North and South 24-Parganas distts.), Andhra Pradesh, Bihar, Karnataka, Maharashtra, Orissa, Tripura and Uttar Pradesh. Also in Sri Lanka, Bangladesh, Burma (now Myanmar), Malaysia and other countries.

Remark : A pest on the china rose and cotton plants.

Family X. COCCIDAE

Genus *Ceroplastes* Gray, 1828

47. *Ceroplastes actiniformis* Green

1896. *Ceroplastes actiniformis* Green, *Indian Mus. Notes*, **4** : 8.

Host plants : Polyphagous; leaves of palms, sandal tree, *Areca catechu*, etc.

Distribution : West Bengal (Calcutta and Haora distt.), Andhra Pradesh, Bihar, Goa, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh. Also in Pakistan and Sri Lanka.

Remark : Noted as a pest on sandal tree in the Botanical Gardens, Shibpur (Ghose, 1961).

48. *Ceroplastes ceriferus* (Fabr.)

1798. *Coccus ceriferus* Fabricius, *Ent. Syst. Suppl.* : 546.
1852. *Ceroplastes ceriferus* : Walker, *Homopt. Ins. in colln. of Br. Mus.*, (4) : 1087.

Material examined : In spirit collection : (i) from Darjiling, coll. D. Hooper, Regd. No. 7068/13; (ii) from Puruliya, coll. P. Pandit; (iii) from Puruliya, coll. J. Weveria; and (iv) from Samsing forest (500 m.), ex citrus (Rutaceae), 27.3.1981, coll. R.K. Varshney.

Host plant : Tea (Das & Ganguli, 1961), *Citrus*, etc.

Distribution: India : West Bengal (Darjiling and Puruliya distt.), Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Maharashtra, Tamil Nadu and Uttar Pradesh. Also in Sri Lanka, Thailand, Philippines, China and Taiwan.

49. *Ceroplastes floridensis* Comstock

1881. *Ceroplastes floridensis* Comstock, *Rept. U.S. Deptt. Agr., Commnr. Agr.* 1880 : 331.

Host plants : On leaves and twigs of tea (Das & Ganguli, 1961); mango, *Ixora* sp. (Ghose, 1961) and orange *Citrus reticulata* (Basu et al., 1969; Nath 1972). Known to occur on many other plants in different parts of India.

Distribution : India : West Bengal (Barddhaman, Darjiling and Haora distts.), Assam, Bihar, Karnataka, Kerala, Orissa, Tamil Nadu and Uttar Pradesh. Also in Pakistan and Sri Lanka and many other countries.

Remark : First reported from the State as a commonly occurring insect on tea plant in Darjiling by Watt (1898).

50. *Ceroplastes rubens* Maskell

1893. *Ceroplastes rubens* Maskell, *Trans. Proc. New Zealand Inst.*, **25** (1892) : 214.

Material examined: In spirit collection : (i) On *Croton* sp., Calcutta, coll. N. Annandale, Regd.No. 9033/16, and (ii) On 'Fern tree', Calcutta, coll. E.C. Cotes; [this material has once dried].

Host plants : Citrus, croton, etc. Stray occurrences.

Distribution : India : West Bengal (Darjiling distt.), Andhra Pradesh, Assam, Kerala, Orissa and Tamil Nadu. Also in Burma (Myanmar) and Sri Lanka in Indian region, and Japan, Australia, Hawai Is., etc.

Remark : Mild and negligible attack observed on *Citrus reticulata* at Kalimpong and Samsing (Nath, 1972).

Genus *Ceroplastodes* Ckll., 1893

51. *Ceroplastodes cajani* (Maskell)

1891. *Eriochiton cajani* Maskell, *Indian Mus. Notes,* **2** : 61.
1900. *Ceroplastodes cajani* : Cockerell, *Nature*, **61** : 368.

Host plants : On twigs of *Cajanus cajan* Also on other plants including tulsi (*Ocimum sanctum*).

Distribution : India : West Bengal (Calcutta distt.), Andhra Pradesh, Bihar, Gujarat, Himachal

Pradesh, Kerala, Orissa, Punjab, and Tamil Nadu. Also in Pakistan, Sri Lanka, Malaysia and Philippines.

Remark : Recorded from Calcutta on *Ocimum sanctum* (Green, 1908).

52. ***Ceroplastodes chiton*** Green

1909. *Ceroplastodes chiton* Green, *Coccidae of Ceylon*, **4** : 287.

Host plants : *Cajanus cajan* (syn. *C. indicus*), *Cassia* sp., *Solanum* sp., *Ficus* spp., etc.

Distribution : India : West Bengal (Darjiling distt.), Andaman Is., Himachal Pradesh, North Eastern States, and Uttar Pradesh. Also in Pakistan, Sri Lanka, Thailand, Malaysia, Indonesia (Java) and Taiwan.

Remark : Recorded from Darjiling on *Cajanus indicus* (Green, 1908).

Genus ***Chloropulvinaria*** Borchsenius, 1952

53. ***Chloropulvinaria floccifera*** (Westwood)

1870. *Coccus flocciferus* Westwood, *Gard. Chron. Agr. Gaz.*, **10** : 308.
1952. *Chloropulvinaria floccifera* : Borchsenius, *Akad. Nauk. Zool. Instt. USSR*, **12** : 299.

Host plants : On leaves of *Acalypha* sp. Also reported on *Camellia* sp.

Distribution : India : West Bengal (Calcutta distt.). Also in Bangladesh (Chowdhury & Ullah, 1984). Elsewhere known from France and U.S.A.

Remark : Recorded from Calcutta on *Acalypha* (Green, 1900).

54. ***Chloropulvinaria polygonata*** (Ckll.)

1907. *Pulvinaria polygonata* Cockerell, *Proc. Davenport Acad. Sci.*, **10** : 131.
1957. *Chloropulvinaria polygonata* : Borchsenius, *Fauna of USSR, Coccidae*, **9** : stet.
1961. *Pulvinaria cellulosa* Green : Ghose, *Indian Agric.*, **5**(1) : 65.

Material examined : One lot from Viswa Bharati, Santiniketan, on mango tree, 5.4.1971, coll. A. Chatterjee, on slides, Regd. No. 10171-74/H7.

Host plants : Mango and citrus.

Distribution : India : West Bengal (Birbhum and Maldah distts.), Bihar, Orissa and Uttar Pradesh. Also in Pakistan, Sri Lanka and Philippines.

Remarks : Although Varshney (1985) has listed *polygonata* and *cellulosa* as separate species on the

basis of remarks given in Green (1937), earlier Varshney (1984) has pointed out that these have been considered identical by various workers from as early as Morrison (1920). Tao et al. (1983) have treated this species in *Macropulvinaria*.

The year of publication of the paper of Cockerell, in which *polygonata* was described, is controversial. It is 1905 according to Morrison & Renk (1957 : p.50) and 1907 according to Borchsenius (1957 : p.69).

55. *Chloropulvinaria psidii* (Maskell)

1893. *Pulvinaria psidii* Maskell, *Trans. Proc. New Zealand Instt.*, **25** : 223.
1952. *Chloropulvinaria psidii* : Borchsenius , *Akad. Nauk. Zool. Instt. USSR*, **12** : 300.

Host plants : *Psidium guajava, Bassia butyracea, Mallotus philippinensis, Morus indica, Maesa indica, Euonymus frigidus, Gardenia florida* etc.

Distribution : India : West Bengal (Darjiling distt.), Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra, Orissa, Pondicherry, Tamil Nadu and Tripura. Also in other countries.

Remarks : First record from the State was from Kalimpong on *P. guajava* by Dutt (1948). Ghose (1961) recorded it on above plants from different places in Darjiling district. It is a pest on guava in Darjiling, and on tea and coffee plants in S. India and Sri Lanka. Tao et al. (1983) have included this species in *Pulvinaria*.

Genus *Coccus* Linnaeus, 1758

56. *Coccus hesperidum* Linnaeus

1758. *Coccus hesperidum* Linnaeus, *Syst. Nat.*, ed. **X**, 1 : 455.
1948. *Lecanium punctuliferum* Green : Dutt, *Sci. Cult.*, **14** : 122.

Material examined: Five lots from Goomti near Kurseong, and Martham near Rangpo (W. Bengal-Sikkim border), on orange, *Hibiscus*, Euphorbeaceae and other bushes, April 1981, coll. R.K. Varshney.

Host plants: Highly polyphagous. Noted on *Areca catechu, Mangifera indica, Artocarpus integra* (Ghose, 1961) and *Citrus reticulata* and other *Citrus* spp. (Dutt, 1948; Nath, 1972).

Distribution : India : West Bengal (widely including Barddhaman, Darjiling, Nadia and North & South 24-Parganas distt.), Andhra Pradesh, Assam, Bihar, Goa, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Orissa, Tripura, etc. Also in many other countries.

Remarks : First record from the State on *Dalbergia* by Green (1904). It is a severe pest of *Citrus* plants in Kalimpong (Dutt, 1948).

57. *Coccus watti* (Green)

1900. *Lecanium watti* Green, *Indian Mus. Notes*, **5** : 6.
1903. *Coccus watti* : Fernald, *Cat. Coccidae of World* : 174.
1974. *Saissetia watti* : Ali, *Indian Mus. Bull.*, **6**(2) : 45.

Host plants : Citrus and tea.

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

Remark : A minor attack of it was noticed on *Citrus* at Krishnanagar by Rao & Kumar (1952), who redescribed and figured it in detail.

Genus *Macropulvinaria* Hodgson, 1968

58. *Macropulvinaria burkilli* (Green), **new comb.**

1908. *Pulvinaria burkilli* Green, *Mem. Dept. Agr. India*, (Ent.) **2** : 31.

Host plant : On leaves of *Croton tiglium.*

Distribution : India : West Bengal (Calcutta distt.) and Tamil Nadu.

Remarks : This species was originally described by Green (1908) on the above host plant, from 'Siugaing (near Calcutta), coll. I. Burkill'.

As this species is close to *maxima*, differing by its much smaller size and in absence of derm cells, it is transferred here to *Macropulvinaria*, to which *maxima* has been transferred by Tao et al. (1983).

59. *Macropulvinaria maxima maxima* (Green)

1904. *Pulvinaria maxima* Green, *Entomologist's mon. Mag.*, **40** : 206.
1983. *Macropulvinaria maxima* : Tao et al., *J. Taiwan Mus.*, **36**(1) : 87.

Material examined : 19 exs. on *Jatropha pendurifolia*, at Subhas Sarovar, Beliaghata, Calcutta, 30.6.1978, coll. R.K. Varshney & B.N. Das, on slides, Regd., No. 694-701/H 15, as *Pulvinaria maxima.*

Host plants : Neem (*Melia azadirachta*) (Ghose, 1961) and *Jatropha pendurifolia* (Varshney, 1984) in the State. Also on cotton, mulberry, grape-vine, kadam, *Ziziphus*, etc.

Distribution : India : West Bengal (Calcutta distt.), Andhra Pradesh, Bihar, Kerala, Orissa, Tamil Nadu and Uttar Pradesh. Also in other countries.

Remark : It is a pest of neem, infesting branches, petioles and bark crevices.

Genus ***Metaceronema*** Takahashi, 1955

60. ***Metaceronema japonica*** (Maskell)

1897. *Ceronema japonica* Maskell, *Entomologist's mon.Mag.*, **33** : 243.
1955. *Metaceronema japonica* : Takahashi, *Ins. matsum.*, **19** : 27.
1961. *Eriochiton theae* Green : Das & Ganguli, *Indian J. Ent.*, **23**(4) : 248.

Host plant : Tea plant.

Distribution : India : West Bengal (Darjiling distt.). Also in Pakistan.

Remarks : First record from the State by Watt (1898) on tea from Thurbo Tea Estate in Darjiling. It is stated to be one of the most serious pests of tea seedlings (Das & Ganguli, 1961).

Genus ***Protopulvinaria*** Cockerell, 1894

61. ***Protopulvinaria mangiferae*** (Green)

1889. *Lecanium mangiferae* Green, *Entomologist's mon. Mag.*, **25** : 249.
1929. *Protopulvinaria mangiferae* : Steinweden, *Ann. ent. Soc.America*, **22** : 223.
1961. *Coccus mangiferae* : Ghose, *Indian Agric.*, **5**(1) : 65.

Host plants : Mango (*Mangifera indica*) and jackfruit (*Artocarpus heterophyllus*).

Distribution : India : West Bengal (Calcutta distt.), Bihar and Tamil Nadu. Also in Pakistan and Sri Lanka.

Remark : Minor infestation noted on leaves of *Artocarpus* (Ghose, 1961).

Genus ***Pulvinaria*** Deplanche, 1866

62. ***Pulvinaria*** sp.

Host plant : *Citrus reticulata.*

Distribution : India : West Bengal (Darjiling distt.).

Remark : Reported from the State for the first time on citrus from Kalimpong and Dalapchand areas (Nath, 1972).

Genus ***Saissetia*** Deplanche, 1859

63. ***Saissetia*** sp.

Material examined: Two lots from Goomti near Kurseong, and Martham near Rangpo (W. Bengal-Sikkim border), ex citrus and an undet. tree, April 1981, coll. R.K. Varshney.

Host plants : *Citrus* sp. (Rutaceae) and a Myrtaceae plant.

Distribution : India : West Bengal (Darjiling distt.).

64. *Saissetia coffeae* (Walker)

1852. *Lecanium coffeae* Walker, *Homopt. Ins. in colln. Br. Mus.*, (4) : 1079.
1859. *Saissetia coffeae* : Deplanche, *Bull. Soc. Linn. Normandie*, **4** : 206.
1948. *Lecanium hemisphaericum* Targ. : Dutt, *Sci. Cult.*, **14** : 122.
1961. *Saissetia hemisphaerica* : Ghose, *Indian Agric.*, **5** (1) : 66 foot-note.
1969. *Saissetia hemisphorica* (sic) : Basu et al., *Proc. Zool. Soc., Calcutta*, **22** : 174.

Material examined : One lot from Samsing forest (500 m), ex *Hibiscus*, 28.3.1981, coll. R.K. Varshney.

Host plants : Coffee, tea, citrus, *Gardenia florida, Mikania scandens, Tabernaemontana coronaria, Cephalandra indica, Ixora parviflora*, etc.

Distribution : India : West Bengal (very widely, including Calcutta, Darjiling, North and South 24-Parganas distt.), Andaman Is., Assam, Bihar, Goa, Karnataka, Maharashtra, Manipur, Orissa and Tamil Nadu. Also in Bangladesh, Sri Lanka, etc.

Remarks: A severe pest on *Citrus aurantium* and *C. rotundata* in Darjiling region (Dutt, 1948; Basu et al., 1969; Nath, 1972). It is often cited by its synonym *S. hemispherica*.

65. *Saissetia nigra* (Nietner)

1861. *Lecanium nigrum* Nietner, *Ceylon Times*, 1861 : 9.
1902. *Saissetia nigra* : King, *Psyche*, **9** : 296.
1974. *Parasaissetia nigra* : Ali, *Indian Mus. Bull.*, **6** (2) : 39.

Host plants : *Capparis, Ficus, Eugenia, Morus, Musa, Psidium, Pyrus, Gossypium, Thea, Citrus, Erythrina*, coffee, cotton, sandalwood, etc.

Distribution : India : West Bengal (Calcutta distt.), Assam, Bihar, Jammu & Kashmir, Karnataka, Tamil Nadu, Tripura, Uttar Pradesh, etc. Also in other countries.

Remarks : The only record from the State seems to be that of Green (1908) from Calcutta on *Capparis sepiaria*. It was also reported on *Gossypium* from Pusa, which is no more in Bengal.

Genus *Vinsonia* Signoret, 1872

66. *Vinsonia stellifera* (Westwood)

1871. *Coccus stellifer* Westwood, *Trans. ent. Soc. London*, 1871 : iii.

1888. *Vinsonia stellifera* : Douglas, *Entomologist's mon. Mag.*, **25** : 152.

Host plants : *Mangifera indica, Eugenia jambolana* and *Citrus aurantium* (Ghose, 1961). Also on other plants.

Distribution : India : West Bengal (Calcutta and Darjiling distts.), Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, etc. Also in Pakistan, Sri Lanka etc. as far as South America.

Remark : It is frequently noted on *Citrus* in Darjiling district (Nath, 1972).

Family XI. DIASPIDIDAE

Genus *Acanthomytilus* Borchsenius, 1947

67. *Acanthomytilus sacchari* (Hall)

1923. *Lepidosaphes sacchari* Hall, *Bull. Egypt. Min. Agr., Tech. Sci. Ser.*, **36** : 23.
1954. *Acanthomytilus sacchari* : Balachowsky, *Cochenilles Palaearct., Mem. Sci. Inst. Pasteur* : 105.

Host plants : Sugarcane (*Saccharum officinarum*) and *Neyraudia arundinacea.*

Distribution : India : West Bengal (? district), Bihar, Tamil Nadu and Uttar Pradesh. Also in Pakistan.

Remark : First record from the State on sugarcane by Pruthi & Rao (1942).

Genus *Andaspis* MacGillivray, 1921

68. *Andaspis meliae* (Green)

1919. *Lepidosaphes meliae* Green, *Rec. Indian Mus.*, **16** : 445.
1963. *Andaspis meliae* : Williams, *Bull. Br. Mus. (nat. Hist.) Ent.*, **15** : 20.
1985. *Pararaoaspis meliae* : Varshney, *Orient. Ins.*, **19** : 36.

Host plant : On stem and shoots of neem (*Melia azedarach*).

Distribution : India : West Bengal (Calcutta distt.), Andhra Pradesh, Karnataka and Tamil Nadu.

Remark : Collected and reported from this State by Borchsenius (1967).

69. *Andaspis numerata* Brimblecombe

1959. *Andaspis numerata* Brimblecombe, *Queensland J. Agr. Sci.*, **16** : 393.
1963. *Andaspis dasi* Williams, *Bull. Br. Mus. (nat. Hist.) Ent.*, **15** : 14.
1985. *Raoaspis dasi* : Varshney, *Orient. Ins.*, **19** : 36.

Host plant : Tea (*Camellia sinensis*).

Distribution : India : West Bengal (Jalpaiguri and Koch Bihar distts.) and Assam. Also in Pakistan and Australia.

Remarks : Collected in the State from Calcutta and Duars. It was originally described as *A. dasi* by Williams (1963).

Genus ***Aonidia*** Targioni-Tozzetti, 1868

70. ***Aonidia indica*** Green

1919. *Aonidia indica* Green, *Rec. Indian Mus.*, **16** : 440.
1966. *Porogymnaspis indica* : Borchsenius, *Cat. Arm. Scale ins. of World* : 206.

Host plant : Undetermined plant, probably *Vateria* sp.

Distribution : India : West Bengal (Calcutta distt.).

Remarks : Known from its original record from the State only, from Indian Museum compound, Calcutta, on undetermined plant by Green (1919).

Genus ***Aonidiella*** Berlese & Leonardi, 1895

71. ***Aonidiella aurantii*** (Maskell)

1879. *Aspidiotus aurantii* Maskell, *Trans. Proc. New Zealand Inst.*, **11** (1878) : 199.
1895. *Aonidiella aurantii* : Berlese, *Riv. Pat. Veg.*, **4** : 125.

Host plants : *Citrus documana, C. aurantium, C. limon, C. aurantifolia, Murraya exotica, Morus* sp., pear, peach, etc.

Distribution : India : West Bengal (very widely including Darjiling, Hugli, Jalpaiguri, Maldah, Medinipur, Nadia, North & South 24-Parganas distts.), Andhra Pradesh, Assam, Bihar, Delhi, Karnataka, Kerala, Punjab, Tamil Nadu and Tripura. Also from Pakistan, Nepal, Burma (now Myanmar), Sri Lanka and many other countries.

Remarks : Red scale is noted as a severe pest on *Citrus aurantifolia* at Kalimpong (Dutt, 1948); on *C. documana* in Horticultural Farm, Krishnanagar (Ghose, 1961); and on *C. limon* in Darjiling district (Basu et al., 1969; Nath, 1972).

72. ***Aonidiella orientalis*** (Newstead)

1894. *Aspidiotus orientalis* Newstead, *Indian Mus. Notes*, 3(5) : 26.

1937. *Aonidiella orientalis* : McKenzie, *Univ. California Publ. Ent.*, **6** : 327.

Host plants : Highly polyphagous. *Areca catechu, Cocos nucifera, Murraya exotica, Cycas revoluta*, palms etc. in the State.

Distribution : India : West Bengal (Barddhaman, Calcutta, Hugli, North & South 24-Parganas distts.), Andaman & Nicobar Is., Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Tamil Nadu and Tripura. Also in many countries.

Remark : Oriental yellow scale is noted as a pest on *Areca catechu* and garden palms in the State (Ghose, 1961).

Genus ***Aspidiotus*** Bouche, 1833

73. ***Aspidiotus*** sp.

Material examined : On tea plants at Darjiling, April, 1982, coll. S. Mukherjee, on slides, 18 females, Regd. No. 931/H 15.

Host plant : Tea (*Camellia sinensis*).

Distribution : India : West Bengal (Darjiling distt.).

74. ***Aspidiotus destructor*** Signoret

1869. *Aspidiotus destructor* Signoret, *Ann. Soc. ent. France*, (4) **9** : 120.

Host plants : Polyphagous. On tea plant (Das & Ganguli, 1961), *Psidium guajava, Mangifera indica* and *Musa* sp. (Ghose, 1961).

Distribution : India : West Bengal (widely including Barddhaman and Maldah distts.), Andhra Pradesh, Karnataka, Kerala, Lakshadweep Is., Maharashtra, Rajasthan, Tamil Nadu, Tripura, etc. Also in Pakistan, Sri Lanka and many other countries.

Remarks : It is a cosmopolitan very serious pest. Its first record from the State was on tea in an Estate in the Duars, by Cotes (1895).

Genus ***Aulacaspis*** Cockerell, 1893

75. ***Aulacaspis litseae*** (Green)

1896. *Chionaspis euginiae* var. *litzeae* Green, *Indian Mus. Notes*, **4** : 3
1937. *Chionaspis litseae* : Green, *Spolia Zeylan.*, **20** (3) : 319.
1985. *Aulacaspis litseae* : Takagi, *Ins. matsum.*, (n.s.) **33** : 47.

Host plants : *Litsea zeylanica* and 'ghumti'.

Distribution : India : West Bengal (Darjiling distt.). Also in Sri Lanka.

Remarks : Recorded in the State from Darjiling by Green (1919). There 'ghumti' is perhaps name of a place in Darjiling district rather than a plant name.

76. ***Aulacaspis mangiferae*** Newstead

1911. *Diaspis (Aulacaspis) cinnamomi* var. *mangiferae* Newstead, *Bull. ent. Res.*, **2** : 86.
1921. *Aulacaspis mangiferae* : MacGillivray, *Coccidae* : 317.

Host plant : A minor pest on mango (Ghose, 1961).

Distribution : India : West Bengal (Barddhaman, Calcutta and Maldah distt.), Bihar and Karnataka. Also in Pakistan, Sri Lanka and other countries.

Remarks : Borchsenius (1966) and some other workers have treated this species as a synonym of *A. tubercularis* (Newstead), which, however, is reported as a nomen nudum by Ali (1969).

Genus ***Chionaspis*** Signoret, 1869

77. ***Chionaspis vitis*** Green

1896. *Chionaspis vitis* Green, *Indian Mus. Notes*, **4** (1) : 3.
1961. *Phenacaspis vitis* : Ghose, *Indian Agric.*, **5** (1) : 68.

Host plant : Minor infestations on *Mangifera indica* (Ghose, 1961).

Distribution : India : West Bengal (Murshidabad and Nadia distt.), Bihar, Orissa and southern States. Also in Sri Lanka, Indonesia, Taiwan, etc.

Genus ***Chrysomphalus*** Ashmead, 1880

78. ***Chrysomphalus aonidum*** (Linnaeus)

1758. *Coccus aonidum* Linnaeus, *Syst. nat.*, ed. X,**1**: 455.
1899. *Chrysomphalus aonidum* : Cockerell, *Proc. Acad. nat. Sci. Philadelphia* 1899 : 273.
1961. *Chrysomphalus ficus* Ashmead : Ghose, *Indian Agric.*, **5** (1) : 69.

Material examined : Several lots from areas around Samsing, Kalimpong and Kurseong, ex batavi nibu, kamla nibu, jamun, guava etc., March-April 1981, coll. R.K. Varshney.

Host plants : Reported as a minor pest on leaves of *Citrus aurantium, Phoenix* sp. and palms (Ghose, 1961), but heavily infesting *Citrus reticulata* and *C. grandis* (Basu et al., 1969; Nath, 1972).

Distribution : India : West Bengal (Calcutta and Nadia distt.), Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu and Tripura. Also in Pakistan, Sri Lanka and many other countries.

Remarks: Florida red scale or Circular black scale has been frequently cited by its synonym *C.ficus*. It has been reported as an important pest of orange in Darjiling (Basu et al., 1969).

79. ***Chrysomphalus dictyospermi*** (Morgan)

1889. *Aspidiotus dictyospermi* Morgan, *Entomologist's mon. Mag.*, **25** : 352.
1895. *Chrysomphalus dictyospermi* : Maskell, *Trans. Proc. New Zealand Inst.*, **27** : 44

Host plants : On twigs and branches of *Mangifera indica* in the State (Ghose, 1961). Also on other plants.

Distribution : India : West Bengal (Murshidabad and Nadia distt.), Andhra Pradesh, Assam, Karnataka, Meghalaya, Northern States, Tamil Nadu and Tripura. Also in Sri Lanka.

80. ***Chrysomphalus pinnulifer*** (Maskell)

1891. *Diaspis pinnulifera* Maskell, *Trans. Proc. New Zealand Inst.*, **23** : 4.
1900. *Chrysomphalus dictyospermi* var. *pinnulifera* : Cockerell, *Entomologist's mon. Mag.*, **36** : 157.
1927. *Chrysomphalus pinnulifer* : Chamberlin, *Month. Bull. Dept. Agric. California*, **16** : 486.

Host plants : *Ammomum cardamomum, Agave* sp. and *Pandanus* sp.

Distribution : India : West Bengal (Darjiling distt.) and southern States.

Remark : Reported from higher altitudes, 914-1371 m, in Kalimpong (Ghose, 1961).

Genus ***Cornuaspis*** MacGillivray, 1921

81. ***Cornuaspis beckii*** (Newman)

1869. *Coccus beckii* Newman, *Entomologist*, **4** : 217.
1948. *Lepidosaphes beckii* : Dutt, *Sci. Cult.*, **14**:122.
1963. *Cornuaspis beckii* : Borchsenius, *Zool. Zhur.*, **42** : 1168.
1972. *Mytilococcus beckii* : Nath, *Bull. Ent.*, **13**(1) : 3.

Host plants : *Citrus aurantifolia* and other *Citrus* species.

Distribution : India : West Bengal (Darjiling distt.), Assam and Kerala. Also in Sri Lanka and other countries.

Remark : Citrus mussel scale recorded for the first time from the State on sweet lime from Kalimpong by Dutt (1948).

Genus ***Eucornuaspis*** Borchsenius, 1963

82. ***Eucornuaspis pinnaeformis*** (Bouche)

1851. *Aspiditous pinnaeformis* Bouche, *Ent. Zeitg. Stettin*, **12** : 111.
1952. *Lepidosaphes machili* (Maskell) : Rao & Kumar, *Indian J. Ent.* **14**(1) : 9.
1966. *Eucornuaspis pinnaeformis* : Borchsenius, *Cat. Arm. Scale ins. of World* : 58.

Host plants : Orchids, *Cymbidium* spp., *Magnolia grandiflora, Dendrobium, Machilus, Cinnamomum*, etc.

Distribution : India : West Bengal (Darjiling distt.). Also in Nepal, Thailand, Taiwan, Korea, China, Japan, U.S.S.R., Europe, U.S.A., Latin America and Australia.

Remark : Recorded from the State by Rao & Kumar (1952) from Darjiling.

Genus ***Fiorinia*** Targioni-Tozzetti, 1868

83. ***Fiorinia japonica*** Kuwana

1902. *Fiorinia fioriniae* var. *japonica* Kuwana, *Proc. California Acad. Sci.*, (3) **3** : 79.

Host plants : *Juniperus* spp. Also on *Abies, Cedrus, Picea, Pinus*, etc.

Distribution : India : West Bengal (Haora distt.). Also in Sri Lanka and other far off countries, e.g., Japan, Philippines, Australia and U.S.A.

Remarks : Coniferous fiorinia scale was recorded for the first time from State and the country by Rao & Kumar (1952) on *Juniperus chinensis* at Botanical Gardens near Calcutta.

84. ***Fiorinia theae*** Green

1900. *Fiorinia theae* Green, *Indian Mus. Notes*, 5 : 3.

Host plant : On stem and leaves of tea plant (*Thea*).

Distribution : India : West Bengal (Darjiling distt.), Assam, Bihar and Uttar Pradesh. Also in Sri Lanka.

Remarks : Tea scale has been recorded on tea from Darjiling by Das & Ganguli (1961). Another species 'near *theae*' has been indicated from Nepal by Takagi (1979).

Genus ***Greenaspis*** MacGillivray, 1921

85. ***Greenaspis decurvata*** (Green)

1903. *Chionaspis decurvata* Green, *Indian Mus. Notes*, **5** : 63.

1966. *Greenaspis decurvata* : Borchsenius, *Cat. Arm. Scale Ins. of World* : 198.

Host plants : Paddy (*Oryza sativa*), *Phoenix*, *Cymbopogon* and other grasses.

Distribution : India : West Bengal (Calcutta distt.), Kerala and Orissa. Also in Pakistan.

Remark : Originally recorded from Calcutta on paddy by Green (1903).

Genus ***Hemiberlesia*** Ckll. *In* Leonardi, 1897

86. ***Hemiberlesia lataniae*** (Signoret)

1869. *Aspidiotus lataniae* Signoret, *Ann. Soc. ent. France*, (4) **9** : 124.
1905. *Hemiberlesia lataniae* : Cockerell, *Univ. Colorado Stud.* **2** : 202.

Material examined : From Calcutta, on *Muehlenbeckia platycauda*, June 1909, coll. N. Annandale, in wet collection, labelled as *Aspidiotus lataniae*.

Host plants : Apple, peach, plum, pear (Dutt, 1948; Rao & Chatterjee, 1950), *Phoenix* sp., *Mangifera indica*, *Psidium guajava* (Ghose, 1961).

Distribution : India : West Bengal (Calcutta and Darjiling distt.), Assam, Karnataka, Maharashtra, Orissa, Tamil Nadu and Tripura. Also in Pakistan and Sri Lanka.

Remarks : A medium pest on *Pyrus malus* in Kalimpong (Dutt, 1948); a worst pest of grafts of mangoes in Calcutta and of guavas in Darjiling district (Ghose, 1961).

87. ***Hemiberlesia rapax*** (Comstock)

1881. *Aspidiotus rapax* Comstock, *Rept. Ent. U.S. Dept. Agr.* 1880 : 307.
1897. *Aspidiotus (Hemiberlesia) rapax* : Cockerell, *U.S. Dept. Agric. Div. Ent. Tech. Ser.*, **6** : 4.

Host plants : On twigs and leaves of guava, apple, peach, pear, plum (Dutt, 1948; Rao & Chatterjee, 1950), and on tea (Das & Ganguli, 1961).

Distribution : India : West Bengal (Calcutta and Darjiling distt.), Assam, Orissa and Tamil Nadu. Also in Nepal and Sri Lanka.

Remarks : First record from the State by Watt (1898) on tea in Darjiling. Most of the reports are from Kalimpong.

Genus ***Insulaspis*** Mamet, 1950

88. ***Insulaspis gloverii*** (Packard)

1869. *Coccus gloverii* Packard, *Guide to study of insects*, ed. 1 : 527.

1948. *Lepidosaphes gloverii* : Dutt, *Sci. Cult.*, **14** : 122.
1963. *Insulaspis gloverii* : Borchsenius, *Zool. Zhurb.*, **42** : 1172.
1972. *Mytilococcus gloverii* : Nath, *Bull. Ent.*, **13** (1) : 3.

Host plants : On leaves and stems of *Citrus*, crotons, guava and mango. Common on *Citrus aurantium* (Dutt, 1948), *C. reticulata* and *C. sinensis* in Darjiling district (Basu et al., 1969; Nath, 1972).

Distribution : India : West Bengal (Darjiling distt.) and Bihar. Also in Pakistan, Sri Lanka and other countries.

Remarks : Citrus long scale infestations are severe on apical region of twigs and fruits, and often this species occurs in association with other coccids.

Genus ***Lineaspis*** MacGillivray, 1921

89. ***Lineaspis caroli*** (Green)

1919. *Chionaspis caroli* Green, *Rec. Indian Mus.*, **16** : 434.
1966. *Lineaspis caroli* : Borchsenius, *Cat. Arm. Scale ins. of World* : 104.

Host plant : Tea plant.

Distribution : India : West Bengal (Darjiling distt.).

Remark : This species was originally described from Darjiling by Green (1919).

Genus ***Lopholeucaspis*** Balachowsky, 1953

90. ***Lopholeucaspis excoecariae*** Borchsenius

1964. *Lopholeucaspis excoecariae* Borchsenius, *Ent. Obozr.*, **43** : 865.

Host plant : On leaves of *Excoecaria agallocha.*

Distribution : India : West Bengal (South 24-Parganas distt.).

Remark : Originally described from Garanbose Is. on Matla river, in the State, by Borchsenius (1964).

91. ***Lopholeucaspis menoni*** Borchsenius

1964. *Lopholeucaspis menoni* Borchsenius, *Ent. Obozr.*, **43** : 865.
1919. *Leucaspis japonica* : Green [nec Cockerell], *Rec. Indian Mus.*, **16** : 449.

Host plants : On bark of *Ficus religiosa*. Also on *Euphorbia* and *Salvadora.*

Distribution : India : West Bengal (Calcutta distt.), Delhi, Rajasthan and Uttar Pradesh.

Remarks : Recorded from Calcutta on *Ficus religiosa* by Green (1919) as *Leucaspis japonica*, which was a case of misidentification.

Genus ***Mytilaspis*** Targioni-Tozzetti, 1868

92. ***Mytilaspis*** sp.

Material examined : Two lots from Darjiling proper and Goomti near Kurseong, ex a hedge bush and citrus shrub, April 1981, coll. R.K. Varshney.

Host plants : A hedge bush and citrus (Rutaceae) ('singhani kanta' in nepali).

Distribution : India : West Bengal (Darjiling distt.).

Genus ***Parlatoria*** Targioni-Tozzetti, 1868

93. ***Parlatoria boycei*** McKenzie

1952. *Parlatoria boycei* McKenzie, *Bull. Dept. Agric. California,* **41** : 10.

Host plant : Pear (*Pyrus communis*).

Distribution : India : West Bengal (Darjiling distt.).

Remark : Known from the State by its original record by McKenzie (1952).

94. ***Parlatoria cinerea*** Hadden

1909. *Paraltoria cinerea* Hadden *in* Doane & Hadden, *Canadian Ent.*, **41** : 299.

Host plants : Recorded on pear in the State and on *Citrus, Rosa, Bougainvillea, Jasminum,* etc. elsewhere.

Distribution : India : West Bengal (Darjiling distt.). Also in Pakistan and other countries.

Remarks : Recorded in the State from Kalimpong by Rao & Chatterjee (1950). It occurs mostly on stems and sometimes on leaves.

95. ***Parlatoria oleae*** (Colvee)

1880. *Diaspis oleae* Colvee, *Gac. Agr. Min. Fom., Madrid,* **14** : 40.
1920. *Parlatoria oleae* : Leonardi, *Mon. Conccin., Italy* : 137.

Host plants : On stem and leaves of peach and pear. Reported on number of other plants.

Distribution : India : West Bengal (Darjiling distt.), Bihar, Maharashtra, Rajasthan and Tamil Nadu. Also from Pakistan, Iran, U.S.S.R. and other countries.

Remark : Recorded in the State from Darjiling by Rao & Chatterjee (1950).

96. ***Parlatoria proteus*** (Curtis)

1843. *Aspidiotus proteus* Curtis, *Gard. Chron.*, **39** : 676.
1869. *Parlatoria proteus* : Signoret, *Ann. Soc. ent. France*, (4) **9** : 450.

Host plants : Polyphagous Tea (*Camellia* sp.), orchids, etc.

Distribution : India : West Bengal (in quarantine), Karnataka, etc. Also in Pakistan, Sri Lanka and other countries.

Remarks : Ghose (1961) reported it on a consignment of plants to be exported. Hence, it may not be treated strictly a species occurring in the State.

97. ***Parlatoria ziziphi*** (Lucas)

1843. *Coccus ziziphi* Lucas, *Ann. Soc. ent. France*, (3) **1** : XXIX.
1869. *Parlatoria zizyphi* : Signoret, *Ann. Soc. ent. France*, (4) **9** : 451.
1930. *Parlatoria (Websteriella) ziziphus* : Ayyar, *Bull. Imp. Inst. Agr., Pusa*, **197** (1929) : 34.

Host plants : *Ziziphus* spp. and *Citrus* spp. Also on orchids.

Distribution : India : West Bengal (Calcutta distt.), Tamil Nadu, etc. Also in Burma (now Myanmar), Sri Lanka, Pakistan and other countries.

Remarks : Recorded from the State on *Citrus* from Ballygunge, Calcutta, by Green (1903). These scales appear as small black dots on the leaf.

Genus ***Pinnaspis*** Cockerell, 1892

98. ***Pinnaspis*** sp. [nr. ***strachani*** (Cooley)]

Host plants : All parts of jute (*Corchorus capsularis*). Also on *Hibiscus cannabinus* and *H. sabdariffa* var. *altissima*.

Distribution : India : West Bengal (North 24-Parganas distt.).

Remark : Reported from Barrackpore in the State, on above host plants, by Dutt (1952).

99. ***Pinnaspis exercitata*** (Green)

1896. *Chionaspis exercitata* Green, *Indian Mus. Notes*, **4** : 3.
1947. *Pinnaspis exercitata* : Ferris & Rao, *Microent.*, **12** : 28.
1969. *Pinnaspis excercitata* (sic) : Ali, *Indian Mus. Bull.*, **4**(2) : 64.[lapsus calami].

Host plants : Tea (*Thea*) and *Aleurites montana* in the State. On *Eurya, Psychotria, Ziziphus, Cassia siamea*, etc. elsewhere

Distribution : India : West Bengal (Darjiling and Jalpaiguri distts.), Karnataka, Kerala, Orissa and Tamil Nadu. Also in Pakistan and Sri Lanka.

Remark : Recorded in the State from Darjiling tea areas and Duars, by Ferris & Rao (1947).

100. ***Pinnaspis strachani*** (Cooley)

1899. *Hemichionaspis minor* var. *strachani* Cooley, *Spec. Bull. Exp. Sta. Massachusetts Agr. Coll.* : 54.
1947. *Pinnaspis strachani* : Ferris & Rao, *Microent.*, **12** : 29.
1968. *Pinnaspis temporaria* Ferris : Ali, *Orient. Ins.*, **1** (1-2) : 39.

Host plants : A minor pest on the leaves of *Artocarpus integra* and *A. heterophyllus* (Ghose, 1961). Also on several other plants.

Distribution : India : West Bengal (Calcutta and Haora distts.), Andhra Pradesh, Bihar, Jammu & Kashmir, Karnataka and Tamil Nadu. Also in many other countries.

Remarks : First record of it from the State was by de Niceville (1903) from Botanical Gardens, Shibpore, as '*Chionaspis minor*', on *Crotalaria hirsuta*, collected in 1900.

101. ***Pinnaspis theae*** (Maskell)

1891. *Chionaspis theae* Maskell, *Indian Mus. Notes*, **2** : 60.
1929. *Pinnaspis theae* : Takahashi, *Rept. Dept. Agr. Res. Inst. Formosa*, **40** : 74.
1961. *Chionaspis separata* (Green) : Das & Ganguli, *Indian J. Ent.*, **23**(4) : 253.

Host plants : On leaves of tea *(Thea chinensis), Symplocos theaefolia* and *Cylogena elata.*

Distribution : India : West Bengal (Darjiling distt.) and North-Eastern States. Also in Sri Lanka and a few other countries.

Remarks : First recorded in the State by Cotes (1895) on tea. While Watt & Mann (1903) found it in a single Tea Estate in Darjiling, Das (1960) has reported that it is widespread in the district.

Genus ***Pseudaonidia*** Cockerell, 1897

102. ***Pseudaonidia trilobitiformis*** (Green)

1896. *Aspidiotus trilobitiformis* Green, *Indian Mus. Notes*, **4** : 4.

1899. *Pseudaonidia trilobitiformis* : Cockerell, *Bull. Illinois Lab. Nat. Hist.*, **5** : 396.

Host plants : On leaves and branches of *Dalbergia* sp., *Mangifera indica* and *Murraya exotica* (Ghose, 1961). Also on many other plants.

Distribution : India : West Bengal (Barddhaman and Calcutta distt.), Andhra Pradesh, Bihar, Kerala, Tamil Nadu and Tripura. Also in Pakistan, Sri Lanka and other countries of Asia, Africa and S. America.

Remarks : Recorded in the State from Calcutta by Green (1900), and from State Seed Multiplication Farm, Barddhaman by Ghose (1961).

Genus ***Pseudaulacaspis*** MacGillivrary, 1921

103. ***Pseudaulacaspis cockerelli*** (Cooley)

1897. *Chionaspis cockerelli* Cooley, *Canadian Ent.*, **29** : 278.
1930. *Chionaspis dilatata* Green : Ayyar, *Bull. Imp. Inst. Agr. Res. Pusa*, **197** (1929) : 15.
1961. *Phenacaspis cockerelli* : Ghose, *Indian Agric.*, **5**(1) : 67.
1967. *Pseudaulacaspsis cockerelli* : Takagi & Kawai, *Ins. matsum.*, **30** (1) : 40.

Host plant : *Areca catechu.*

Distribution : India : West Bengal (Calcutta distt.), Andhra Pradesh, Karnataka, Kerala, Maharashtra and Tamil Nadu. Also in Bangladesh, Sri Lanka and many other countries.

Remarks : Ghose (1961) erroneously stated that his record of this species was for the first time in India. In fact Green recorded it from Calcutta on palm much earlier, as *Ch. dilatata* (vide, Ayyar, 1930).

104. ***Pseudaulacaspis manni*** (Green)

1907. *Chinaspis manni* Green *in* Green & Mann, *Mem. Dept. Agr. India, (Ent.)* **1** : 344.
1961. *Phenacaspis manni* : Das & Ganguli, *Indian J. Ent.*, **23**(4) : 254.
1970. *Pseudaulacaspis manni* : Takagi, *Ins. matsum.*, **33**(1) : 41.

Host plants : Tea plant, *Ficus* sp., brinjal, etc.

Distribution : India : West Bengal (Calcutta and Darjiling distt.) and Himachal Pradesh.

Remarks : First record of it in the State was by Green & Mann (1907) itself, when this species was originally described from collections in a Tea Estate in the Balasun Valley in Darjiling district. Later, it was noticed in almost every valley in the district (Das & Ganguli, 1961).

105. ***Pseudaulacaspis pentagona pentagona*** (Targ.)

1886. *Diaspis pentagona* Targioni-Tozzetti, *Riv. Bachicolt.*, **18** : 1.

1921. *Pseudaulacaspis pentagona* : MacGillivray, *Coccidae* : 315.

Host plants : Peach, apple, plum, mulberry and cherry plants (Dutt, 1948; Rao & Chatterjee, 1950).

Distribution : India : West Bengal (Darjiling distt.), Assam, Meghalaya and Uttar Pradesh hills. Also in Sri Lanka.

Remarks : Recorded as a severe pest on *Morus* sp. in Kalimpong (Dutt, 1948) and on above other plants in Darjiling district (Rao & Chatterjee, 1950).

Genus ***Quadraspidiotus*** MacGillivrary, 1921

106. ***Quadraspidiotus perniciosus*** (Comstock)

1881. *Aspidiotus perniciosus* Comstock, *Rept. Ent. U.S. Dept. Agr.* 1880 : 304.
1938. *Quadraspidiotus perniocisus* : Ferris, *Atlas of Scale ins. of N. America*, **2** : 259.

Host plants : Highly polyphagous, particularly on *Pyrus malus, P. communis, Prunus domestica* and *P. persica* (Rao, 1948; Dutt, 1948).

Distribution : India : West Bengal (Calcutta, Darjiling and Jalpaiguri distts.), Himachal Pradesh, Jammu & Kashmir, Karnataka, Maharashtra, Meghalaya, Orissa, Punjab, Sikkim, Tamil Nadu and Uttar Pradesh. Also in Nepal, Pakistan and many other countries.

Remarks : It is a well known notorious scale pest of apple, plum, pear, peach, etc. all over the world. It is notable in Kalimpong orchards in the State. Dutt (1948) reports that it prefers plum as primary host in Darjiling district.

Genus ***Thysanofiorinia*** Balachowsky, 1954

107. ***Thysanofiorinia nephelii*** (Maskell)

1897. *Fiorinia nephelii* Maskell, *Entomologist's mon. Mag.*, **33** : 242.
1954. *Thysanofiorinia nephelii* : Balachowsky, *Cochenilles Palaearct.* : 314.

Host plants : Litchi (*Nephelium litchi*) and *Indigofera* sp.

Distribution : India : West Bengal (Nadia distt.) and Karnataka. Also known from other countries.

Remarks : Recorded for the first time in the State and country, from Horticultural Farm, Krishnanagar, by Rao & Kumar (1952).

ECONOMIC IMPORTANCE

Coccid insects are economically important both ways, beneficial (i) as producer of lac, wax and dyes, and (ii) for biological control of weeds like *Opuntia, Lantana* and *Parthenium*; and harmful as the pests, often severe, of various useful plants to mankind.

India exported a little over 6,200 metric tons of lac during 1989-90, earning about Rs. 17.76 crores in foreign exchange. Amount for 1988-89 were even higher than that. Not only money-wise, lac culture is important for sustaining about one million families of tribals and other socially backward communities in the lac growing areas of West Bengal , Bihar, Madhya Pradesh, etc.

Coccids as pests with their high fecunidity rate and wide distribution in many countries and continents pose threat to useful plants. Many species attack significant horticultural and agricultural plants. Often there is outbreak of a species, resulting in quality deterioration and yield loss. For example, *Pseudaulacaspis pentagona* caused loss to peach plants in Georgia, U.S.A. in 1981, worth about $ 88,000 and with another $ 33,000 spent on their control measures, the total amounted over $ 120,000. In West Bengal, it is reported that attack of *Maconellicoccus hirsutus* reduced yield of jute seeds by 78% and that it is also the cause of 'tukra' disease in mulberry. Monetary value of damages, loss of revenue and cost of control measures for the coccid pests, have been estimated approximately $ 3 billion a year globally (Kosztarab, 1990).

Both important crops of West Bengal, tea and jute, are attacked by a number of species of coccids. *Citrus* plants in Darjiling district are host to many coccid species. Some of them, e.g. *Aonidiella aurantii*, are not only injurious to plants, but also very difficult to control. If left unchecked, colonies of these sucking insects can lead to defoliation, dieback of small twigs, dropping of fruits and eventual drying up of branches, resulting in loss for several years.

SUMMARY

A total of 107 species of coccids, under 11 families, have been reported occurring in various parts of West Bengal. Host plants and distributional range are mentioned for each species. General morphology, a key to families and some notes on economic importance are given. One new combination, *Macropulvinaria burkilli*, has been proposed.

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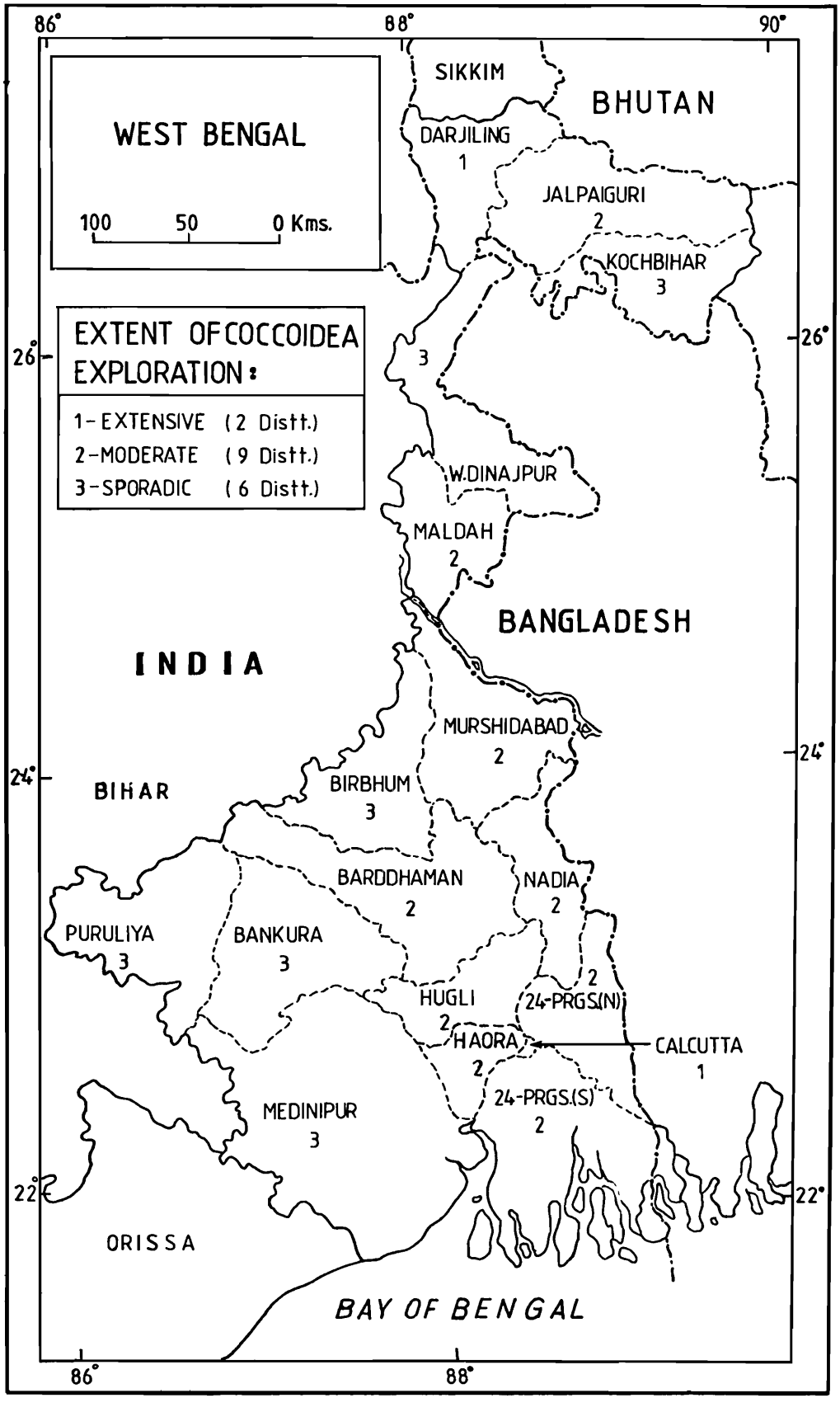
86°
88°
90°
WEST BENGAL
100 50 0 Kms.
EXTENT OF COCCOIDEA EXPLORATION :
1-EXTENSIVE (2 Distt.)
2-MODERATE (9 Distt.)
3-SPORADIC (6 Distt.)
SIKKIM
BHUTAN
DARJILING
1
JALPAIGURI
2
KOCHBIHAR
3
3
W.DINAJPUR
MALDAH
2
BANGLADESH
INDIA
MURSHIDABAD
2
BIHAR
BIRBHUM
3
BARDDHAMAN
2
NADIA
2
PURULIYA
3
BANKURA
3
HUGLI
2
24-PRGS.(N)
2
HAORA
2
CALCUTTA
1
24-PRGS.(S)
2
MEDINIPUR
3
ORISSA
BAY OF BENGAL
26°
24°
22°
86°
88°

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INSECTA : HEMIPTERA : REDUVIIDAE

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INTRODUCTION

The Reduviids or the "Assassin Bugs" are the heteropteran insects. These are small to large, robust or elongated, somewhat flattened, smooth, hairy or spiny bugs of predaceous habits. Some species are pathogenic. The group exhibits a remarkable variety in form, colouration and habits. It reaches its highest development in the tropical, and warmer temperate regions. The family is represented by about 2500 species belonging to 300 genera in the world (Essig, 1942). Nearly 450 species belonging to 129 genera of 14 sub-families are so far known from the Indian subregion (Miller 1959 a, b; Muraleedharan 1976; Cook 1977; Samuel and Joseph 1953 Wygddzinsky and Lent 1980; Ambrose and Livingstone 1986; Livingstone and Murugan 1987; Livingstone and Ravichandran 1988; Livingstone and Ravichandran 1990).

Our knowledge on Reduviid fauna from West Bengal is scanty. A perusal of literature reveals that altogether 90 spp. belonging to 46 genera in 9 subfamilies are so far known from the state of West Bengal (Distant 1902, 1910; Cook 1977). The present work is an attempt to provide a comprehensive account of 73 species belonging to 43 genera of the family Reduviidae from West Bengal. The material for remaining 17 species (Marked*) in 12 genera were not available for study. As such, these are not dealt with in this paper. The work is based on the recent collections made by different party members and also the old collections represented in Zoological Survey of India. This account deals with a brief note on earlier investigations, keys to taxa, geographical distribution of each species and literature reference. Charts showing the districtwise distribution of 90 species from West Bengal have also been included in this paper.

The classification of the family has been mainly adopted after Distant (1902, 1910) and for some of the subfamilies Miller (1959) and Cook (1977) have been followed.

GENERAL DIAGNOSIS

The group is characterised by head narrow, longer than broad; pointed anteriorly; antennae filiform, apical segments often very fine, four or five-segmented; eyes well developed; ocelli when present placed behind the eyes; rostrum short, curved, stout, usually three-segmented, pointed and with 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 normal, hairy or spiny; fore legs somewhat raptorial, tarsi one-two-or three-segmented with claws.

CLASSIFIED LIST OF SPECIES/SUB SPECIES

Subfamily I. SAICINAE

Genus 1. ***Polytoxus*** Spin.

1. *Polytoxus pallescens* Distant

Subfamily II. TRIBELOCEPHALINAE

Genus 2. ***Tribelocephala*** Stal

2. *Tribelocephala indica* (Walker)

Genus 3. ***Apocaucus*** Distant

3. *Apocaucus laneus* Distant

Subfamily III. STENOPODINAE

Genus 4. ***Pygolampis*** Germ.

4. *Pygolampis unicolor* Walker

Genus 5. ***Sastrapada*** Amy. & Serv.

5. *Sastrapada baerensprungi* (Stal)

Genus 6. ***Oncocephalus*** Klug.

6. *Oncocephalus annulipes* Stal

7. *O. impudicus* Reut.

8. *O. morosus* Distant

9. *O. naboides* (Walker)

Subfamily IV. ACANTHASPIDINAE

Division PSOPHARIA

Genus 7. ***Psophis*** Stal

10. *Psophis erythraea* Stal

Division EPIRODERARIA

Genus 8. ***Centrocnemis*** Signoret

11. *Centrocnemis* stali Reut.

Division REVUVIARIA

Genus 9. ***Reduvius*** Lam.

12. *Reduvius knyvetti* Distant

Genus 10. ***Isdegardes*** Dist.

13. *Isdegardes melanocephalus* Distant

Division ACANTHASPISARIA

Genus 11. ***Acanthaspis*** Burmeister

14. *Acanthaspis fulvipes* (Dallas)
15. *A. lineatipes* Reuter
16. *A. maculata* (Distant)
17. *A. sexguttata* (Fabricius)

Division LENAEARIA

Genus 12. ***Velitra*** Stal

18. *Velitra rubropicta* (Amy. & Serv.)
19. *V. sinensis* (Walker)

Genus 13. ***Sminthocoris*** Distant

20. *Sminthocoris fusipennis* (Stal)

Division CONORHINARIA

Genus 14. ***Conorhinus*** Lap.

21. *Conorhinus rubrofasciatus* (de Geer)

Subfamily V. PIRATINAE

Genus 15. ***Ectomocoris*** Mayr

22. *Ectomocoris atrox* (Stal)
23. *E. cordiger* Stal
24. *E. elegans* (Fabricius)
25. *E.ochropterus* Stal
26. *E. quadriguttatus* (Fabricius)

Genus 16. ***Pirates*** Serv.

27. *Pirates affinis* Serv.
28. *P. arcuatus* (Stal)
29. *P. atromaculatus* (Stal)
30. *P. lepturoides* (Wolff)
31. *P. sanctus* (Fabr.)

Genus 17. ***Sirthenea*** Spin.

32. *Sirthenea flavipes* (Stal)

Subfamily VI. ECTRICHODIINAE

Genus 18. ***Scadra*** Stal

33. *Scadra cincitocornis* Kirby

Genus 19. ***Ectrychotes*** Burm.

34. *Ectrychotes abbreviatus* Reut.

35. *E. crudelis* (Fabr.)

36. *E. dispar* Reut.

37. *E. pilicornis* (Fabr.)

38. *E. scutellaris* (Bredd.)

Genus 20. ***Haematorrhopus*** Stal

39. *Haematorrhopus tuberculatus* Stal

Genus 21. ***Vilius*** Stal

40. *Vilius melnopterus* Stal

Subfamily VII. HARPACTORINAE

Division HARPACTORARIA

Genus 22. ***Lopocephala*** Lap.

41. ***Lepocephala guerini*** Lap.

Genus 23. ***Rnynocoris*** Hahn.

42. *Rhynocoris costalis* (Stal)

43. *R. fuscipes* Fabr.

44. *R. marginellus* (Fabr.)

45. *R. nigricollis* (Dallas)

Genus 24. ***Sphedanolestes*** Stal

46. *Sphedanolestes bowringi* Distant

47. *S. indicus* Reut.

48. *S. mendicus* (Stal)

49. *S. pubinotum* Reut.

50. *S. pulchriventris* (Distant)

Division VESBIARIA

Genus 25. ***Vesbius*** Stal

51. *Vesbius purpureus* (Thumb.)

52. *V. sanguineous* Stal.

Division SYCANARIA

Genus 26. ***Sycanus*** Amy. & Serv.

53. *Sycanus affinis* Reut.

54. *S. collaris* (Fabricius)

Division EUAGORASARIA

Genus 27. ***Euagoras*** Burm.

55. *Euagoras plagiatus* (Burm.)

Genus 28. ***Macracanthopsis*** Reut.

56. *Macracanthopsis hampsoni* Distant

Genus 29. ***Cydnocoris*** Stal

57. *Cydnocoris crocatus* Stal

Genus 30. ***Villanovanus*** Distant

58. *Villanovanus dichrous* (Stal)

Genus 31. ***Endochus*** Stal

59. *Endochus atricapillus* Distant

60. *E. nigricornis* Stal

Genus 33. ***Epidaus*** Stal

62. *Epidaus atrispinus* Stal

63. *E. famulus* (Stal)

Genus 34. ***Isyndus*** Stal

64. *Isyndus reticulatus reticulatus* (Stal)

Genus 35. ***Rihirbus*** Stal

65. *Rihirbus trochantericus* Stal

Division CORANUSARIA

Genus 36. ***Coranus*** Curtis

66. *Coranus fuscipennis* Reut.

67. *C. obscurus* (Kirby)

68. *C. spiniscutis* Reut

Division POLIDIDUSARIA

Genus 37. ***Gallobelgicus*** Distant

69. *Gallobelgicus typicus* Distant

Genus 38. ***Scipinia*** Stal

70. *Scipinia horrida* (Stal)

Genus 39. ***Irantha*** Stal

71. *Irantha armipes* (Stal)

Genus 40. ***Polididus*** Stal

72. *Polididus armatissimus* Stal

Subfamily VIII. NABIDINAE

Division NABIDINARIA

Genus 41. ***Nabis*** Latr.

73. *Nabis capsiformis* Germ.

SYSTEMATIC ACCOUNT

Key to subfamilies of the family Reduviidae

1(2) Rostrum three jointed 3

2(1) Rostrum four jointed ..... Nabidinae

3(4) Ocelli absent 5

4(3) Ocelli present 7

5(6) Antenniferous tubercles laterally obliquely prominent; prontoum transverse; first joint of antennae incrassate; body tomentose ..... Tribelocephalinae

6(5) Antenniferous tubercles not prominent; pronotum not transverse; first joint of antennae long & slender; body sericeous or pilose ..... Saicinae

7(8) Hemelytra without a quadrangular 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; first joint of antennae rarely very short, generally elongate; space between the eyes transverse ..... Harpactorinae

9(10) Hemelytra without a discoidal cell 11

10(9) Hemelytra with a doscoidal cell somewhat hexangular & touching base of the membrane, or largely triangular ..... Stenopodinae

11(12) Scutellum with its apex triangular or subtriangular 13

12(11) Scutellum with its apex broad & two or three spined ..... Ectrichodiinae

13(14) Pronotum constricted before or near middle; anterior tarsi three jointed ..... Acanthaspidinae

14(13) Pronotum constricted behind middle ..... Piratinae

Subfamily SAICINAE

Genus 1. ***Polytoxus*** Spin. 1858

1858. *Polytoxus*, Spin. *Ins. Art* : 47.

1. ***Polytoxus pallescens*** Distant

1903. *Polytoxus pallescens* Distant, A.M.N.H. (7) XI, : 257.
1903. *Polytoxus pallescens* : Distant, *Fauna Brit. India*, **2**:218.

Material examined : 1 ex., Calcutta, 20.xii.1906, coll.?

Distribution : India : West Bengal (Calcutta); Uttar Pradesh. Elsewhere : Sri Lanka.

Subfamily TRIBELOCEPHALINAE

Key to genera of the subfamily TRIBELOCEPHALINAE

1(2) Head oblong, its base moderately constricted, anteriorly spinously developed; pronotum transverse, narrowed from behind middle; antennae with first joint incrassate ..... ***Tribelocephala***

2(1) Head with the anterior lobe moderately porrect & a little produced infront of eyes, but clothed with long curled hairs; pronotum narrowed anteriorly, the basal area centrally sulcately impressed; antennae longly pilose, not incrassate ..... ***Apocaucus***

Genus 2. ***Tribelocephala*** Stal, 1853

1853. *Tribelocephala*, Stal, *Ofv. Vet. Ak. Forh.* : 263.

2. ***Tribelocephala indica*** (Walker)

1873. *Ophistoplatys indica* Walker, *Cat. Het.*, **8**:20.
1902. *Tribelocephala indica* : Distant, *Fauna Brit. India* **2** : 220.

Material examined : 2 exs., Darjiling, singla, v. 1913, coll. Lord Carmichael.

Distribution : West Bengal (Darjeeling). Elsewhere : Sri Lanka.

Genus 3. ***Apocaucus*** Distant, 1909.

1903. *Apocaucus*, Distant, A.M.N.H. (8) 3:506.

3. ***Apocaucus laneus*** Distant

1909. *Apocaucus laneus* Distant, A.M.N.H. (8) 3:507.
1910. *Apocaucus laneus* : Distant, *Fauna Brit. India* 5:185.

Material examined : 1 ex., Calcutta, 25.x.1912, coll. F.H. Gravely.

Distribution : West Bengal (Calcutta, Darjiling).

Subfamily : STENOPODINAE

Key to the genera of the subfamily STENOPODINAE

1(2) First joint of rostrum longer than two apical joints together ..... ***Pygolampis***

2(1) First joint of rostrum not longer than two apical joints together 3

3(4) Anterior femora with two series of small spines beneath; pronotum longer than broad ..... ***Sastrapada***

4(3) Anterior femora incrassated & with a single series of spines beneath ..... ***Oncocephalus***

Genus 4. ***Pygolampis*** Germ, 1817

1817. *Pygolampis*, Germ., *Fauna : Ins. Eur.* : 8.

4. ***Pygolampis unicolor*** Walker

1873. *Pygolampis unicolor* Walker, *Cat. Het.* 8:36.
1902. *Pygolampis unicolor* : Distant, *Fauna Brit. India* 2 : 223.

Material examined : 1 ex., Chowringhee, Calcutta, 2.xi.1911, coll. F.H. Gravely; 1 ex., Calcutta, 2.viii.1914, coll. F.H. Gravely.

Distribution : West Bengal (Calcutta).

Genus 5. ***Sastrapada*** Amy. & Serv., 1843

1843. *Sastrapada*, Amy & Serv. *Hem.*, : 388.

5. *Sastrapada baerensprungi* (Stal)

1859. *Harpagochare baerensprungi* Stal, *Vet. AK. Forh.*, 381.
1902. *Sastrapada baerensprungi* : Distant, *Fauna Brit. India*, **2** :224.

Material examined : 1 ex., Darjiling, Pashok, vi. 1916, coll. L.C. Hartless.

Distribution : India : West Bengal (Darjiling); Sikkim. Elsewhere : Sri Lanka.

Genus 6. *Oncocephalus* Klug, 1830.

1830. *Oncocephalus,* Klug, *Symb. Phys.*, : 2.

Key to the species of the genus ***Oncocephalus***

1(2) Hemelytra fully developed 3

2(1) Hemelytra abbreviated; pronotum without lateral median spines; anterior lobe of pronotum is more than twice as long as the posterior lobe. ..... *morosus*

3(4) Anteocular & postocular areas of head almost equal in length; pronotum profoundly sinuate at anterior margin; rostrum with first joint slightly shorter than the second ..... *naboides*

4(3) Anteocular portion of head longer than postocular area 5

5(6) Anteocular portion longer but less than twice the length of the postocular portion; spines on the anterolateral angles of anterior lobe robustly produced; anterior femora incrassated but elongate ..... *impudicus*

6(5) Anteocular portion more than twice the length of the postocular area; scutellar spine elongate, slightly curved upward; anterior angle of the anterior lobe of pronotum laterally compressed and tuberculous ..... *annulipes*

6. *Oncocephalus annulipes* Stal

1855. *Oncocephalus annulipes* Stal, *Ofv. Vet. A.K. Forh* : 44.
1902. *Oncocephalus annulipes* : Distant, *Fauna Brit. India*, **2** : 231.

Material examined : 2exs., Calcutta, 28.vi.1908, coll. Mus. ; 1 ex., Calcutta, 7.vi.1916, coll. Kemp; 1ex., Calcutta, Tollygunj, 4.v.1962, coll. K.S. Pradhan; 2 exs., Haldia, Medinipur, 2.ii.1986; coll. K.K. Roy and party.

Distribution : India : West Bengal (Calcutta, Medinipur); Bihar; Maharashtra; Kashmir. Elsewhere: Burma; Sri Lanka.

7. *Oncocephalus impudicus* Reut.

1883. *Oncocephalus impudicus* Reut., *Act. Soc. Fern.*, **12**:715.
1902. *Oncocephalus impudicus* : Distant, *Fauna Brit. India*, **2** : 229.

Material examined : 1ex., Darjiling, Pashok, 26.v.1914-vi.1916, coll. F.H. Gravely.

Distribution : West Bengal (Darjiling); Sikkim.

8. *Oncocephalus morosus* Distant

1902. *Oncocephalus morosus* Distant, *Fauna Brit. India*, **2** : 235.

Material examined : 2 exs., Darjiling, Singla, vi.1913, Coll. Lord Carmichael.

Distribution : West Bengal (Darjiling); Sikkim.

9. *Oncocephalus naboides* (Walker)

1873. *Pirates naboides* Walker, *Cat. Het.* **8**:121.
1902. *Oncocephalus naboides* : Distant, *Fauna Brit. India*, **2**:228.

Material examined : 1 ex., Calcutta, 20.vi.1908, coll. N.A.

Distribution : West Bengal (Calcutta).

Subfamily ACANTHASPIDINAE

Key to Division of the subfamily ACANTHASPIDINAE

1(2) Head pronotum spinulose or tuberculose; coxae and femora somewhat spinose .....*Epiroderaria*

2(1) Head, pronotum unarmed 3

3(4) Head long; postocular area much longer than the anteocular area; antennae remote from eyes .5

4(3) Head not so long; postocular area almost of equal length to the anteocular area 7

5(6) Antennae inserted near apex of the head; distinct transverse impression between post & anteocular area absent .....*Pospharia*

6(5) Antennae inserted in between eye & apex of head; transverse impression between post & anteocular area or immediately behind eyes .....*Conorhinaria*

7(8) Body depressed; disc of the abdomen beneath distinctly flattened; antennae inserted close to eyes .....*Lenaearia*

8(7) Body oblong; disc of the abdomen beneath not flattened 9

9(10) Eyes & ocelli large & prominent, eyes extending transversely quite across the lateral area of head pronnotum boradly longitudinally impressed .....*Reduviaria*

10(9) Eyes & ocelli usually small; rarely large but then never extending transversely across the lateral area of head; pronotum not broadly longitudinally impressed .....*Acanthaspisaria*

Division PSOPHARIA

Genus 7. : ***Psophis*** Stal, 1863

1863. *Psophis* Stal, *Ann. Soc. ent. Fr.*, : 53.

10. ***Psophis erythraea*** Stal

1863. *Psophis erythraea* Stal, *Ann. Soc. Ent. Fr.*, 53.
1902. *Psophis erythraea* : Distant, *Fauna Brit, India*, **2** : 243.

Material examined : 1 ex., Darjiling, Kalimpong 24.iv.-10.v.1915 coll. F.H. Gravely; 1 ex., Darjiling, Karseong, Coll. Mus.

Distribution : West Bengal (Darjiling) Assam; Kerala.

Division EPIRODERARIA

Genus 8. ***Centrocnemis*** sign., 1852.

1852. *Centrocnemis* Sign. *Ann. Soc. Ent. Fr.*, 545.

11. ***Centrocnemis stali*** Reut.

1881. *Centrocnemis stali* Reut., *Act. Soc. Sc. finn.* 12 : 333.
1902. *Centrocnemis stali;* Distant *Fauna, Brit. India*, **2** : 246.

Material examined : 1 ex., Darjiling , Kalimpong, 24.iv.1915, coll. F.H. Gravely.

Distribution : West Bengal (Darjiling); Assam; Sikkim.

Division REDUVIARIA

Key to the Genera of the Division ***Reduviaria***

1(2) Head oblong; scutellum with its apex spinose or acute; anterior tibiae short, somewhat broadly compressed & curved; anterior lobe of pronotum, much shorter than the posterior lobe .....
.....*Reduvius*

2(1) Head broad; scutellum subtriangular , a little foveately depressed before apex, which is slender and acuminate; anterior tibiae provided with a spongy furrow of variable dimension; posterior lobe of pronotum less convex & wider than the anterior lobe ..... *Isdegardes*

Genus 9. ***Reduvius*** Lamarck, 1801

1801. *Reduvius* Lamarck, *Syst.*, : 296.

12. ***Reduvius knyvetti*** Distant.

1902. *Reduvius knyvetti* Distant, *Fauna Brit. India*, 2:251.

Material examined : 1cx., Darjiling, Pashok, 26.v.1911, coll. F.H. Gravely; 1cxz., Darjiling, Kurseong, 26.vi.1910, coll. Annandale; 1cx., Darjiling, Ghumti, 2.vii.1911, coll. F.H. Gravely.

Distribution : West Bengal (Darjiling); Sikkim.

Genus 10 ***Isdegardes*** Distant

1909. *Isdegardes* Distant *Ann. Soc. Ent. Blg.* **3** : 365.

13. ***Isdegardes melanocephalus*** Distant

1909. *Isdegardes melanocephalus* Distant, *Ann. Soc. Ent. Blg.*, **3**:365.
1910. *Isdegardes melanocephalus* : Distant, *Fauna Brit. India*, **2** : 192.

Material examined : 1 ex., Calcutta, 13.vi.1915, coll. C. Paiva.

Distribution : West Bengal (Calcutta).

Remarks : Material is badly damaged due to flood during 1943.

Division ACANTHASPISARIA

Genus 11 ***Acanthaspis*** Amy. & Serv., 1843

1843. *Acanthaspis*, Amy. & Serv., *Ilem* : 336.

Key to species of the Genus ***Acanthaspis***

1(2) Posterior lobe of pronotum with two short but prominent discal tubercles; pronotum unicolours, unspotted ..... *fulvipes*

2(1) Posterior lobe of pronotum discally unarmed 3

3(4) Pronotum with the anterior & posterior lobe differently clourd the central salcation to the posterior pronotal lobe not much broad 5

4(3) Pronotum with anterior & posterior lobe of same colour; posterior lobe of pronotum centrally broadly sulcate & with five transverse basal spot ..... *sexguttata*

6(5) Posterior pronotal lobe without any spots; a small spot on the postocular area of the head; membrane without any spot; corium without such spots ..... *lineatips*

14. *Acanthaspis fulvipes* (Dallas)

1850. *Playmeris fulvipes* Dallas, *Tr. Ent. Soc.*: f.3.
1902. *Acanthaspis fulvipes* : Distant, *Fauna Brit. India*, **2** : 259.

Material examined : 1 ex., Darjiling, Sevok, 16.v.1915, coll. M. Masson; 1 x., Sukna,? coll. N.A.

Distribution : India : West Bengal (Darjiling); Assam; Sikkim. Elsewhere : Bangladesh, Bhutan.

15. *Acanthaspis lineatipes* Reut.

1881. *Acanthaspis lineatipes* Reut, *Act. Soc. Fenn.* 12 : 328.
1902. *Acanthaspis lineatipes* : Distant, *Fauna Brit. India*, **2** : 268.

Material examined : 1ex., Darjiling, Rangpo, 29.v.1974, coll. J.K. Jonathan.

Distribution : West Bengal (Darjiling).

16. *Acanthaspis maculata* (Distant)

1903. *Velitra maculata* Distant, *Ann. Soc. nt. Belg.*, : 58.
1910. *Acanthaspis maculata* Distant, *Fauna Brit, India*, **5** : 194.

Material examined : 1 ex., Calcutta, 26.vi.1908, coll. J.B.R.; 2 exs., Medinipur, Kharagpur, 17-30.vi.1911, coll. R.S. Hodgart.

Distribution : India : West Bengal (Calcutta, Medinipur); Punjab. Elsewhere : Burma.

17. *Acanthaspis sexguttata* (Fabricius)

1775. *Reduvius sexguttata* Fabricius, *Syst. Ent.*, : 832.
1902. *Acanthaspis sexguttata* : Distant, *Fauna Brit. India* : 270.

Material examined : 5exs., Calcutta, 25.vi.1907, coll. Mus.; 1 ex., Calcutta, 11.viii.1907, coll.?

Distribution : West Bengal (Calcutta); Karnataka.

Division LENAEARIA

Key to the Genera of the Division LENAEARIA

1(2) Prosternal process acute, sulcate, posteriorly recurved; posterior tibia & femora almost subequal in length ..... ***Velitra***

2(1) Prosternal process straight, not recurved, second joint of antennae four or five times as long as first ..... ***Sminthocoris***

Genus 12. *Velitra* Stal, 1865

1865. *Velitra*, Stal, *Hem. Afr.* **3** : 122.

Key to the species of the Genus *Velitra*

1(2) Spots to corium elongate, reddish ochraceous or testaceous; legs unicolours ..... *rubropicta*

2(1) Spots to corium transverse, stramineous or creamy white; legs piceous ..... *sinensis*

18. *Velitra rubropicta* (Amy. & Serv.)

1843. *Opinus rubropicta* Amy. & Serv. *Hem.*, : 339.
1902. *Velitra rubropicta* : Distant, *Fauna Brit, India*, **2** : 276.

Material examined : 1 ex., Calcutta, coll. Mus.

Distribution : India : West Bengal (Calcutta). Elsewhere : Burma; Java; Malayan Penninsula.

19. *Velitra sinensis* (Walker)

1873. *Reduvius sinensis* Walker, *Cat. Het.* **7**:196.
1902. *Velitra sinensis* : Distant, *Fauna Brit. India*, **2** : 277.

Material examined : 1 ex., Bankura, Puruliya, 7.xi.1985, coll. M. Datta.

Distribution : India : West Bengal (Bankura). Elsewhere : Sri Lanka; China; Hongkong.

Genus 13. *Sminthocoris* Distant, 1902.

1902. *Sminthocoris*, Distant, *Fauna Brit. India*, **2** : 279.

20. *Sminthocoris fuscipennis* (Stal)

1874. *Sminthus fuscipennis* Stal, *En. Hem.*, **4** :68.
1902. *Smithocoris fuscipennis* : Distant, *Fauna Brit, India*, **2** : 280.

Material examined : 1 ex., Darjiling, Pashok, ? coll. F.H. Gravely.

Distribution : India : West Bengal (Darjiling); Assam; Arunachal Pradesh; Meghalaya. Elsewhere: Burma.

Division CONORHINARIA

Genus 14. ***Conorhinus***, Lap. 1832.

1832. *Conorhinus*, Lap., *Ess. Hem*, : 78.

21. ***Conorhinus rubrofasciatus*** (de Geer)

1773. *Cimex rubrofasciatus* de Geer, *Mem*, 3 : 349, pl. XXV.
1902. *Conorhinus rubrofasciatus* : Distant, *Fauna Brit. India*, **2** : 286.

Material examined : 1 ex., North 24-Parganas, Barasat, 2.iii.1965, coll. B.K.B.; 1 ex., North 24-Parganas, Ramkrishnapur, Sodepur, North 24-Parganas, 25.xii.1967, coll. K.D. Chatterjee; 2 exs., Calcutta, iii.1924, coll. S. Ribiro; 1 ex., Jambani forest, Jhargram, Medinipur, 3.viii.1983, coll. A.K. Hazra.

Distribution : India : West Bengal : (Calcutta, Medinipur, North 24-Parganas); Andaman Islands; Maharashtra; Karnataka. Elsewhere : Burma; Bangladesh; Sri Lanka; Malay; Madagascar; West Africa.

Subfamily PIRATINAE

Key to genera of the subfamily PIRATINAE

1(2) Head of moderate length; antennae inserted near, or not remote from eyes; intermediate tibiae generally provided with a spongy furrow 3

2(1) Head long, porrect, antennae inserted remotely from eyes; intermediate tibiae without a spongy furrow ..... *Sirthenea*

3(4) Spongy furrow, occupying more than half of anterior tibiae ..... *Ectomocoris*

4(3) Spongy furrow occupying less or not more than half of anterior tibiae ..... *Pirates*

Genus 15. ***Ectomocoris*** Mayr., 1865

1865. *Ectomocoris*, Mayr. *Verh Z-b. Gs. Wien*, **15** : 438.

Key to species of the Genus ***Ectomocoris***

1(2) Pronotum bicolorous; posterior lobe palely coloured ..... *quadriguttatus*

2(1) Pronotum unicolorous 3

3(4) Legs ochraceous; unicolorous 5

4(3) Legs not unicolorous; antennae ochraceous, first joint black; apical joint of rostrum castaneous; apices of the coxae & legs pale ochraceous; trochanters, anterior femora, apical halves of intermediate & posterior femora black .....*atrox*

5(6) Second joint of antennae shorter than anterior lobe of pronotum; inner margin of clavus linear; fascia near lateral margin of corium & apex of membrane fuscous .....*ochropterus*

6(5) Second joint of antennae about as long as anterior lobe of pronotum 7

7(8) Body black; base of claval suture, an oblique subclaval spot & two linear fasciae near lateral margin of corium and a transverse fascia near base of membrane purplish black .....*elegans*

8(7) Body piceous to opaque; apical half of clavus confluent with a somewhat similar spot on corium & a small spot on other area of basal cell to membrane are luteous .....*cordiger*

22. *Ectomocoris atrox* (Stal)

1855. *Pirates atrox* Stal, *Ofv. Vot.-Ak. forh.*, : 187.
1902. *Ectomocoris atrox* : Distant, *Fauna Brit. India*, **2** : 296.

Material examined : 1ex., Calcutta, 29.x.1911., coll. F.H.G.; 1 ex., Darjiling, Singla, v.1913, coll. Lord Camichael.

Distribution : India : West Bengal (Calcutta, Darjiling). Elsewhere : Burma; China; Sri Lanka; Malaya.

23. *Ectomocoris cordiger* Stal.

1866. *Ectomocoris cordiger* Stal, *Ofv. Vet.-Ak. Form.*, 256.
1902. *Ectomocoris cordiger* : Distant, *Fauna Brit. India*, **2** : 295.

Material examind : 2 exs., Calcutta, 10.xi.1907, coll. Mus.; 2 exs., Calcutta, 18.vi.1907, coll. Mus.; 1 ex., Calcutta, 23.vi.1908, coll. Mus.; 1 x. Calcutta v. 1914, coll. F.H. Gravely; 1 ex., Calcutta, x.1911, coll. F.H. Gravely.

Distribution : India : West Bengal (Calcutta); Maharashtra. Elsewhere : Bangladesh; Sri Lanka.

24. *Ectomocoris elegans* (Fabricius)

1883. *Reduvius elegans* Fabricius, *Syst. Rhync.* : 270.
1902. *Ectomocoris elegans* : Distant, *Fauna Brit. India*, **2** : 295.

Material examined : 1 ex., Calcutta, Eden Garden; 2 exs, Calcutta, 26.x.1949, coll. A.P. Kapur.

Distribution : India : West Bengal (Calcutta); Uttar Pradesh. Elsewhere : Burma; Malaya; Siam.

25. *Ectomocoris ochropterus* Stal

1866. *Ectomocoris ochropterus* Stal, *Ofv. Vet.-AK. Forh.* : 256.
1902. *Ectomocoris ochropterus* : Distant, *Fauna Brit. India*, **2** : 294.

Material examined : 1 ex., Calcutta, ?; Coll ?.

Distribution : West Bengal (Calcutta); Bihar; Orissa.

26. *Ectomocoris quadriguttatus* (Fabricius)

1781. *Reduvius quadriguttatus* Fabricius, *Spec. Inss.* **2** : 380.
1902. *Ectomocoris quadriguttatus* : Distant, *Fauna Brit. India*, **2** : 29.

Material examined : 2 exs., Calcutta,? coll.?

Distribution : India : West Bengal (Calcutta); Maharashtra; Pondicherry. Elsewhere : Sri Lanka.

Genus 16. *Firates* Serv., 1831

1831. *Pirates*, Serv., *Ann. Sc. Nat.*, **23**:215.

Key to the species of the Genus *Pirates*

1(2) Anterior femora minutely tuberculously spinose beneath 3

2(1) Anterior femora not spinose beneath 5

3(4) Legs wholly black or brown; anterior pronotal lobe strongly striate, the striae longitudinal on disk and oblique on lateral areas ..... *affinis*

4(3) Legs flavescent, apices of the femora fuscous , anterior pronotal lobe with a central fine linear sulcation, merged in a foveate spot near base ..... *sanctus*

5(6) Membrane spotted, body black 7

6(5) Membrane fuscous, unicolorous, body piceous black spongy furrow to anterior tibiae occupying an a thord part of their undersurface ..... *lepturodies*

7(8) Membrane with an arcuate transverse fascia near its base and subapical rounded spot ..... *arcuatus*

8(7) Membrane with a large discal black spot and a small black spot near base of clavus .... *atromaculatus* .

27. *Pirates affinis* Serv.

1831. *Pirates affinis* Serv., *Ann. Sc. Nat.* **13**:216.
1902. *Pirates affinis* : Distant, *Fauna Brit. India*, **2** : 299.

Material examined : 1 ex., Calcutta, 2.ii.1915, coll. F.H. Gravely.

Distribution : India : West Bengal (Calcutta); Assam; Maharashtra; Meghalaya. Elsewhere : Burma; Java; Malay Peninsula.

28. *Pirates arcuatus* (Stal)

1870. *Spilodermus arcuatus* Stal, *Ofv. vet. Akad. Forh.*, : 692.
1902. *Pirates arcuatus* : Distant, *Fauna Brit. India*, **2** : 300.

Material examined : 1 ex., Calcutta, 27.vii. 1914, coll. F.H. Gravely; 1 ex., Calcutta, v.1914, coll. F.H. Gravely.

Distribution : India : West Bengal (Calcutta); Assam; Kerala; Meghalaya. Elsewhere : Burma; Philippines.

29. *Pirates atromaculatus* (Stal)

1870. *Cleptocoris atromaculatus* Stal. ofv. Vet.-AK. Forh., : 692,
1902. *Pirates atromaculatus* : Distant, *Fauna Brit. India*, **2**:30.

Material examined : 2exs., Darjiling, Singla, vi.1913, coll. Lord Carmichael; 1 ex., Darjiling, 21..ix.1959, coll. B.K. Tikadar; 1 ex., Calcutta, 19.vi.1907, coll. C. Paiva.

Distribution : India : West Bengal (Calcutta, Darjiling); Assam; Meghalaya; Nagaland. Elsewhere: Burma; Java; Philippines.

30. *Pirates lepturoides* (Wolff)

1804. *Reduvius lepturoides* Wolff, Ic. 4:65.
1902. *Pirates lepturoides* : Distant, *Fauna Brit. India*, **2** : 301.

Material examined : 1 ex., Calcutta, 20.v.1914, coll. F.H. Gravely.

Distribution : India : West Bengal (Calcutta); Bihar; Maharashtra; Orissa Uttar Pradesh. Elsewhere: Burma; Borneo; Java; Sri Lanka.

31. ***Pirates sanctus*** (Fabricius)

1787. *Reduvius sanctus* Fabricius, *Mant.* **2**:310.
1902. *Pirates sanctus* : Distant, *Fauna Brit. India*, **2** : 298.

Material examined : 3exs., Calcutta, 20.vi.1908, coll. N.A.; 1ex., Calcutta, Museum building, 3.ii.1940, coll. Chatterjee; 1 ex., Calcutta, 25.v.1912, coll. F.H. Gravely; 1 ex., Medinipur, Kharagpur, 17-30.vi.1911, coll. R. Hodgart; 1 ex., Haora, Sibpur, 11.1922, coll. H.S. Rao.

Distribution : India : West Bengal (Calcutta, Haora, Medinipur); Bihar; Orissa. Elsewhere : Burma; Sri Lanka.

Genus 17. ***Sirthenea*** Spin, 1840

1840. *Sirthenea*, Spin, *Ess. Hem.*, : 100.

32. ***Sirthenea flavipes*** (Stal)

1855. *Rasahus flavipes* Stal, *Ofv. - AK. Forh.*, : 187.
1902. *Sirthenea flavipes* : Distant, *Fauna Brit. India*, **2** : 303.

Material examined : 7 exs., Calcutta, 9.xi.1907, coll. Mus; 1 ex., Calcutta, 11.xi.1907, coll. Mus.

Distribution : India : West Bengal (Calcutta); Assam; Nagaland. Elsewhere : Borneo; China; Japan; Java; Philippines; Sri Lanka.

Subfamily ECTRICHODIINAE

Key to genera of the subfamily ECTRICHODIINAE

1(2) Antennae with eight joints 3

2(1) Antennae with six joints; anterior femora strongly incrassated 5

3(4) Scutellum with two apical spinous angulations; rostrum with first joint about as long as remaining joints together ..... ***Scadra***

4(3) Scutellum with three apical spinous angulations, the middle one minute ..... ***Ectrychotes***

5(6) Abdomen above rugose not globose; abdomen beneath not longitudinally impressed or with the first four segments linearly medially impressed ..... ***Haematorrhophus***

6(5) Abdomen globose, above levigate, not rugose ..... ***vilius***

Genus 18. *Scadra* Stal, 1859

1859. *Scadra*, Stal, *Ofv. Vet.-AK. Forh.*, : 176&182.

33. *Scadra cincticornis* Kirby

1891. *Scadra cincticornis* Kirby, *J. Linn. Soc., Zool.* XXIV : 119.
1902. *Scadra cincticornis* : Distant, *Fauna Brit. India*, **2**:310.

Material examined : 1ex., Koch Bihar, Mathabhanga, 17.viii.1986, coll. T.K. Pal; 1 ex., N.E. of Reyana river, 1.iv.1973, coll. H.S. Sharma.

Distribution : India : West Bengal (Darjiling); Uttar Pradesh. Elsewhere : Burma; Sri Lanka.

Genus 19. *Ectrychotes* Burm., 1835.

1835. *Ectrychotes*, Burm., *Handl* **2** : 237.

Key to the species of the Genus *Ectrychotes*

1(2) Pronotum not unicolorous 3

2(1) Pronotum unicolorous 7

3(4) Lateral areas of posterior pronotal lobe palely coloured 5

4(3) Anterior & posterior pronotal lobes differently coloured; sternum, legs, transverse fasciae to fourth & fifth ventral segments & the sixth & anal segments bright bluish black; interior area of corium, membrane & a spot on a last dorsal abdominal segment black ..... *pilicornis*

5(6) Head, pronotum sternum shining coppery green, scutellum, corium, abdomen beneath rostrum leg luteous; corium with a large chocolate brown spot occupying the whole of disk & clavus; apical halve of femora, base & apices of tibiae & tarsi coppery brown or green ..... *scutellaris*

6(5) Body shining violaceous; scutellum, base of abdomen clavus, base & lateral margin of corium, apices of coxae, trochanteres, basal half of posterior femora, base of tarsi coral red ..... *dispar*

7(8) Anterior femora with an anterior vitta near apex, the dull ochraceous dorsal disk of the last two abdominal segments not punctate ..... *crudelis*

8(7) Bases of the anterior femora coral red; the dosal disk of the last two abdominal segments densely punctate ..... *abbreviatus*

34. *Ectrychotes abbreviatus* Reut.

1881. *Ectrychotes abbreviatus* Reut. *Act. Soc. Sc. Fern.* **12**:303.
1902. *Ectrychotes abbreviatus*; Distant, *Fauna Brit. India*, **2**:317.

Material examined : 1ex., North 24-Parganas, Barasat, Bamunmura, 20.v.1965, coll. M.S.S. & B.K.B.; 1 ex., Haora, Chunahati, 31.viii.1964, coll. S. Ali; 1 ex., Haora, B. Garden, 28.vi.1965, coll. P. Parui; 1 ex., Calcutta, 11.xi.1910, coll. F.H. Gravely.

Distribution : India : West Bengal (Calcutta, Haora, North 24-Parganas); Bihar; Uttar Pradesh.

35. *Ectrychotes crudelis* (Fabricius)

1803. *Reduvius crudelis* Fabricius, *Syst. Rhync.* : 269.
1902. *Ectrychotes crudelis* : Distant, *Fauna Brit. India*, 2:316.

Material examined : 1ex., Calcutta, 16.viii. 1902, coll. Mus.; 1ex., Calcutta, 14.viii. 1904, coll. Broenetti.

Distribution : India : West Bengal (Calcutta). Elsewhere : Burma; Malayasia.

36. *Ectrychotes dispar* Reut.

1881. *Ectrychotes dispar* Reut, *Act. Soc. Sc. Fen* 12:304.
1902. *Ectrychotes dispar* : Distant, *Fauna Brit, India.* 2:315.

Material examined : 1ex., south 24-Parganas, Sonarpur, 18.vii.1964, coll. S.K. Ghosh; 1x., Calcutta, 17.viii.1916, coll. Thang Man; 1 ex., Calcutta, 3.x.1907, coll. Mus.

Distribution : India : West Bengal (Calcutta, south 24-Parganas); Bihar; Karnataka, Maharashtra, Orissa. Elsewhere : Bangladesh; Nepal.

37. *Ectrychotes pilicornis* (Fabr.)

1787. *Reduvius pilicornis* Fabricius, *Mantins*, 2:311.
1902. *Ectrychotes pilicornis* : Distant, *Fauna Brit. India*, 2:314.

Material examined : 1ex., South 24-Parganas, Madhupur, 3.v.1986, coll. B.N. Das & Party; 1ex., South 24-Parganas, Casipur, 2.v.1986, coll. B.N. Das & Party.

Distribution : West Bengal (South 24 Parganas); Uttar Pradesh.

38. *Ectrychotes scutellaris* (Bredd.)

1803. *Ectrichodia scutellaris* Bredd., *Zool. Anz.* 2b, : 512.
1902. *Ectrychotes scutellaris* : Distant, *Fauna Brit, India*, 2 : 316.

Material examined : 2exs., Darjiling, Singla, vi. 1913, coll. Lord Carmichael.

Distribution : West Bengal (Darjiling); Assam; Meghalaya; Sikkim.

Genus 20. *Haematorrhophus* Stal, 1874.

1874. *Haematorrhophus*, Stal, *En. Hem.* 4:49.

39. *Haematorrhophus tuberculatus* Stal

1874. *Haematorrhophus tuberculatus* Stal, *En. Hem.* **4** : 49.
1902. *Physcrhynchus tuberculatus* : Distant, *Fauna Brit. India*, **2** : 320.
1977. *Haematorrhophus tuberculatus* : Coock, *Oriental Insects*, **11**(1) : 79.

Material examined : 2exs., Darjiling, Sukna, iv.1913, coll. Lord Carmichael.

Distribution : India : West Bengal (Calcutta); Assam. Elsewhere : Burma ; Sri Lanka.

Genus 21. *Vilius* Stal, 1863.

1863. *Vilius*, Stal, *Ann. Soc. Ent. Fr.*, : 43.

40. *Vilius melanopterus* Stal.

1863. *Vilius malanopterus* Stal, *Ann. Soc. Ent. Fr.* : 45.
1902. *Vilius malanopterus* : Distant, *Fauna Brit. India*, **2** : 325.

Material examined : 1ex., Calcutta, 27.vii. 1906, coll. C.A. Paiva

Distribution : India : West Bengal (Calcutta); Assam. Elsewhere : Burma; Sri Lanka.

Subfamly HARPACTORINAE

Ky to the Division of the subfamily HARPACTORINAE

1(2) Antennae long, its first joint longer than head 3

2(1) Antennae short, the first joint not longer than head ..... *Coranusaria*

3(4) Head without any spine or tubercle 5

4(3) Head armed with a spine or tubercle behind the base of each antennae; lateral pronotal angles spinous or at least prominent ..... *Euagorasaria*

5(6) Anterior femora granulate, generally nodose or nodulose & always spinous ..... *Poldidusaria*

6(5) Anterior femora neither granulate nor nodulose & without any spine 7

7(8) Postocular & anteocular area almost subequal in length; abdominal segments lobately dialated; head almost as long as pronotum; body oblong & subelongate ..... *Harpactoraria*

8(9) Postocular area longer than the anteocular area 9

9(10) Postocular area nearly three times longer than the anteocular area; the eyes are inserted near the apex of the head ..... *Vesbiaria*

10(9) Postocular area more than three times longer than the anteocular area; abdomen on each side much dilated; head distinctly longer than pronotum ..... *Sycanaria*

Division HARPACTORARIA

Key to the Genera of the Division HARPACTORARIA

1(2) First joint of antennae as long as head ..... *Lopocephala*

2(1) First joint of antennae much longer than head; about as long as anterior femora 3

3(4) Posterior lobe of pronotum not longitudinally impressed ..... *Rhinocoris*

4(3) Posterior lobe of pronotum longitudinally impressed ..... *Sphedanolestes*

Genus 22. ***Lopocephala*** Lap., 1832

1832. *Lopocephala* Lap., *Ess. Hem.*, : 12.

41. ***Lopocephala guerini*** Lap.

1832. *Lopocephala guerini* Lap., *Ess. Hem.*, 12.
1902. *Lopocephala guerini* : Distant, *Fauna Brit. India.* **2** : 331.

Material examined : 1ex., Calcutta, 27.viii. 1906, coll. C. Paiva.

Distribution : West Bengal (Calcutta); Assam, Andhra Pradesh; Gujarat; Goa; Orissa.

Genus 23. ***Rhynocoris*** Hahn, 1834.

1834. *Rhinocoris*, Hahn, *Wanz. Ins.*, 2 : 20.

Key to species of the genus ***Rhinocoris***

1(2) First joint of rostrum distinctly longer than anteocular area of head 3

2(1) First joint of rostrum not or scarcely longer than anteocular area of head 5

3(4) Pronotal lobes concolorous; first joint of antennae about equal in length to anterior femora; pronotum with anterior lobe posteriorly centrally impressed ..... *marginellus*

4(3) Pronotal lobes not concolorous; posterior lobe tubous; abdomen beneath unicolorous; first joint of antennae shorter than anterior femora; anterior lobe of pronotum not sculptured & with a central cruciform impression ..... *nigricollis*

5(6) Body coral red; upper surface of postocular area & a lateral fascia behind eyes black; segmental fascia to abdomn beneath and the legs black; pronotum with anterior lobe distinctly sculptured. ..... *fuscipes*

6(5) Body black; a spot between & a lateral spot behind eyes, coral red; coxae trochanters and abdomen beneath coral red; coxae trochanters and abdomen beneath coral red; pronotum with anterior lobevery obscurely sculptured ..... *costalis*

42. ***Rhynocoris costalis*** (Stal)

1866. *Reduvius costalis* Stal, *ofv. Vet.-AK. Forh.*, : 285.
1902. *Harpactor costalis* : Distant, *Fauna Brit. India,* **2** : 334.
1986. *Rhynocoris costalis* : Ambrose & Livingstone, *J. Bombay, nat. Hist. Soc.*, **83** (1) : 176.

Material examined : 1 ex., Medinipur, Salbani, 9.viii.1985, coll. B.C. Das.

Distribution : India : West Bengal, (Medinipur); Assam. Elsewhere : Burma; Malay; Peninsula.

43. ***Rhynocoris fuscipes*** (Fabricius)

1787. *Reduvius fuscipes* Fabricius, *Mant. Ins.* **2** :312.
1902. *Rhinocoris fuscipes* : Distant, *Fauna Brit. India,* **2** : 333.
1986. *Rhynocoris fuscipes* : Ambrose & Livingstone, *J. Bombay nat. Hist. Soc.*, **83**(1) : 176.

Material examined : 1 ex., Murshidabad, Beldanga, 13.x.1983, coll. A.K. Hazra; 1ex., Calcutta, Garia, 27.vi.1908, coll. J.B.R.

Distribution : India : West Bengal (Murshidabad); Maharashtra; Orissa; Tamil Nadu. Elsewhere: Sri Lanka.

44. ***Rhynocoris marginellus*** (Fabricius)

1803. *Reduvius marginellus* Fabricius, *Syst. Rhyag.* : 271.
1902. *Harpactor marginellus* : Distant, *Fauna Brit. India,* **2** : 334.
1986. *Rhynocoris marginellus* : Ambrose & Livingstone, *J. Bombay nat. Hist. Soc.*, **83**(1) : 176.

Material examined : 1ex., Calcutta, Botanical Garden, 21.vi.1961, coll. S. Ali.

Distribution : India : West Bengal (Calcutta); Assam; Sikkim. Elsewhere : Burma.

45. *Rhynocoris nigricollis* (Dallas)

1850. *Arilus nigricollis* Dallas. *Tr. E.S.*, : 8.
1902. *Harpactor nigricollis* : Distant *Brit. India*, 2:335.
1986. *Rhynocoris nigricollis* : Ambrose & Livingstone, *J. Bombay nat. Hist. Soc.*, 83(1) : 176.

Material examined: 1ex., Darjiling, 7.ix.1909, coll. Bruenetti; 1ex., Darjiling, Kurseong, 1..ix.1909, coll. N. Annandale; 1ex., Darjilig, Ghumti, vii. 1911, coll. F.H. Gravely.

Distribution : India : West Bengal (Darjiling); Sikkim. Elsewhere : Bhutan; Burma; Sumatra.

Genus 24. *Sphedanolestes* Stal 1866.

1866. *Sphedanolestes*, Stal. *Ofv. Vet. - AK. Forh.* : 284 & 288.

Key to species of the genus *Sphedanolestes*

1(2) Pronotum unicolorous, or palely pubescent 3

2(1) Pronotum bicoloured , anterior lobe and posterior margins sanguineous, rest black; head with a large spot behind eyes black, pronotum distinctly impressed on postrior lobe ..... *mendicus*

3(4) Pronotum sangunieous; first joint of rostrum, a large spot on each side of head, s small spot on each side of eyes pale luteous ..... *bowringi*

4(3) Pronotum black 5

5(6) Membrane longly passing the abdominal apex; pronotum with a broad central impression which reaches middle of the posterior lobe 7

6(5) Membrane just passing the abdominal apex; anterior pronotal lobe centrally sulcate, posterior lobe discally broadly impressed ..... *indicus*

7(8) Head with anteocular & postocular region about equal in length; anterior femora distinctly nodulose; body violaceous black ..... *pulchriventris*

8(7) Head with the postocular a little longer than the anteocular area; anterior femora not nodulose; body black ..... *pubinotum.*

46. *Sphedanolestes bowringi* Distant

1909. *Sphedanolestes bowringi* Distant *Ann. Soc. Ent. Blg.* 3:369.
1910. *Sphedanolestes bowringi* : Distant, *Fauna Brit. India*, 5 : 205.

Material examined : 1ex., Darjiling, Singla, vi.1913, coll. Lord Carmichael.

Distribution : West Bengal (Darjiling).

47. *Sphedanolestes indicus* Reut

1881. *Sphedanolestes indicus* Reut, *Act. Soc. Sc. Penn.* **12**:289.
1902. *Sphedanolestes indicus* : Distant, *Fauna Brit. India* : 340.

Material examined : 1 ex., Darjiling, Pashok, 26.v.1916, coll. F.H. Gravely.

Distribution : India : West Bengal (Darjiling).

48. *Sphedanolestes mendicus* (Stal)

1866. *Reduvius mendicus* Stal, Ofv. *Vet.-AK. Forh.*, : 286.
1902. *Sphedanolestes mendicus* : Distant, *Fauna Brit. India*, **2**:341.

Material examined : 2 exs., Calcutta? Coll. J.W.M.

Distribution : India : West Bengal (Calcutta); Assam; Gujarat, Meghalaya. Elsewhere : Burma; Malay Peninsula.

49. *Sphendanolestes pubinotum* Reut.

1881. *Sphedanolestes pubinotum* Reut., *Act. Soc. Fenn.* **12**:289.
1902. *Sphedanolestes pubinotum* : Distant , *Fauna Brit. India,* **2**:340.

Material examined : 1ex., Darjiling, Pashok, 11.x.1917, coll. F.H.G.; 1ex., Darjiling, Kurseong, 8.x.1909, coll. N.A.; Darjiling,, Kalimpong, 24.iv.-10.v.1915, coll. F.H. Gravely.

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya; Sikkim. Elsewhere : Burma.

50. *Sphendanolestes pulchriventris* (Distant)

1836. *Reduvius pulchriventris* Stal, *Ann. Soc. Ent. Fr.* : 37.
1902. *Sphedanolestes pulchriventris* : Distant, *Fauna Brit. India,* **2**:340.

Material examined : 2exs., Darjiling, Kalimpong, 24.iv.-10.v.1915, coll. F.H. Gravely.

Distribution : West Bengal (Darjiling).

Division VESBIARIA

Genus 25. *Vesbius* Stal, 1865

1865. *Vesbius*, Stal, *Hem. Afr.*, **3**:50.

Key to species of the genus *Vesbius*

1(2) Smaller in size (7-8 mm);trochanters and femora black ..... *purpureus*

2(1) Larger in size (8-11 mm.) ; trochanters and bases of femora sanguineous ..... *sanguineous*

51. *Vesbius purpureus* (Thunb)

1784. *Cimex purpureus* Thunb., *Nov. Ins. Sp.*, **3**:57.
1902. *Vebius purpureus* : Distant, *Fauna Brit. India*, **2**:344.

Material examined : 1ex., Calcutta, Museum Campus, 29.v.1975, coll. S.K. Mitra.

Distribution : India : West Bengal (Calcutta); Assam; Meghalaya Elsewhere : Burma; Java; Philippines.

52. *Vesbius sanguineous* Stal

1874. *Vesbius sanguineous* Stal. *En. Hem.*, **4**:36.
1902. *Vesbius sanguineous* : Distant, *Fauna Brit, India*, **2**:345.

Material examined : 1ex., Darjiling, Singla,v.1913, coll. Lord Carmichael.

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya Elsewhere : Burma; Borneo; Java; Malaya Peninsula.

Division SYCANARIA

Genus 26. *Sycanus* Amy. & Serv., 1843.

1843. *Sycanus*, Amy. & Serv., *Hem.*, : 360.

Key to species of the genus *Sycanus*

1(2) Apical half of corium pale straminceous; abdomen with the posterior angle of the third and fourth segments more or less acute ..... *collaris*

2(1) Apical third of corium straminceous or ochraceous ; abodmen with the posterior angle of the third and fourth segments convex ..... *affinis*

53. *Sycanus affinis* Reut.

1881. *Sycanus affinis* Reut., *Act. Soc. Sc. Fenn.* **12**:285.
1902. *Sycanus affinis* : Distant, *Fauna Brit, India*, **2**:353.

Material examined : ex., Darjiling, Singla, v.1913, coll. Lord Carmichael.

Distribution : West Bengal (Darjiling); Assam; Meghalaya; Kerala.

54. *Sycanus collaris* (Fabricius)

1781. *Reduvius collaris* Fabr., *Spec. Ins.* **2**:380.

1902. *Sycanus collaris* : Distant, *Fauna Brit. India*, 2:351.

Material examined : 1ex., Mdinipur, Jhargram, 15.ix.1985, coll. S. Biswas; 1ex., Medinipur , Jhargram, Jambani forest, 3.viii. 1983, coll. A.K. Hazra; 1ex., Bankura, Susunia, 27.x.1985, coll. M. Dutta.

Distribution : India : West Bengal (Bankura, Medinipur) Assam. Elsewhere : Ceylon.

Divsion EUAGORASARIA

Key to the Genera of the Division EUAGORASARIA

1(2) Anterior tibiae simple, not inwardly spined before apex 3

2(1) Anterior tibiae incurved and spined before apex ..... ***Rihirbus***

3(4) Anterior lobe of pronotum not prominently tuberculous on each side 5

4(3) Anterior lobe of pronotum prominently tuberculous on each side ..... ***Isyndus***

5(6) Posterior lobe or pronotum not discally spined 7

6(5) Posterior lobe of pronotum discally spined 15

7(8) First joint of rostrum considerably shorter than second 9

8(7) First joint or rostrum longer than second 11

9(10) Head with a tubercle behind base of each antenna ..... ***Euagoras***

10(9) Head spined behind base of each antenna ..... ***Macracanthopsis***

11(12) Head shorter than pronotum 13

12(11) Head about as long as pronotum ..... ***Endochus***

13(14) Anteocular and postocular areas of head about equal in length ..... ***Cydnocoris***

14(13) Postocular area of head about half as long as anteocular area ..... ***Villanovanus***

15(16) Head about as long as pronotum ..... ***Platerus***

16(15) Head shorter than pronotum and with a tubercle behind base of each antenna; scutellum without a suberect spine ..... ***Epidaus***

Genus 27. ***Euagoras***., Burm. 1835

1835. *Euagoras* , Burm. *Handb.*, 2:226.

55. *Euagors plagiatus* (Burm.)

1834. *Zelus plagiatus* Burm., *Nov. Act. Ac. Nat. Cur.* 14 Suppl. i.:303.
1902. *Euagoras plagiatus* : Distant, *Fauna Brit. India*, 2 : 363.

Material examined: 2ex., Calcutta,? Mus. Coll.; 1x., Darjiling, Sukna, 2.vii.1908, coll. No.; 1 ex., Darjiling, Karmatala 8.xi.1973, coll. N. Sharma.

Distribution : India : West Bengal (Calcutta, Darjiling); Assam; Andaman; Meghalaya.Elsewhere: Burma; Java; Philippines.

Genus 28. *Macracanthopsis* Reut, 1881

1881. *Macracanthopsis*, Reut., *Act. Soc. Sc. Fenn.*, 12:282.

56. *Macracanthopsis hampsoni*. Distant

1909. *Macracanthopsis hampsoni* Distant, *Ann. Soc. Ent. Belg.*, 13:371.

Material examined: 1ex., Darjiling, Kalimpong, 14.iv.-10.v.1915, coll. F.H. Gravely.

Distribution : West Bengal (Darjiling).

Genus 29. *Cydnocoris* Stal, 1866.

1866. *Cydnocoris*, Stal, *Ofv. Vet.-AK. Forh.*, 274.

57. *Cydnocoris crocatus* Stal

1866. *Cydnocoris crocatus* Stal, *Ofv. Vet.-AK. Forh.* : 274.
1902. *Cydnocoris crocatus* : Distant, *Fauna Brit. India*, 2 : 361.

Material examined : 1ex., Darjiling, Singla, vi.1913, coll. Lord Carmichael.

Distribution : India : West Bengal. Elsewhere : Burma.

Genus 30. *Villanovanus* Distant, 1902.

1902. *Villanovanus*, Distant, *Fauna Brit. India*, 2 : 364.

58. *Villanovanus dischrous* (Stal)

1863. *Endochus dischrous* Stal, *Ann. Soc. Ent., Fr.*, : 26.
1902. *Villanovanus dischrous* : Distant, *Fauna Brit. India*, 2 : 364.

Material examined : 2exs., Darjiling , Singla, v.1913, coll. Lord. Carmichael; 1ex., Darjiling, Sukna, v.1913, coll. Lord Carmichael.

Distribution : India : West Bengal (Darjiling); Assam; Nagaland. Elsewhere : Bangladesh.

Genus 31. ***Endochus*** Stal, 1959.

1959. *Endochus* Stal, *Ofv. Vet.-AK. Forh.*, : 194.

Key to the species of the genus ***Endochus***

1(2) Ochraceous or pale luteous; scutellum unarmed; head unarmed ..... *nigricornis*

2(1) Golden yellow; scutellum with an apical tuberculous spine; head with a short acute spine behind middle ..... *atricapillus*

59. ***Endochus atricapillus*** Distant

1902. *Endochus atricapillus* Distant, *Fauna; Brit. India,* **2**:367.

Material examined : 1ex., Darjiling, Singla,v.1913, coll. Lord Carmichael.

Distribution : West Bengal (Darjiling); Sikkim.

60. ***Endochus nigricornis*** Stal.

1859. *Endochus nigricornis* Stal, *Ofv. Vet.-AK. Forh.*, : 194.
1902. *Endochus nigricornis* : Distant, *Fauna Brit. India*, **2**:365.

Material examined : 1ex., Darjiling, Singla, vi.1913. coll. Lord Carmichael.

Distribution : India : West Bengal (Darjiling); Assam. Elsewhere : Bangladesh; Burma; Malay Peninsula.

Genus 32. ***Platerus*** Dist., 1903.

1903. *Platerus*, Distant. A.M.N.H. (7) **11**:247.

61. ***Platerus pilcheri*** Distant

1903. *Platerus pilcheri* Distant, A.M.N.H.(7) 248.
1903. *Platerus pilcheri* : Distant, *Fauna Brit. India*, **2**:375.

Material examined : 1ex., Darjiling, Brich hills.,? coll. M. Banerjee; 2 exs., Darjiling, vii.1912, coll.?

Distribution : West Bengal (Darjiling); Sikkim.

Genus 33. *Epidaus* Stal, 1859.

1859. *Epidaus* Stal, *Ofv. Vet-AK. Forh.*, : 103.

Key to the species of the Genus *Epidaus*

1(2) Anterior lobe of pronotum sculptured; body pale tawny brown; lateral spines to the posterior lobe of pronotum slightly recurved ..... *atrispinus*

2(1) Anterior lobe of pronotum not sculptured; body dull ochraceous; the base of the lateral spines to the posterior lobe of pronotum notched, spines are not recurved ..... *famulus*.

62. *Epidaus atrispinus* Distant

1902. *Epidaus atrispinus* : Distant, *Fauna Brit. India,* **2**:372.

Material examined : 1 ex., Darjiling, Kurseong, 21-29.v.1906, coll. N. Annandale.

Distribution : West Bengal (Darjiling); Sikkim.

63. *Epidaus famulus* (Stal)

1863. *Endochus famulus* Stal, *Ann. Soc. ent. Fr.*, 27.
1902. *Epidaus famulus* : Distant, *Fauna Brit. India*, **2**:372.

Material examined : 1 ex., Darjiling; Kalimpong, 24.iv.-10.v.1915, coll. F.H. Gravely.

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya. Elsewhere : Burma.

Genus 34. *Isyndus* Stal, 1858

1858. *Isyndus*, Stal, *Ofv. Vet.-AK. Forh.*, 445.

64. *Isyndus reticulatus reticulatus* (Stal)

1969. *Isyndus reticulatus reticulatus* Dispins, *Entomologist*, **25**:66-72.

Material examined : 2 exs., Darjiling, Ghoom, 8.vii.1914, coll. Lord Carmichael.

Distribution : India : West Bengal (Darjiling); Sikkim. Elsewhere : China, Japan.

Genus 35. *Rihirbus* Stal, 1861.

1861. *Rihirbus*, Stal, *Stett. ent. Zit.* **22**:129.

65. *Rihirbus trochantericus* Stal

1861. *Rihirbus trochantericus* Stal, *Stett. ent. Zeit.* **22** : 132.
1902. *Rihirbus trochantericus* : Distant, *Fauna Brit. India,* **2**:378.

Material examined : 1 ex., Darjiling, Kalimpong, 24.iv.10.v.1915, coll. F.H. Gravely.

Distribution : India : West Bengal (Darjiling); Assam; Kerala. Elsewhere : Burma; Philippines; Sri Lanka.

Division CORANUSARIA

Genus 36. *Coranus* Curtis, 1833

1833. *Coranus*, Curtis, *Brit. Ent.* **10**:453.

Key to species of the Genus *Coranus*

1(2) First joint of antennae almost as long as head; body testaceous to fuscous; membrane bronzy fuscous; antennae brownish ochraceous ..... *spiniscutis*

2(1) First joint of antennae distinctly shorter than head; membrane brassy black; antennae piceous 3

3(4) Connexivum above and beneath pale testaceous with transverse piceous spots, tibiae black, annulated with pale testaceous near base and apex ..... *fuscipennis*

4(3) Connexivum ochraceous broadly spotted with black; tibiae ochraceous; with basal medial and apical piceous anulations ..... *obscurus*

66. *Coranus fuscipennis* Reut.

1881. *Coranus fuscipennis* Reut., *Act. Soc. Sc. Fenn.* **12**:275.
1902. *Coranus fuscipennis* : Distant, *Fauna Brit. India,* **2** : 381.

Material examined : 2 exs., Calcutta.,? Mus. coll.

Distribution : India : West Bengal (Calcutta); Kerala. Elsewhere : Sumatra.

67. *Coranus obscurus* (Kirby)

1891. *Harpactor obscurus* Kirby, *J. Linn. Soc. Zool.* **24** : 120.
1902. *Coranus obscurus* : Distant, *Fauna Brit. India*, **2** : 381.

Material examined : 1 ex., Darjiling, Kalimpong, 24.iv.10.v.1915, coll. F.H. Gravely.

Distribution : India : West Bengal (Calcutta, Darjiling); Assam; Nagaland; Sikkim. Elsewhere : Sri Lanka; Burma.

68. *Coranus spiniscutis* Reut.

1881. *Coranus spiniscutis* Reut., *Act. Soc. Sc. Fenn.* **12**:275.
1902. *Coranus spiniscutis* : Distant, *Fauna Brit. India*, **2**:381.

Material examined : 2 exs., Calcutta,? coll. Mus.

Distribution : India : West Bengal (Calcutta); Assam; Bihar. Elsewhere : Burma.

Division POLIDIDUSARIA

Key to genera of the Division POLIDIDUSARIA

1(2) Head with the central lobe not spinously produced 3

2(1) Head with the central lobe longly spinously produced; rostrum with first joint passing the eyes. ..... ***Gallobelgicus***

3(4) First and second joint of rostrum subequal in length ..... ***Scipinia***

4(3) First joint of rostrum always longer than second 5

5(6) Postocular area of the head much longer than anteocular, anterior femora spined ..... ***Irantha***

6(5) Postocular area as long as or a little longer than anteocular; all the femora spined ..... ***Polididus***

Genus 37. *Gallobelgicus* Distant

1906. *Gallobelgicus typicus* Distant, A.M.N.H. (7) 18 : 371.
1910. *Gallobelgicus typicus* : Distant, *Fauna Brit. India*, **5** :216.

Material examined : 1 ex., Darjiling, Pashok, vi. 1916, coll. L.C. Hartless.

Distribution : India : West Bengal (Darjiling). Elsewhere : Sri Lanka.

Genus 38. ***Scipinia*** Stal, 1861

1861. *Scipinia*, Stal, *Stett. ent. Zeitt.* 22 : 137 & 138.

70. ***Scipinia horrida*** (Stal)

1859. *Scipinia horrida* Stal, *Freg. Eng. Resa, Ins.*, : 262.
1902. *Scipinia horrida* : Distant, *Fauna Brit. India*, 2:384.

Material examined : 4 exs., Darjiling, Singla,? v. 1913, coll. Lord Camichael.

Distribution : India : West Bengal (Darjiling). Elsewhere : Burma; Philipines; Sri Lanka.

Genus 39. ***Irantha*** Stal, 1861.

1861. *Irantha* Stal, *Stett. Ent. Zeit.*, 22 : 137.

71. ***Irantha armipes*** (Stal)

1855. *Harpactor armipes* Stal, *Ofv,. Vet.-AK. Forh.*, : 189
1902. *Irantha armipes* : Distant, *Fauna Brit. India*, 2:385.

Material examined : 1ex., Darjiling, Pashok, vi.1916 coll. L.C. Hartless.

Distribution : India : West Bengal (Darjiling); Kerala. Elsewhere : Sri Lanka.

Genus 40. ***Polididus*** Stal, 1858.

1858. *Polididus*, Stal, *Ofv. Vet.-AK. Forh.*, 378.

72. ***Polididus armatissimus*** Stal

1859. *Polididus armatissinus* Distant, *Ofv. vet. AK. Forh.*, 378.
1902. *Polididus armatissimus* Distant, *Fauna Brit. India*, 2:386.

Material examined : 2 exs., Calcutta, 23.vi.1907, coll. Mus. 1ex., Calcutta, 26.x.1949, coll. A.P. Kapur; 1ex., Darjiling, Kurseong, 13.-16.vii.1907, Mus. coll. 1ex., Calcutta, 28.xi.1907, coll. Mus.

Distribution : India : West Bengal (Calcutta, Darjiling); Bihar; Orissa; Maharashtra; Punjab. Elsewhere : Burma; Bangladesh; China; Japan; Philippines; Sri Lanka.

Subfamily NABIDINAE

Division NABIDINARIA

Genus 41. *Nebis* Latr., 1807.

1807. *Nabis*, Latr., *Gen.*, 3:127.

73. *Nabis capsiformis* Germ.

1837. *Nabis capsiformis* Germ., *Silb. Rev.* 5 : 132.
1902. *Nabis capsiformis* : Distant, *Fauna Brit. India*, 2:400.

Material examined : 2 exs., Calcutta, 6.xi.1907, Mus. coll.

Distribution : India : West Bengal (Calcutta); Bihar; Maharashtra; Orissa. Elsewhere : Burma; Ethiopia; Nearctic; Palaearctic.

SUMMARY

Out of 90 species so far known from the state of West Bengal, the paper incorporates an account of 73 species belonging to 43 genera distributed over 8 subfamilies of Family Reduviidae from the state of West Bngal. Keys to taxa, geographical distribution, literature references are provided in the paper. Besides, distribution of all 90 species in the State of West Bengal are shown in the charts. An upto date list of species of Reduviidae of West Bengal is also incorporated.

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THE CHART SHOWING DISTRICT WISE DISTRIBUTION OF REDUVIIDAE SPECIES SO FAR KNOWN FROM WEST BENGAL

	Name of the Species	Darjiling	Jalpaiguri	Koch-Bihar	West Dinajpur	Maldah	Murshidabad	Birbhum	Nadia	Bardhaman	Puruliya	Bankura	Haora	Hugli	24-Parganas (N)	24-Parganas (S)	Medinipur	Calcutta
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	*Acanthaspis fulvipes* (Dallas)	-		-	-	+							-	-	-	-	-	-
2.	*A. lineatipes* Reut		-	-	-	+	-						-	-	-		-	-
3.	*A. maculata* (Distant)	-			+							+	-	-	-	-	-	-
4.	*A. pernobilis* Reut*			-	-	+	-						-	-	-	-	-	-
5.	*A. quinquespinosa* (Fabricius)*			-		+					-		-	-	-	-	-	-
6.	*A. rugulosa* Stal*			-	+		-		-		-		-	-	-	-	-	-
7.	*A. sexguttata* (Fabricius)			-	+	-				-	-		-	-	-	-	-	-
8.	*Allaeocranum quadrisignatum* Reut*	-			-	+		-			-		-	-	-	-	-	-
9.	*Apocaucus laneus* Distant	-		-	+	+	-				-		-	-	-	-	-	-
10.	*Centrocnemis stali* Reut	-		-	-	+	-						-	-	-	-	-	-
11.	*Conorhinus rubrofasciatus* de Geer		-		+	-					-	+	-		+	-	-	-
12.	*Coranus fuscipennis* Burm.			-	+	-			-		-	-	-	-	-	-	-	-
13.	*Coranus obscurus* (Kirby)				+	+							-		-	-	-	-
14.	*Coranus spiniscutis* Reut				+								-			-	-	

	Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
15.	*Cydnocoris crocatus* Stal					+	-			-	-	-		-	-		-	-
16.	*Ectomocoris atrox* (Stal)	-			+	-	-							-	-	-	-	-
17.	*E. cordiger* Stal	-			+	+	-					-		-	-		-	-
18.	*E. elegans* (Fabricius)				+								-	-	-	-	-	-
19.	*E. ochropterus* Stal				+								-				-	
20.	*Ectomocoris quadriguttatus* (Fabricius)	-			+	-				-					-	-		-
21.	*Ectrychotes abbreviatus* Reut				+		+	-							-			
22.	*E. crudelis* Fabricius				+													-
23.	*E. cupreus* Fabricius*				+		-											
24.	*E. dispar* Reut				+		-							-			+	-
25.	*E. nigripes* Leth.				+		-								-			
26.	*E. pilicornis* (Fabricius)					+									-			
27.	*E. scutellaris* (Bredd.)					+												
28.	*Endochus atricapillus* Distant					+												
29.	*E. nigricornis* Stal					+												
30.	*Epidaus atrispinus* Stal					+												
31.	*E. famulus* (Stal)				+													
32.	*Eriximachus globosus* Distant																	
33.	*Euagoras plagiatus* (Burm.)				+	+												
34.	*Gallobelgicus typicus* Distant					+												

	Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
35.	*Haematorrhophus tuberculatus* Stal					+												
36.	*Holoptilus fasciatus* Reut*				+										-			
37.	*Irantha armipes* (Stal)					+												
38.	*Isdegardes melanocephalus* Distant				+									-	-			
39.	*Isyndus reticulatus reticulatus* Stal					+									-			
40.	*Lopocephala guerini* Lap.				+												-	-
41.	*Macracanthopsis hampsoni* Distant					+												
42.	*M. nodipes* Reut.*				+										-			-
43.	*Nabis capsiformis* Germ.				+										-		-	
44.	*Oncocephalus annulipes* Stal				+							+		-	-			-
45.	*O. impudicus* Reut.				+	+									-			
46.	*O. morosus* Distant					+					-						-	
47.	*O. naboides* Walker				+		-							-	-		-	-
48.	*O. modestus* Reut.*	-			+		-	-	-					-	-	-	-	-
49.	*O. schioedtei* Reut.*		-			-	-	+						-	-	-		-
50.	*Paralenaeus pyrrhomelas* Reut.*					+	-						-	-	-	-	-	-
51.	*Pirates affinis* serv.				+		-										-	-
52.	*P. arcuatus* (Stal)				+	-	-	-			-	-	-	-		-	-	-
53.	*P. atromaculatus* (Stal)		-	-	+	+	-			-	-	-	-	-	-		-	-
54.	*P. flavipes* (Walker)*				+	-	-		-	-		-	-	-	-		-	-

	Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
55.	*P. lepturoides* (Wolff)	-	-	-	+		-			-		-	-	-	-	-	-	-
56.	*P. sanctus* (Fabricius)	-	-		+		+	-		-		+	-	-	-	-	-	-
57.	*Platerus pilcheri* Distant		-		-	+			-		-		-	-	-	-	-	-
58.	*Polididus armatissiums* Stal		-	-	+	+							-	-	-	-	-	-
59.	*Polytoxus pallascens* Distant		-		+						-		-	-	-	-	-	-
60.	*Psophis erytharea* Stal		-			+							-	-	-	-	-	-
61.	*Pygolampis unicolor* Walker		-		+					-	-				-	-	-	-
62.	*Reduvius knyvetti* Distant		-			+							-		-	-	-	
63.	*Rhynocoris costalis* (Stal)										-	+			-		-	
64.	*R. fuscipes* (Fabr.)												+		-			-
65.	*R. marginellus* (Fabr.)				+											-	-	
66.	*R. nigricollis* (Dallas)					+											-	
67.	*Rihirbus trochantericus* Stal					+							-					
68.	*Sastrapada baerensprungi* (Stal)					+									-			-
69.	*Scadra annulipes* Reut.*				+													
70.	*S. cincitocornis* Kirby					+												
71.	*Scipinia horrida* (Stal)					+												
72.	*Sminthocoris fuscipennis* Stal					+												
73.	*Sphedanolestes bowringi* Distant					+												
74.	*S. indicus* Reut.																	

	Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
75.	*S. mendicus* (Stal)				+													-
76.	*S. pubinotum* Reut.					+												-
77.	*S. pulchriventricus* (Distant)					+				-	-				-			
78.	*Sfaccia diluta* (Stal)*				+										-		-	
79.	*Stegius pravus* Distant*								+		-						-	
80.	*Sycanus affinis* Reut		-	-		+				-	-				-		-	-
81.	*S. bifidus* Fabricius*				+					-		-				-		-
82.	*S. collaris* (Fabricius)	+	-							-					-	-	-	-
83.	*S. versicolor* Dohrn*		-		+						-	-			-		-	-
84.	*Tribelocephala indica* (Walker)		-	-		+						-	-		-		-	-
85.	*Velitra rubropicta* Amy. & Serv.		-	-	+						-				-		-	-
86.	*V. sinensis* (Walker)	+								-	-			-	-		-	
87.	*Vesbius purpureus* Thunb.		-		+					-	-	-	-		-	-	-	-
88.	*V. sanguinosus* Stal					+				-	-		-		-		-	-
89.	*Vilius melanopterus* (Stal)		-		+					-		-	-		-	-	-	-
90.	*Villanovanus dichorus* (Stal)					+						-	-		-		-	-

* Not included in the key due to non-availability of the material. However, references are provided in the appendix.

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APPENDIX

Seventeen species of Reduviid bugs which could not be examined due to nonavalability of materials from West Bengal, are provided with references as given below. These species (marked * in the distribution chart) are not included in the key.

1. *Acanthaspis pernobils* Reuter

1881. *Acanthaspis pernobilis* Reut., *Act. Soc. Fenn.*, **12**:325.
1902. *Acanthaspis pernobilis* : Distant, *Fauna Brit. India, Rhynachota*, 2:264.

2. *Acanthaspis quinquespinosa* (Fabricius)

1781. *Reduvius quinquespinosa* Fabricius, *Spec. Ins.*, 2:382.
1902. *Acanthaspis quinquespinosa* : Distant, *Fauna Brit. India, Rhynchota*, 2:257.

3. *Acanthaspis rugulosa* Stal

1863. *Acanthaspis rugulosa* Stal, *Ann. Soc. Ent. Fr.*, : 49.
1902. *Acanthaspis rugulosa*; Distant, *Fauna Brit. India, Rhynchota*, 2:264.

4. *Allaeocranum quadrisignatum* (Reut.)

1881. *Mecrocleptes quadrisignatum* Reut., *Act. soc. Sc. Fenn.*, **12**:333.
1192. *Allaocranum quadrisignatum* : Distant, *Fauna Brit. India, Rhynchota*, 2:250.

5. *Ectrychotes cupreus* Reuter

1881. *Ectrychotes cupreus* Reuter, *Act. Soc. Sc. Fenn.*, **12**:303.
1902. *Ectrychotes cupreus* : Distant, *Fauna Brit. Indian, Rhynchota,* 2:316.

6. *Ectrychotes nigripes* Leth.

1891. *Ectrychotes nigripes* Leth. *Ann. Soc. Ent. Belg.* 35 c.r., : 144.
1902. *Ectrychotes nigripes* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 318.

7. *Holoptilus fasciatus* Reuter

1881. *Holoptilus fasciatus* Reuer, *Act. soc. Sc. Fenn.*, **12**:272.
1902 *Holoptilus fasciatus* : Distant, *Fauna Brit. India, Rhynchota*, 2:200.

8. *Macracanthopsis nodipes* Reuter

1881. *Macracanthopsis nodipes* Reuter, *Act. Soc. Sc. Fenn.*, **12** : 282.
1902. *Macracanthopsis nodipes* : Distant, *Fauna Brit. India, Rhynchota*, 2:362.

9. *Oncocephalus modestus* Reuter

1883. *Oncocephalus modestus* Reuter, *Act. Soc. Sc. Fenn.*, **12**:716
1902. *Oncocephalus modestus* : Distant, *Fauna Brit. India. India, Rhynchota,* **2**:229.

10. *Oncocephalus schioedtei* Reuter

1883. *Oncocephalus schioedtei* Reut. *Act., soc. Sc. Fenn.*, **12**:702.
1902. *Oncocephalus schioedtei* : Distant, *Fauna Brit. India, Rhynchota*, **2**:232.

11. *Paralenaneus pyrrhomelas* Reuter

1881. *Paralenaneus pyrrhomelas* Reuter, *Act. Soc. Sc. Fenn.*, **12**:322.
1902. *Paralenaneus pyrrhomelas* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 279.

12. *Pirates flavipes* (Walker)

1873. *Lestomerus flavipes* Walker, *Cat. Het.*, **7**:93.
1902. *Pirates flavipes* : Distant, *Fauna Brit. India, Rhynchota,* **2**:297.

13. *Scadra annulipes* Reuter

1881. *Scadra annulipes* Reuter, *Act. soc. Sc. Fenn.*, **12**:309.
1902. *Scadra annulipes* Distant, *Fauna Brit. India, Rhynchota,* **2**:310.

14. *Staccia diluta* (Stal)

1859. *Oncocephalus diluta* Stal, *Freg. Eug. Resa, Ins. Hem.* : 236.
1902. *Staccia diluta* : Distant, *Fauna Brit. India, Rhynchota,* **2**:225.

15. *Stegius pravus* Distant

1902. *Stegius pravus* Distant, *Fauna Brit. India, Rhynchota,* **2**:323.

16. *Sycanus bifidus* (Fabricius)

1787. *Reduvius bifidus* Fabr., *Mant. Ins.*, **2**:312.
1902. *Sycanus bifidus* : Distant, *Fauna Brit. India, Rhynchota,* **2**:353.

17. *Sycanus versicolor* D ohrn

1859. *Sycanus versicolor* Dohrn, *Stett. ent. Zeit.*, **20**:96.
1902. *Sycanus versicolor* : Distant, *Fauna Brit. India, Rhynchota,* **2**:355.

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INSECTA : HEMIPTERA : LYGAEIDAE

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INTRODUCTION

The Lygaeids are small to medium sized oval and elongated insects which are second largest heteropteran ones. These are mostly phytoghaous but a few are thought to be predaceous. They are cosmopolitan in distribution. The majority are dull or black coloured, some are brightly coloured. They mostly occur on moss surface, rubbish beneath stones or low plants (herbs and shurbs).

A little over 250 species belonging to nearly 100 genera are known from Indian subregion (Distant 1904, 1910, 1918; Lefroy 1909; Pruthi 1925; Cherian 1933; Chatterjee 1937; Rangarajan *et al.* 1964; Subba Rao *et al,* 1965; Chopra and Rostogi 1980; Mukhopadhyay, 1980, 1988; Mukhopadhyay and Ghosh, L.K. 1982).

A perusal of literature reveals that a total of 88 lygaeid species belonging to 55 genera and 11 subfamilies are known from West Bengal (Mukhopadhyay 1980, 1988; Mukhopadhyay and Ghosh, L.K. 1982).

The present work is an attempt to provide a comprehensive account of the family Lygaeidae from West Bengal. This is based on the recent collections made by different survey party members and also the old collections present in the Zoological Survey of India. The account deals with a brief note on earlier investigations, keys to taxa, geographical distribution of each species and literature references. Charts showing the district-wise distribution of 19 species examined from various districts of West Bengal have also been included in the paper.

MATERIAL AND METHOD

Collection and Preservation

The insects are usually collected with the help of Aerial nets which are usually handled for catching these insets in flight and sweeping nets and swept through vegetations. They may be collected by beating of branches with a stick over a sheet of cloth or rexin (preferably white). Picking up of individual specimens from the bark or on lower side of leaves, with the help of forceps. Thse insects can also be collected in light trap method. Specimens are killed in an insect killing bottle. They are removed from the bottle as soon as killed, then dried on blotting paper and finally set on pin. All the specimens set on pin and labelled are finally stored in boxes with preservatives for study.

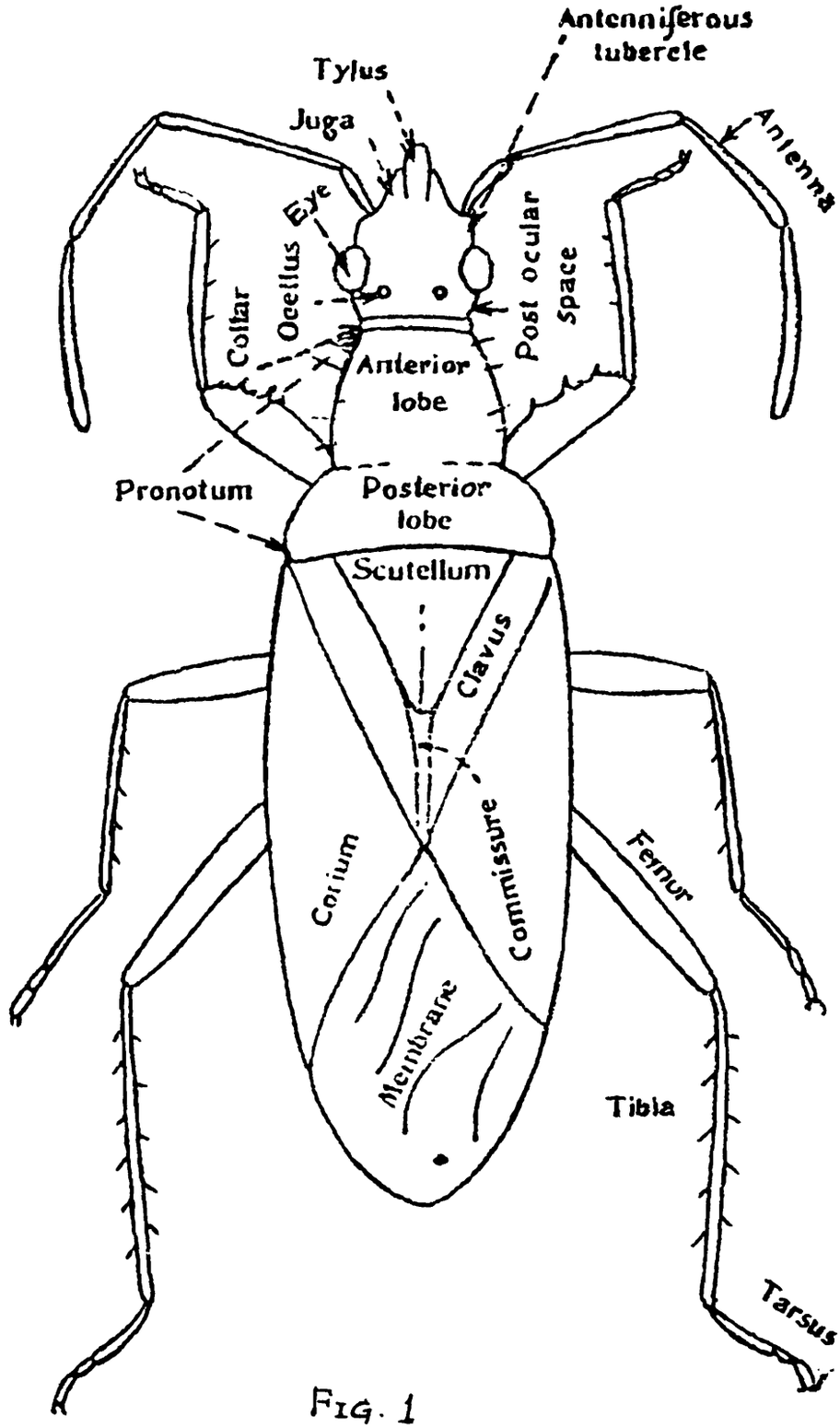

Fig. 1 – Structural features of a generalised adult Lygaeid

GENERAL DIAGNOSIS

The group is characterised by head short antennae 4-segmented, situated below a line drawn from the centre of the eye to the apex of the face, eyes normal to large and exerted; tarsi 3-segmented, presence of ocelli; Rostrum 4-jointed; absence of cuneous and abdomen without pore bearng plate or disc; Legs short, forelegs normal or raptorial (in some cases); hemelytra with elongated clavus and membrane prominent with 4-5 lose gitudine veins.

SYSTEMATIC ACCOUNT

Subfamily I. LYGAEINAE

Genus 1. ***Graptostethus*** Stal

1. *Graaptostethus servus* (Fabricius)
2. *G. trisignatus* Distant
3. *G. verticalis* (Dallas)

Genus 2. ***Lygaeosoma*** Spinola

4. *Lygaeosoma bipunctata* Dallas

Genus 3. ***Spilostethus*** Stal

5. *Spilostethus hospes* (Fabr.)
6. *S. pendruns militaris* (Fabricius)

Subfamily II. RHYPAROCHROMINAE

Genus 4. ***Dieuches*** Dohrn

7. *Dieuches femora* Dohrn
8. *Dieuches* sp.

Genus 5. ***Elasmolomus***

9. *Elasmolomus sordidus* (Fabr.)

Genus 6. ***Metochus*** Scoutt

10. *Metochus uniguttatus* (Thunberg)

Genus 7. ***Paromius*** Fieber

11. *Paromius gracilis* Rambur

12. *P. Pallidus* (Montrousier)

Genus 8. ***Pseudopachy brachius*** Malipatil

13. *Pseudopayhubrachius* guttus (Dalas)

Genus 9. ***Rhyparothesus*** Scudder

14. *Rhyparothesus sparsus* (Distant)

Subfamily III. PACHYGRONTHINAE

Genus 10. ***Pachygrontha*** Germer

15. *Pachygronotha bipunctata* Stal

Subfamily IV. GEOCORINAE

Genus 11. ***Geocoris*** Fallen

16. *Geocoris ochropterus* (Fieber)

Subfamily V. ORSILLINAE

Genus 12. ***Nysius*** Dallas

17. *Nysius ceylonicus* (Motchulsky)
18. *N. inconspicuus* Distant
19. *N. minor* Distant

Key to Subfamilies of LYGAEDIAE

1(2) IV and V sternite with suture not extending to lateral margin; usually three dorsal scent gland opening ..... Rhyparochrominae

2(1) All abdominal sutures extend to lateral margin; usually two dorsal gland opening 3

3(4) Segments II to VII with abdominal spiracles located dorsally 5

4(3) Not all abdominal spiracles dorsal 7

5(6) Apical margin of the corium sinuate at inner angle ..... Orsillinae

6(5) Apical margin of the corium straight ..... Lygaeinae

7(8) All abdominal spiracles ventral; cross veins and basal cells absent on membrane; femora heavily spined ..... Pachygronthinae

8(9) Not all abdominal spiracles ventral; abdominal spiracles of segment V to VII ventral .... Geocorinae

Key to the genera of **Lygaeinae**

1(2) Head totally valvety or shiny piceous black; pronotal base without lobular extenson; .... ***Lygaeosoma***

2(1) Head not totally black 3

3(4) Metathoracic scent gland opening inconspicous; Femora of legs in male usually spinose; brightly coloured insects usually with a combination of red and black ..... ***Spiostethus***

4(3) Metathoracic scent gland opening not as above; Femora in male mutic; colouration never as above; osteolar periteme distinct; Basal area of pronotum at least with two black maculate spots .... ***Graptostethus***

Subfamily LYGAEINAE

Genus ***Graptostethus*** Stal

1968. *Lygaeus s.g. Gratostethus* Stal, *Kongl. Seensk, vet. Akad. Hand.*, **11**:73,74.

Type species : *Cimex servus* Fabricius, 1787.

Key to the species of ***Graptostethus***

1(2) Corium and clavus without any black marking ..... *trisignatus*

2(1) Corium and clavus with black markings 3

3(4) Pale marking absent in scutellcr apex; pronotal subcarination absent ..... *servus*

4(3) Pale tint present in scutellcr apex; pronotum middorsally sub carinate ..... *verticalis*

Graptostelhus servus (Fabricius)

1787. *Cymex servus* Fabricius, *Mant. Ins.*, 2:300.
1988. *Graptostethus servus* (Fabr.) Mukhopadhyay, *Rec. zool. Surv. India*, Occ. paper No. 107:18.

Material examined: 1 ex., Bankura, Bishnupur, 25.x.85, coll. M. Dutta & Party : 1 ex. Medinipur, Jhargram, 9.iii.coll. K.K. Roy & Party; 2 exs., Murshidabad, Jiyaganj, 6.ii.86; coll. I.J. Gupta & Party; 10. exs., Murshidabad, Sagardighi, 14.ii.86, coll. I.J. Gupta & Party.

Distribution : India : West Bengal (Calcutta, Bankura, Darjiling, Medinipur, Murshidabad, South 24 Parganas); Kerala; Maharashtra; Meghalaya. Elsewhere : Australia; Burma; China; Malaya Archipelago; Sri Lanka; South Africa; South palaearctic Region.

Remarks : The species remains associated with plants belonging to N.O. Asclepiadaceae.

Subfamily LYGAEINAE

2. *Graptostethus trisignatus* Distant

1879. *Graptostethus trisignatus* Distant, *Ann. Mag. Nat. Hist.*, (5) : 130.
1988. *Graptostethus trisignatus* Distant : Mukhopadhyay, *Rec. zool. surv. India*, Occ. paper No. 107 : 17.

Material examined : 1ex., Hooghly, Tarakeshwar, 21.i.1984, coll. S.K. Ghosh & Party.

Distribution : India :West Bengal (Hugli, Darjeling); Meghalaya; Nagaland. Elsewhere : Burma.

3. *Graptostethus verticalis* (Dallas)

1852. *Lygaeus verticalis* Dallas, *List. Hem. B.M.*, 2:548.
1901. *Graptostethus verticallis* Distant, A.M.N.H. (7) : 537.
1988. *Graptostethus verticalis* (Dallas) : Mukhopadhyay, *Rec. zool. Surv. India*, Occ. paper No. 107:17

Material examined : 7 exs., Calcutta 28.xi.81, coll. A. Mukhopadhyay; 6 exs, Haora, Shibpur, 8.v.81, coll. A. Mukhopadhyay.

Distribution : West Bengal (Calcutta, Haora).

Remarks : The species remains associated with *Vernonia cineria* and occasionally grass and dicotyledonous weeds. (Mukhopadhyay, 1988).

Genus ***Lygaeosoma*** Spinola

1837. *Lygaeosoma* Spinola, *Essai Ins. Hem* pp. 254-256.
Type species : *Lygaeosoma serdea* Spinola, 1837.

4. *Lygaeosoma bipunctata* (Dallas)

1852. *Lygaeus bipunctata* Dallas, *List. Hem. B.M.*, 2:547.
1868. *Lygaeosoma bipunctatus* Stal, *Hem. Afr.*, 1:72.
1989. *Lygaeosoma bipunctata* Ghosh *et al.*, *Fauna Orissa, State Fauna Series* 1, : Zoological Survey of India : 201.

Material examined : 1 ex., Calcutta, 15.i.1981, coll. A. Mukhopadhyay; 1 ex. Haora, Shibpur, 18.vi.1981, coll. A. Mukhopadhyay. 1ex., South-24 Parganas, Baruipur, 17.v.1981, coll. A.Mukhopadhyay.

Distribution : India : West Bengal (Calcutta, Haora, south 24-Parganas); Maharashtra. Elsewhere: Burma.

Remarks : Mukhopadhyay (1988) records the species for the first time from West Bengal. According to him, it occurs in the litter of *Ficus religiosa* (N.O. Ficaceae)

Genus *Spilostethus* Stal

1868. *Lygaeus S.G. Spilostethus* Stal, *Kongl. Svensk. Vet. Akad. Handl,* 7(11):72.
Type species : *Cimex militaris* Fabricius, 1775 Cimex pandurus Scopoli, 1763.

Key to the species of *Spilostethus*

1(2) Membranal suture with central white spot and two cresent white markings; labium reaches or passes 2nd coxae ..... *pandurus* var *militaris*

2(1) Membranal suture without such white spot; labium passes third coxae ..... *hospes*

5. *Spilostethus hospes* (Fabricius)

1794. *Lygaeus hospes* Fabricius, *Ent. Syst.*, 4:150.
1914. *Spilostthus hospes* Bergroth, *Ent. Mitteil,* 2:356.
1989. *Spilostethus hospes* (Fabricius) : Ghosh et al., *Fauna Orissa, State Fauna Series* I. Zoological Survey of India : 202.

Material examined : 5 exs. Bankura, Simlapal, 24.xii.85, coll. K. Mandal & Party; 2 exs., Medinipur, Garbeta, 17.ii.84, coll. K.K. Roay & Party; 1 ex, Medinipur, Khedriaghat, 15.ii.84, coll. K.K. Ray & Party; 5 exs., Murshidabad, Sagardighi, 14.ii.86, coll. I.J. Gupta & Party.

Distribution : India : West Bengal (Bankura, Calcutta, Medinipur, Murshidabad, Puruliya, South 24-Parganas); Maharashtra; Tamil Nadu. Elsewhere : Australia; Burma; China; Malaya Archipelago; New Caledonia; Pakistan; Sri Lanka.

Remarks : The species is known to occur on *Calotropis gigantea, C. procera, Solanum melongena, Antirrhinum* sp. and *Morus indica*. It is recognised by redwhite or black spots or bands on body; wings are characterised by 4-5 sumple veins in the membrane of hemelytra. It is commonly found on sugarcane and sorghum ears in South India.

6. *Spilostethus pandurus militaris* (Fabricius)

1763. *Cimex pandurus* Scopoli., *Ent. Carn. Exhib. Ins. Corniol,* IV. 368. 126-127.
1912. *Spilostethus pandurus* Oshamin *Kat. Hem.*, 1:27.
1988. *Spilostethus pandurus militaris* (Fabricius) : Mukhopadhyay, *Rec. zool. surv. India.* Occ. paper No. 107:15.

Material examined : 1ex., Nadia, Debagram, 20.xii.85, coll. B.N. Das & Party.

Distribution : India : West Bengal (Darjiling, Haora, Nadia, South 24-Parganas); Karnataka; Maharashtra; Punjab; Uttar Pradesh; Rajasthan. *Elsewhere* : Australia; Burma; Malay Archipelago; Palaearctic region; South Arica.

Remarks : The subspecies remain, associated with the plants belonging to N.O. Asclepiadaceae.

Subfamily II RHYPAROCHROMINAE

Genus *Dieuches* Dohrn

1860. *Dieuches Dohrn*, Stett. *Ent. Zeit.*, **21**:159.
Type species : *Dieuchs syriacus* Dohrn, 1860.

7. *Dieuches femoralis* Dohrn

1860. *Dieuchs femoralis* Dohrn, *Stett. Ent. Zeit*, **21**:405.
1988. *Dieuches femoralis* Dohrn : Mukhopadhyay, *Rec. zool. surv. India*, Occ. paper No. 107 : 55.

Material examined : 1ex., Bankura, Bishnupur, 25.x.85, coll. M. Datta & Party 1ex., Medinipur, Haldia, 3.viii.85, coll. B.C. Das & Party.

Distribution : India : West Bengal (Bankura, Calcutta, Darjiling, Medinipur); Assam; Jammu & Kashmir; Nagaland; Sikkim. Elsewhere : Burma; Sri Lanka.

Remarks : The species is characterised by lateral margin of pronotum uniformly narrowed anteriorly; posterior pronotal margin more than two and a half times of collar. Mukhopadhyay (1988) recorded the species for the first time from West Bengal.

8. *Dieuches* sp.

Material examined: 1ex., Bankura, Indus, 5.iii.86, coll. K.P. Mukherjee & Party; 1ex., Medinipur, Haldia, 3.viii.86, coll. B.C. Das & Party.

Genus *Elasmolomus* Stal.

1872. *Elasmolomus* Stal, *Ofv. Vet. Akad. Forh.*, **89**:58.
Type species : *Cimex sordidus* Fabricius, 1787.

9. *Elasmolomus sordidus* (Fabricius)

1787. *Cimex sordidus* Fabricius, *Mant. Ins.*, **2**:302.
1988. *Elasmolomus sordidus* (Fabricius) : Mukhopadhyay, *Rec. zool. Surv. India*, Occ. paper No. 107:50.

Material examined : 2exs., Birbhum, Illambazar, 14.iii.86, coll. K.P. Mukherjee & Party; 1 ex., Bankura, Sabanpur, 12.iii.86, coll. K.P. Mukherjee & Party.

Distribution : India : West Bengal (Bankura, Birbhum, Calcutta, Darjiling); Bihar; Maharashtra; Meghalaya; Nagaland. Elsewhere : Burma; China; Sri Lanka.

Remarks : The species is recognised by bright castaneous to sordid brown colour of anterior lobe of pronotum and base of scutellum.

Genus *Metochus* Scott

1874. *Metochus* Scott. *Ann. Mag. Nat. Hist.*, (4) **14**:433-434.
Type species : *Metochus abbreviatus* Scott, 1874.

10. *Metochus uniguttatus* (Thunberg)

1822. *Pendulinus uniguttatus* Thunberg, *Hem. Rost. Cap.*, **4**:6.
1874. *Metochus uniguttatus* Scott. *Ann. Mag. Nat. Hist.* (4) **14**:433-434.
1988. *Metochus uniguttus* (Thunberg) : Mukhopadhyay, *Rec. zool. Surv. India*, occ. paper No. 107:56

Material examined : 4 exs., Bankura, Indus, 5.iii.86, coll. K.P. Mukherjee & Party; 1ex., Malda, Paglahat, 8.xii.87, coll. T.R. Mitra & Party.

Distribution : West Bengal (Bankura, Calcutta, Haora, Malda); Andaman Islands; Meghalaya; Maharashtra. *Elsewhere* : Burma; China; Malaya Archipelago; Sri Lanka.

Remarks : This is commonly found on fig trees in West Bengal.

Genus *Paromius* Fieber

1860. *Paromius* Fieber, *Eur. Hem.*, pp. 45, 170-171.
Type species : *Stenocoris gracilis* Rambur, 1839.

Key to the species of *Paromius*

1(2) Labium reaches or just passes 1st coxae ..... *gracilis*

2(1) Labium reaches or passes 2nd coxae; collar fuscous and all labial segments deep castaneous ..... *pallidus*

11. *Paromius gracilis* (Rambur)

1839. *Stenocoris gracilis* Rambur, *Fn. Andal.*, **2**:140.
1913. *Paromius pallidus* Distant, *Ann. Mag. Nat. Hist.* (8) **12**:556-557.
1988. *Promius gracilis* (Rambur) : Mukhopadhyay, *Rec. zool. Surv. India*, Occ. paper No. 107:63.

Material examined : 1ex., Bankura, Bishnupur, 25.x.85, coll. M. Datta & Party.; 6 exs. , Koch-Bihar, Sonarpur, 1.v.87, coll. Raja Ram & Party; 2 exs., Koch Bihar, Alipurduar, 6.v.87, coll. Rajaram &

Party; 3 exs., Medinpur, Garbeta, 15.xi.84, coll. K.K. Ray & Party; 1ex., Murshidabad, Jangipur, 10.xi.86, coll. I.J. Gupta & Party.

Distribution : India : West Bengal (Bankura, Calcutta, Darjiling, Haora, Koch Bihar, Medinipur, Murshidabad). *Elsewhere* : Burma; Japan; Sri Lanka.

12. ***Paromus pallidus*** (Montrousier)

1865. *Plociomerus pallidus* Montrouier, *Ann. Soc. Linn. Lyon.* (2) **11**:229-230.
1913. *Paromius pallidus* Distant, *Ann. Mag. Nat. Hist.* (8) **12**:556-557.
1988. *Paromius pallidus* (Montrousier) : Mukhopadhyay, *Rec. zool. Surv. India*, Occ. paper No. 107:63.

Material examined : 1ex., South 24-Parganas, Kakdip, 18.xi.84, coll. S.K. Ghosh & Party.

Distribution : West Bengal (Calcutta, South 24-Parganas).

Genus ***Psudopachybrachius*** Malipatil

1978. *Pseudopachybrachius* Malipatil, *Aust. J. Zool.* Supplementary series No. 56:63.
Type species : *Rhyparochromus gutta* Dallas, 1852.

13. ***Pseudopachybrachius guttus*** (Dallas)

1852. *Rhyparochrimus gutta* Dallas, List Hem. B.M. 2:573-574.
1978. *Pseudopachybrachius guttus* Malipatil, *Aust. J. Zool.* Suppl. *ser.* No. 56:63.

Material examined : 3 exs., Bankura, Sonamukhi, 30.x.85, coll. M. Datta & Party; 1ex., Bankura, Ashna, 24.xii.85, coll. D.K. Mandal & Party; 5 exs., Bankura, Bishnupur, 6.xi.85, coll. S.Sen & Party; 1 ex., Birbhum, Illambazar, 27.i.86, coll. S.B. Roy & Party; 2exs., Medinipur, Digha, 28.ix.83, coll. A.K. Hazra & Party; Puruliya, Ajodhya Hill, 4.xi.85, coll. S. Sen & Party; 1 ex., Puruliya Ketka, 7.x.83, A.K. Hazra & Party.

Distribution : India : West Bengal (Bankura, Birbhum, Calcutta, Darjiling, Haora, Hugli, Jalpaiguri, Medinipur, Nadia, North 24-Parganas, Puruliya, South 24-Parganas); Bihar. *Elsewhere* : Burma; Christmas Island, South Africa; Tahiti.

Remarks : This species is apparently distributed throughout the Tropical, Subtropical and Neotropical regions.

Genus ***Rhyparothesus*** Scudder

1962. *Rhyparothesus* Scudder, *Can. Ent.*, **95**:983.
Type species : *Aphanus orientalis* Distant, 1904.

14. ***Rhyparothesus sparsus*** (Distant)

1904. *Aphanus sparsus* Distant, *Fauna, Brit. India,* **2**:81.
1964. *Rhyparothesus sparsus* Slater, *A Catalogue of the Lygaeidae of World,* 2:1289.

Material examined : 4 exs., Calcutta, 12.xi.82, coll. A. Mukhopadhyay.

Distribution : West Bengal (Calcutta); Maharashtra.

Subfamily III. PACHYGRONTHINAE

Genus ***Pachygrontha*** Germar

1837. *Pachygrontha* Germar, *Silb. Rev. Ent.*, 5:152-153.
Type species : *Pachygrontha lineata* Germar, 1837.

15. ***Pachygrontha bipunctata*** Stal

1865. *Pachygrontha bipunctata* Stal, *Hem. Afr.*, 2:149.
1988. *Pachygrontha bipunctata* Stal : Mukhoadhyay, *Rec. zool. Surv. India*, Occ. Paper No. 107:34.

Material examined : 4exs., Bankura, Sonamukhi, 30.x.85, coll. M. Datta & Party.

Distribution : West Bengal (Bankura, Calcutta, Medinipur, South 24-Parganas).

Subfamily GEOCORINAE

1814. *Geocoris* Fallen., *Spec. Nov. Ihtem. Disp.Meth.*,: 10.
Type species : *Cimex grylloides* Linnaeus, 1761.

Subfamily GEOCORINAE

Genus ***Geocoris*** Fallen.

1814. *Geocoris* Fallen, *Spec. Nov. Hem. Meth* : 10
Type species : *Cimex grylloides* Linn., 1761.

16. ***Geocoris ochropterus*** (Fieber)

1798. *Cimex tricolor* Fabricius, *Ent. Syst. Suppl.* : 536.
1844. *Ophthalmicus ochropterus* Fieber, *Ent. Mongr.* : 117.
1859. *Geocoris ochropterus* Dohrn, *Cat. Hem.* : 35.

Material examined : 3 exs., Medinipur, Jhargram, 9.iii.84 coll. K.K. Ray & Party.

Distribution: India: West Bengal (Calcutta, Darjiling, Medinipur, south 24-Parganas); Maharashtra. Elsewhere : Burma; Sri Lanka.

Subfamily V. ORSILLINAE

Genus *Nysius* Dallas

1852. *Nysius* Dallas, *List. Hem.* B.M. **2**:551-552.
Type species : *Lygaeus thymi* Wolff, 1804.

Key to the species *Nysius*

1(2) Head, antennae and pronotum reddish ocharceous, latter with anterior transverse fascia ..... *inconspicuus*

2(1) Head, antennae dark or piceous; ronotum anteriorly black, posteriorly ochraceous 3

3(4) 2nd and 3rd segments of the antennae subequal and brownish ochraceous ..... *minor.*

4(3) All antennal segments black with 2nd segment distinctly longer than 3rd segment ..... *cylonicus*

17. *Nysius ceylonicus* (Motschulsky)

1863. *Heterogaster ceylonicus* Motschulsky, *Bull. Soc. Nat. Moscu.*, **36**:78.
1904. *Nysius cylonicus* Distant, *Fauna & Brit. India*, **2**:18.
1988. *Nysius ceylonicus (Motschulsky)* : Mukhopadhyay, *Rec. zool. surv. India*, Occ. paper No. 107:20.

Material examined : 2exs., Koch Bihar, sonarpur, 1.v.87, coll. Raja Ram & Party.

Distribution : West Bengal (Calcutta, Darjiling, Koch Bihar).

18. *Nysius incospicuus* Distant

1904. *Nysius incospicuus* Distant, *Fauna Brit. India*, **2**:18.
1988. *Nysisus inconspicuus* Distant : Mukhopadhyay, *Rec. zool. Surv. India*, Occ. paper No. 107:19.

Material examined : 3 exs., Jalpaiguri, Mendabari, 16.x.87, coll. S.K. Tandon & Party.

Distribution : West Bengal (Bardhaman, Calcutta, Darjiling, Haora, Jalpaiguri, South 24-Parganas).

19. *Nysius minor* Distant

1909. *Nysius minor* Distant, *Ann. Mag. Nat. Hist* (8) **3** : 321.
1988. *Nysius minor* Distant : Mukhopadhyay, *Rec. zool. Surv. India*, Occ. paper No. 107:20.

Material examined : 4 exs., Jalpaiguri, Mendabari, 16.x.87 coll. S.K. Tandon & Party.

Distribution : West Bengal (Darjiling, Jalpaiguri).

THE CHART SHOWING DISTRICTWISE DISTRIBUTION OF SPECIES OF LYGAEIDAE KNOWN FROM WEST BENGAL

	Name of the Species	Darjiling 1	Jalpaiguri 2	Koch-Bihar 3	West Dinajpur 4	Maldah 5	Murshidabad 6	Birbhum 7	Nadia 8	Bardhaman 9	Puruliya 10	Bankura 11	Haora 12	Hugli 13	24-Parganas (N) 14	24-Parganas (S) 15	Medinipur 16	Calcutta 17
1.	*Graptostethus servus*	+			+	+	-		-	-	-	+	+	-	-	-	+	-
2.	*Graptostethus trisignatus*				-	+	-		-		-	-	-	-	-	-	-	-
3.	*Grapotostethus verticalis*				+	-	+		-		-		-	-	-	-	-	
4.	*Lygaeosoma bipunctata*				+	-	+		-	-	-	-		-	-	-		
5.	*Spilostetethus hospes*	+			+	+			-		-	+	+	-	-	+	+	-
6.	*Spilostethus pandurus militaris*					+	+		-					+	-	-	+	-
7.	*Dieuches femoralis*	+		+	+				-	-	-	+	-	-		-		-
8.	*Dieuches sp.*	+		-							-	+	-	-		-		-
9.	*Elasmolomus sordidus*	+		+	+	+				-	-			-	-	-	-	-
10.	*Metochus uniguttatus*	+			+	-	+			-	+				-			
11.	*Paromius gracilis*	+			+	+	+			+		+	+	-				
12.	*Paromius pallidus*			+										-	-		+	
13.	*Pseudopachybrachius guttus*	+		+	+	+	+	+	+	-		+		+	+	+	+	

	Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
14.	*Rhyparothesus sparus*	-	-		+	-		-	-		-	-	-	-	-	-		-
15.	*Pachygrontha bipunctata*	+	-	-	+	-	-	-	-	-	-	+	-	-	-	-	+	-
16.	*Geocoris ochropterus*	-		-	+	+	-					+	-	-	-	-	+	-
17.	*Nysius ceylonicus*	-	-	-	+	+	-	-		+	-	-	-	-	-	-	-	
18.	*Nysius inconspicuus*	-	+		+	+	+	-	+				-	-	-	-	+	-
19.	*Nysius minor*	-	-	-		+	-	-	+		-		-		-	-	-	

SUMMARY

The paper incorporates the account of 19 species in 12 genera distributed over 5 subfamilies from West Bengal. Keys to taxa, geographical distribution, reference to original literature have also been provided.

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APPENDIX

List of species of Lygaeidae known so far from West Bengal

LYGAEINAE

1. *Aethalotus horni* Breddin, 1907
2. *Caenocoris nerii* Germar, 1847.
3. *Oncopeltus confusus* Horvath, 1914
4. *Lygaeosoma bipunctata* (Dallas, 1852)
5. *Lygaesoma pusillum* (Dallas, 1852)
6. *Spilostethus pandurus militaris* (Fabricius, 1775)
7. *Spilostethus hospes* (Fabricius, 1794)
8. *Tropidothroax fimbriatus* (Dallas, 1852)
9. *Aspilocoryphus mendicus* Fabricius, 1775)
10. *Graptostethus argentatus* (Fabricius, 1803)
11. *Graptostethus trisignatus* (Distant, 1879)
12. *Graptostethus verticalis* (Dallas, 1852)
13. *Graptostethus servus* (Fabricius, 1787)
14. *Pyrrhobaphus leucurus* (Fabricius, 1787)

ORSILLINAE

15. *Nysius inconspicuus* Distant, 1904.

16. *Nysius ceylonicus* Motschulsky, 1863.
17. *Nysius minor* Distant, 1909

CYMINAE

18. *Ninus insignis* Stal, 1860
19. *Cymoninus turaensis* (Paiva, 1919)
20. *Cymodema basicornis* (Motschulsky, 1863)

BLISSINAE

21. *Macropes* raja, Distant 1909
22. *Macropes uniformis* Distant, 1909
23. *Diamorphopterus bicoloripes* (Distant, 1883)

GEOCORINAE

24. *Geocoris pulvisculatus* Distant, 1904.
25. *Geocoris bengalensis* Mukopadhyay and Ghosh, 1982
26. *Geocoris ochropterus* (Fieber, 1844)
27. *Geocoris pseudolituratus* Mukhopadhyay and Ghosh, 1982
28. *Geocoris lituratus* (Feiber, 1844)
29. *Geocoris rufipennis* Distant, 1918
30. *Geocoris juncundus* (Fieber, 1861)
31. *Geocoris jalighatus* Distant, 1910.
32. *Geocoris ornatus* (Fieber, 1861)
33. *Geocoris puri* Distant, 1910.

MALCINAE

34. *Malcus scutellatus* Distant, 1901.

HETEROGASTRINAE

35. *Artemidorus pressus* Distant, 1903.
36. *Dinomachus rachinus* Distant, 1906
37. *Dinomachus indicus* Distant, 1909
38. *Dinomacus bengalensis* Mukhopadhyay, 1988
39. *Boccharis indicus* Mukhopadhyay, 1980.

40. *Sadletus pallescens* Distant, 1909.

ARTHENEINI

41. *Teutates sculpturatus* Distant, 1909

PACHYGRONTHINAE

42. *Pachygrontha bipunctata* Stal, 1865

OXYCARENINAE

43. *Oxycarenus bicolor* Fieber, 1852.
44. *Oxycarenus laetus* Kirby, 1891.

RHYPAROCHROMINAE

CLERADINI

45. *Clerada apicicornis* Signoret, 1863

PLINTHISINI

46. *Plinthisus acanthothorax* Kiritshenko, 1931

ANTILLOCORNI

47. *Botocudo signandus* (Distant, 1903)
48. *Botocudo punctatus* Mukhopadhyay, 1988

LETHAEINI

49. *Neoleithaeus indicus* Mukhopadhyay, 1988
50. *Hexatrichocoris mallens* Kiritshenko, 1931
51. *Lethaeus indicus* Dallas, 1852
52. *Diniella bengalensis* Distant, 1909

DRYMINI

53. *Lemnius ovatus* Distant, 1904
54. *Appolonius concticornis* (Walker, 1872)

55. *Appolonius crassus* (Distant, 1906)
56. *Thebanus bengalensis* Mukhopadhyay, 1988
57. *Kanigara flavomarginata* Distant, 1906
58. *Scolopstethus montanus* (Distant, 1909)
59. *Scolopstethus bengalensis* Mukhopadhyay, 1988

OZOPHORINI

60. *Primierus bispinus* (Motschulsky, 1863)

STYGNOCORINI

61. *Arruanus excavatus* Distant, 1904

RHYPAROCHROMINI

62. *Elasmolomus sordidus* (Fabricius, 1787)
63. *Elasmolomus paralineasus* Mukhopadhyay, 1988
64. *Lachnesthus leucospilus* (Walker, 1872)
65. *Rhyparothesus bengalensis* (Distant, 1909)
66. *Rhyparothesus ornatulus* (Distant, 1909)
67. *Rhyparothesus sparsus* (Distant, 1904)
68. *Dieuches femorlis* Dohrn, 1860
69. *Dieuches leucocerus* (Walker, 1872)
70. *Dieuches coloratus* (Distant, 1909)
71. *Metochus uniguttatus* (Thunberg, 1822)
72. *Poeanitus festivus* Distant, 1901

MEGALONOTINI

73. *Proderus spinosus* (Distant, 1909)

MYODOCHINI

74. *Suffenus fusconervosus* (Motschulsky, 1863)
75. *Stigmatonotum cephalotes* (Kritschenko, 1931)
76. *Stigmatonotum minutum* Malipatil, 1978
77. *Pachybrachius annulipes* (Baerensprung, 1859)
78. *Horridipamera neitneri* (Dohrn, 1860)

79. *Pseudpachybrachius guttus* (Dallas, 1852)
80. *Paromius gracilis* (Rambur, 1839)
81. *Paromius pallidus* (Montrousier, 1865)
82. *Paromius exiguus* (Distant, 1883)
83. *Pamerana nigritula* (Walker, 1872)
84. *Paraeucosmetus pallicornis* (Dallas, 1852)
85. *Paraeucosmetus brachylabius* Mukhopadhyay, 1988.

DOUBTFUL TAXA

86. *Prostemmidea mimica* Reuter, 1893.
87. *Meschia quadrimaculata* Distant, 1910
88. *Meschia pugnax* Distant, 1910

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INSECTA : HEMIPTERA : HETEROPTERA : PYRRHOCORIDAE

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INTRODUCTION

Pyrrhocoridae is one of the smallest families of the Order Hemiptera and of economically important because it includes one of the most serious pest of cotton known as *Dysdercus* Amyot & Serville. They are also commonly known as 'Cotton stainers', the name derived from their habit of piercing the bolls and staining the fibre. This family represents Suborder Heteroptera and is very similar to the other Heteropteran family Lygaeidae but distinguished from it by the absence of ocelli.

The world record of Pyrrhocorid fauna consists approximately 360 species representing 43 genera. The family is primarily Tropical and Subtropical in distribution. Indian Pyrrhocoridae is represented by 45 species under 15 genera of which about 20 species under 12 genera are recorded from the State of West Bengal including 2 species under 2 genera dealt in this paper which were hitherto unknown from the State.

This paper provides a consolidated account of 14 species under 11 genera. The remaining 6 species recorded from the State could not be studied due to the non-availability of the material, hence listed from the published literature and included in the annotated list of Pyrrhocoridae from West Bengal at the end of this paper.

The considerable work on this group is done only by Distant (1902, 1910). Apart from his work practically no substantial contribution has been made by any of the worker so far.

MATERIAL & METHOD

Pyrrhocoridae are mostly phytophagous in nature and usually inhabits the agricultural fields, bushes, vegetable gardens, crop fields etc. However, the species belonging to the genus *Dysdercus* Amoyt & Serville are serious pest to the cotton and mostly occur in the cotton fields. The specimens of this group can be collected either by the sweeping the crops or bushes with insect nets or by light trapping. After collection the specimens are killed in a killing jar using benzene or chloroform vapour and preserved dry with Napthelene and Paradichlorobenzene. The specimens are kept in insect envelop with proper data label mentioning locality, date of collection and name of the collector with ecological notes. In the laboratory specimens are set and pinned properly before identification for easy handling of the insects under binocular microscope. Then the data label recorded in the respective envelop is being attached separately to each specimen.

The tip of the abdomen of male specimen are cut, the chitinous portion are being dissolved in 10% KOH, stained in acid fuchsin and mounted in canada balsum to prepare permanent slides of male genetalia of each species.

The claspers or parameres, an important component of the male genetalia, structurally varies conspicously from one species to other and even from one variety to other of the same species. Therefore, together with the morphological characters of male and female specimens, wherever possible the shape of the clasper are also taken into consideration for determining the identity of a particular species.

Morphology and terminology of the male external gentalia

The male external genetalia comprise the pygophore and its contained internal sexual structures. The pygophore is composed for the most part of the modified old ninth abdominal segment and it may be seathed at its base by the modified eighth abdominal segment. Near the floor of the pygophore arises internally the median intromittent organ, the aedeagus. The aedeagus is typically divided into two major regions, the basal phallosoma and the apical endosoma. The aedeagus at its base provided with the basal plates. The arms of the basal plates are linked by membranous connections and a set of muscles to two movable processes belonging to the ninth abdominal segment and which serve to assists in the coupling process, is known as parameres or style.

LIST OF SPECIES INCLUDED IN THE PRESENT STUDY AND THEIR SYSTEMATIC ACCOUNT

Family PYRRHOCORIDAE Fieber 1860
Subfamily EURYOPTHALMINAE Hussey 1929
Tribe PHYSOPELTINI Hussey 1929

Genus ***Macroceraea*** Spinola 1837

1. *Macroceraea grandis* (Gray)

Genus ***Iphita*** Stal 1870

2. *Iphita limbata* Stal

Genus ***Physopelta*** Stal 1843

3. *Physopelta gutta* Burm.

4. *Physopelta schlanbuschi* Fabricius

Subfamily PYRRHOCORINAE Amyot and Serville 1843

Genus ***Dysdurcus*** Amyot and Serville 1843

5. *Dysdercus evanescens* Distant

6. *Dysdercus koenigii* (Fabricius)

Genus ***Antilochus*** Stal 1863

7. *Antilochus russes* Stal

8. *Antilochus coqueberti* (Fabricius)

Genus ***Odontopus*** Laporta 1832

9. *Odontopus nigricornis* Stal

Genus ***Pyrrhopeplus*** Stal 1870

10. *Pyrrhopeplus carduelis* var. *posthumus* Horvath

Genus ***Euscopus*** Stal 1870

11. *Euscopus rufipes* Stal

Genus ***Melamphaus*** Stal 1808

12. *Melamphaus rubrocinctus* (Stal)

Genus ***Dindimus*** Stal 1861

13. *Dindimus lanius* Stal

Genus ***Scantius*** Stal 1865

14. *Scantius forsteri volucris* Gerot.

Key to the subfamilies of the family PYRRHOCORIDAE

1(2) Females always with sixth ventral segment cleft at base..... Euryopthalminae Hussey

2(1) Both sexes with sixth ventral segment entire..... Pyrrhocorinae Amyot and Servellie

Key to the genera of the Subfamily EURYOPTHALMINAE

1(2) Antennae quite long in male, first joint is about twice as long as head and pronotum together..... ..... ***Macroceraea*** (=Lohita)

2(1) Antennae normal in both the sexes, first joint longer than head but shorter than head and pronotum together..... 3

3(4) Pronotum with anterior disc convex, which does not reach anterior margin of pronotum, lateral margin strongly reflexed..... ***Iphita***

4(3) Pronotum with its anterior convex disc reaching the anterior margin of pronotum, lateral margins not strongly reflexed..... ***Physopelta***

Subfamily EURYOPHTHALMINAE Hussey 1929

Genus ***Macroceraea*** Spinola 1837

1837. *Macroceraea* Spinola, *Essai Ins. Hem.*, 177.

1. *Macroceraea grandis* (Gray)

1832. *Lygaeus grandis* Gray, In Griffiths Anim. Kingd. XV Ins. 242 pl. XCII Fig.3.
1902. *Lohita grandis* : *Distant, Fauna, Brit. India*, II : 95.
1913. *Macroceraea grandis* : Bergroth, *Mem. Soc. Ent. Belg. XXII* : 166.

Material examined : 1 ex., Darjiling, 18.III.1974, Coll. *H.K. Bhowmick* ; 5 exs., Koch Bihar, 3.v.1987, Coll. *Raja Ram* ; 6 exs., Nadia, Patuli, 16.XII.1985, Coll. *B.N.Das* ; 3 exs., Nadia, Mayapur, 22.XII.1985, Coll. *B.N. Das* ; 2 exs.,Maldah, Nishipur, 23.XII.1987,Coll. *T.R. Mitra.*

Diagnostic characters : Antennae, disc of the posterior lobe of pronotum and middle of the scutellum blood red; a large more or less rounded spot near inner angle of corium, a central elongate spot to clavus; anterior femora, bases and apices of intermediate and posterior femora blood red.

Genitalia : Clasper (Paramere) : basal one third bulging, setose apically, abruptly narrowed and deflexed.

Distribution : India : West Bengal : (Calcutta, Darjiling, Koch Bihar, Maldah, Nadia) ; Assam. Elsewhere : Philippines.

Genus *Iphita* Stal 1870

1870. *Iphita* Stal, *Enum. Hem.* I : 99.

2. *Iphita limbata* Distant

1902. *Iphita limbata* : Distant, *Fauna Brit. India*, II : 96.

Material examined : 3 exs., Maldah, Manikchak village, 21.X.1983, Coll. *A.K.Hazra* and party.

Diagnostic characters : Second joint of the antennae is little longer than the first; apices of the femora, bases of tibiae, coxae and trochanters dull reddish; body brownish piceous; lateral margin of pronotum, corium and base of apical joint of antennae pale luteous.

Genitalia : Clasper (Paramere) : medially bulging, apically smoothly narrowed with a projection from apical one third.

Distribution : India : West Bengal (Maldah); Assam; Kerala; Maharashtra. Elsewhere : Bangladesh

Genus *Physopelta* Amyot & Serville 1843

1843. *Physopelta* Amyot and Serville, *Hemip.* : 271.

Key to species of the genus Physopelta

1(2) Body reddish ochraceous; a discal rounded black spot at the middle of the corium; length 15-16 mm; paramere weakly bifid with inner arm narrower than outer..... *gutta* Burm.

2(1) Body sanguineous; a dot like black spot at the middle of the corium; length 13-16 mm.; paramere deeply bifid with dissimilar arms..... *schlanbuschi* Fabricius

3. *Physopelta gutta* (Burmeister)

1834. *Lygaeus (Pyrrhocoris) gutta* Burmeister, Nova Acta Acad. Leop. Carol. XVI, suppl., 424 Pl.XLI, Fig. 10.
1902. *Physopelta gutta* : Distant, *Fauna Brit India*, II : 97.
1927. *Physopelta gutta* : Tacuber, *Konowia* VI : 174.

Material examined : 9 exs. Darjiling, Singla Goom, 17.VI.1973, Coll. *H.S. Sharma* ; 2 exs., Kurseong, Gaurishankar Tea Factory, 30.IV.1971, Coll. *A.R. Bhowmik*; 1 ex., West Dinajpur, Kemnijhorea, 87.V.1975, Coll. *B.C. Nandi.*

Diagnostic characters : Basal angle of membrane, base of first joint of antennae, coxae, trochanter, femora beneath reddish ochraceous, apical angle of corium and the membrane black, a discal rounded black spot at the middle of the corium.

Genitalia: Clasper (Paramere) : Simple, bifid at the apex, inner arm comparatively narrower than the outer

Distribution : India : West Bengal (Darjiling, West Dinajpur); Assam. Elsewhere : Australia, Borneo, Burma, Ceylon, China, Japan, Java, Philippines, Sumatra.

4. *Physopelta schlanbuschi* (Fabricius)

1787. *Cinex slanbuschii* Fabricius, *Mant. Ins.*, II : 299.
1902. *Physopelta schlanbuschi* : Distant, *Fauna Brit. India*, II : 99.
1909. *Physopelta schlanbuschi* : Lefroy, *Rec. Ind. Mus.*, III : 325.

Material examined: 7 exs., Maldah, Gaur, 19.IX.1975, Coll. *H.K. Bhowmick* and party .; 4 exs., Calcutta, Dattabad, 30.VIII.1962, Coll. *K.N.C.N.*; 1 ex., Calcutta, Bagmari, 24.VIII.1962, Coll. *B.D.H.C.P.*; 1 ex., Koch Bihar, Dinhata, 3.V.1987, Coll. *Raja Ram* and party.

Diagnostic characters : Body blood reddish, two large transverse spots near anterior margin of posterior lobe of pronotum, scutellum, apex of the rostrum, membrane black, a small dot like spot on the corium, antennae with apical joint greyish and base of the first joint blood reddish.

Genitalia : Clasper (Paramere) : Gradually divergent apically, deeply bifid with dissimilar arms.

Distribution : India :West Bengal (Calcutta, Koch Bihar, Maldah);Assam. Elsewhere: Burma, China, Hong Kong.

Subfamily PYRRHOCORINAE Amyot and Serville 1843

Key to the genera of the Subfamily PYRRHOCORINAE

1(2) Hemelytra complete, membrane fully developed 3

2(1) Hemelytra incomplete, membrane absent or seldom fully developed; head with eyes not wider than anterior margin of pronotum; apical margin of corium truncate; first joint of rostrum much sorter than head ..... ***Scantius***

3(4) Apical angle of corcium more or less rounded, not elongately acute 5

4(3) Apical angle of corcium elongately acute ..... ***Dysdercus***

5(6) Head transversely constricted or impressed beneath near base ..... ***Antilochus***

6(5) Head not transversely constricted or impressed beneath 7

7(8) Anterior area of pronotum not or incompletely circumbscribed by continuous impression or punctures; head with eyes not broader than anterior margin of pronotum; eyes not pedunculate.. ..... *Euscospus*

8(7) Anterior area of pronotum completely circumbscribed by continuous impression or punctures... 9

9(10) Incisures of third and fourth ventral segments moderately laterally curved 11

10(9) Incisures of ventral segments straight, not distinctly curved ..... ***Pyrrhopeplus***

11(12) Lateral margin of the pronotum acute, seldom reflexed 13

12(11) Lateral margin of pronotum strongly reflexed ..... ***Dindymus***

13(14) Eyes not touching anterior margin of pronotum ..... ***Melamphaus***

14(13) Head immersed to eyes ..... ***Odontopus***

Genus *Dysdercus* Amyot & Serville 1843

1843. *Dysdercus* Amyot and Surville, *Heimp.*, 272.

Key to species of the genus *Dysdercus*

1(2) Membrane black; head, pronotum, sanguineous; extreme base of the first joint of antennae sanguineous; paramere deeply biffid at apex; outer arm about twice the length of the inner arm ....*koenigii* (Fabricius)

2(1) Membrane pale brownish; head pronotum reddish ochraceous; antennae black; paramere obliquely emerginate at apex.....*evanescens* Distant

5. *Dysdercus evanescens* Distant

1902. *Dysdercus evanescens* Distant, *Am. Mag. Nat. Hist.*, **IX** : 43.
1902. *Dysdercus evanescens* : Distant, *Fauna Brit. India,* **II** : 120.
1909. *Dysdercus evanescens* : Lefroy, *Rec. Ind. Mus.*, **III** : 326.

Material examined: 3 exs., Jalpaiguri, Madrihat, 27.IV.1975, Coll. *B.C. Nandi*; 2 exs., Darjiling, Kakjhora, 19.X.1961, Coll. *R.N. Katiyar*; 3 exs.,Darjiling, Rangiroom, 10.VI.1975, Coll. *J.K. Jonathan*; 2 exs., Jalpaiguri, Garumara Forest, 3.V.1975, Coll. *B.C. Nandi*; 1 ex., Darjiling, Rangpo, on way of F.R.H. 29.V.1974, Coll. *J.K. Jonathan* ; 1 ex., Darjiling, Sukiapukri, 19.V.1971, Coll. *A.R. Bhowmik* ; 1 ex., Darjiling, Hanafalls, Ghum Bhankan 26.V.1971, Coll. *A.R. Bhowmik.*

Diagnostic characters: Pale to reddish orchaceous; head, lateral margins of pronotum, scutellum, legs, antennae reddish ochraceous; a small round blackish spot on the disc of the corium; prosternum with a spot behind each eye, connected by a narrow transverse line; anterior areas of abdominal segments reddish ochraceous sometime stripped with creamy white; membrane pale brownish; pronotum and corium thickly punctate.

Genitalia : Clasper (paramere) : Cylindrical, robust, obliquely emarginate at apex.

Distribution : India : West Bengal (Darjiling, Jalpaiguri); Assam, Maharashtra, Sikkim. Elsewhere : Burma.

6. *Dysdercus koenigii* (Fabricius)

1775. *Cimex koenigii* Fabricius, *syst. Ent.* 720.
1902. *Dysdercus cingulatus* : Distant, *Fauna, Brit. India,* **II** : 119.
1914. *Dysdercus koenigii* : Bergroth, *Ent. Mitt.* **III** : 355.

Material examined: 8 exs., Jalpaiguri, Hasimara, 5.IV.1987, Coll. *Raja Ram and Party*; 34 exs., Murshidabad, Kadampur, 1. III.1986, Coll. *S.K. Mitra and party* ; 4 exs., Nadia, Bahadurpur forest, 15.XII.1985, Coll. *B.N. Das and party*

Diagnostic characters : Head, pronotum, rostrum, blood reddish; antennae; apex of rostrum, scutellum, membrane, legs black; corium with a black discal spot; anterior margin to prosternum, anterior collar to pronotum creamy white, abdomen stripped with creamy white and sanguineous.

Genitalia : Clasper (Paramere) : Robust, flattened, apex deeply bifid, outer arm twice the length of the inner arm, shorter one further bifurcate.

Distribution : India : West Bengal (Jalpaiguri, Murshidabad, Nadia). Elsewhere : Ceylon.

Genus ***Antilochus*** Stal 1863

1863. *Antilochus* Stal, *Berl. ent. Zeitschr.*, **VII** : 393.

Key to species of the genus ***Antilochus***

1(2) Membrane pale brownish ochraceous with a black rounded spot near its base; pronotum with two transverse series of punctures and a transverse series of punctures near base of scutellum; paramere with axe shaped apex ..... *russus* Stal

2(1) Membrane black, without spot; pronotum with anterior discal area margined with black punctures; paramere simple, with clavate inner margin..... *coqueberti* Fabricius

7. ***Antilochus russes*** Stal

1863. *Antilochus russes* Stal, *Berlin Ent. Zeitschr.* **VII** : 394.
1903. *Antilochus russes* : Distant, *Fauna., Birt. Ind.*, **II** : 101.

Material examined : 2 exs., Jalpaiguri, Champak Sanatuary, 24.XII.1973, Coll. *G. K. Srivastava and party*; 4 exs., Jalpaiguri, Bhutanghat, 6.IX.1975, Coll. *H.K. Bhowmik*; 1 ex., Jalpaiguri, Jainti forest, 8.V.1987, Coll. *Raja Ram and party.*

Diagnostic characters : Blood reddish, membrane brownish ochraceous with a black rounded spot near its base; a transverse series of punctures present near base of scutellum; two transverse of punctures to pronotum.

Genitalia : Clasper (paramere) : Tubular, axe shaped apically.

Distribution : India : West Bengal (Jalpaiguri); Assam, Sikkim. Elsewhere : Bhutan.

8. ***Antilochus coqueberti*** (Fabricius)

1784. *Cimex angur* Fabricius, *Nova Ins. Spec.*, **III** : 58.
1902. *Antilochus coqueberti* : Distant, *Fauna Brit. India*, **II** : 101.
1926. *Antilochus coqueberti* : Esaki, *Am. Mus. Nat. Hung.* **XXIV** : 158.

Material examined : 1 ex., Darjiling, Chinabati, 9.III.1974, Coll. *H.K. Bhowmik*; 1 ex., West Dinajpur, Rayganj, 6.V.1976, Coll. *B.C. Nandi*; 1 ex.,Darjiling, Morpong, 18.III.1974, Coll. *H.K. Bhowmik*; 1 ex.,Jalpaiguri, Jainty forest, 8.V.1987, Coll. *Raja Ram and party*; 1 ex., Darjiling, Mal Forest, Coll. *G.K. Srivastava and party.*

Diagnostic characters : Body blood reddish; membrane black with its apical margin pale brownish, ochraceous; pronotum obscurely punctate but its anterior discal areas is margined with black punctures.

Genitalia : Clasper (Paramere) : Robust, simple, tubular, inner margin curvate.

Distribution : India : West Bengal (Calcutta, Darjiling, Jalpaiguri); Andaman Island, Assam, Kashmir. Elsewhere : China, Cochin, Malacca.

Genus ***Odontopus*** Laporte 1832

1832. *Odontopus* Laporte, *Ess. Hem.*, : 37.

9. ***Odontopus nigricornis*** Stal

1861. *Odontopus nigricornis* Stal, Stett. *Ent. Zeit.*, **XXII** : 146.
1910. *Odontopus nigricornis* : Distant, *Fauna Brit. India,* **V** : 96.

Material examined : 4 exs., Darjiling, Sukna, 19.II.1974, Coll. *II.K. Bhowmik.*; 5 exs., Darjiling, Sukna 15.II.1974, Coll. *II.K. Bhowmik*; 3 exs., Darjiling, Mahanadi plantation, 17 II 1974, Coll. *II.K. Bhowmik* ; 1 ex. Jalpaiguri, Apalchand, Kathambari, 11.X.1987, Coll. *S.K. Tandon & party.*

Diagnostic characters : Singuineous (blood reddish) or ochraceous a round spot near apical angle of corium, anterior femora finely serrate beneath and armed with one or two spines; antennae with third joint shortest and first and second subequal in length.

Genitalia : Clasper (Paramere) : Distinctly tapering, apically hook shaped with setae.

Distribution : India : West Bengal (Darjiling, Jalpaiguri); Maharashtra, Mysore. Elsewhere : Burma, Siam.

Genus ***Pyrrhopeplus*** Stal 1870

1870. *Pyrrhopelpus* Stal *Enum. Hem.*, **I** : 103 & 115.

10. ***Pyrrhopeplus carduelis*** var ***posthumus*** Horvath

1892. *Pyrrhopeplus carduelis* var *posthumus* Horvath, *Termesz Fuzetck* **XV** : 135.
1910. *Pyrrhopeplus posthumus* : Distant, *Fauna Brit. India,* **V** : 97.
1913. *Pyrrhopeplus carduelis* var *posthumus* : Bergroth, *Mem. Soc. Ent. Belg.* **XXII** : 172.

Material examined : 2 exs., Darjiling, Gayabari, Mahandai, 2.IV.1971, Coll. *A.R. Bhowmik and party.*

Diagnostic characters : Body pale ochraceous; a rounded black spot on corium near anterior angle; pronotum and scutellum darkly punctate; anterior and lateral margins of pronotum, scutellum, lateral margin of corium ; sternum, coxae and femora testaceous or dark ochraceous.

Genitalia : Clasper (Paramere) : Tubular inner margin curvate, apex dissimilarly bifarcate, outer arm longer.

Distribution : India : West Bengal (Darjiling); Assam. Elsewhere : Burma, Tibet.

Genus ***Euscopus*** Stal 1870

1870. *Euscopus* Stal, *En. Hem.*, **1** : 102 and 106.

11. ***Euscopus rufipes*** Stal

1870. *Euscopus rufipes* Stal, *En. Hem.*, **1** : 106.
1902. *Euscopus rufipes* : Distant, *Fauna Brit India*, **II** : 106.
1925. *Euscopus rufipes* : China, *Ann. Mag. Nat. Hist.*, (9) **14** : 463.

Material examined : 2 exs., Darjiling, Lebong. 26.V.1916, Coll. *F.H. Gravely*

Diagnostic characters : Body black; legs, apex of the scutellum, lateral margin of the prosternum sanguineous; a large rounded discal spot on the clavus; apical margins and inner angle of the membrane pale fuliginous; body beneath greyish sericeous; a rounded black spot near basal lateral margins of the third, fourth and fifth segments.

Distribution : India : West Bengal (Darjiling); Assam, Meghalaya, Nagaland. Elsewhere: Bangladesh, Burma, Java.

Genus ***Melamphaus*** Stal

1868. *Melamphaus* Stal, *Hem. Fabr.*, **1** : 83.

12. ***Melamphaus rubrocintus*** (Stal)

1863. *Dysdercus rubrocintus* Stal., *Berl. ent. Zeitschar.*, **VII.** 4903.
1903. *Melamphaus rubrocintus* : Distant, *Fauna Brit India*, **II** : 108.

Material examined : 1 ex., Calcutta, 22.X.1904, Coll. *Runetti.*

Diagnostic characters : Body reddish ochraceous, lateral margin of pronotum reflexed with two oblique fasciae differing in direction; one before middle and the other near apex, reddish ochraceous; antennae, rostrum, pronotum excluding anterior margin, scutellum, corium at apex black or piceous; spots near coxae, anterior margin of pronotum reddish ochraceous; apical margin of membrane dull fuliginous, sternum fuscous.

Distribution : India : West Bengal (Calcutta); Assam, Meghalaya, Nagaland. Elsewhere : Burma.

Genus ***Dindymus*** Stal

1861. *Dindymus* Stal, *Ofv. vet. An. Forh* : 196.

13. *Dindymus lanius* Stal

1863. *Dindymus lanius* Stal, *Berl. ent. Zeitschr.* **VII** : 401.
1903. *Dindymus lanius* : Distant, *Fauna, Brit. India,* **II** : 110.

Material examined : 1 ex., Darjiling, 24.IV.1910, Coll. *F.H. Gravely.*

Diagnostic characters : Sanguineous; legs, base of the abdomen, third, fourth joint and apex of the second joint of antennae and sternum black; membrane with a large discal black spot; corium finely and thickly punctate; lateral margin of prosternum punctate; anterior area of pronotum coarsely punctate where as posterior area sparingly punctate.

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya. Elsewhere : Burma, Yunnan.

Genus *Scantius* Stal 1865

1865. *Scantius* Stal, *Hem. Afr.*, **III** : 10.

14. *Scantius forsteri volucris* Gerstacker

1873. *Scantius forsteri volucris* Gerstacker in V.D. Deckens Reise, **III** : 413.
1903. *Scantius forsteri volucris* : Distant, *Fauna, Brit. India,* **II** : 117.

Material examined : 1 ex., Tollygunge, Calcutta, 11.XII.1910, Coll. *F.H. Gravely.*

Diagnostic characters : Body piceous; abdomen, lateral margin of sternum, apex of scutellum, basal lateral margin of corcium sanguineous; central linear spots on basal apical margins of pronotum; first joint of antennae passing the apex of the head, second joint almost as long as first, third shortest; pronotum transversely constricted near middle; membrane absent; corium as long as the penultimate abdominal segment.

Distribution : India : West Bengal (Calcutta); Kerala, Maharashtra, Punjab, Tamil Nadu. Elsewhere : Angola, East Africa.

List of species of the family Pyrrhocoridae recorded from the State of West Bengal

1. *Antilochus coqueberti* (Fabricius)
2. *Antilochus russus* Stal
3. *Dindymus lanius* Stal
4. *Dysdercus evanescens* Distant
5. *Dysdercus koenigii* (Fabricius)
6.** *Dysdercus poceilus* (H & S)

7. *Euscopus rufipes* Stal
8. *Iphita limbata* Stal
9. *Macroceraea grandis* (Gray)
10.** *Megadysdercus mesiostigma* (Distant)
11. *Melamphaus rubrocintus* (Stal)
12.** *Melamphaus faber* Fabricius
13.* *Odontopus nigricornis* Stal
14.** *Odontopus scutellaris* Walker
15.** *Physopelta apicalis* Walker
16. *Physopelta gutta* (Burm.)
17. *Physopelta schlanbuschi* (Fabricius)
18.** *Pyrrhopeplus pictus* Distant
19.* *Pyrrhopeplus carduelis* var *posthumus* Horvath
20. *Scantius forsteri volucris* Gerstacker

* Denotes new records from the State
** Denotes specimens not available for study, listed from published literature

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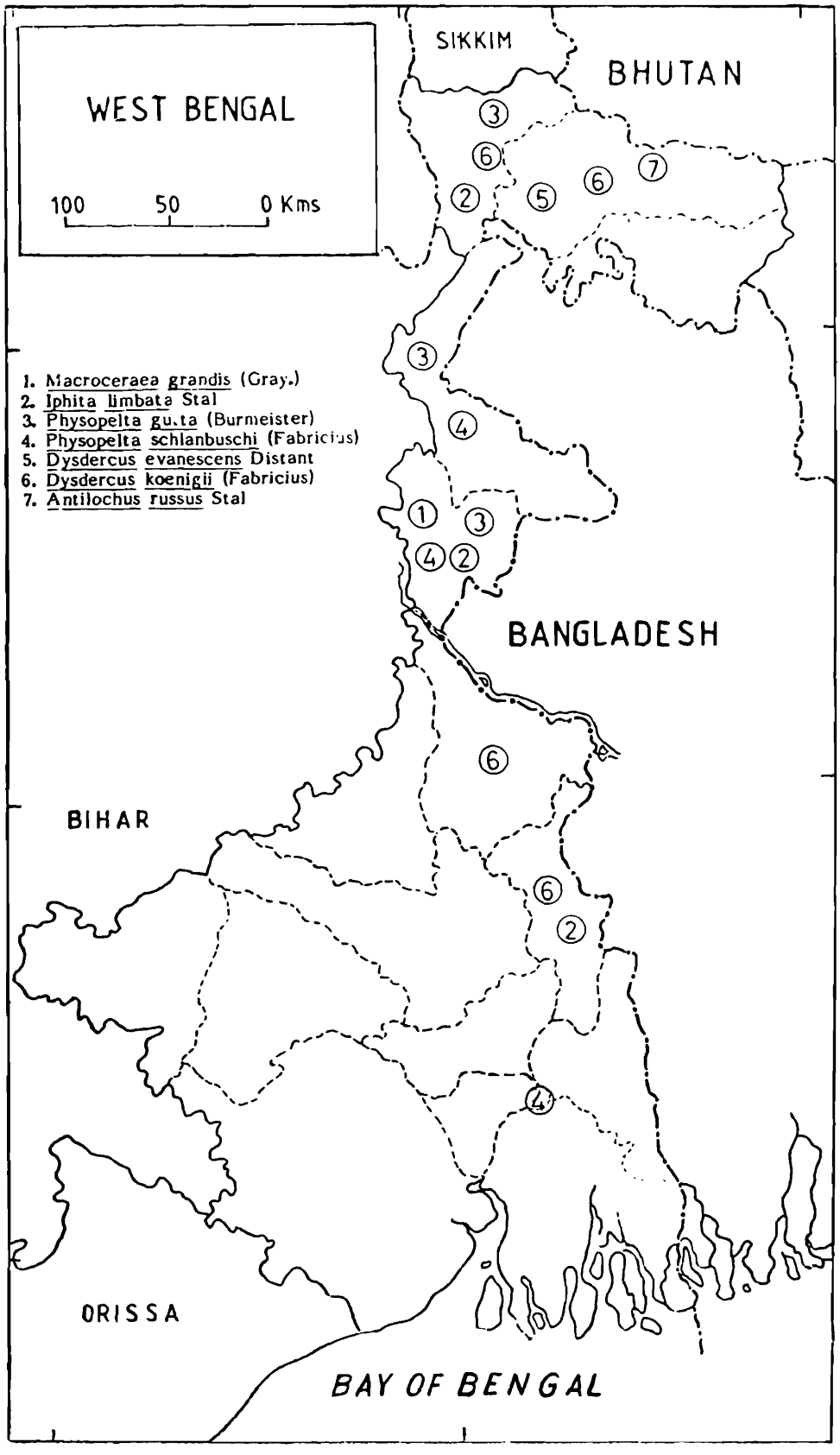
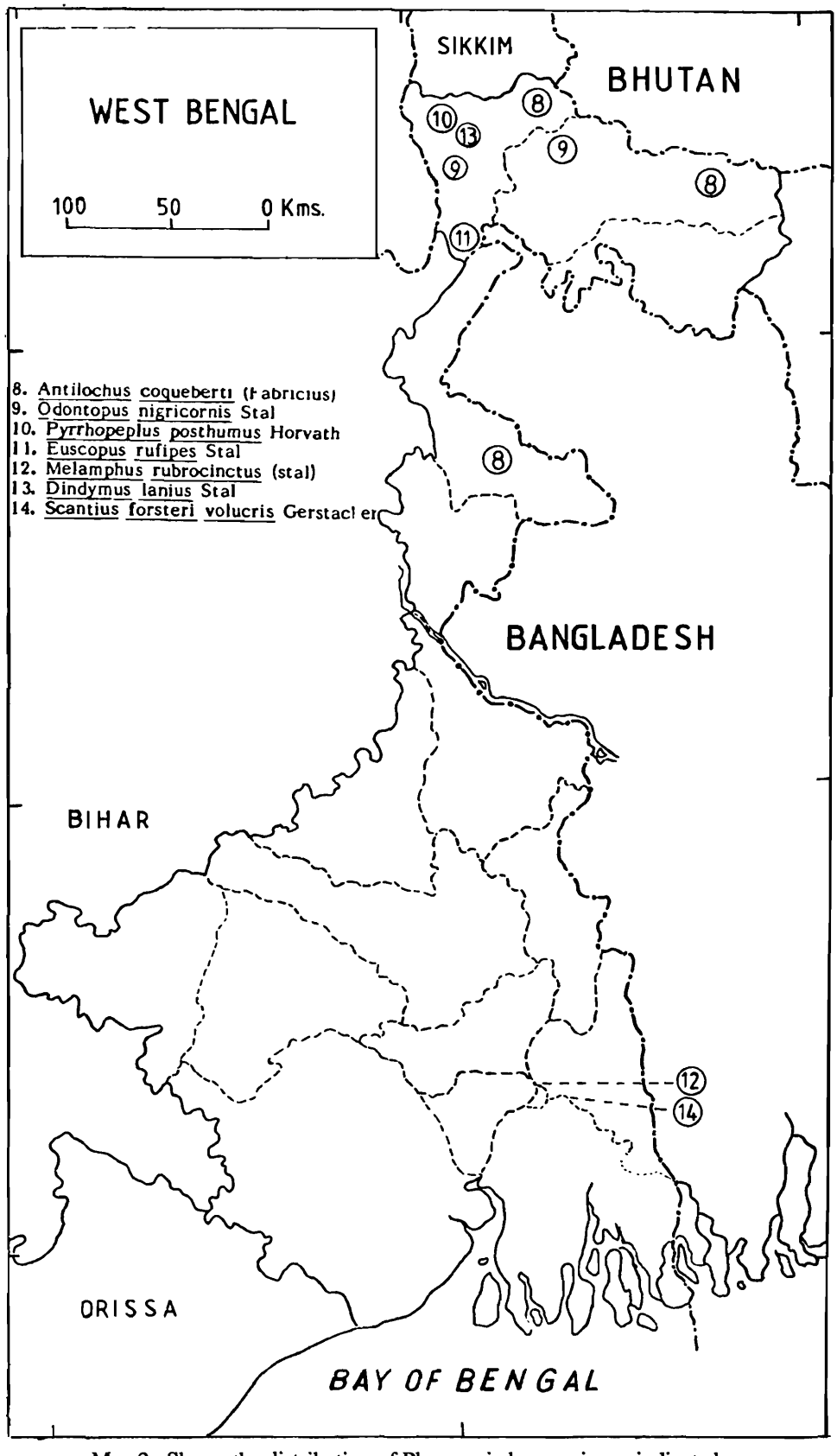


Map 1. Shows the distribution of Phyrocoriedae species as indicated.



Map 2. Shows the distribution of Phyrocoriedae species as indicated.

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INSECTA : HEMIPTERA : COREOIDEA

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INTRODUCTION

Coreids are commonly known as the leaf footed bugs. They are phytophagous in nature and include some pests of cultivated plants. This Superfamily includes four families viz., Alydidae, Coreidae, Rhopalidae and Stenocephalidae. Amongst these, members belonging to the family Coreidae some are considered as the pest of crops. In West Bengal available coreid species mostly belong to families Alydidae and Coreidae.

The Stenocephalidae and the Rhopalidae are the most primitive among Coreoidea opined by Schaefer (1965) on the basis of a series of characters which he studied. The representatives of the family Stenocephalidae are probably the most primitive, from similar ancestors probably arose Rhopalids. Similar ancestors probably gave rise on the one hand to the Alydidae and on the other hand the most advanced Coreidae. This conclusion goes hand to hand with the findings of Schaefer (1965) and Ahmed & Shadab (1975.).

Coreids fauna in the oriental region comprises of 212 species and according to Distant (1918) the Indian Fauna pertains to 148 species belonging to 46 genera.

Record of Coreid fauna from the State of West Bengal is known mainly through the works of Distant (1904, 1908 and 1918) who has reported 29 species under 18 genera. The present work brings the total number of species to 52 under 27 genera. The material collected by the different survey parties and those lying in the National Zoological collection could be studied which pertains to 25 species under 16 genera dealt in the paper.

Due to the paucity of the specimens and non-availability of the material of the so far recorded species from the state no workable key could be made. The diagnostic characters of the species studied have been provided for easy recognisation. The distributional pattern of each of the species is provided along with the host specificity of the economically important ones, at the end the total list of 52 species under 27 genera so far known from the state is given.

MATERIAL AND METHOD

Coreids like most of the hemipteran insects are phytophagous in nature and feed on agricultural fields, vegetable gardens, crop fields etc. 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 napthelene. The insects are kept in the insect envelops and labelled properly mentioning locality, altitude, date of collection and name of the collector with ecological notes etc. In the laboratory the specimens are set, pinned and mounted to display properly for easy handling under binocular microscope during the process of identification. For detailed specific identification the genitalial structures are also dissected out and mounted on slides for further study.

GENERAL DIAGNOSIS OF THE SUPERFAMILY COREOIDEA

The coreid bugs are generally medium to large insects, head much narrower than pronotum, antennae four segmented inserted well on sides of the head, ocelli present and rostrum are four segmented. Clavus of wing extending beyond scutellum. Scent glands opening on thorax conspicuous. Mostly dull coloured and capable of producing pungent scent, in some genera they exhibit extra ordinary dialation of the antennae, many species have flattened and leaf-like legs hence called leaf-footed bugs. A few species are known to be predaceous also.

Key to the families of Superfamily Coreoidea available

1(2) Bucculae generally long and extending to near insertion of antennae; pronotum posteriorly usually three times or more than the length of head; scutellum reaching or passing base of metanotum , generally broader than head between eyes..... Coreidae

2(1) Short bucculae, not extending posteriorly beyond the insertion of antennae; pronotum posteriorly or slightly boarder than breadth of head; scutellum frequently not reaching base of metanotum, somewhat narrower than head between eyes..... Alydidae

Under the family Alydidae only two genera are found in West Bengal viz., *Leptocorisa* Latr. and *Riptortus* Stal rest of the species belong to family Coreidae.

Genus *Leptocorisa* Latr.

1825. *Leptocorisa* Latr. *Fam. Nat.*, 3 : 86. Type species : *Leptocorisa tipuloides* de Geer

1. *Leptocorisa acuta* (Thunb.)

1783. *Cimex acuta* Thunb. *Nov.Ins. Sp.*, 2 : 34.
1904. *Leptocorisa acuta* : Distant, *Fauna Brit. India*, 1 : 410.

Material examined ; 10 exs., INDIA : West Bengal, North 24 Parganas, T. Sengupta Coll. 2 exs., INDIA : West Bengal, Nadia, Kalyani, 20.11.1965, K.S. Pradhan coll.

Diagnostic characters : Body above brownish, beneath pale greenish, antennae fuscous, base of second, third and fourth joint luteus, a small distinct tubercle near each lateral pronotal angle , a distinct central carinate line to pronotum.

Distribution : India : West Bengal (Calcutta, North 24-Parganas, Nadia). Other Indian States : Assam, Bihar, Karnataka, Meghalaya, Sikkim and Tamilnadu. Elsewhere : China and Islands of Malayan Archipelago.

Remarks : Generally infest on Paddy and Millet crop.

Genus ***Riptortus*** Stal.

1859. *Riptortus* Stal, *Ofv. Vet-Ak. Forth*, 460. Type species : ***Riptortus dentipes*** Fabr.

2. ***Riptortus fuscus*** (Fabr.)

1798. *Lygaeus fuscus* Fabr., *Ent. Syst. Suppl.*, 539.
1904. *Riptortus fuscus* Fabr.; Distant, *Fauna Brit. India*, **1** : 414.

Material examined : 2 exs., INDIA : West Bengal, Murshidabad, 25.11.1986, S.K. Mitra coll. 1 ex., INDIA : West Bengal, Coochbihar, Sonapur, 11.5.1987, Raja Ram coll.

Diagnostic characters : Closely allied to *Riptortus pedestris* Fabr. but sharply differ from it by the partial or total absence of the pale laevigate sternal spots, even when present are very small and usually obliterated on the metasternum.

Distribution : India : West Bengal : (Calcutta, Coochbihar Darjiling, Murshidabad, Puruliya), Assam, Bihar, Kerala, Maharashtra and Uttar Pradesh. Elsewhere : Burma, Ceylon, Malay Peninsula.

Remarks ; Infest on pigeon pea or red gram (Cajanus cajan). The species is recorded for the first time from the State.

3. ***Riptortus linearis*** (Fabr.)

1775. *Lygaeus linearis* Fabr., Syst. Ent., 710.
1904. *Riptortus linearis* : Distant, *Fauna Brit. India* **1** : 415.

Material examined ; 2 exs., INDIA : West Bengal, Calcutta, 20.10.1952, Saukat Ali coll. 2 exs., Calcutta, Botanical Garden, 10.11.1961; K.S. Pradhan coll.

Diagnostic characters : Body dark cinnamon brown; pronotum, corium, and lateral areas of sternum distinctly punctate, first, second and third joint of antennae; lateral angular spines to pronotum and abdomen black, a small spot at the middle of posterior pronotal margin, and the apex of the scutellum, pale luteous.

Distribution : India :West Bengal (Darjiling) ; Maharashtra, Sikkim. Elsewhere : Burma, Ceylon.

Remarks : Infest on pigeon pea or red gram, cow pea and fig.

4. *Riptortus pedestris* (Fabr.)

1775. *Lygaeus pedestris* Fabr., Syst. Ent., 727.
1904. *Riptortus pedestris* : Distant, *Fauna Brit. India*, **1** : 414.

Material examined: 2 exs, INDIA : West Bengal, Kadam Pally, Berhampur, Murshidabad District, 26.11.1986, S.K. Mitra coll.

Diagnostic characters ; Dark brownish ochraceous, finely and obscurely pilose; posterior margin of the pronotum and a lateral fascia on each side of the head, not extending beyond base of antnnae, dark castaneous; posterior thickly mottled with reddish brown; posterior tibiae with the bases and apices reddish brown; lateral pronotal spine black.

Distribution : India : West Bengal (Murshidabad); Karnataka, Maharashtra. Elsewhere : Burma, Ceylon & Malay Peninsula.

Remarks: This coreid species generally infest various corps and vegetables like pigeon pea or red garm, wheat, black gram, cow pea and also on cadamam. The species is recorded for the first time from the State of West Bengal.

Family COREIDAE

Genus *Acanthocoris* Amy. and Serv.

1843. *Acanthocoris* Amy. and Serv., *Hem.*, 213. Type species : *Acanthocoris scabrator* Fabr.

5. *Acanthocoris scabrator* (Fabr.)

1803. *Coreus scabrator* Fab., *Syst. Rhyng.*, 195.
1904. *Acanthocoris scabrator* : Distant, *Fauna Brit. India*, **1** : 385.

Material examined: 5 exs., INDIA : West Bengal, Darjiling, Rohni, 26.10.1949, G.K. Manna coll.

Diagnostic characters : Fuscous or brown with numerous brownish ochraceous points, antennae hirsute, the apical joint ochraceous with its base fuscous; pronotum with the lateral angles acutely produced, their anterior margin serrate, posterior femur a moderately incrassated, toothed or serrate on inner margin; rostrum reaching the intermediate coxae.

Distribution: India: West Bengal (Darjiling). Assam, Meghalaya, Sikkim , Karnataka, Maharashtra. Elsewhere : Burma, Ceylon.

Remarks : The species is recorded for the first time from the State of West Bengal.

Genus *Anoplocnemis* Stal

1873. *Anoplocnemis* Stal, *En. Hem.*, **3** : 47.
Type species : *Anoplocnemis curvipes* Fabr.

6. *Anoplocnemis phasiana* (Fabr.)

1781. *Lygaeus phasiana* Fabr. *Spec. Ins.*, **2** : 361.
1904. *Anoplocnemis phasiana* : Distant, *Fauna Brit. India*, **1** : 346.

Material examined: 4 exs., INDIA : West Bengal, Darjiling, 11.9.1974, H.K. Bhowmick and A.R. Bhowmick coll.2 exs., Jalpaiguri, Buxaduar, 11.1.1987, V.D. Srivastava coll.

Diagnostic characters : Colour varies from ochraceous, castaneous, piceous or piceous with the corium castaneous, antennae fuscous or piceous, with the apical joint ochraceous; extreme apex of scutellum ochraceous; posterior femora in male much curved at base, then strongly incrassate, inwardly broadly dentate near apex, outer margin linearly serrate, in the female only moderately incrassate inwardly and ourwardly finely linearly serrate, moderately acutely dentate near apex; in both sexes segmental margins are more or less distinctly ochraceous.

Distribution : India : West Bengal (Darjiling); Assam, Meghalaya, Maharashtra, Karnatak, Naga hills, Sikkim. Elsewhere : Burma, Ceylon and Malay Peninsula

Remarks : Mostly infest brinjal. The species is recorded for the first time from the State of West Bengal.

Genus *Babaranus* Distant

1904. *Babaranus* Distant, *Fauna Brit. India*, **1** : 482.
Type species : *Babaranus orantulus* Distant

7. *Bavaranus ornatulus* distant

1904. *Babaranus ornatulus* Distant, Fauna Brit. India, 1 : 482.

Material examined; 1 ex. INDIA : West Bengal, Darjiling, Pashok, 11.4.1916, L.C. Heartless coll; 2 exs., INDIA : West Bengal, Darjiling, Rongpu, 30.4.1974, J.K. Jonathan coll.

Diagnostic characters : Head dull pale ochraceous, two longitudinal lines on anterior area, a small spot on disk, two longitudinal lines on basal area obliquely branching on each side, and the lateral margins, piceous or black; antennae piceous first joint excluding apex, narrow bases of second and third joints and broad base to fourth joint pale ochraceous; pronotum ochraceous; scutellum ochraceous with an obscure dark central longitudinal line, abdomen with segmental dark spots.

Distribution : West Bengal (Darjiling); Assam.

Remarks : The genus and the species recorded for the first time from the state of West Bengal.

Genus *Clavigralla* Spin.

1837. *Cravigralla* spin, *Ess.* 2000.
Type species : *Cravigralla gibbosa* Spin.

8. *Clavigralla gibbosa* Spin.

1837. *Cravigralla gibbosa* Spin. *Ess*, 202.
1904. *Cravigralla gibbosa* : Distant, *Fauna Brit. India*, **1** : 401.

Material examined : 2 exs. INDIA : West Bengal, Calcutta, 18.3.1907, Mus. coll.; 1 ex., INDIA: West Bengal, Jalpaiguri, Oodiabani forest, 9.10.1987, S.K. Tandon coll.

Diagnostic characters ; Ochraceous, punctate, moderately pilose; posterior area of pronotum, apical area of corium, and spots on connexivum castaneous second and third joint of antennae subequal in length; pronotum transversely and somewhat conically tuberculate on disk, the lateral angles produced into acute black spines; posterior femora spined beneath near apices.

Distribution : India : West Bengal (Calcutta, Jalpaiguri), Maharashtra, Karnataka. Elsewhere : Tenasserim.

Remarks : Infest on pigeon pea or red gram. The genus and the species is recorded for the first time from the State of West Bengal.

Genus *Cletus* Stal

1859. *Cletus* Stal, *Freg. Eug. Resa. Ins. Hem,* 236. Type species : *Cletus triginus* Thunb.

9. *Cletus bipunctatus* (Westwood)

1842. *Coreus bipunctatus* Westwood, *Hope Cat.* **2** : 23.
1904. *Cletus bipunctatus* : Distant, *Fauna Brit. India* **1** : 393.

Material examined : 5 exs., INDIA : West Bengal, Puruliya District, Balarampur, 3.9.1985, S.Sen coll. 2 exs, INDIA : West Bengal, Birbhum, Gopalpur, Eglegram Forest, 24.1.1986, S.B. Roy coll.

Diagnostic characters : Body beneath and legs luteous , a small spot on the lateral area of each sternal segment and a few small discal spots to abdomen black; antennae pale reddish ochraceous, the apical joint juscous, pronotal lateral angles shortly but acutely produced, the apices of the spines fuscous.

Distribution : India : West Bengal (Coochbihar & Purulia), Karnataka and Maharashtra. Elsewhere; Burma, Ceylon.

Remarks : Known as sugarcane black bug also infest on paddy.

Genus *Cletomorpha* Mayr

1866. *Cletomorpha* Mayr. *Reise Nov. Hem.*, 118. Type spdcies : *Chitomorpha bellula* Stal

10. *Cletomorpha raja* Distant

1901. *Cletomorpha raja* Distant, *Amer. Mus. Nat. Hist.*, (7) vii, 423.
1904. *Cletomorpha raja* : Distant, *Fauna Brit India*, **1** : 397.

Material examined : 6 exs. INDIA : West Bengal, Darjiling, 20.4.1976, A.R. Bhowmick coll. 4 exs. INDIA : West Bengal, Darjilig, Pashok, 26.5.1916, F.H. Gravely coll.

Diagnostic characters : Antennae fuscous, with the apical joint ochraceous the first and second joints almost sub equal in length, third shorter but longer than fourth, pronotal angles acutely produced, with their apices distinctly recurved; sternum somewhat coarsely punctate; abdomen above pale reddish ochraceous.

Distribution : India : West Bengal (Darjiling), Assam, Sikkim. Elsewhere : The species is recorded for the first time from the State.

Genus *Cloresmus* Stal

1859. *Cloresmus* Stal, Ofv. Vet.-Ak. Forh, 451. Type species : *Cloresmus signoreti* Stal

11. *Cloresmus antennatus* Distant

1908. *Cloresmus antennatus* Distant, *Fauna Birt. India*, **4** : 471.

Material examined : 3 exs., INDIA : West Bengal, Nazeok, Darjiling, 7.1.1974, G.K. Srivastava coll.

Diagnostic characters : Head, pronotum and scutellum dark metallic olivaceous green; antennae with the basal joint piceous, second and third joints fuscous brown, fourth joint pale ochraceous; head with the apices of the lateral lobes pointed but not projecting beyond the central lobe; antennae with the first joint shorter than the second, about equal in length to the third, first three joints clothed with rather long hairs, fourth joint longest.

Distribution : India : West Bengal (Darjiling), Sikkim.

Remarks : This species is recorded from the State of West Bengal for the first time.

Genus *Daladar* Amy. Serv.

1843. *Daladar* Amy. and Serv., *Hem*, 187. Type species : *Daladar acuticosta* Amy. and Serv.

12. *Daladar planiventris* (Westwood)

1842. *Acanonicus planiventris* Amy. & Serv., in *Hope cat.* 2 : 8.
1904. *Daladar planiventris* : Distant, *Fauna Brit. India*, **1** : 352.

Material examined: 2 exs. INDIA : West Bengal, Peshok, Darjiling, 25.5.1910, F.H. Gravely coll.

Diagnostic characters: Pronotal angles more horizontally and less lunately produced, their apices obtusely rounded and moderately dentate before the anterior angles; the third joint of the antennae less broadly dialated.

Distribution : India : West Bengal (Darjiling), Assam, Maharashtra, Sikkim, Tamilnadu. Elsewhere : Burma, Ceylon, Malay Peninsula and Sumatra.

Remarks : This species is recorded for the first time from the state of West Bengal.

Genus *Elasmomia* Stal

1873. *Elasmomia* Stal, En. Hem., 38. Type species : *Elasmomia granulipes* Westwood.

13. *Elasmomia granulipes* (Westwood)

1842. *Myctis granulipes* Westwood, in *Hope Cat*, **2** : 11.
1904. *Elasmomia granulipes* : Distant, *Fauna Brit. India*, **1** : 339.

Material examined : 5 exs., INDIA : West Bengal, Mirik, Darjiling, 22.9.1974, H.K. Bhowmick coll; 1 ex. Darjiling, 15.4.1974, J.K. Jonathan coll.; 5 exs. Darjilig, 21.6.1959, H. Khajuria coll.; 1 ex. Sukna, Darjiling, 1.7.1908, N. Annandale coll.

Diagnostic characters : Apical joint of antennae excluding extreme base ochraceous; pronotum with the lateral margins moderately reflexed and serrate, the lateral angles horizontally produced with their apices subacute, posterior tibia moderately ampliated, but neither dilated nor angulate.

Distribution : India : West Bengal (Darjiling), Sikkim.

Remarks : This is the new record from the state.

Genus *Homoeocerus* Burm.

1835. *Homoeocerus* Burm, *Handb.* ii (1) : 316. Type species : *Homoeocerus puncticornis* Burm.

14. *Homoeocerus albiguttulus* Stal

1873. *Homoeocerus albiguttulus* Stal, *En. Hem.*, **3** : 61.
1904. *Homoeocerus albiguttulus* : Distant, *Fauna Brit. India*, **1** : 361.

Material examined ; 4 exs. INDIA : West Bengal, Calcutta, 5.6.1950, G.K. Manna coll.

Diagnostic characters : Corium with a small pale luteous transverse spot near inner angle broadly margined posteriorly with piceous; antennae very pale custaneous, long, slender, second joint longest,

first, third and fourth joint subequal in length, fourth joint luteus with its apical half black; rostrum with the third and fourth joint subequal in length.

Distribution : India : West Bengal (Calcutta), Assam, Meghalaya, Sikkim. Elsewhere : Burma, China.

Remarks : Reported for the first time from the State.

15. *Homoeocerus inornatus* Stal

1873. *Homoeocerus inornatus* Stal, *En. Hem.*, **3** : 58.
1904. *Homoeocerus inornatus* : Distant, *Fauna Brit. India*, **1** : 355.

Material examined: 2 exs., INDIA : West Bengal, Peshok, Darjiling, 26.5.1915, F.H. Gravely coll.

Diagnostic characters : Antennae very pale castaneous; meso and metasterna with a very small fuscous spot on each lateral area; antennae with the second joints longest than the first, third joint subequal to the length to the first, fourth shortest; pronotum with the lateral angles moderately and subactuely produced, between them the disk is somewhat indistinctly infuscated.

Distribution : India : West Bengal (Darjiling), Sikkim, Pondicherry. Elsewhere : Burma, China and Rangoon.

Remarks : This is the first record from the State of West Bengal.

16. *Homoeocerus serrifer* (Westwood)

1842. *Coreus serrifer* Westwood, in *Hope Cat* **2** : 24.
1904. *Homoeocerus serrifer* : Distant, *Fauna Brit. India*, **1** : 366.

Material examined : 2 exs., INDIA : West Bengal, Peshoke, Darjiling, 26.5.1916, F.H. Gravely coll.; 2 exs., Coochbihar, 2.5.1987, Raja Ram coll.

Diagnostic characters: Body ochraceous, thickly and somewhat darkly punctate; lateral margins of pronotum and basal lateral margin of corium pale luteous; antennae with second joint longest, second and third subequal in length, fourth shortest, much shorter than first; pronotum with the lateral angles moderately angulately prominent.

Distribution : India : West Bengal (Darjiling, Coochbihar), Maharashtra, Meghalaya, Sikkim. Elsewhere : China, Burma, Ceylon, Malay Peninsula and Java.

Remarks : Recorded for the first time from the State of West Bengal.

17. *Homoeocerus signatus* Walker

1871. *Homceocerus signatus* Walker, *Cat. Het.*, **4** : 97.

1904. *Homoeocerus signatus* : Distant, *Fauna Brit. India*, **1** : 356.

Material examined: 2 exs., INDIA : West Bengal, Peshok, Darjiling, 26.5.1916, F. H. Gravely coll.

Diagnostic characters : Corium with a large transverse macular spot at inner angle and the lateral margins luteous; head with a narrow fascia each side before eyes and the subgranular lateral margins of the pronotum black; antennae with the first and second joint pale custaneous, third joint luteous, apices of second and third joing black, lateral angles of the pronotum moderately and subacutely produced.

Distribution : India : West Bengal (Darjiling), Maharashtra, Sikkim. Elsewhere : Ceylon.

Remarks : Recorded for the first time from the State of West Bengal.

18. *Homoeocerus simiolus* Distant

1904. *Homoeocerus simiolus* Distant., *Fauna Brit. India*, 1 : 363.

Material examined; 3 exs., INDIA : West Bengal, Peshok, Darjiling, 26.5.1916, F.H. Gravely coll.

Diagnostic characters : Ochraceus or brownish ochraceous sometimes with brownish tinge, finely and darkly punctate; antennae very pale castaneous, apices of the first, second and third joints obsoletely blackish; pronotum with the lateral margins finely, blackly, subserrulate, the lateral angles subprominent; rostrum with the third and fourth joints subequal in length.

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

Remarks : Recorded for the first time from the State.

19. *Homoeocerus walkeri* Kirby

1891. *Homoeocerus walkeri* Kirby, *J. Linn. Soc. Zool.* **24** : 91.
1904. *Homoeocerus walkeri* : Distant, *Fauna Brit. India*, **1** : 358.

Material examined ; 3 exs., INDIA : West Bengal, Peshok, Darjiling, 11.6.1916, L.C. Heartless coll.; 1 ex., Jalpaiguri, Jainti, 17.1.1987, V.D. Srivastava coll.

Diagnostic characters ; Head, pronotum, scutellum, basal lateral margins of corium, body beneath, and legs ochraceous; pronotum and the corium purplish brown; two small spots placed transversely and sometimes amalgamated at inner angles of corium luteous; antennae pale castaneous, apical joint infuscated, apices of second and third joints piceous, first joint much shorter than second and slightly longer than third, the apex of which is little dialated.

Distribution: India : West Bengal (Darjiling), Assam, Meghalaya, Naga Hills, Sikkim. Elsewhere: Burma and Ceylon.

Remarks : This is the new record from the State of West Bengal.

Genus ***Mictis*** Leach

1843. *Mictis* Leach, *Zool. Misc.*, **1** : 92. Type species : *Mictis profana* Fabr.

20. ***Mictis tenebrosa*** (Fabr.)

1787. *Cimex tenebrosa* Fabr. *Mant.*, 2 : 288.
1904. *Mictis tenebrosa* : Distant, *Fauna Brit. India*, **1** : 344.

Material examined : 1 ex., INDIA : West Bengal, Darjiling, 11.9.1974, H.K. Bhowmick coll.

Diagnostic characters : Greyish brown or brownish ochraceous; antennae, legs and body beneath somewhat darker in hue; abdomen above black with two large central ochraceous spots sometimes narrowly connected ; pronotum with the lateral margins finely serrated, the lateral angles moderately, prominently, subactuely rounded.

Distribution : India : West Bengal (Darjiling), Assam, Meghalaya, Sikkim. Elsewhere : Burma, China and Malay peninsula

Remarks : Both the genus and species recorded for the first time from the State of West Bengal.

Genus ***Notobitus*** Stal

1859. *Notobitus* Stal. *Ofv. Vet-Ak, Forth*, 451. Type species : *Notobitus meleagris* Fabr.

21. ***Notobitus meleagris*** (Fabr.)

1787. *Cimex meleagris* Fabr, *Mant*, **2** : 297.
1904. *Notobitus meleagris* : Distant, *Fauna Brit. India*, **1** : 371.

Material examined : 5 exs., INDIA : West Bengal, Calcutta, 20.5.1907 Mus. coll.

Diagnostic characters : Blackish olivaceous, corium becoming little browner on its apical area;tarsi, anterior and intermediate tibiae, apices of the anterior and intermediate femora and the bases of the posterior femora, luteous or ochraceous; antennae blackish, basal area of fourth joint luteous; abdomen above black, with two spots on each lateral margin before apex.

Distribution : India : West Bengal (Calcutta), Maharashtra, Meghalaya, Nilgiri Hills. Elsewhere; Burma, China.

Remarks : The species is a new record from the State of West Bengal.

Genus *Ochrochira* Stal

1873. *Ochrochira* Stal, *En. Hem.*, **3** : 39. Type species : *Ochrochira albiditaris* Westwood

22. *Ochrochira biplagiata* (Walk.)

1871. *Prionolomia biplagiata* Walk., *Cat. Het.* **4** : 22.
1904. *Ochrochira biplagiata* : Distant, *Fauna Brit. India*, **1** : 343.

Material examined ; 1 ex., INDIA : West Bengal, Darjiling, Rongirum, 23.5.1974, J.K. Jonathan coll.; 1 ex., Siliguri, 18.6.1907, Mus. coll.; 2 exs. Darjilig, Peshok, 26.5.1916, F.H. Gravely coll.

Diagnostic characters : Body above ochraceous; antennae, eyes, lateral dentation to pronotum, transverse striae to sutellum, membrane, body beneath and legs fuscous; apical joint of antennae and the tarsi pale ochraceous pronotum with a somewhat distant central longitudinal impression.

Distribution : India : West Bengal (Darjiling), Meghalaya, Sikkim. Elsewhere : Burma.

Remarks : Both genus and species are the new record from the State of West Bengal.

Genus *Petillia* Stal

1865. *Petillia* Stal, *Hem. Afr.*, **2** : 2. Type species : *Petillia tragus* Fabr.

23. *Petilla calcer* (Dall.)

1852. *Myctis calcer* Dall, *List. Hem.*, **2** : 397.
1904. *Petillia calcer* : Distant, *Fauna Brit. India* **1** : 351.

Material examined : 2 exs. INDIA : West Bengal, Darjiling, Sukna, 1.5.1908, N. Annandale coll.; 2 exs., Darjiling, Pashok, June, 1916, F.H. Gravely coll.

Diagnostic characters : Pronotum with some scattered black tuberculous points and sometimes with distinct longitudinal dark fascie, the lateral margin darkly serrate, the lateral angles only moderately produced, their apices pointed and slightly directed backward, veins of the corium piceous; posterior femora increassated, more strongly so in males, with small scattered dark tubercles; obsoletely spined beneath, and with a broad black central and apical annulation; posterior tibiae inwardly dilated and strongly dentate.

Distribution : West Bengal (Darjiling), Maharashtra, Naga Hills, Sikkim. Elsewhere : Burma, Ceylon and Phillipines Islands.

Remarks : The species is recorded for the first time from the State of West Bengal.

24. *Petillia lobipes* (Westwood)

1842. *Myctis lobipes* Westwood, in *Hope Cat.*, **2** : 11.
1904. *Petillia lobipes* : Distant, *Fauna Brit. India*, **1** : 349.

Material examined : 1 ex. INDIA : West Bengal, Calcutta, N. Annandale coll.; 1 ex., Calcutta, Botanical Garden, 10.11.1961, K.R. Rao coll.

Diagnostic characters : Body above and legs pale brownish, moderately ochraceously pilose; body beneath ochraceous; pronotum with scattered black tuberculous spots on disk and two obscure transverse black spots on anterior area; posterior tibiae dentately dilated near base and then shortly spines to apex, the dentate dilation black with an ochraceous spot near base; body beneath with scattered small dark tucerculous spots, the surrounding areas of the intermediate and posterior coxae somewhat broadly piceous; antennae fuscous.

Distribution : India : West Bengal (Calcutta), Maharashtra. Elsewhere : China, Java and Pakistan

Remarks : The species is recorded for the first time from the State of West Bengal.

25. *Petillia patulicollis* (Walker)

1871. *Trematocoris patulicollis* Walker, *Cat. Het.*, **4** : 37.
1904. *Petillia patulicollis* : Distant, *Fauna Brit. India*, **1** : 350.

Material examined : 1 ex., INDIA : West Bengal, Darjiling, Kurseong, 16.7.1907, Mus. coll.

Diagnostic characters : Pale brownish or brownish ochraceous, moderately ochraceously pilose; pronotum finely darkly crenulate, the lateral angles broadly and somewhat convexly produced, their margins serrated and each terminating in a small spines directed backward; posterior tibiae dilated on inner margin and very irregularly dentate, broadest near base, and most strongly spined a little before apex.

Distribution : India : West Bengal (Darjiling), Naga Hills, Sikkim.

Remarks : The species is reported for the first time from the State of West Bengal.

List of Coreid species found in the State of West Bengal

1. *Acanthocoris scabrator* (Fabricius)
2. *Anoplocnemis phasiana* (Fabricius)
3. *Aschistus brevicornis* Dall
4. *Babaranus ornatulus* Distant
5. *Clavigralla gibbosa* Spin.
6. *Cletus bipunctatus* (Westwood)

7. *Cletus punctiger* (Dall)
8. *Cletus punctulatus* (Westwood)
9. *Cletomorpha hastata* Fabr.
10. *Cletomorpha raja* Distant
11. *Cloresmus khasianus* Distant
12. *Cloresmus modestus* Distant
13. *Cloresmus nepalensis* Westwood
14. *Cloresmus antennatus* Distant
15. *Colpura erebus* Distant
16. *Colpura nodulosa* Distant
17. *Corizus bengalensis* Dall
18. *Daladar acutocosta* Amy.and Serv.
19. *Daladar planiventris* (Westwood)
20. *Derepteryx greyi* White
21. *Derepteryx hardwicki* White
22. *Dulichius inflatus* Kirby
23. *Elasmomia granulipes* (Westwood)
24. *Homoeocerus albiguttulus* Stal
25. *Homoeocerus inornatus* Stal
26. *Homoeocerus puncticornis* Burm.
27. *Homoeocerus serrifer* (Westwood)
28. *Homoeocerus simiolus* Distant
29. *Homoeocerus signatus* (Walker)
30. *Homoeocerus walkeri* Kirby
31. *Hydara orientalis* Distant
32. *Leptocorisa varicornis* (Fabricius)
34. *Metapropis aurita* Bredd.
35. *Mictis tenebrosa* (Fabricius)
36. *Notobitus excellens* Distant
37. *Notobitus meleagris* (Fabricius)

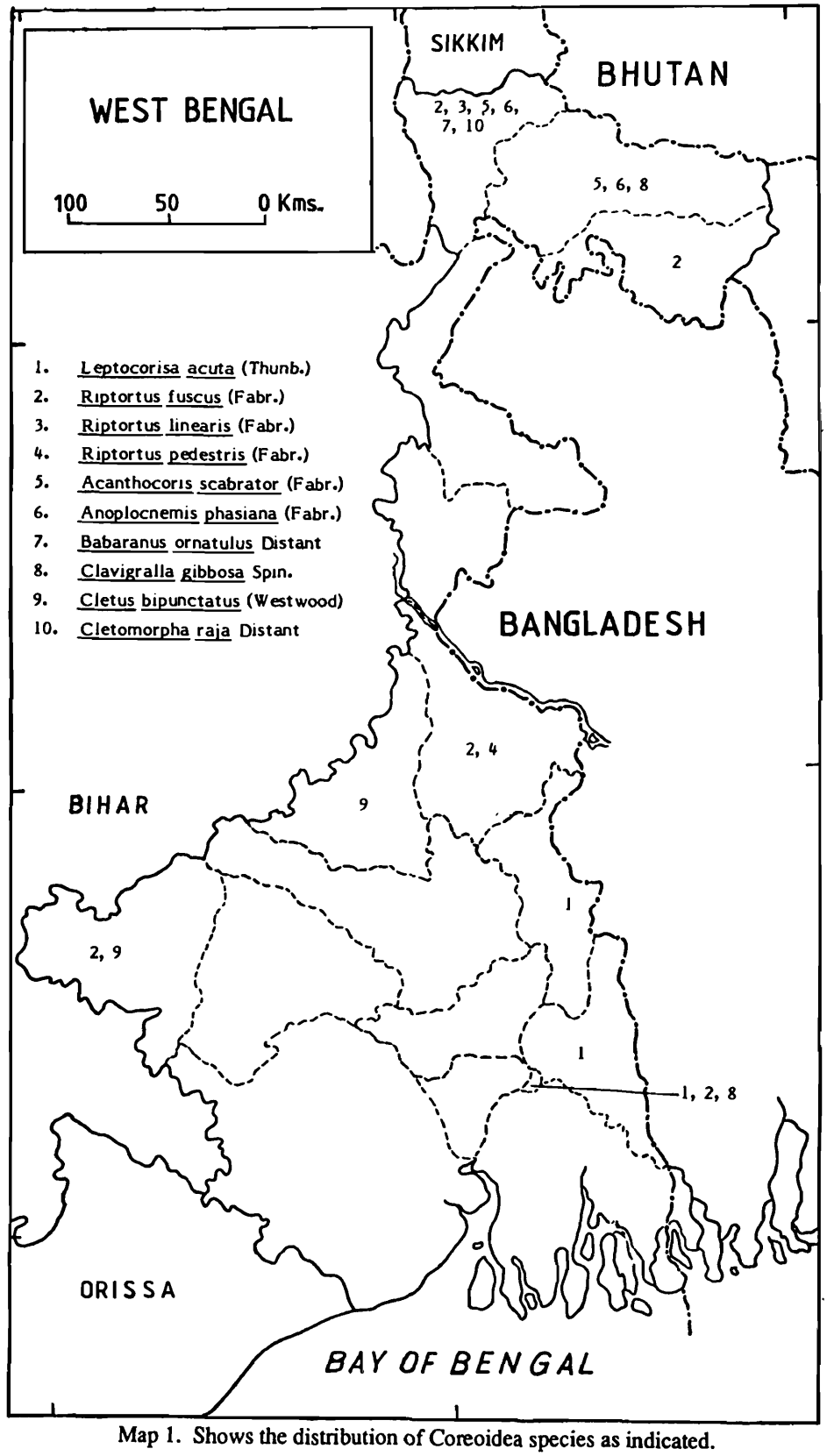
38. *Notobitus serripes* Dall
39. *Ochrochira biplagiata* (Walker)
40. *Petalocnemis obscura* Dall
41. *Petillia calcer* (Dallas)
42. *Petillia lobipes* (Westwood)
43. *Petillia notatipes* Walker
44. *Petillia patulicollis* (Walker)
45. *Physomerus grossipes* Fabricius
46. *Prionoloma cardoni* Leithierry
47. *Riptortus fuscus* (Fabricius)
48. *Riptortus linearis* (Fabricius)
49. *Riptortus pedestris* (Fabricius)
50. *Serinetha abdominalis* (Fabricius)
51. *Serinetha augur* (Fabricius)
52. *Serinetha rufomaculata* (Fabricius)

SUMMARY

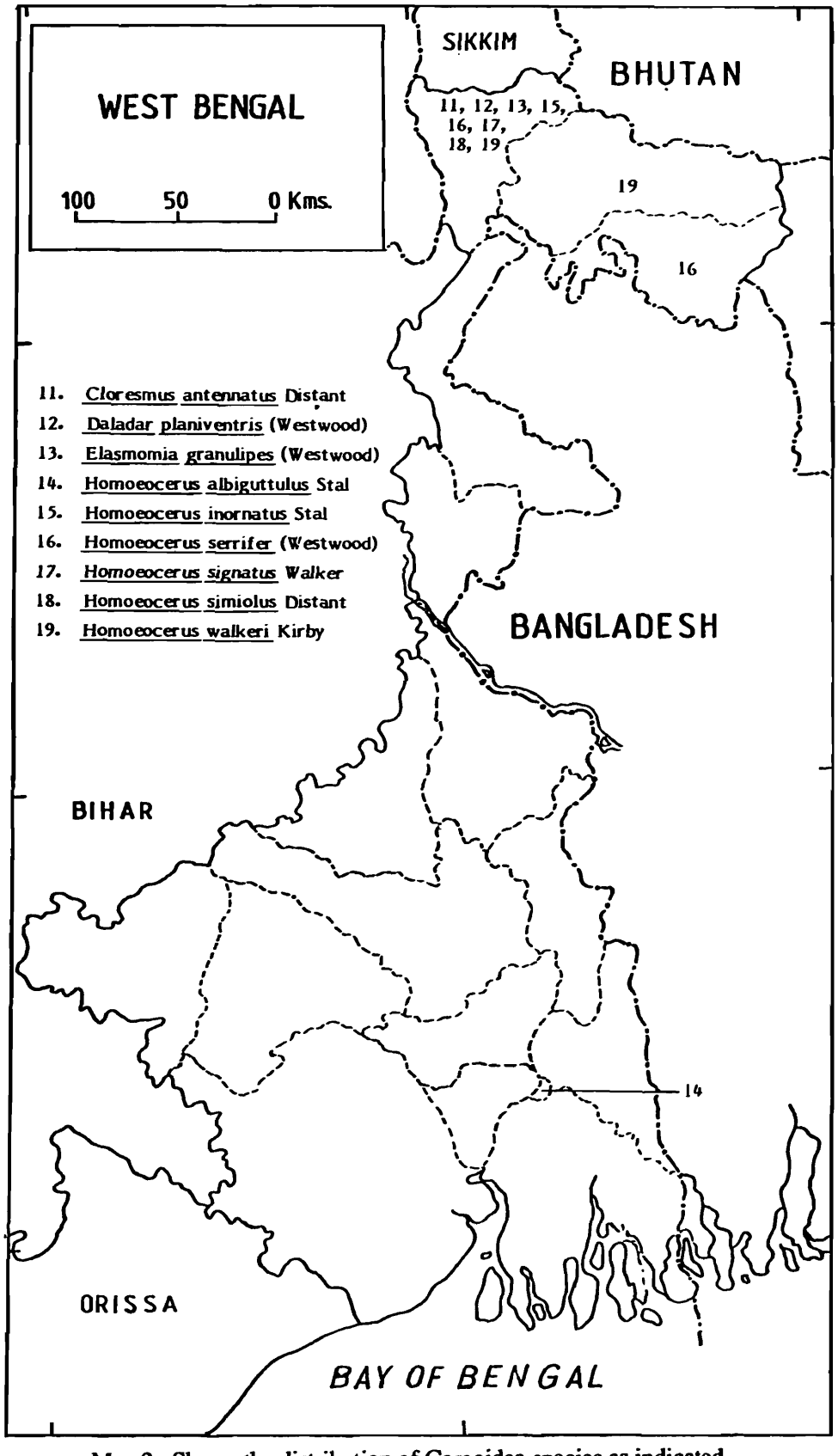
The paper presents an account of 52 species belonging to 27 genera of the Superfamily Coreoidea. Out of four families of Coreoidea only two families viz., Alydidae and Coreidae are represented in West Bengal. Most of the species also belong to Coreidae which is the largest family and good number of species infest on cereals, pulses, vegetables and other economically important plants causing considerable damage to the yield. In the present paper 23 species are added as new record of the coreid fauna from the State of West Bengal. Diagnostic characteristics of each of the species studied along with the distributional pattern in various districts of West Bengal and other States of India as well as broad has ben mentioned along with the host preference of the economically important species. Apart from material studied a complete list of coreid fauna known from the State of West Bengal is appended at the end.

ACKNOWLEDGEMENT

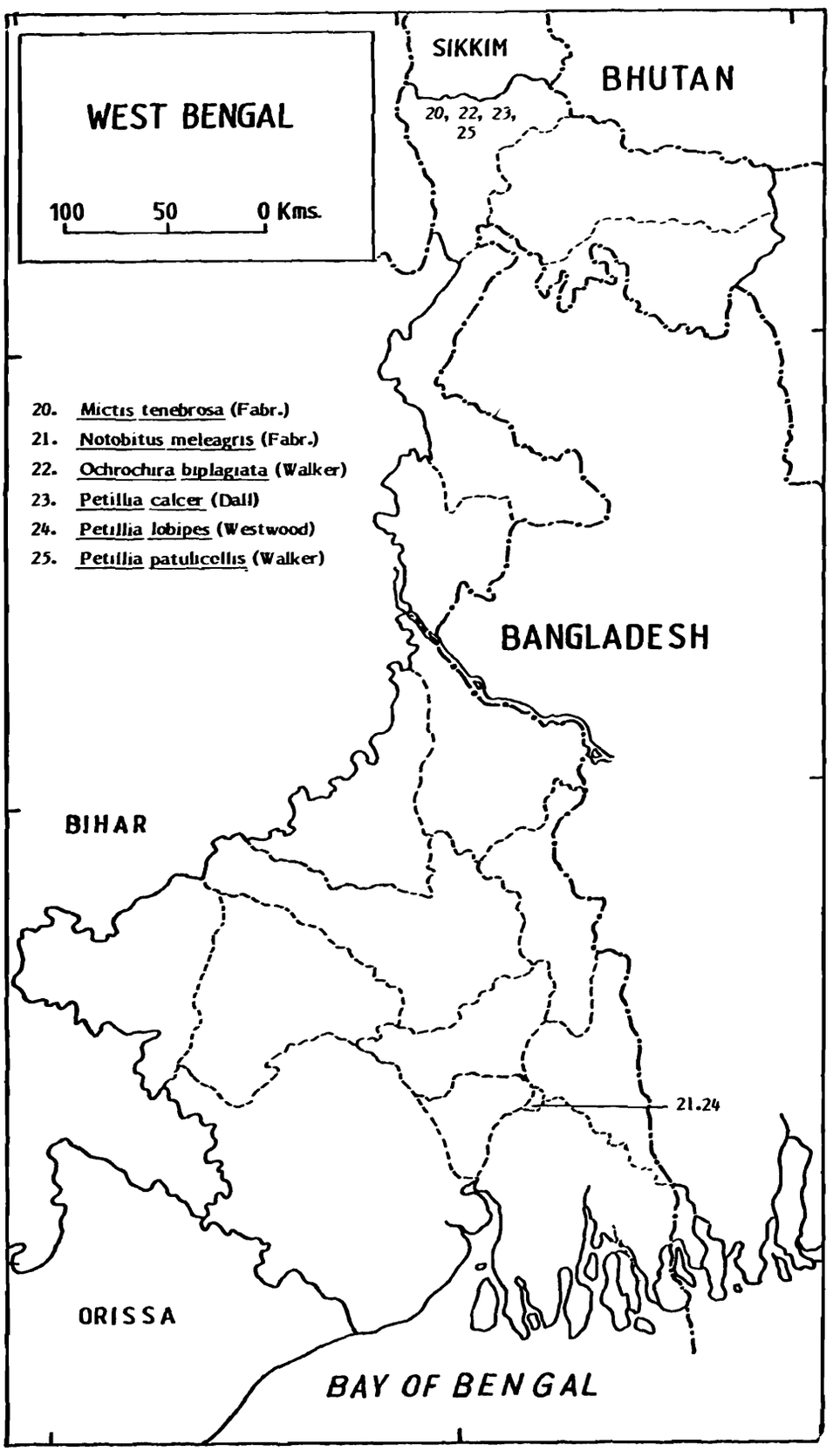
Authors are grateful to the Director, Zoological Survey of India for the Laboratory facilities. Hearty thanks are due to Drs. S.K. Bhattacharyya and R.K. Varshney, Scientist SF, S.K. Tandon & Tapan Sengupta, Scientist SE for numerous courtesies. Help rendered by the Staff members of Hemiptera section is also thankfully acknowledged.



Map 1. Shows the distribution of Coreoidea species as indicated.



Map 2. Shows the distribution of Coreoidea species as indicated.



Map 3. Shows the distribution of Coreoidea species as indicated.

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INSECTA : HEMIPTERA : PENTATOMOIDEA - 1

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INTRODUCTION

The Pentatomids or 'Shield Bugs' are moderately-sized to large heteropteran insects which are terrestrial or arboreal phytophagous though some are carnivorous in habit. They are mostly solitary. A few species may be seen in clusters or aggregations. These insects are generally pests of vegetable crops. Some families like Asopidae are chiefly predaceous on lepidopterous larvae. The group is remarkable for its beautiful colouration and for a nauseous odour emitted by the insects. The members of Pentatomoidea are spread over tropical and temperate zones and are most abundant in tropical regions.

A little over 540 species of Pentatomoidea are known from India against about 5,000 species from the world. A perusal of literature reveals that about 97 species belonging to 61 genera are known from West Bengal (Distant 1902, 1908, 19918; Datta *et al.* 1985).

The present work is an attempt to provide a comprehensive account of the Superfamily Pentatomoidea from West Bengal. It is based on the recent collections made by different party members and also the old collections.

However, the present faunistic account deals with 31 species pertaining to 21 genera distributed under 4 families of which 11 species under 8 genera are new records from West Bengal. Of these, one species viz., *Coptosoma indicum* Distant is hitherto reported for the first time from India. For each species is given the original reference and subsequent reference(s), running keys for easy identification of various taxa, distributional records within the state and elsewhere of 31 species for which material could be studied. Moreover, note on economic importance and characteristic features of the species wherever possible are provided.

The classification is basically followed *sensu* (Distant 1902, 1908, 1918), Linnavouri (1975), Ahmad and Kamaluddin (1982), Durai (1987). All the material examined is in the National Zoological Collections at the Zoological Survey of India, Calcutta.

MATERIAL AND METHODS

The pentatomid bugs can be collected by sweeping net. Beating branches with a stick over a sheet of cloth or rexine (preferably white) is helpful for collection. Picking up of individual specimen is done from leaves, stems, twigs with the help of forceps.

After collection, the specimens are killed in a killing jar using benzene or chloroform vapour. Then the insects are transferred to the insect envelopes and a separate date level mentioning collection locality, name of collector, date of collection, altitude etc. are provided to each envelope. The Pentatomids are usually preserved dry with paradichlorobenzene and naphthalene.

In Laboratory, the specimens are set, pinned and mounted to display properly for easy handling under the binocular microscope during the process of identification.

List of species so far recorded from West Bengal.

The species recorded from India for the first time is marked with single asterik and those from West Bengal for the first time are marked with double asterik.

Order : HEMIPTERA

Super Family : PENTATOMOIDEA

Family : PENTATOMIDAE

Genus 1 : ***Adria*** Stal

1. *Adira parvula* Dall

Genus 2 : ***Aeliomorpha*** Stal

2. *Aeliomarpha lineaticollis* Westwood

Genus 3 : ***Agonoscelis*** Spinola

3. *Agonoscelis nubila* (Fabr.)

Genus 4 : ***Antestia***

4. *Antestia anchora* (Thunb.)

5. *A. cruciata* Fabr.

Genus 5 : ***Asopus*** Burmeister

6. *Asopous malabaricus* Fabr.

Genus 6 : ***Andrallus*** Bergroth

7. *Andrallus spinidens* (Fabr.)

Genus 7 : ***Bagrda*** Stal

8. *Bagrada picta* Fabr.

Genus 8 : ***Canthecona*** Wolff

9. *Canthecona furcellata* Wolff

10. *C. ornatula* Dist.

Genus 9 : ***Catacanthus*** spinola

11. *Catacanthus incarnatus* (Dru.)

Genus 10 : ***Carbula*** Stal

12. *Carbula indica* Westwood

13. *Carbula* sp.

Genus 11 : ***Caystrus*** Stal

14. *Caystrus scutellatus* Distant

Genus 12 : ***Cazira*** Amyot & Serville

15. *Cazira ulcerata* Herr-Schiiff.

16. *C. verrucosa* Westwood

Genus 13 : ***Compastes*** Stal

17. *Compastes taurus* Dist.

Genus 14 : ***Dalpada*** Amyot & Serville

18. *Dalpada nigricollis* Westwood

19. *D. oculata* Fabr.

20. *Dalpada* sp.

Genus 15 : ***Dolycoris*** Stal

21. ** *Dolycoris bacarum* (Linn.)

22. *D. indicus* Stall

Genus 16 : ***Erthesina*** Spinola

23. *Erthesina oberrans* Dist.

24. *E. fullo* (Thunb.)

Genus 17 : ***Eysarcoris*** Hahn

25. *Eysarcoris Capitatus* (Distant)

26. *E. dubious* Dall

27. *E. guttiger* (Thunb)

28. ** *E. montivagus* (Distant)

29. *E. Ventralis* (Westwood)

Genus 18 : ***Halyomorpha*** Mayr

30. *Halyomorpha picus* Fabr.

Genus 19 : ***Halys*** Fabricius

31. *Halys dentatus* Fabr.

Genus 20 : ***Keriahana*** Distant

32. *Keriahana elongata* Distant

Genus 21 : ***Menida*** Motschulsky

33. *Menida histrio* (Fabr.)

Genus 22 : ***Nezara*** Amyot & Serville

34. *Nezara graminea* Fabr.

35. *N. viridula* (Linn.)

Genus 23 : ***Palomena*** Muls. & Rey

36. *Palomena unicolor* Westwood

Genus 24 : ***Piezodorus*** Fieber

37. *Piezodorus rubrofasciatus* Fabr.

Genus 25 : ***Plautia*** Stal

38. *Plautia fimbriata* Fabr.

Genus 26 : ***Prionaca*** Dallas

39. *Prionaca nigrecens* Dist.

Genus 27 : ***Sciocoris*** Fallen

40. *Sciocoris* sp.

Genus 28 : ***Stenozygum*** Fieber

41. ***Stenozygum speciosum* (Dall.)

Genus 29 : ***Zicrona*** Amyot & Serville

42. *Zicrona caerulea* (Linnaeus)

Family PLATASPIDAE

Genus 30 : ***Brachyplatys*** Roisd

43. *Brachyplatys subaeneus* Westw.

Genus 31 : ***Coptosoma*** Dallas

44. *Coptosoma abescum* Montd.

45. ***C. cribrarium* (Fabr.)

46. *** C. duodecimpunctatum* (Germar)

47. **C. indicum* Distant

48. *C. marginiifrons* Distant

49. *C. testaceum* Walk

50. *C. siamicum* Walk.

51. ***C. variegatum* Herr. -sch.

52. *Coptosoma* sp.

Genus 32 : ***Tiarocoris*** Voll.

53. *Tiarocoris suffusus* Distant

Family SCUTELLERIDAE

Genus 33 : ***Arctocoris*** Germ.

54. *Arctocoris incisus* Stal

Genus 34 : ***Chrysocoris*** Hahn.

55. ** *Chrysocoris purpureus* (Westwood)

56. *C. stollii* (Wolff.)

Genus 35 : ***Fitha*** Walker

57. ** *Fitha ardens* Walker

Genus 36 : ***Melanophara*** Stal

58. *Melanophara spinifera* Westwood

Genus 37 : ***Poecilocoris*** Dallas

59. *Poecilocoris obesus* Dall

Genus 38 : ***Scutellera*** Lam.

60. *Scutellera norrbilis* Fabr.

Genus 39 : ***Scotinophara*** Stal

61. *Scotinophara dentata* Dist.

Family TESSARATOMIDAE

Genus 40 : ***Eurostus*** Dallas

62. *Eurostus grossipes* Dall

Genus 41 : ***Muscanda*** Walker

63. *Muscanda testacea* Walk

Genus 42 : ***Pycanum*** Amyot & Serville

64. *Pycanum ochraceum* Dist.

Genus 43 : ***Tessaratoma*** Lepell & Serville

65. *Tessaratoma papillosa* (Dru.)

Family CYDNIDAE

Genus 44: ***Cydnus*** Fabricius

66. ***Cydnus indicus* Westw.

67. *C. Varians* Fabr.

Genus 45 : ***Geotomus*** Muls & Rey

68. ***Geotomus pygmaeus* (Dallas)

Genus 46 : ***Lactistes*** sciodte

69. *Lactistes rastellus* sciodte

Genus 47 : ***Macroscytus*** Ficber

70. *Macroscytus electus* Dist.

Genus 48 : ***Nishadana*** Distant

71. *Nishadana typicsus* Dist.

Genus 49 : ***Stibaropus*** Dallas

72. *Stibaropus callidus* Sciodfe

Family DINIDORIDAE

Genus 50 : ***Aspongopus*** Laporte

73. *Aspongopus janus* Fabr.

74. *A. brunneus* Thunb.

75. *A. obscurus* Fabr.

76. *A. ochreus* Westw.

Genus 51 : ***Cyclopelta*** Amyot & Serville

77. *Cyclopelta obscura* Lepell & Serv.

78. *C. siccifolia* Westw.

Genus 52. ***Dalsira*** Amyot & Serville

79. *Dalsira glandulosa* Wolff.

Genus 53 : ***Megymenum*** Laporte

80. *Megymenum inerme* Her. Sch.

81. *M. severini* Berg.

Family UROSTYLIDAE

Genus 54 : ***Urolabida*** Westwood

82. *Urolabida histrionica* Westw.

83. *U. uniloba* Stal

Genus 55 : ***Urochela*** Dallas

84. *Urochela guttulata* Stal

85. *U. pilosa* Stal

86. *U. quadripunctata* Dall.

Genus 56 : ***Urostylis*** Westwood

87. *Urostylis gracilis* Dall

88. *U. nigromarginalis* Reut

89. *U. sinensis* Walk

Family ACANTHOSOMATIDAE

Genus 57 : ***Acanthosoma*** Curtis

90. *Acanthosoma distinctum* Dall

Genus 58 : ***Anaxandra*** Stal

91. *Anaxandra hamata* Rout.

92. *A. rufescens* Dall

93. *A. nigricornis* Wlk.

Genus 59 : ***Elasmostethus*** Fieber

94. *Elasmostethus trunculatum* Wlk

Genus 60 : ***Elasmucha*** Stal

95. *Elasmucha albicincta* Dist.

96. *E. montandoni* Dist.

Genus 61 : ***Microdeuterus*** Dallas

97. *Microdeuterus megacephalus* Herr.-Sch.

GENERAL DIAGNOSIS

The group includes several families and is characterised by a prominent large and usually triangular scutellum which reaches to the apex of the clavus; in some cases the scutellum is very large and semielliptical and may cover most, or all of the abdomen and hemelytra. The number of segments in the

antennae is mostly five in the adults. The number of tarsal segments may be two or three but whichever of these may occur it is always the same on all three pairs of legs.

Key to families

1(2) Hemelytra larger than the body, folded at the base of membrane; head always clypeated..... Plataspidae

2(1) Hemelytra shorter than body..... 3

3(4) Scutellum very large, without frena..... Scutelleridae

4(3) Scutellum medium, with frena; basal ventral abdominal segment covered with metasternum..... 5

5(6) Scutellum extending to about or beyond middle of abdomen..... Pentatomidae

6(5) Scutellum not extending as above..... Cydnidae

Family I PENTATOMIDAE

Key to genera

1(2) Anterior and posterior tibiae dilated..... ***Erthesina***

2(1) Anterior and posterior tibiae rather normal..... 3

3(4) Basal abdominal spine present..... 5

4(3) Basal abdominal spine absent..... 9

5(6) Basal spine of abdomen acute and moderately long..... ***Piezodorus***

6(5) Basal spine of abdomen usually tuberculate..... 7

7(8) Pronotum with lateral margin truncate behind the eyes; lateral margins of head laterally sinuate... Nezara

8(7) Pronotum with lateral margin normal; lateral margins of head scarcely sinuate..... ***Menida***

9(10) Anterior lateral margins of pronotum crenulated..... 11

10(9) Anterior lateral margins of pronotum normal..... 13

11(12) Head elongated, tapering in front..... ***Halys***

12(11) Head rounded or truncated at apex.....***Dalpada***

13(14) Scutellum hump-shaped..... ***Zicrona***

14(13) Scutellum not hump-shaped..... 15

15(16) Scutellum apically narrowed, shorter than corium..... 17

16(15) Scutellum a little narrowed at posterior half, almost as long as or a little longer than corium..... 21

17(18) Head normal.....***Carbula***

18(17) Head flattened or deflected.....19

19(20) Head deflected..... ***Stenozygum***

20(19) Head flattened..... ***Sciocoris***

21(22) Body normal, head not deflected..... 23

22(21) Body obovate, strongly convex ventrally, head deflected..... 27

23(24) Head narrowed in front..... 25

24(23) Head emerginate; scutellum about as long as broad at base, abdomen obscurely tub erculate at base ..... ***Plautia***

25(26) Anterior lateral margins of pronotum entire, straight, somewhat acute, anterior margin somewhat callous centrally..... ***Agonoscelis***

26(25) Anterior lateral magin of pronotum actually reflexed ; anterior margin normal.....***Dolycoris***

27(28) Scutellum almost triangular; anterior lateral margins of pronotum elevated or callous... ***Antestia***

28(27) Scutellum rather obovate, anterior lateral margins of pronotum normal..... ***Eysarcoris***

Genus 1. ***Agonoscelis*** Spinola

1. ***Agonoscelis nubila*** (Fabricius)

1775. *Cimex nubila* Fabricius, *Syst. Ent.*, : 712

1851. *Agonoscelis nubila* Dallas, *List Hem.*, **1** : 179.
1989. *Agonoscelis nubila* (Fabricius) : Ghosh, Biswas, Chakrabortyand Sen, *Fauna of Orissa* : State Fauna series No. 1 : 203.

Material exa. nined : 8 exs. : West Bengal : Jalpaiguri, Raja bhatkhawa, 27.iv.1986, *Coll. B.C. Das & party* ; 2 exs. : Jalpaiguri, Alipurduar, 28.Iv. 1986. *B.C. Das & party*; 7 exs., Birbhum, Bank of Ajoy river, 27.i. 1986, *Coll. S.B. Roy & Party;* 11 exs., Birbhum, Ilambazar, 27.i.1986,*Coll. S.B. Roy & Party;* 2 exs., Murshidabad, Berhampore, 28.II. 1986, *Coll. S.K. Mitra & Party* 3 exs. Darjiling, sukana, 5.iv. 1984, *Coll. M. Prasad& party*; 4 exs., Darjiling Kalijhora, 4.iv. 1984, *Coll. M. Prasad & party.*

Distribution : India : West Bengal : (Birbhum, Darjiling, Jalpaiguri, Murshidabad); Bihar, Jammu & Kahsmir, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Tamil Nadu. Elsewhere : Burma; China; Japan; Malayan Archepelago; Malaya Peninsula; Sri Lanka.

Genus 2 . ***Antestia*** Stal

2. ** ***Atnestia 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 : 4 exs., Jalpaiguri, 19.iii. 1986, *Coll. A.K. Hazra & party* ; 1 ex., Murshidabad, Sagardighi, 14.ii. 1986, *Coll. I.J. Gupta & party.*

Diagnosis : Head before each eye with linear spot; pronotum with a series of subquadrate spots on posterior margin, an oblique streak on anterior margin; scutellum hexanotate, basal angle spotted; abdomen ventrolaterally blackish, extreme lateral bands intercepted, forewing, membrane black, margin transparent.

Distribution : India : West Bengal (Jalpaiguri, Murshidabad); North eastern India. Elsewhere : Burma.

Remarks : The species is of new distributional record to West Bengal.

Genus 3. ***Andrallus*** Bergroth

3. ***Andhrallus spinidens*** (Fabricius)

1787. *Cimex spinidens* Fa bricius, *Ment. Inst.*, **11** : 285.
1906. *Andrallus spinidens* Bergroth, *Ann. Soc. ent. Belg.*, **49** : 370.
1985. *Audinetia spinidens* (Fabricius) : Datta, Ghosh and Dhar, *Rec. zool. surv. India*, Occ. paper No. 80 : 4.

Material examined :1 ex., Nadia, Phulia, 4.xii. 1985, *Coll. B.N. Das & party*; 1 ex., Medinipur, Jhargram, 2 x. 1983, *Coll. A.K. Hazra & party.*

Distribution : India : West Bengal (Medinipur, Nadia), Assam, Bihar, Maharashtra, Meghalaya. Elsewhere : Abissinia, Africa, Bangladesh, Fiji, Malay Archipelago, Mexico, Tahiti and virtually widely distributed.

Genus 4. ***Carbula*** Stal

4. ***Cabula indica*** (Westwood)

1837. *Pentatoma indica* Westwood, *Hope Cat.*, **1** : 42.
1904. *Carbula indica* Distant, *Fauna Brit. India, Rhynchota*, **1** : 171.

Distribution : India : West Bengal (Darjiling), Sikkim. Elsewhere : Nepal.

Genus 5. ***Daplada*** Amyot & Serville

5. ***Dalpada*** sp.

Material examined : 1 ex., Jalpaiguri, Mendbari, 16.x. 1987 *Coll. S.K. Tandon & party.*

Genus 6. ***Dolycoris*** Muls. & Rey

Key to species

1(2) Membrane longer; head, pronotum and scutellum less densely punctate; anterior lateral margins of pronotum sparingly punctured with dark base; smaller in size (about 9.5 mm)..... *indicus*

291) Membrane rather shorter; head, pronotum and scutellum densely punctate; anterior lateral margins of pronotum not as above; larger in size (12-14 mm)..... *baccarum*

6. ***Dolycoris baccarum*** (Linnaeus)

1761. *Cimex baccarum* Linnaeus, *Faun. Suec.*, **2** : 249, 928.
1866. *Dolycoris baccarum* Muls. & Rey, *Pun. France Pent.* : 238.
1904. *Dolycoris baccarum* (Linnaeus) : *Distant, Fauna Brit. India*, **1** : 159.
1977. *Dolycoris baccarum* : Datta and Chakrabarty, *Newsl. Zool. Surv. India* **3** (4) : 212.

Material examined: 2 exs., Darjiling, Bagdogra, 13.v. 1987, *Coll Raja Ram& Party*; 1 ex., Maldah, Nimbari, 29.v. 1987. *Coll. K.P. Mukherjee. & Party;* 2 exs., Darjiling, Kalijhora, 4.iv. 1984, Coll. M. Prasad & Party, 3 exs., Jalpaiguri, Alipurduar, 18.i. 1987, *Coll. V.A. Srivastava & party.*

Distribution : India : West Bengal (Darjiling, Jalpaiguri,Maldah), Kashmir, Maharashtra. Elsewhere : W. Pakistan, common in Palaearctic region.

Remarks : The species is of new distributional record from the State of West Bengal.

7. Dolycoris indicus Stål

1876. *Dolycoris indicus* Stal, *Ent. Hem.*, 5 : 76.
1904. *Dolycoris indicus* Stal : Distant, *Fauna Brit. India*, 4 : 160.
1977. *Dolycoris i· 'icus* Stal, Datta and chakravarty, *Newsl. Zool. Surv. India* 3(4) : 212.

Material examined : 1 ex., Koch Bihar, Torsa River, bed 29.iv. 1987, *Coll. Raja Ram & Party;* 1 ex., Darjiling, Kalijhora, 4.iv. 1987. *Coll. M. Prasad & Party;* Darjiling, Sukna, 5.iv. 1984. *Coll. M. Prasad & party* ; 1 ex., Darjiling, Bagdogra, 13.v. 1987, *Coll. Raja Ram & party* ; 1 ex., Medinipur, Datan, 16.viii. 1985, *Coll. B.C. Das & Party.*

Distribution : India : West Bengal (Calcutta, Darjiling, Koch Bihar, Medinipur), Maharashtra, Nagaland, South India.

Genus 7. *Erthesina* Spinola

8. *Erthesina fullo* (Thunb.)

1783. *Cimex fullo* Thunberg, *Nov. Ins. Spec.* ii.420.
1837. *Erthesina fullo* Spinola, Ess. : 291.
1904. *Erthesina fullo* (Thunb.) : Distant, *Fauna Brit. India*, 1 : 117.

Material examined : 2 exs. Puruliya, Belmura, 7.x. 1983, *Coll. A.K. Hazra & Party.*

Distribution : India : West Bengal (Puruliya), Andaman Islands, Andhra Pradesh, Assam, Kerala. Elsewhere : Bangladesh, China, Formosa, Hainan, Japan, Sri Lanka.

Genus 8. *Eysarcoris* Hahn.

Key to species of *Eysarcoris*

1(2) Smaller in size (upto 4 mm); lateral angles of pronotum subprominent rounded with a small nodule near apex ..... *capitatus*

2(1) Larger in size; lateral angles of pronotum not as above 3

3(4) Anterior area of pronotum luteous with two large transverse brassy-black spots ..... *ventralis*

4(3) Anterior area of pronotum without such spot and with dense bronzy-black punctures 5

5(6) Ventral disc of abdomen brassy black; apical segment of antennae piceous excepting the very base which is ochraceous brown; lateral angles of pronotum obtusely prominent ..... *guttiger*

6(5) Only angular portion of ventral abdominal disc brassy-black; apical segment of antennae ochraceous brown, lateral angles of pronotum more produced ..... *montivagus*

9. *Eysarcoris capitatus* (Distant)

1902. *Eysarcoris capitatus* (Distant), *Fauna Brit. India*, 1 : 169.
1985. *Eysarcoris captitatus* (Distant) : Dutta, Ghosh and Dhar, *Rec. zool. Surv. India* Occ. paper 80 : 9.

Material examined :12 exs., Medinipur, keyagram, 24.xii. 1985, *Coll. A.K. Hazra & party*; 1 ex., South 24-Parganas, Bakkhali, 1.v. 1986, *Coll. B.N. Das & party.*

Diagnosis: Body brownish, finely punctate, head deflected; pronotum with a round spot on anterior area, densely punctate with a median fascia, black extending from meso-sterna to adbomen; rostrum at apex black; corium coarsely punctate; scutellum darker basally.

Distribution : India : West Bengal (Medinipur, South 24-parganas) Northeastern India.

10. *Eysarcoris guttiger* (Thunberg)

1783. *Cimex guttiger* Thunberg, *Nov. Ins.* sp,. 2 : 32.
1851. *Eysarcoris guttiger* (Dallas), *List. Hem.*, 1 : 288.
1989. *Eysarcoris guttiger* (Thunb) : Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa : State Fauna Series* No. 1, Part 2 : 204.

Material examined : India : West Bengal : 1 ex. Bankura, Bishnupur, 26.x. 1985, *Coll. M. Dutta & party*; 1 ex., Bankura, sonamukhi, 30.x. 1985, *coll. M. Datta and party*; 1 ex., Medinipur Jhargram, 6.ix. 1985, *coll. S. Biswas and Party*; 1 ex., Medinipur Denkal, 17.x.1983. *Coll. A.K. Hazra & party*; 2 exs., Puruliya, Puruliya Sainik School, 1 xi. 1985, Coll. S. Sen & party.

Distribution : India : West Bengal (Bankura, Medinipur, Murshidabad, Puruliya), Maharashtra, Nagaland, orissa, Sikkim, South India. Elsewhere : Sri Lanka.

Remarks : It is a minor pest of *Pennisetum typhoidium* (N.O. Gramineae) in South India.

11. ** *Eysarcoris montivagus* (Distant)

1904. *Eysarcoris montivagus* (Distant), *Fauna Brit. India.* 1 : 166.
1989. *Eysarcoris monivagus* (Distant) : Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa : State Fauna Series* No. 1 : 204.

Material examined : 1 ex., Maldah, Piazbari, 4.xii. 1987, *Coll. T.R. Mitra and party*; 2 exs., Medinipur, Digha, 6.xii. 1985, *Coll. A.K. Hazra and party*; 3 exs., Puruliya, Puruliya sainik School, 1.xi. 1985, *coll. S. Sen & party;* 1 ex., south 24 Parganas, Rajarhat, 21.viii, 1985; *Coll. B.N. Das & Party*; 1 ex., South 24 Parganas, Bakkhali, 1.v. 1986, *Coll. B.N. Das & party.*

Distribution : India : West Bengal (Maldah, Medinipur, Puruliya, South 24-Parganas), commonly found in the Northeastern States and Orissa.

12. *Eysarcoris ventralis* (Westwood)

1837. *Pentatoma ventralis* Westwood, *Hope Cat.*, **1** : 36.
1904. *Eusarcocoris ventralis* Distant, *Fauna Brit. India. Rhynchota,* 1 : 167.

Material examined : 1 ex., Bankura, Bishnupur, 4.xi. 1985, *coll. S. Sen & party*; 1 ex., Maldah, Pizabari, 4.xii. 1987, *coll. T.R. Mitra & Party*; 2 exs., Medinipur, Digha, 6.xii. 1985, *Coll. A.K. Hazra & party*; 1 ex. Puruliya, Sainik School.1.xii. 1985, *Coll. S. Sen & party*; 1 ex., south 24 Parganas, Rajarhat, 21.viii. 1985, *coll. B.N. Das & party*; 1 ex., South 24 parganas, Bak Khali, 1.v. 1986, *Coll. B.N. Das & party.*

Distribution : India : West Bengal (Bankura, Maldah, Medinipur, Puruliya, South 24-Parganas) Arunachal pradesh, Bihar, Karnataka, and Maharashtra. *Elsewhere* : Burma, Malaya Peninsula.

Genus 9. *Halys* Fabricius

13. *Halys dentatus* Fabricius

1803. *Halys dentatus* Fabricius, *Syst. Rhyn.* : 180.
1904. *Halys dentatus* Fabricus : Distant, *Fauna Brit. India*, **1** : 119.
1977. *Halys dentatus* Fabr. : Datta and Chakrabarti, *Newsl. Zool. Surv. India*, **3**(4) : 212.

Material examined : 1 ex., West Bengal : Murshidabad, Beldanga, 13.x. 1983, *Coll. A.K. Hazra party*; 1 ex., Nadia, Ranaghat, 5.ii. 1986, *Coll. A.R. Lahiri & Party* 1 ex., Puruliya, Sainik School, Campus, 1.xi. 1985, *Coll. S. Sen & party* 1 ex., South 24 Parganas, Raidighi, 25.iv. 1986, *Coll. B.N. Das & Party.*

Distribution : India : West Bengal (Calcutta, Murshidabad, Nadia, Puruliya, South 24 Parganas); Kerala, Maharashtra, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh. Elsewhere : Pakistan; Sri Lanka.

Genus 10. *Menida* Motschulsky

14. *Menida histrio* (Fabricius)

1787. *Cimex histrio* Fabricius, *Mant. Inst.*, **2** : 296.
1868. *Menida histrio* Fabricius, *Hem. Afr.* : 34.
1989. *Menida histrio Fabr.* : Ghosh, Biswas, Chakraborty and Sen, *Fauna of orissa : State Fauna Series* No. 1 : 204.

Material examined: 1 ex., Birbhum, Ballavpur Reserve Forest, 29.i.1986, *Coll. S.B. Roy & Party*; 3 exs., Maldah, Nimbari, 24.vi.1987, *Coll. K.P. Mukherjee & party*; 1 ex., medinipur, Shalbani, 9.viii. 1985, *Coll. B.C. Das & party;* 3 exs., Medinipur, Digha, 6.xii. 1985, *Coll. A.K. Hazra & party,* 1 ex., Nadia, Fulia, 16.xii. 1985, *Coll. B.C. Das & party;* 1 ex., West Dinajpur, Raiganj, 29.xi. 1983, *Coll. A.K. Sanyal & party.*

Distribution : India : West Bengal (Birbhum, Maldah, Medinipur, Nadia, West Dinajpur), Karnataka, Northeastern States including Orissa.

Remarks : The species is common on wheat and sugarcane in India.

Genus 11. ***Nezara*** Amyot & Serville

15. ***Nezara viridula*** (Linnaeus)

1758. *Cimex viridula* Linnaeus, *Syst. Nat. ed.* **10** : 444.
1985. *Nezara viridula Linnaeus* : Dutta, Ghosh and Dhar, *Rec. zool. surv. India* Occ. paper 80 : 14.

Material examined : 2 exs., Jalpaiguri, Alipurduar, 26.iv. 1986, *Coll. B.C. Das & party*, 1 ex., Medinipur, Shankarpur Forest, 25.xi. 1985, *Coll. A.K. Hazra & party* 2 exs., Birbhum, Ballavpur, 29.i. 1986, *Coll. S.B. Roy & party* 2 exs., Koch Bihar, Sonarpur, 1.viii. 1987, *Coll Rajaram & party*; 2 exs., Murshidabad, 28.ii. 1986, *Coll. S.K. Mitra & party*; 2 exs., Puruliya, Sainik School, 1.xii. 1985, *coll. S. Sen & Party*; 4 exs., Nadia, Mayapur, 22.xii. 1985, *Coll. B.N. Das & party.*

Diagnosis : Body dark green, densely punctate; head binotate; antennae also green, brownish apically; abdomen black ventrolaterally; pronotum trinotate; corium with green spots.

Distribution : India : West Bengal (Birbhum, Jalpaiguri, Koch Bihar, Medinipur, Murshidabad, Nadia, North 24-Parganas, Puruliya), Maharashtra, Southern Peninsula.

Remarks : This is known as green rice bug, occurring also on wheat, millets and fibre crops.

Genus 12. ***Piezodorus*** Fieber

16. ***Piezodorus rubrofasciatus*** Fabricius

1787. *Piezodorus rubrofasciatus* Fabricius, *Mant. Ins.*, **2** : 1
1904. *Piezrodorus rubrofasciatus* Fabr. : Distant, *Fauna Brit. India*, **1** : 224.
1989. *Piezodorus rubrofasciatus* Fabricius : Ghosh, Biswas, Chakraborty and Sen, *Fauna of orissa : State Fauna Series* No. 1 : 205.

Material examined : 1 ex., Medinipur, Keranitala, 3.iii. 1985, *Coll. B. Nandi & party*, 1 ex., Medinipur, Kapra village, 25.xii. 1985, *Coll. A.K. Hazra & party*, Bankura, Bishnupur, 20.x. 1985, *Coll. M. Datta & party*; 1 ex., Murshidabad, Jangipur, 12.ii. 1986, *Coll. I.J. Gupta & party*; 1 ex Murshidabad, Berhampore, 26.ii. 1986, *coll. S.K. Mitra & party*; 1 ex., Haora, Uluberia, 26.i. 1986, Coll. B. Datta & party; 1 ex., Jalpaiguri, Alipurduar, 11.v. 1987, *Coll. Rajaram & party.* 1ex., Koch Bihar, Velaguri, 2.V.1987, *Coll. Rajaram & party.*

Distribution : India : West Bengal (Bankura, Jalpaiguri, Koch bihar, Medinipur, Murshidabad), Assam, Maharashtra, Orissa.

Genus 13. ***Plautia*** Stal

17. ***Plautia fimbriata*** Fabricius

1787. *Plautia fimbriata* Fabricius, *Mant. Ins.*, **2** : 295.

1904. *Plautia fimbriata* Fabricius : Distant, *Fauna Brit. India*, **1** : 191.
1989. *Plautia fimbriata* Fabricius : Ghosh, Biswas, chakraborty and Sen, *Fauna of orissa : State Fauna series* No. 1 : 205.

Material examined : 4 exs. Koch bihar, Torsa river bed, 29.iv. 1987. *Coll. Rajaram & Party*; 1 ex., Puruliya, Mukutmanipur, 22.x. 1985, *Coll. M. Datta & Party*; 1 ex., Medinipur, Haldia, 3.iii. 1984, *Coll. K.K. Roy & Party*, 1 ex., Nadia, Palpara, 2.ii. 1985, *Coll. A.R. Lahiri. & Party.*

Distribution : India : West Bengal (Koch Bihar, Medinipur, Nadia, Puruliya), Assam, Maharashtra, Nagaland, Orissa, Sikkim and Tamil Nadu.

Genus 14. ***Sciocoris*** Fallen

18. ***Sciocoris*** sp.

Material examined : 1 ex., Maldah, Muchia, 12.xii. 1987, *Coll. T.R. Mitra & Party* 3 exs., Jalpaiguri, Birpara, 4.i. 1987, *Coll. T.K. Pal & Party;* 1 ex., Medinipur, Haldia, 3.iii. 1984, *Coll. K.K. Roy & Party.*

Genus 15. ***Stenozygum*** Fieber

19. ** ***Stenozygum speciosum*** (Dallas)

1851. *Strachia speciosum* Dallas, *List hem.*, **1** : 261.
1985. *Stenozygum speciosum* (Dallas): Datta, Ghosh and Dhar, *Rec. zool. Surv. India* Occ. paper 80 : 9.

Material examined : 1 ex., Jalpaiguri, Rajabhatkhawa, 19.iii. 1986, *Coll. A.K. Hazra & Party.*

Diagnosis : Body brownish; head trinotate with a central fascia with a spot on each side and two spots on anterior margin, median fascia extending from pronotum to scutellun; basal angle with spot, subapically with a triangular patch; connexivum black, spotted yellow; double series of spots on the sternum.

Distribution : India : West Bengal (Jalpaiguri), Northwestern and southern India.

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

Genus 16. ***Zicrona*** Amyot & Serville

20. ***Zicrona caerulea*** (Linnaeus)

1758. *Cimex caerulea* Linnaeus, *Syst. nat. ed.* **10** : 445.
1985. *Zicrona caerulea* (Linn.) : Datta, Ghosh and Dhar, *Rec. zool. surv. India* Occ. paper No. 80 : 10.

Material examined : 5 exs., Darjiling, Panitanki, 5.xii. 1986, *Coll. R.S. Barman & Party*; 5 exs,

Koch Bihar, Chowdhurihat, 27.iii. 1984, *Coll. M. Prasad & Party*; 1 ex., Medinipur, keyagaria, 7.xii. 1985, *coll. A.K. Hazra & party*; 3 exs., West Dinajpur, Raiganj, 29.ii. 1983, *Coll. A.K. Sanyal & Party;* 1 ex., Maldah, Piazbari, 4.xii.. 1987. *Coll. T.R. Mitra & party;* 1 ex., Birbhum, Ilambazar, 27.i. 1986, *Coll. S.B. Roy & Party.*

Diagnosis : Body bluish; antennal segments, forewing and membrane blackish; surface finely punctate; scutellum hump-shaped.

Distribution : India : West Bengal (Birbhum, Darjiling, Koch Bihar, Maldah, Medinipur, West Dinajpur), Northwest and Northeast India. Elsewhere : Burma, Malaya Archipelago.

Family II. PLATASPIDAE

Genus 17. *Coptosoma* Dallas

Key to the species of *Coptosoma*

1(2) Pronotum with spots on the disc 3

2(1) Pronotum without any spot on the disc 5

3(4) Pronotum with 8 reddish ochraceous spots of which 4 on angerior, 1 each on lateral margins and on disc, body larger in size (6-7 mm) and brassy black in colour ..... *Duodecim punctatum*

4(3) Pronotum with 6 ochraceous spots of which 4 on disc and 2 on lateral angles; body smaller in size (2-2.5 mm) and shining black in colour ..... *variegatum*

5(6) Abdomen with long ray-like marginal spots; apices of lateral lobes of head completely meeting in front of central lobe ..... *cribrarium*

6(5) Abdomen without such marginal spots 7

7(8) Body much smaller; pronotum with anterior margin concolorous ..... *indicum*

8(7) Body larger in size, pronotum with a broken pale anterior margin ..... *siamicum*

21. ** *Coptosoma cribrarium* (Fabricius)

1798. *Cimex cribrarium* Fabricius, *Ent. Syst. Suppl.* : 531
1985. *Coptosoma cribrarium* (Fabr.) : Datta, Ghosh and Dhar, *Rec. zool. surv. India* Occ. paper no. 80 : 16.

Material examined : 1 ex., North 24-parganas, Barrackpore, 14.xi. 1961, *Coll. K.V. Lakshminarayan & Party.*

Diagnosis : Body yellowish green, black ventrally, thickly punctate; an oblique spot behind each

eye; pronotum with a series of transverse punctures; scutellum punctate; lst abdominal segment with a ray-like fascia.

Distribution : India : West Bengal (North 24-Parganas), Northeastern and Southern India. Elsewhere : Burma, China, Formosa.

Remarks : It is a comon pest on Leguminosae and compositae (Datta *et al* 1985). The species is a new record from West Bengal.

22. ** *Coptosoma duodecimpunctatum* (Germ.)

1839. *Thyreocoris duodecimpunctatum* Germar, *Zeitschr.* **1** : 30.
1851. *Coptosoma dudecimpunctatum* Dallas, *List. hem.* **1** : 62.
1904. *Coptosoma duodecimpunctatum* : Distant, *Fauna Brit. India*, 1 : 19.

Material examined: 10 exs., Bankura, Sonakumhi forest, 8.ix. 1986, *Coll. K.P. Mukherjee & Party.*

Distribution : India : West Bengal (Bankura), Assam, Meghalaya, Sikkim. Elsewhere : Barwai, Burhampur, Malay Peninsula, Palon, Pegu.

Remarks : The species is hitherto reported for the first time from West Bengal.

23. *Coptosoma indicum* Distant

1904. *Coptosoma indicum* Distant, *Fauna Brit. India*, **1** : 33.

Material examined : 4 exs. Haora, Uluberia, 26.i. 1986, *Coll. B. Datta & Party.*

Distribution : India : West Bengal (Haora). Elsewhere : Siam, Sri Lanka.

Diagnosis: Body small shining black excepting antennae, rostrum, legs, lateral margins of sternum and abdomen. Lateral and apical margins of scutellum ochraceous. Also a linear spot at end of each abdominal segment ochraceous. Length of body 2 mm. width of body 2 mm.

Remarks : The species is a new record from India.

24. *Coptosoma siamicum* Walker

1867. *Coptosoma siamicum* Walker, *Cat. Het.*, **1** : 89.
1901. *Coptsoma siamicum* : Distant, *Ann. Mus. Nat. Hist.* (7) **8** : 240.

Material examined: 1 ex., North 24 Parganas, Barrackpore, 14.xi.1961, *coll. K.V. Lakshminarayan & Party.*

Distribution : India : West Bengal (Calcutta, North 24 Parganas), Madhya Pradesh. *Elsewhere* : Barwai, Burma, Malayan Archipelago, North Australia, Siam, Sri Lanka, Tonkin.

25. *Coptosoma* sp.

Material examined : 1 ex., Medinipur, Digha, 6.xii. 1985, *Coll. A.K. Hazra & Party.*

Remarks : Due to paucity of sufficient material specific identification was not possible.

26. *Coptosoma variegatum* Montand

1894. *Coptosoma variegatum* Montand, *Ann. Mus. Civ. Gen.*, **14** : 134.
1918. *Coptosoma variegatum* : Distant, *Fauna Brit. India*, **7** : 115.

Material examined : 2 exs., Haora, Uluberia, 26.i. 1986, *Coll. B. Datta & party*; 4 exs., North 24 parganas, Barrackpore, 14.xi. 1961, *Coll. K.V. Lakshminarayana and Party.*

Distribution : India : West Bengal (Haora), Sikkim, Uttar pradesh. *Elsewhere* : Sri Lanka; Sumatra; Tonkin.

Remarks : The species is of new distributional record from West Bengal.

Family III. SCUTELLERIDAE

Key to genera

Antennae 4 segmented ..... ***Fitha***

Antennae 5 - segmented ..... ***Chrysocoris***

Genus 18. *Chrysocoris* Hahn.

Key to species

1(2) Body larger in size (15-17 mm); pronotum with 5 distinct spots : 2 on anterior and 3 on posterior disc..... *purpureus*

2(1) Body smaller in size (13-14.5 mm); pronotum with 8 spots of which 3 near anterior margin, 3 larger on posterior disc and one each on lateral angle..... *stollii*

27. ** *Chrysocoris purpureus* (Westwood)

1775. *Cimex stockerius* Fabricius, *Syst. Ent.*, 696 (1).
1868. *Chrysocoris purpureus* Stal, *Hem. Afr.*, **1** : 10(1) & 11(6)
1989. *Chrysocoris purpureus* (Westwood) : Ghosh, Biswas, Chakraborty and Sen *Fauna or Orissa : State Fauna Series* No. 1 ; 205.

Material examined : 2 exs., Bankura, Bishnupur, 25.x. 1985, *Coll. M. Datta & Party*; 2 exs., Nadia,

Debagram, 25.xii. 1986, *Coll. B.N. Das & party.*

Distribution : India : West Bengal (Bankura, Nadia).

Remarks : The species enjoys wide distribution in southern India. It is hitherto reported for the first time from West Bengal.

28. *Chrysocoris stollii* (Wolff)

1901. *Cimex stollii* Wolff., 1o.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. 1 : 206.

Material examined : 10 exs., Bankura, Bishnupur, 25.x.1985, *Coll. M. Datta & party*; 8 exs., Puruliya, Jhalda, 8.ix. 1986, *Coll. R.S. Barman & party*, 2 exs., Murshidabad, Ajimganj, 5.ii. 1986, *Coll. I.J. Gupta & Party*; 4 exs., Medinipur, Shakarpur Forest, 25.xii. 1985, *Coll. A.K. Hazra & party*; 2 exs. West Dinajpur, Raiganj, 14.xii. 1986, *Coll. B.C. Das & party;* 5 exs., South 24-Parganas, Joka, 30.v. 1986, *coll. B.N. Das & Party*; 3 exs., South 24-Parganas, Ramdharia, 18.iv. 1986, *coll.. B.N. Das & Party*; 5 exs., Birbhum, Ballavpur Reserve Forest, 29.i.1986, *Coll. S.B. Roy & party.*

Distribution : India : West Bengal (Bankura, Birbhum, Medinipur, Murshidabad, Puruliya, South 24 Parganas, West Dinajpur). The species enjoys rather wide distribution throughout the country. It is common on the plants belonging to N.O. Euphorbiaceae.

Genus 19. *Fitha* Walker

29. *Fitha ardens* Walker

1867. *Fitha ardens* Walker, *Cat. Het.*, **1** : 45.
1985. *Fitha ardens* Walker : Datta, Ghosh and Dhar, *Rec. zool. Surv. India* Occ. paper No. 80 : 18.

Material examined: 1 ex., Medinipur, Digha, 29.ix. 1988, *coll. A.K. Hazra & party*; 1 ex., Bankura, sonamukhi, 30.x. 1985, *coll. M. Datta & party*; 1 ex., South 24 parganas, Bakkhali, 1.v. 1986, *coll. B.N. Das & Party*; 1 ex., South 24-parganas, Sonarpur, 28.xi. 1961, *Coll. A.R. Bhoumick & party*; 1 ex., Calcutta Horticultural Garden, 23.vi. 1961, *Coll. A.R. Bhoumick & party.*

Diagnosis: Body elliptical, coarsely punctate; first joint of antenna reddish, rest black, pronotal disc and lateral margins hexanotate; scutellum uniformly coloured, abdomen on each side with purple stripes with yellowish patch at base and apex; legs red.

Distribution : India : West Bengal (Bankura, Calcutta, South 24-Parganas) and widely distributed throughout the country.

Family IV. CYDNIDAE

Key to genera

Head without spines.....*Goeotomus*

Head with small spines .....*Cydnus*

Genus 20. *Cydnus* Fabricius

30. ** *Cydnus indicus* Westwood

1803. *Cydnus indicus* Westwood, *Syst. Rhyn.* : 184.
1985. *Cydnus indicus* Westwood : Datta, Ghosh and Dhar, *Rec. zool. Surv. India* Occ. paper No. 80 : 3.

Material examined : 2 exs., Bankura, Bishnupur, 18.xii. 1985, *Coll. D.K. Mondal & Party*; 1 ex., Bankura, Bishnupur, 25.x. 1982, *Coll. M. Datta & party.*

Diagnosis : Body piceous, head coarsely punctate, laterally reflexed, pilose; ;last segments of antennae dilated. Pronotum convex, with a transverse impression, densely punctate, laterally pilose; scutellum punctate; apex and basal angles impunctate; membrance of forewings smoky.

Distribution : India : West Bengal (Bankura), Western India. Elsewhere : Australia, South Africa and Southeast Asia.

Remarks : The species is a new record from West Bengal

Genus 21. *Geotomus* Muls. & Rey

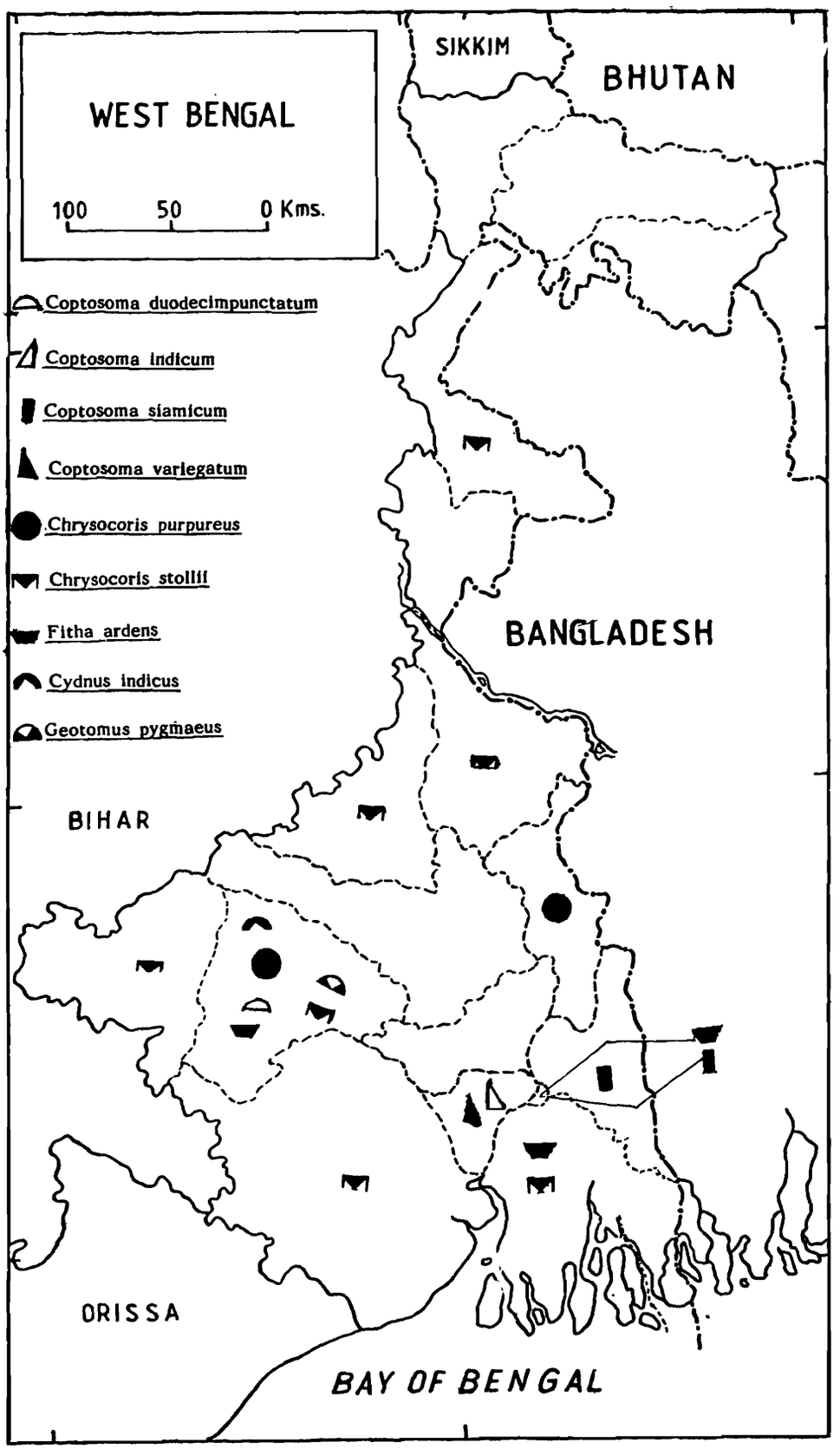
31. *Geotomus pygmaeus* (Dallas)

1851. *Aethus pygmaeus* Dallas, *List Hem.*, **1** : 120.
1866. *Geotomus pygmaeus* Muls. & Rey, *Pun, France Pent.* : 34.
1904. *Geotomus pygmaeus* (Dallas) : Distant, *Fauna Brit. India*, **1** : 98.

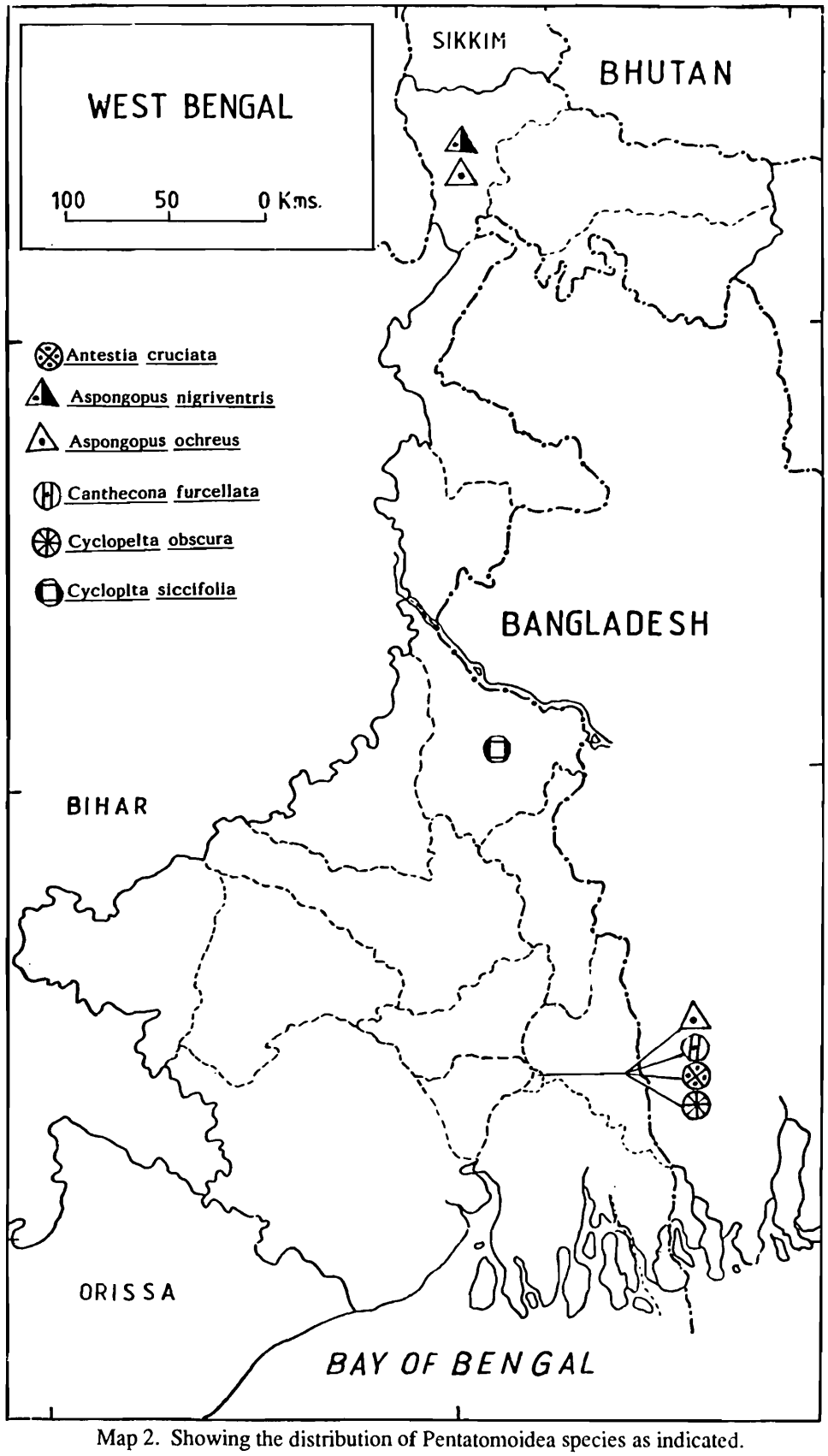
Material examined : 1 ex., India : West Bengal (Bankura, Bishnupur), 8.iii. 1986, *Coll. K.P. Mukherjee & Party.*

Distribution : India : West Bengal (Bankura), Maharashtra. Elsewhere : Burma, China, Hawaii, Japan, Malayan Archipelago and New Caledonia.

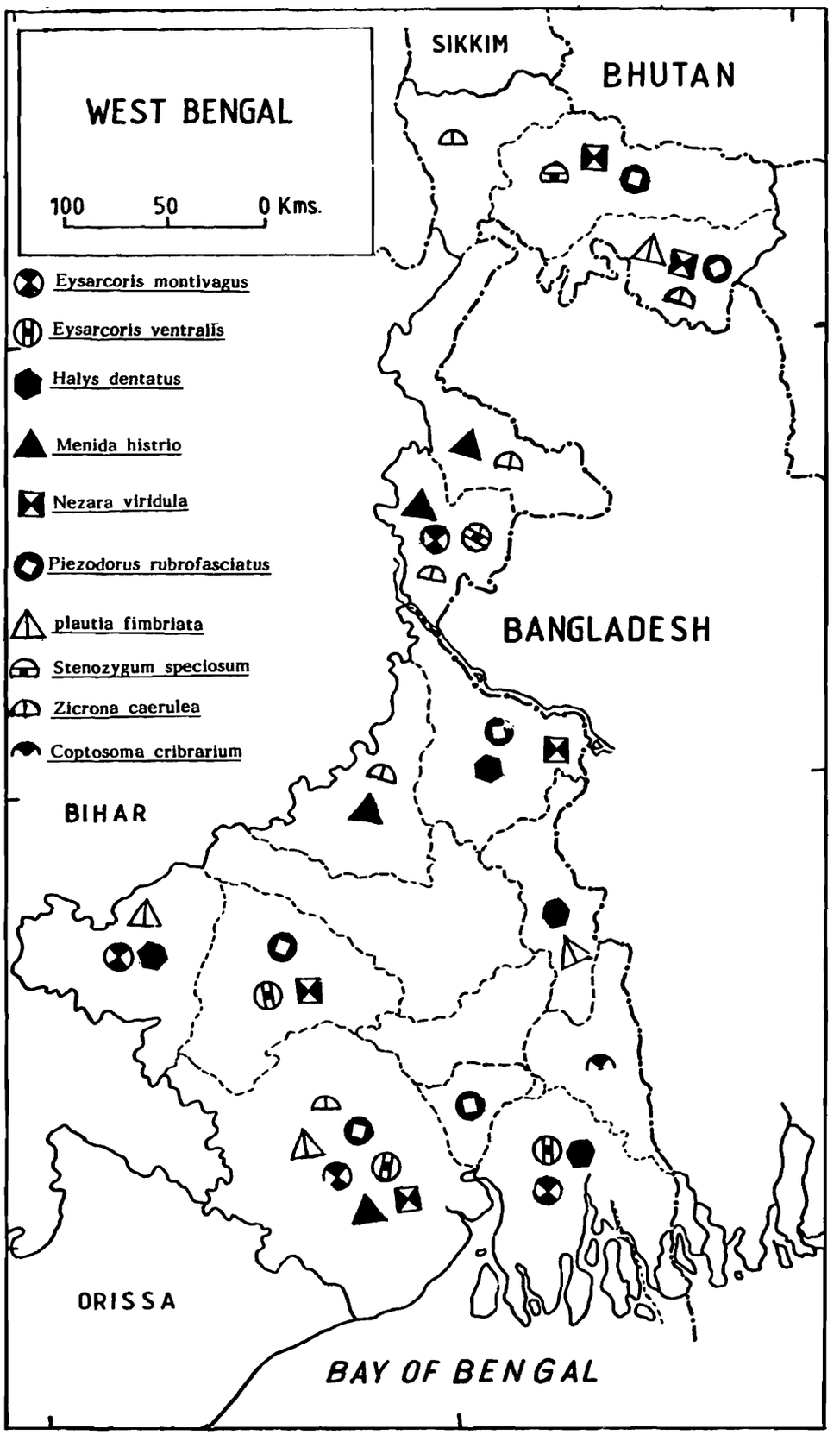
Remarks : The species is hitherto reported for the first time from West Bengal.



Map 1. Showing the distribution of Pentatomoidea species as indicated.



Map 2. Showing the distribution of Pentatomoidea species as indicated.



Map 3. Showing the distribution of Pentatomoidea species as indicated.

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State Fauna Series 3 : Fauna of West Bengal, Part 5 : 495 509, 1994

INSECTA : HEMIPTERA : PENTATOMOIDEA - II

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INTRODUCTION

The Pentatomid fauna of West Bengal is comprised by 97 species of which material for 31 species were examined and presented in part I of this paper. This part deals with 11 additional species listed earlier in the synoptic list. The key for these 11 species is based mainly on genitalia.

Besides, morphological diagnosis has also been given for recognition of the taxa. The paper also includes original reference, subsequent Indian reference(s), if any, distribution, notes on economic importance of species. The work has been suitably illustrated. The study is based on collections represented in Zoological Survey of India.

SYSTEMATIC ACCOUNT

Family I. PENTATOMIDAE

Genus I. ***Antestia*** Stal

1. *Antestia cruciata* (Fabricius)

Genus II. ***Canthecona*** Amyot E' Serv.

2. *Canthecona furcellata* Wolff.

Family II. SCUTELLERIDAE

Genus III. ***Scutellera*** Lam.

3. *Scutellera nobilis* Fabricius

Family III. DINIDORIDAE

Genus IV. ***Aspongopus*** Laporte

4.* *Aspongopus nigriventris* Westwood

5. *A. ochreus* Westwood

Genus V. ***Cyclopelta*** Amy. E' Serv.

6. *Cyclopelta obscura* Lepell. & Serv.

7. *C. siccifolia* Westwood

Genus VI. ***Megymenum*** Laporte

8. *Megymenum brevicorne* Fabricius

Family IV. TESSAROTOMIDAE

Genus VII. ***Dalcantha*** Amyot E' Servelle

9.* *Dalcantha dilitata* Amyot E' Servelle

Genus VIII. ***Pycanum ochraceum*** Distant

Family V. UROSTYLLIDAE

Genus IX. ***Urochela*** Dallas

11. *Urochela quadripunctata* Dallas

Key to genera and species (based on genitalia)

1(2) Clasper cylindrate.....3

2(1) Clasper variously shaped.....9

3(4) Apical 1/3 of clasper sickle-shaped (Fig. 5).....***Scutellera***

4(3) Apical 1/3 of clasper not sickle-shaped 5

5(6) Tip rather elongate with simple tip (Fig. 3).....***Canthecona***

6(5) Tip not as above.....7

7(8) Tip apically sharp (Fig. 21).....***Urochaela***

8(7) Tip bulging type, ventrally cup-shaped, apical portion converging (Fig. 15)..... .***Megymenum***

9(10) Clasper C-shaped, apical part not truncate, clasper deeply curved (Fig. 1)..... ...***Antestia***

10(9) Clasper either ovoid, rectangulate or triangulate.....11

11(12) Clasper ovoid 13

12(11) Clasper rectangulate, truncate or triangulate but never ovoid.....15

13(14) Clasper oval, basal portion with digitiform projection (Fig. 19).....***Pycanum***

14(13) Clasper without such projection surface of clasper sparsely scalloped..... ....***Cyclopelta***

Apical portion of clasper rather projected (Fig. 11).....*Cyclopelta obscura*

Apical portion of clasper not projected, rather club-shaped, sparsely scalloped (Fig. 13).... .... *Cyclopelta siccifolia*

15(16) Clasper obliquely truncate or triangulate, if triangulate body robust with row of marginal hairs..... ..... ***Aspongopus***

Clasper obliquely truncate (Fig. 9)..... ..... *Aspongopus ochreus*

Clasper rather triangulate (Fig. 7)..... ..... *Aspongopus nigriventris*

16(15) Clasper subtriangulate, convergine apically (Fig. 17)..... ..... ***Dalcantha***

Superfamily PENTATOMOIDEA

Family I PENTATOMIDAE

Genus 1. *Antestia* Stal

1. *Antestia cruciata* (Fabricius)

1775. *Cimex cruciata* Fabricius, *Syst. Ent.* : 714.
1851. *Agonoscelis nubila* Dallas, *List. Hem.*, **1** : 179.
1985. *Antestia cruciata* (Fabricius) : Datta, Ghosh and Dhar, *Rec. zool. Surv. India, Occ. paper* No. 80 : 9.

Material examined : 2 exs., West Bengal : Calcutta, 14.viii.1949, *Coll. G. K. Manna.*

Diagnosis : Head with a pair of median streaks, spots near each eye, clasper (Fig.1) C-shaped, robust, arched along inner margin, conjunctival appendages produced into an elongate declivent sclerotised process, medial penial plates tongue-shaped (Fig.2). Length : 8 mm.

Distribution : India : West Bengal (Calcutta), widely distributed. Elsewhere : Burma; Sri Lanka.

Remarks : The species is very economically important. The destruction of fruits, vegetables and cereal crops are involved by the species which is common on coffee, fruits of Citrus, *Santalum* and on *Zyzyphus* sp.

Genus 2. *Canthecona* Amy. & Serv.

2. *Canthecona furcellata* Wolff.

1802. *Canthecona furcellata* Wolff., *I.C.V.* : 182.
1904. *Canthecona furcellata* Distant, *Fauna Brit. India*, **1** : 248.

Material examined : 2 exs., West Bengal : Calcutta, Date ?, Coll. ?.

Diagnosis : Body clay-coloured, densely punctate, lateral lobes of head brassy-black; rostrum reddish at apex, pronotal angles projected into short black spine; scutellum thickly punctate apically, while abdominal margin with a series of green spots. Clasper (Fg. 3) geniculate basad, 2/3 basad cylindrate, rest 1/3 tapering, apex slightly reflected; conjunctival appendages membranous; medial penial plate fused along ventral margin (Fig. 4).

Economic importance : Destructive to Tussar silkworm.

Length : 15.5 mm.

Distribution: India: West Bengal (Calcutta); Bihar; Maharashtra; Tamil Nadu. Elsewhere: Burma; Sri Lanka.

Remarks: The species is predaceous in nature. It feeds on caterpillar stages of lepidopteran insects. Adults paralyse caterpillar by injecting Saliva in Caterpillar.

Family II. SCUTELLERIDAE

Genus 3. ***Scutellera*** Lam.

3. ***Scutellera nobilis*** Fabr.

1775. *Scutellera nobilis* Fabricius, *Syst. Ent.* : 69.
1904. *Scutellera nobilis* Fabricius : Distant, *Fauna Brit. India*, **1** : 51.

Material examined : 6 exs., West Bengal : Calcutta, 2.vi.1950, *Coll. G. K. Manna.*

Diagnosis: Body metallic green, scutellum with a median fascia, hexanotate on disc, spots placed in pairs, clasper (Fig. 5) C-shaped apical margin serrate, 3/4 stem membranous selerotised process of various shapes, vescia conjunctive in between conjunctival lobes (Fig. 6).

Length : 19 mm.

Distribution : India : West Bengal (Calcutta), Assam; Kerala; Manipur; Maharashtra; Tamil Nadu. Elsewhere : Sri Lanka.

Remarks : The species is generally found on Sandal wood plantation and on agricultural crops.

Family III. DINIDORIDAE

Genus 4. ***Aspongopus*** Laporte

4. ***Aspongopus nigriventris*** Westwood

1837. *Aspongopus nigriventris* Westwood, *Hope. Cat.*, **1** : 26.

1904. *Aspongopus nigriventris* Westw. Distant, *Fauna Brit. India,* **1** : 284.
1985. *Aspongopus nigriventris* Westw. : Datta, Ghosh and Dhar, *Rec. zool. Surv. India, Occ. paper* No.80 : 5.

Material examined : 2 exs., West Bengal : Darjiling 14.vi.1916, *Coll. F. H. Gravely.*

Diagnosis : Body metallic black and finely punctate; pronotum and scutellum with fine transverse series of punctures; antennal joint 2 + 3 shorter than 4 + 5 joint; legs metallic black; hind tibiae slightly dilated medially. Clasper robust triangulate (Fig. 7), conjunctive with several membranous lobes covering vescia and medial penial plate (Fig. 8).

Length : 20 mm.

Economic Importance : Pincipal pollinator of *Caryota urens* Linn., Sapopalu tree.

Distribution : India : West Bengal (Darjiling); Assam.

Remark : The species is hitherto reported for the first time from West Bengal.

5. *Aspongopus ochreus* Westwood

1837. *Aspongopus ochreus* Westwood, *Hope Cat.*, **1** : 25.
1904. *Aspongopus ochreus* Westw. : Distant, *Fauna Brit. India,* **1** : 282.

Material examined : 1 ex., West Bengal : Calcutta ; 1 ex., Sukna, Darjiling, Date ?, Coll. ?.

Diagnosis : Body with legs brownish yellow; antennae dark brown, basal and apical joint brownish yellow, fourth joint slightly longer than fifth one. Clasper (Fig. 9) : basal 2/3 gibbose and rest 1/3 tapering; conjunctival appendage robust, membranous; vesica tapering, covering conjunctival lobes (fig. 10).

Length : 18 mm.

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

Genus 5. *Cyclopelta* Amy. & Serv.

6. *Cyclopelta obscura* Lepell

1825. *Cyclopelta obscura* Lepell, *Eric. Melth,* **X** : 592.
1904. *Cyclopelta obscura* Lepell : Distant, *Fauna Brit. India,* **1** : 280.

Material examined : 1 ex., West Bengal : Calcutta, 5.x.1906, Coll. ?.

Diagnosis : Body blackish; pronotum and scutellum transversely wrinkled with two spots at apex and base; connexivum reddish brown with two black spots; abdomen red, spots at lateral margin; stigmata black; marginal setae; pygophoral appendages sharp hook-shaped laterad; conjunctival lobes membra-

nous apically, lateral tapering to a sclerotised point (Fig. 12).

Length : 15 mm

Distribution : India : West Bengal (Calcutta); Tamil Nadu. Elsewhere : Burma; Sri Lanka.

7. ***Cyclopelta siccifolia*** (Westwood)

1837. *Cyclopelta siccifolia* Westwood, *Hope Cat.* i. 26.
1904. *Cyclopelta siccifolia* (Westw.) : Distant, *Fauna Brit. India,* **1** : 280.

Material examined : 1 ex., West Bengal : Murshidabad, 10.viii.1951, *Coll. A. P. Kapur.*

Diagnosis : Body black; pronotum wrinkled, forewing membrane brownish yellow; scutellar base with sanguineus spot; abdomen with red pigmentations; marginal spots and stigmata black. Clasper (Fig. 13) robust, oval-shaped, distinctly attenuate, thickly setose, spherical surface sparsely nodulate, lateral margin notched; conjunctival appendage deeply emarginate, vesica elongate, linear (Fig. 14).

Distribution : India : West Bengal (Murshidabad); Maharashtra; Meghalaya; Sikkim.. Elsewhere: Burma; Sri Lanka.

Genus 6. ***Megymenum*** Laporte

8. ***Megymenum brevicorne*** (Fabricius)

1787. *Megymenum brevicorne* Fabricius, *Mant. Ins.* **11** : 294.
1904. *Megymenum brevicorne* : Distant, *Fauna Brit. India,* **1** : 286.

Material examined : 2 exs., West Bengal : Calcutta; Date ?, Coll. ?.

Diagnosis : Body metallic black, ovate; antennae very short; pronotum tuberculous at anterior side and prominently angulated at centre; abdomen prominently and broadly tuberculate at the incisures; membrane pale brownish yellow; Clasper (Fig. 15) with dorso-medially with a prominent hump; smoothly tapering to rounded blunt end; conjunctival appendages flattened apicad, vesica covered (Fig. 16).

Length : 13.5 mm.

Distribution : India : West Bengal (Calcutta); Meghalaya; Nicobar Islands. Elsewhere : Burma; China.

Family IV. TESSAROTOMIDAE
Genus 7. ***Dalcantha*** Amy. & Serv.
9. ***Dalcantha dilatata*** Amy. & Serv.

1843. *Dalcantha dilatata* Amy. & Serv., *Hem.* : 171.
1904. *Dalcantha dilatata* Distant, *Fauna Brit. India,* **1** : 276.

Material examined : 1 ex., West Bengal : Calcutta; Date ?, Coll. ?.

Diagnosis : Body purplish brown; antennae black; pronotum and scutellum olivaceous; membranes

metallic brown; some dark lineate marking to the segmental incisures to both sternum and abdomen; Clasper (Fig. 17) short, subtriangulate apicad; conjunctival lobes membranous, vesica apically clavate in between medial penial plates (Fig. 18).

Length : 26 mm.

Distribution : India : West Bengal (Calcutta); Assam; Northern India.

Remark : The species is hitherto recorded for the first time from West Bengal.

Genus 8. ***Pycanum*** Amy. & Serv.
10. ***Pycanum ochraceum*** Distant

1893. *Pycanum ochraceum* Distant, *A.M.N.H.* **XI** (6) : 433.
1904. *Pycanum ochraceum* Distant., *Fauna Brit. India,* **1** : 275.

Material examined : 1 ex., West Bengal : Darjiling, Date ?, Coll. ?.

Diagnosis : Body pale brownish yellow; antennae black; lateral margin of head blackish; lateral margin of pronotum rounded; scutellum pale yellow; membrane pale metallic brown; connexivum spotted; abdomen bluish black and two broken brownish yellow fasciae; Clasper (Fig. 19) robust, apical part ovoid with digitiform projection laterad; conjunctival lobes membranous, medial penial plates not seen (Fig. 20).

Length : 27 mm.

Distribution : India : West Bengal (Darjiling); Assam; Meghalaya; Nagaland. Elsewhere : Burma.

Family V. UROSTYLIDAE
Genus 9. ***Urochela*** Dall.
11. ***Urochela quadripunctata*** Dall.

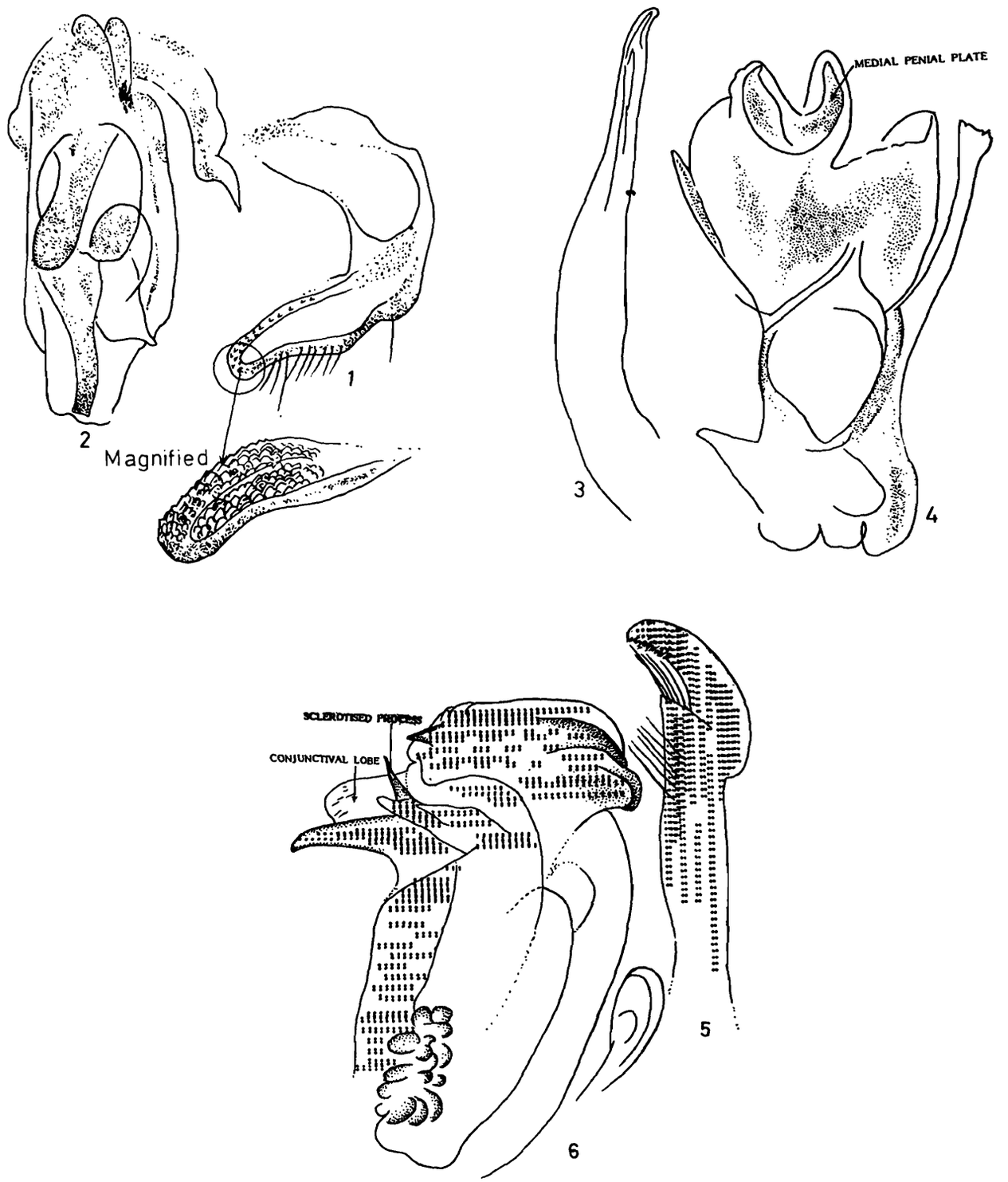
1850. *Urochela quadripunctata* Dall., *Tran. Ent. Soc.*, **1** : 3.
1904. *Urochela quadripunctata* : Distant, *Fauna Brit. India*, **1** : 309.

Material examined : 2 exs., West Bengal : Darjiling, Kurseong, Date ?, Coll. ?.

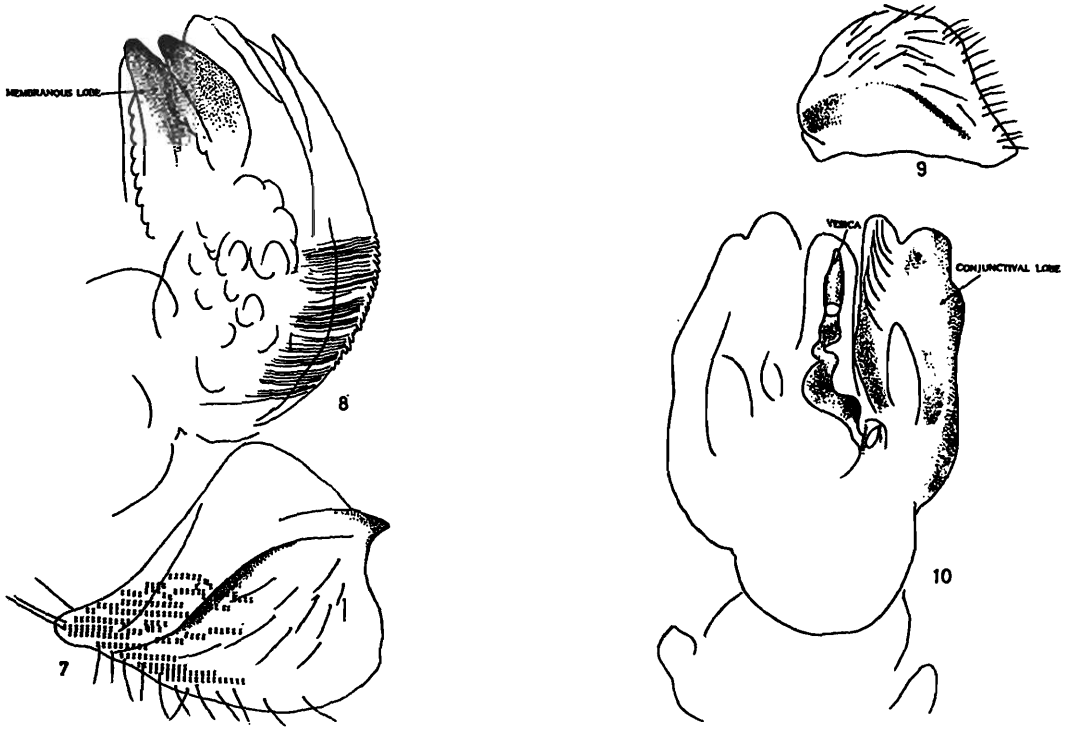
Diagnosis : Body brownish yellow, antennal segments black except 1st joint; pronotum with acentral line along with lateral lines extending to scutellum; corium each side with 2 spots, connexivium black; abdomen with a spot on each segment, another on lateral margin black. Clasper (Fig. 21) rod-shaped, apex sharply convergent to a point, conjunctival lobes robust, drawn out into an elongated projection (Fig. 22).

Length : 8.5 mm.

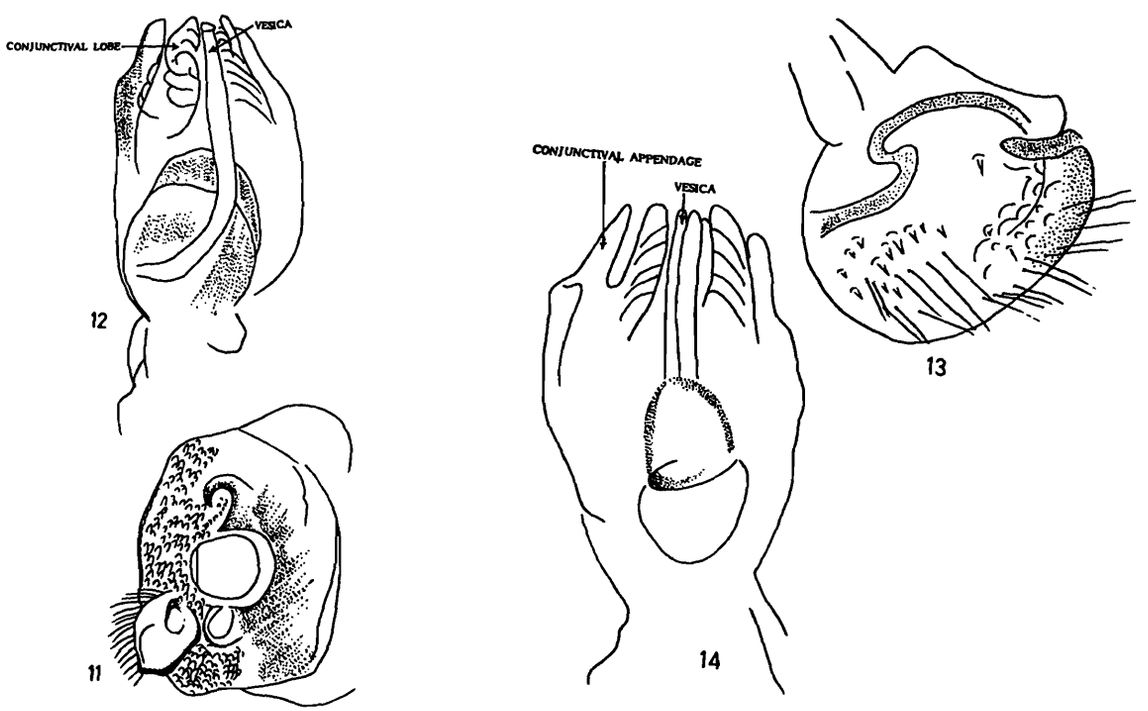
Distribution : India : West Bengal (Darjiling); Sikkim. Elsewhere : Bhutan.



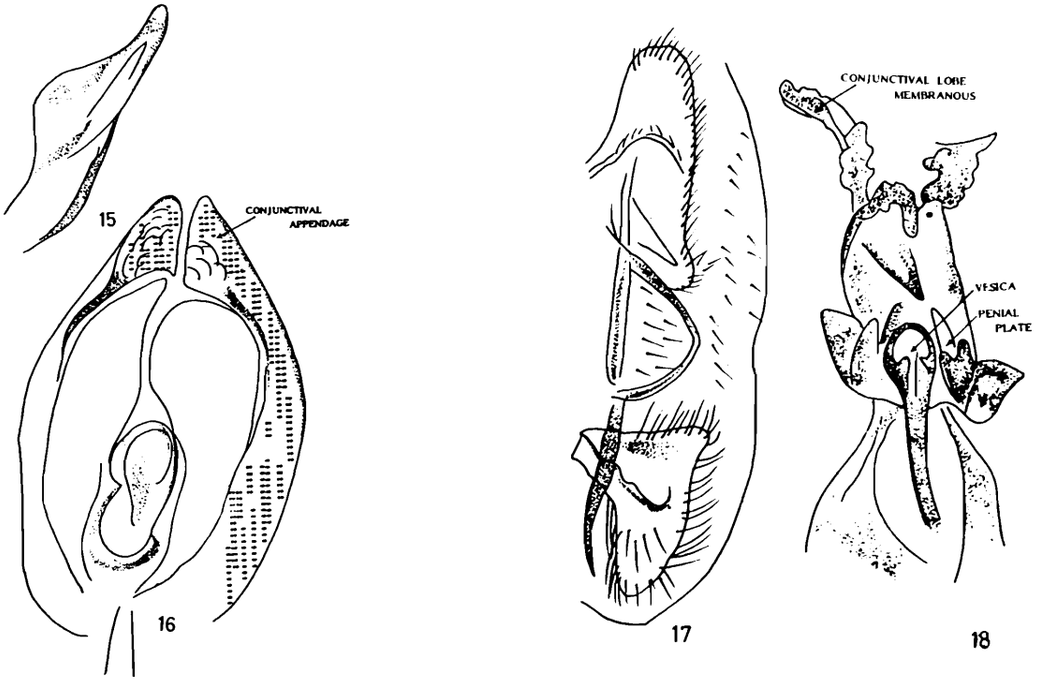
Figs. 1-2. *Antestia cruciata* : 1 Clasper; 2, Medial penial plate.
Figs. 3-4. *Canthecona furcellata* : 3, Clasper; 4, Medial penial plate.
Figs. 5-6. *Scutellera nobilis* : 5, Clasper; 6, Vesica



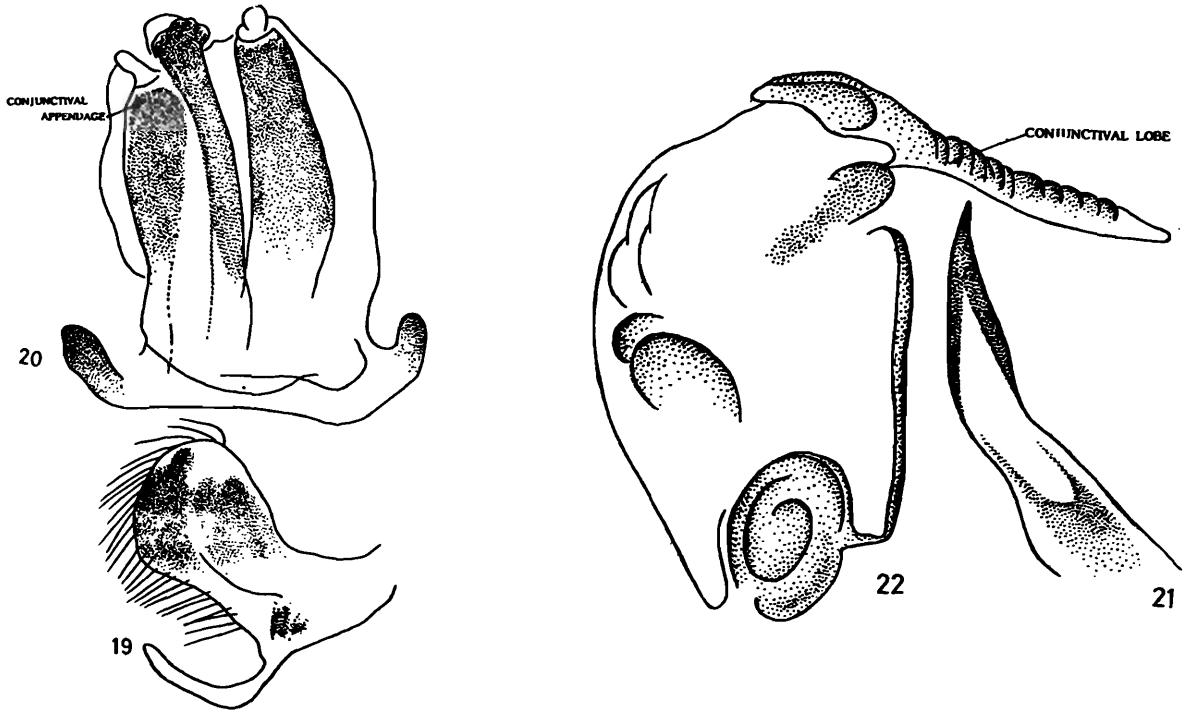
Figs. 7-8. *Aspongopus nigriventris* : 7, Clasper; 8, Vesica and Medial penial plate
Figs. 9-10. *Aspongopus ochreus* : 9, Clasper; 10, Conjunctival lobes.



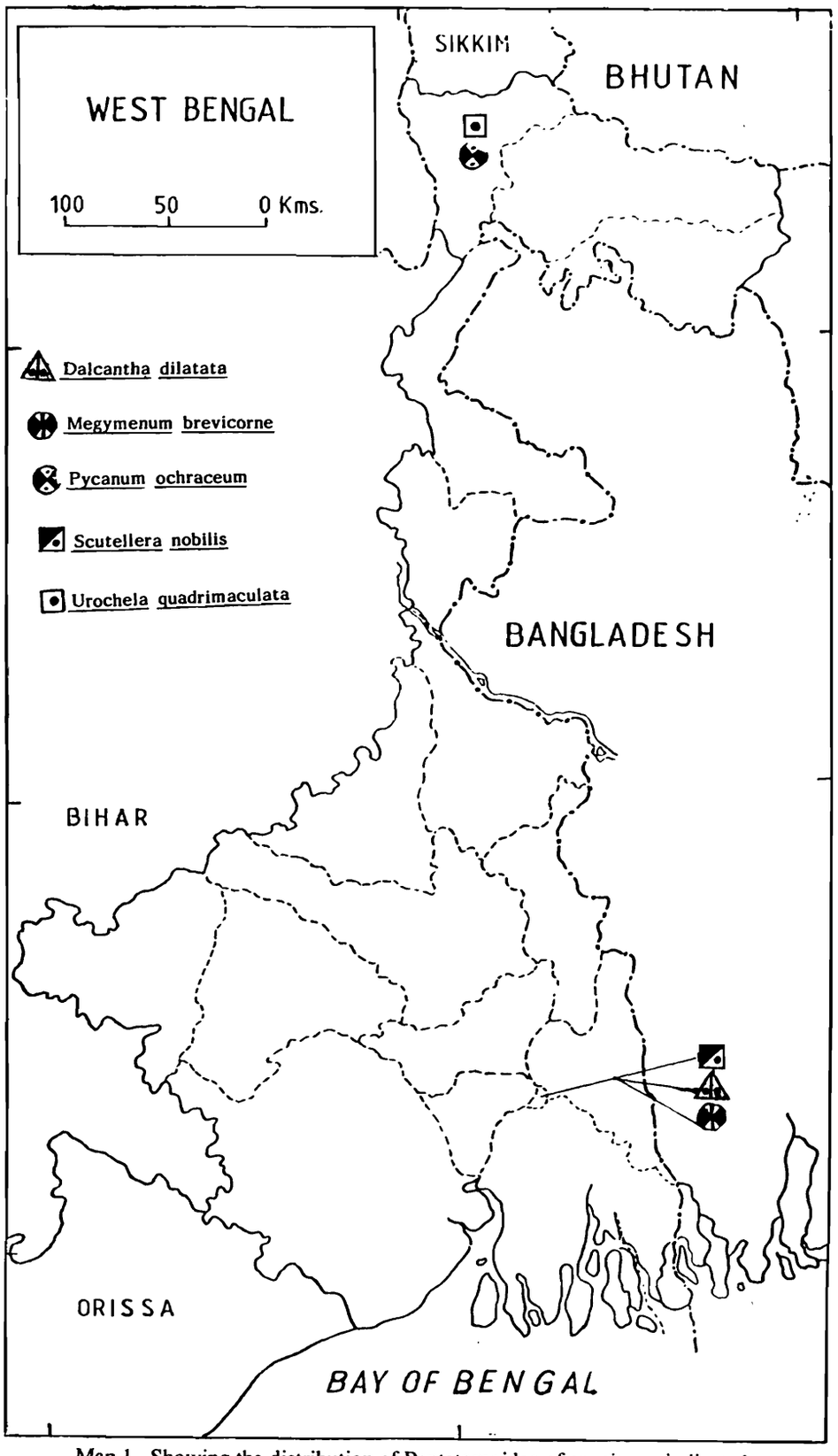
Figs. 11-12. *Cyclopelta obscura* : 11, Clasper; 12, Conjunctival lobes.
Figs. 13-14. *Cyclopelta siccifolia* : 13, Clasper; 14, Vesica.



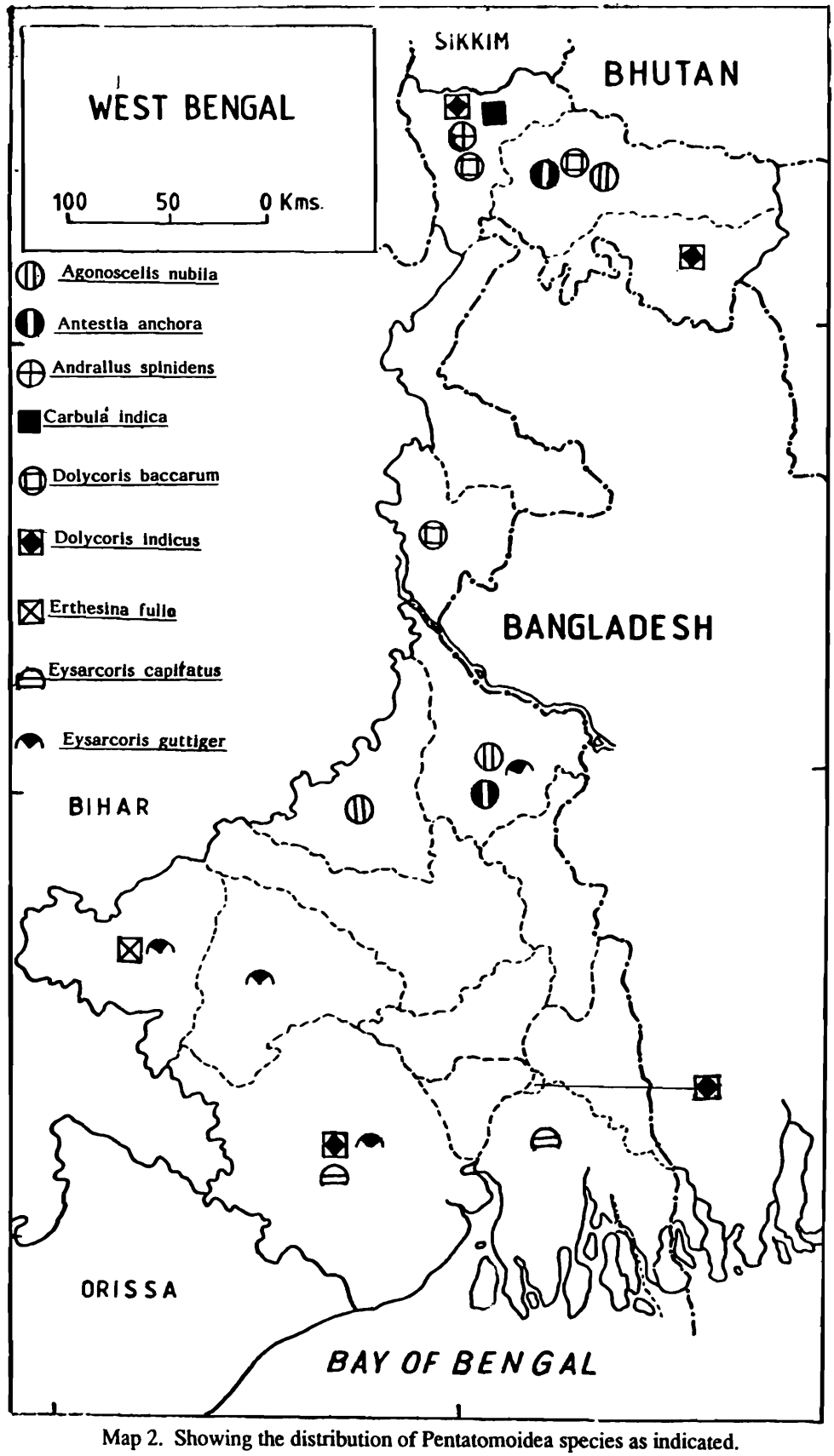
Figs. 15-16. *Megymenum brevicorne* : 15, Clasper; 16, Vesica.
Figs. 17-18. *Dalcantha dilatata* : 17, Clasper; 18, Medial penial plate.



Figs. 19-20. *Pycanum ochraceum* : 19, Clasper; 20, Conjunctival lobes.
Figs. 21-22. *Urochela quadripunctata* : 21, Clasper; 22, Conjunctival lobes.



Map 1. Showing the distribution of Pentatomoidea of species as indicated.



Map 2. Showing the distribution of Pentatomoidea species as indicated.

SUMMARY

The paper deals with 11 species belonging to 9 genera in 5 families of Pentatomids from West Bengal. Of these, two species (*) are new records from West Bengal. Key to species is chiefly based on genital armatures. General diagnosis, relevant data for each species have been provided. The work is suitably illustrated. Maps showing distribution of the species are provided.

ACKNOWLEDGEMENTS

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State Fauna Series 3 : Fauna of West Bengal, Part 5 : 511-534, 1994

INSECTA : HEMIPTERA : MESOVELIIDAE, HYDROMETRIDAE, VELIIDAE & GERRIDAE

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INTRODUCTION

In connection with the State Fauna Series of India, the present paper is dealt with four aquatic families , often called semi-aquatic because of their habit and habitat, of Hemipteran insects, viz., Mesoveliidae, Hydrometridae, Veliidae and Gerridae from the State of West Bengal. This faunistic-cum-taxonomic study mainly based on the collections made by various Mopping Survey parties of the Zoological Survey of India during 1985-88, and other named and unnamed collections housed in the National Zoological Collection. A lot of collections from Wetland Survey parties were also made avilable for this work. A few outside enquiry materials received from different personnels which were identified by the authors, are also included in the present paper for the distribution of species concerned.

For a considerable period of time the above mentioned three families, viz., Mesoveliidae, Veliidae and Gerridae were known as subfamilies under the family Hydrometridae. But afterwards these three sub-families have been raised to families by the noted authors of the world. Distant (1902, 1910) was the pioneer worker on Indian fauna of water-bugs along with the gigantic work on Hemipteran fauna as a whole from Indian Sub-continent. He had recorded some 45 species of water-bugs belonging to the concerned four families from India itself, of these 14 species were from West Bengal. Subsequently Hafiz and Mathai (1938), Hafiz and Ribeiro (1939), Hafiz and Pradhan (1947) and recently Thirumalai (1986) have worked on different families of water-bugs including a few new species. Matsuda (1960) had revised the World Fauna of the family Gerridae including Indian forms. So far, no comprehensive systematic work has been done on the fauna of water-bugs from West Bengal.

Approximately 65 species have been recorded from India belonging to the concerned four families, of which 20 species are from West Bengal. The present paper has recorded 25 species from West Bengal. Eight species with asteric marks in the text, have been recorded for the first time from the state, which belong to the four concerned families of water-bugs.

MATERIAL AND METHOD

The water nets made up of close meshed nylon thread supported by strong ring and long pole can be used by the side of the water bodies or from boats. The nets can also be 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 cn also be used in streams through dense vegetation to collect acquate insects. All the adult acquatic bugs are quite capable of flight over considerable distances and thus may be trapped by using petromax gas light or other source of powerful light placed near the edge of the water bodies during night.

The insects belonging to the families, viz., Mesoveliidae, Hydrometridae, Veliidae and Gerridae are showing different aquatic habitats which are important for their collection. The small slender stick like Hydrometrids are found among vegetation on shalow water. The Mesovellids are small insects capable of running on the water surface and are found among the leaves of aquatic plants. The Veliids can walk over the surface of water without breaking the surface film and these insects are found in more protected and secluded places. Some members of this family swim effectively against the currents of swift streams and inhabit accordingly. The Gerrids are the most familier inhabitants of the surface film of ponds, lake margins and pools in streams. They can run or skate effectively over the surface of water.

Aquatic insects can be preserved both dry and wet, depending upon the purpose, nature of specimens, etc. Collected specimens in the field are generally kept dry in envelope after killing them in killing bottle (Benzene, Ethyl acetate, Cabon tetrachloride or Chloroform - any one can be used as killing agent). Aquatic bugs in the field are also kept in 70% or 80% Ethyl alcohol as wet collection by directly 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 specimens are handled for detailed studies under Binocular Microscopes. Studied materials are kept in dry Insect Cabinet with proper labels, or a number of specimens can be kept as wet collection after changing the alcohol in the Laboratory.

SYSTEMATIC ACCOUNT

Key to the families

1. Antennae longer than head, usually free and inserted in front of eyes which are easily visible from above. Series GYMNOCERATA (Terrstrial and semi-aquatic bugs)..... 2

   Antennae shorter than head, usually hidden in a cavity beneath the eyes and not visible from above.- Series CRYPTOCERATA (True aquatic bug)..... Not dealt in this paper.

2. Coxae not contiguous, sometimes widely sperated from each other; scutellum covered, not visible in winged forms and absent in wingless forms..... 3

   Coxae contiguous or nearly so; scutellum double, not covered and visible from above in winged forms, absent in wingless forms..... MESOVLIIDAE

3. Head short, nearly as long as wide across the eyes; body not very long and of variable shaped; claws of at least front tarsi inserted before apex..... 4

   Head long, nearly as long as the entire thorax in front of eyes; body very long and remarkably cylindrical; claws all inserted at the tip of the tarsi..... HYDROMETRIDAE

4. Posterior femora short and not extending to the abdominal apex..... VELIIDAE

Posterior femora very long and slender, extending far beyond the abdominal apex..GERRIDAE

Remarks : All the above mentioned four families were considered as subfamilies under the family Hydrometridae for a long period of time. But afterwards these have been raised as families by the renowned workers of the concerned groups, which has been followed in the present paper.

Family I. MESOVELIIDAE

Genus *Mesovelia* Mulsant and Rey, 1852

1. *Mesovelia vittigera* Horvath *

1895. *Mesovelia vittigera* Horvath, *Rev d' Ent.*, **14** : 160
1902. *Mosevelia mulsanti* : Distant, *Fauna Brit. India, Rhynchota*, 2:169
1905. *Mesovelia orientalis* : Breddin, *Mt. Mus. Hamburg.*, **22** : 129
1918. *Mesovelia mulsanti* : Paiva, *Rec. Indian Mus.*, **14** : 20.
1939. *Mesovelia vittigera* : Hafiz and Ribeiro, *Rec. Indian Mus.*, **41** : 423.

Material examined : 2exs. (Macropterous), Calcutta tank at light, Calcutta, 12.IX.1906, *C. Paiva* coll.; 1 ex. (Macropterous), Museum Tank, Calcutta, 31.VII.1914, *C. Paiva* coll., 6 exs. (Macropterous), Port Canning, Brackish water pool, South 24-Parganas Dist., 12.XI.1906, *Indian Mus.* coll.; 3 exs. (Apterous), Bantala near Tiljala, South-24 Pargans Dist. 6.V.1987, *T. Sengupta* coll.; 1 ex. (Macropterous), Bartibill, Barrackpore, North 24-Parganas Dist., 2.XII.1986, *Mousumi De* coll.; 1 ex. (Macropterous), Damanpur, Alipurduar, Jalpaiguri Dist., 9.I.1987, *V.D. Srivastava* coll.

Diagnosis : Adults attain a length between 2.5-3.0 mm; body elongate with prominent head: eyes large almost touching the anterior margin of pronotum two ocelli about equally distant from eyes as far from each other; 4 - segmented antennae, 2nd joint shortest other three joints subequal in length; pronotum with lateral angles tuberculously sub-prominent; hemelytra may be absent (apterous forms), when present may be fully developed (macropterous forms) or half developed (brachypterous forms); corium encloses 3 closed-cells on the outer half; scutellum large; tibiae longly hirsute.

Distribution : India : West Bengal (Districts - Calcutta, Jalpaiguri, North 24-Parganas, South 24-Parganas); Andaman Islands; Orissa; Tamil Nadu; Uttar Pradesh. Elsewhere : Bangladesh, Burma, Sri Lanka, Sumatra.

Remarks : Accordingly to Hafiz and Ribeiro (1939) Distant's identification of *Mesovelia mulsanti* Buch. White is incorrect. It would be *Mesovelia vittigera* Horvath. In this paper we also follow Hafiz and Ribeiro. Specimens housed in the Zoological Survey of India hence would be *vittigera.*

Family II. HYDROMETRIDAE

Genus *Hydrometra* Latreille, 1976

2. *Hydrometra vittata* Stal *

1870. *Hydrometra vittata* Stal, *Ofvers. J.K. Vet.-Akad Forh.*, 27: 705

1898. *Hydrometra greeni* : Kirkaldy, *Entomologist*, **31** : 2
1902. *Hydrometra vittata* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 170
1947. *Hydrometra vittata* : Hafiz and Pradhan, *Rec. Indian Mus.*, **45** : 372

Material examined : 5 exs., Eden Gardens, Calcutta, 7.V. 1965, *Saukat Ali* coll.; 1 ex.; Museum compound tank, Calcutta, March 1913, *F.H. Gravely* coll.; 4 exs., Bartibill, Barrackpore, North 24-Parganas Dist., 2.X.1987, *Mosumi De* coll.; 3 exs., Bireshwar, Gopalpur near Basirhat, North-24 Parganas Dist., 3.VII.1987, *T. Sengupta* coll.; 2 exs., Matiabazar, near Bashirhat, North 24-Parganas Dist., 3.VII.1987, *T. Sengupta* coll.; 2 exs., Barrackpore, near CIFRI, North 24-Parganas Dist., 1961, *G. Michael* coll.; 2 exs., Berhampore, Mushidabad Dist., Sept. 1912, *Southwell* coll.; 1 ex., Asansol, Barddhaman Dist., 13-14. II.1910, *Paiva* coll.

Diagnosis : Adults may be 11.00 - 12.00 mm in length ; very elongate and linear body with thread like legs; head very long, much longer than pronotum and dialated at the anterior end; eyes far from anterior margin of prnotum , no ocelli; length of head from eyes to apex nearly 2/3 rd times greater than from eyes to base; 1st antennal segment very short, 2nd and 4th almost equal while 3rd segment longest on each antenna; pronotum long; hemelytra shorter than abodomen, often not developed; minute tarsal claws terminal.

Distribution : India : West Bengal (Districts Barddhaman, Calcutta, Murshidabad, North 24-Parganas, South 24-Parganas); Orissa; U.P. Elsewhere : Burma, Japan, Malay Peninsula, Philippines, Sri Lanka.

Family III. VELIIDAE

Genus *Microvelia* Westwood, 1834

Key to the species of the genus *Microvelia*

1. Legs with long hairs; antennal 1st and 2nd segments slightly smaller than the 3rd segment, 4th segment either slightly smaller of equal to the 3rd segment; pronotum with a mid-longitudinal carination on the anterior half of the length; yellowsish sub-marginal fascia on the anterior end of the pronotum not reaching to the anterior angles..... *annandalei* Distant

   Legs with small hairs; antennal segments otherwise; pronotal carination either absent or otherwise; marginal fascia of prototum otherwise..... 2

2. Antennal 4th segment smaller than 2nd and 3rd segments together; pronotum with a faint mid-longitudinal carination all along the length..... ..... *diluta* Distant

   Antennal 4th segment longer than 2nd and 3rd segments together; pronotal carination absent or otherwise.....3

3. Antennal 2nd and 3rd segments almost equal in length; prototum with no mid-longitudinal

carination; reddish-yellow marginal fascia on the anterior end of pronotum thick and not reaching the anterior angles..... *albomaculata* Distant.

Antennal 2nd and 3rd segments much smaller than the 4th segment; pronotum with very distinct mid-longitudinal black carination all along the length; a dull reddish-yellow thin marginal fascia on the anterior end of pronotum which reaches to the anterior angles..... *burmanica* Paiva

3. *Microvelia annandalei* Distant

1909. *Microvelia annandalei* Distnt, *Ann. Mag. nat. Hist.*,(8) **3** : 501
1910. *Microvelia annandalei* : Distant, *Fauna Brit India, Rhynchota*, **5** : 140
1934. *Microvelia annandalei* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 318

Material examined: 2exs., Port Canning, Brackish water pool,, South 24-Parganas Dist., 12.XI.1906, *Ind.Mus.* coll.

Diagnosis : Body length about 2.0 mm; triangular head with large eyes and apex yellowish; inner margins of eyes pale in colour. Other diagnostic characters as in key.

Distribution : India : West Bengal (District - South 24-Parganas). Elsewhere : Bali, Java, Sumatra.

4. *Microvelia diluta* Distant

1909. *Microvelia diluta* Distant, *Ann. Mag. nat. Hist.*, (8) **3** : 500
1910. *Microvelia diluta* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 139
1934. *Microvelia diluta* : Lundblad, *Arch. Hydrobiol . Suppl.*, **12** : 307

Diagnosis : Body length about 2.5 mm.; anterior margin of pronotum reddish yellow; hemelytra scarcely reaching the abdominbal apex; lateral angles of pronotum sub-equally prominent. Other diagnostic characters as in key.

Distribution: India : West Bengal (District - Calcutta). Elsewhere : Bangladesh, Burma, Singapore, Sri Lanka, Sumatra.

Remarks : No material was avulable for present study from West Bengal. But it is reported from Calcutta by Distant (1910) in Fauna Brit. India. Specimens collected from Rajshahi, Bangladesh, are in the Zoological Survey of India collection which have been studied for morphological observations.

5. *Microvelia albomaculata* Distant*

1909. *Microvelia albomaculata* Distant. *Ann. Mag. nat. Hist.*, (8) **3** : 499
1910. *Microvelia albomaculata* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 138

Material examined: 14 exs., from an earthen water pot, Calcutta, 11.IV.1911, *Ind. Mus.* coll.; 3 exs., Ballygunge, Calcutta, 27.VII.1904,; 1 exs., Bartibill, Barrackpore, North 24-Parganas Dist., 23.VIII.1988, *Mousumi De* coll.; 2 exs., Siliguri, Darjiling Dist., 3-4 VI.1911, *N. Annandale & S. Kemp.* coll.

Diagnosis : Body length about 2.0 mm.; a greyish maginal fascia on the inner side of each eye from tip to the base of head; lateral angles of pronotum sub-angularly prominent; hemelytra prominent, encloses 7 closed silvery cells. Other diagnostic characters as in key.

Distribution: India : West Bengal (Districts - Calcutta, Darjiling, North 24-Parganas). Elsewhere: Bangladesh.

6. *Microvelia burmanica* Paiva

1918. *Microvelia burmanica* Paiva, *Rec. Indian Mus.*, **14**:21

Material examined: 1ex., Tista River, Jalpaiguri, Darjiling Dist., 3.VI.1911, *N. Annandale and S. Kemp* coll.

Diagnosis : Adults may be or little than 2.0 mm. in length; a pale marginal fascia on inner side of each eye and a black line on the disk of the head not continued to the base or apex; hemelytra with enclosed silvery cells unlike those of *albomaculata*. Other diagnostic characters as in key.

Distribution : India : West Bengal (District-Darjiling). Elsewhere : Burma.

Family IV. GERRIDAE

Key to the subfamilies of the family Gerridae

1. Metacetabular suture dorsally continues to the posterior margin of mesonotum, forming a secondary definitive intersegmental suture between mesonotum and metanotum in the wingless forms.; primary intersegmental suture not produced anteriorly but laterally in front of metathoracic spiracle..... 2

   Metacetabular suture dorsally not continuous to the posterior margin of mesonotum , thus not forming any secondary definitive intersegmental suture between mesonotum and metanotum in wingless forms (except Cylindrostethini); primary intersegmental suture anteriorly produced laterally in front of metathoracic spiracle, or the suture lost laterally or dorsally..... 3

2. First abdominal ventrite present ..... Sub-family Rhagadotarsinae

   First abodominal ventrite absent..... Sub-family Trepobatinae

3. 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..... Sub-family Ptilomerinae

   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; thus metacetabular region never divided into two areas..... 4

4. Metasternum represented by a very short, transverse, sub-trangular plate rarely reaching metacetabular region laterally..... Sub-family Halobatinae

Metasternum distinctly present, at least about one tenth as long as mesosternum in length..... ..... Sub-family Gerrinae

Key to the genera of the family Gerridae

1. Body comparatively short and oval; inner margin of eyes convex..... 2

Body comparatively long and thin; inner margin of eyes concave..... 6

2. Eighth abdominal segment of both sexs produced to a long cylindrical process...***Rhagadotarsus***

Eighth abdominal segment of both sesex not produced any cylindrical process..... 3

3. Abdomen in female about as long as pronotum and mesonotum together, in male little longer; first antennal segment longest and 2nd, 3rd and 4th segments subequal in length; mesopleura with distinct longitudinal stripe..... ***Naboandelus***

Abdomen in female and male otherwise; antennal segments otherwise; mesoplerua with no such longitudinal stripe..... 4

4. Body flattened; anterior margin of head broadly and smoothly rounded; apical margin of the 7th abdominal segment in female excessively developed and modified to cover up the 8th segment; thorax with yellow and black margins; fresh water in habitat..... ***Metrocoris***

Body not flattened; anterior margin of head not smoothly rounded; apical margin of the 7th abdominal segment in female simple and not modified; thorax with light colouration; marine in habitat..... 5

5. Fringe of long hairs present on the tibia only of the middle leg..... ***Asclepios***

Fringe of long hairs present on both tibia and first tarsal segment of the middle leg....***Halobates***

6. Middle and hind femora longer than the whole length of the body; metacetabular region always appears to be divided into two areas; first and second tarsal segments completely fused of hind legs; middle femur of male well developed with a fringe of long hairs..... ***Ptilomera***

Middle and hind femora shorter than the whole length of the body; metacetabular region never divided into two areas;first and second tarsal segments not fused; middle femur of male with no fringe of long hairs..... 7

7. Pronotum not prolonged; connexival spines of the 7th segment always absent; in males apical segment of endosoma with very poorly developed ventral plate or absent, but apical plate greatly developed..... 8

Pronotum prolonged; connexival spines of the 7th segment present; in males apical segment of endosoma always provided with ventral plate, and apical plate not greatly developed..... 10

8. First abdominal segment a litle longer than the 2nd segment; hind femora one-third longer than the middle femora.....***Rheumatotrechus***

First antennal segment either much longer or equal to the 2nd segment; hind femora otherwise... 9

9. All antennal segment sub-equal in length; mesonotum without any paired oblique impression; omphalium with no tuft of hairs; hind legs longer than middle legs..... ***Eotrechus***

First antennal segment longest and other three segments sub-equal in length; mesonotum provided with a pair of oblique impressions arising from the anterior margin; a tuft of long hairs arising from the omphalium; hind legs slightly shorter than the middle legs.....***Chimarrhometra***

10. Antennae as long as or slightly shorter than the body length; clypeus with basal margin distinct; pronotum prolonged with a median black longitudinal stripe; middle femur bi-dentate at apcies; 7th and 8th segments of male more or less simple, not greatly modified; abdominal spiracles placed much closer to anterior margin than the posterior margin.....***Limnometra***

Antennae much shorter than the body length; clypeus with basal margin indistinct; pronotum prolonged with yellow longitudinal stripe or anteriorly yelow with posteriorly black stripe; middle femur not bi-dentate; 7th and 8th segments of male modified; abdominal spiracles placed either much closer to the anterior margin or at middle between the anterior and posterior margins....11

11. Ventral median longitudinal elevation or suture obscure or absent; abdominal spiracles placed at the middle between the anterior and posterior margins of each segment; 7th segment of male with concave ventral apical margin but without any median emergination; 8th segment of female always basally telescoped within tubular 7th segment.....***Limnogonus***

Ventral median longitudinal impression distinct throughout; abdominal spiracles placed much closer to anterior margin than to the posterior margin of each segment; 7th segment of male with a concave ventral apical margin with a small median emergination; 8th segment of female always well exposed..... ***Gerris***

Subfamily RHAGADOTARSINAE

Genus ***Rhagadotarsus*** Breddin, 1905

7. ***Rhagadotarsus kraepelini*** Breddin

1905. *Rhagadotarsus kraepelini* Breddin, *Mt.Mus. Hamburg,* **22** : 137
1910. *Nacebus dux* : Distant, *Fauna Brit. India, Rhynchota,* **5** : 166
1934. *Rhagadotarsus kraepelini* : Lundblad, *Arch. Hydrobiol. Suppl.,* **12** : 412

Material examined : 1ex., Calcutta Tank, Calcutta, ZSI Regd. No. 4623/16, *Ind.Mus.* coll.; 1 ex., Bartibill, Barrackpore, North 24-Parganas Dist., 2.XI. 1987, *Mosumi De* coll.

Diagnosis : Adult may attain a length of about 4 mm; body sub-elongata with a long, slender abdominal anal appendage; eyes inwardly somewhat roundly truncated and not emerginate and not produced over the anterior margin of pronotum; antennae with basal two joints stouter than the rest, 2nd joint shortest while 3rd and 4th joints subequal in length; pronotum very short, appearing only as a broad collar; middle legs much longer than the hind legs.

Distribution : India : West Bengal (Districts Calcutta, North 24-Parganas). Burma, China, Formosa, Java, Malay, Philippines, Singapore, Sri Lanka.

Subfamily TREPOBATINAE

Genus ***Naboandelus*** Distant, 1910

8. ***Naboandelus signatus*** Distant

1910. *Noboandelus signatus* Distant, *Ann. Mag. nat. Hist.*, (8) **5** : 152
1910. *Naboandelus signatus* : Distant, *Fauna Brit. India, Rhynchota,* **5** : 164
1918. *Naboandelus signatus* : Paiva, *Rec. Indian Mus.*, **14** : 26

Material examined : 3 exs., Calcutta Tank, Calcutta ZSI Regd. No. 1620/16, 1621/16 & 1622/16, 28.VII.1906; 2 exs., Bartibill, Barrackpore, North 24-Parganas Dist., 2.XII.1986, *T. Sengupta* coll.; 4 exs., Bartibill, Barrackpore, North 24-Parganas Dist., 23.VIII. 1988, *Mousumi De.* coll.

Diagnosis : Adults attain in length of about 2.0 mm; body short and broad; head with rounded eyes scarcely projecting over the anterior angles of pronotum; 1st antennal joint longest and longer than head while 2nd, 3rd and 4th joints almost subequal in length; pronotum short and transverse with a large central yellow spot; anterior margin of pronotum truncate but posterior margin moderately convex; abdomen of female about as long as pronotum and mesonotum together, in male a little longer; middle legs much longer than hind legs.

Distribution : India : West Bengal (Districts - Calcutta, North 24-Parganas). Elsewhere : Burma.

Subfamily PTILOMERINAE

Genus ***Ptilomera*** Amyot and Serville, 1843

Key to the species of the genus ***Ptilomera***

1. Rear margin of metacoxa without thorn like projection in both the sexs; distal two-fifth of the middle femur provided with fringed long hairs in male; with parameres small and dorsally upward directly; female with 7th abdominal segment simple; without coxevial spine in both the sexes ..... *himalayensis* Hungerford & Matsuda

Rear margin of metacoxa provided with thorn like projection in both the sexs; almost all over the femur provided with fringed like hairs in male; with parameres very prominent, bent and laterallydirected; female with 7th abdominal segment modified and provided with long prominent connxival spines..... *laticaudata* (Hardwicke)

9. *Ptilomera himalayensis* Hungerford and Matsuda

1958. *Ptilomera (Proptilomera) himalayensis* Hungerford and Mutsuda *Bull. Brooklyn Ent. Soc.*, **53**(5) : 117-123
1960. *Ptilomera (Proptilomera) himalayensis* : Matsuda, *Kans. Univ. Sci. Bull.*, **41**(2) : 267

Material examined : 11 exs., Kalimpong, E. Himalayas, Darjiling Dist., 19-24.V.1930, *S.L. Hora* coll.

Diagnosis : Apterous forms may attain a length between 10.5-12.5 mm., while macropterous attain a length of about 14.5 mm. Other diagnostic characters as in key.

Distribution : India : West Bengal (District-Darjiling) ; Sikkim.

10. *Ptilomera laticaudata* (Hardwicke)

1825. *Gerris laticaudata* Hardwicke, *Trans. Linn. Soc.*, **14** : 134.
1902. *Ptilomera laticaudata* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 185.
1960. *Ptilomera laticaudata* : Matsuda, *Kans. Univ. Sci. Bull.*, **41**(2) : 267.

Material Examined : 1 ex., Asansol, Barddhaman Dist., 13-14.XI.1910, *Paiva* coll.; 4 exs., Sonamukhi forest, Bankura Dist., 8.III. 1986, *K.P. Mukherjee* coll.; 1 ex., Kalchini, Jalpaiguri Dist., 5.1.1987, *M. Dutta* coll.; 7 exs., Kalchini, Jalpaiguri Dist., 5.1.1987, *T.K. Pal & Party* coll.; 8 exs., Rajabhat Khawa, Alipurduar, Jalpaiguri Dist., 10.1. 1987 *V.D. Srivastava* coll.; 15 exs., Mariambari Tea Estate, near Pankhabari, 5000ft, Darjiling Dist., 27-28.II.1928, *Gopi Ram* coll.

Diagnosis : Both apterous and macropterous adults may attain a length between 13.0-15.0 mm. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts - Bankura, Barddhaman, Darjiling, Jalpaiguri); Sikkim. Elsewhere : Burma, Malay Peninsula, Thailand.

Subfamily HALOBATINAE

Genus *Halobates* Eschscholtz, 1822

11. *Halobates flaviventris* Eschscholtz *

1822. *Halobates flaviventris* Eschscholtz, *Entomographien*, **1** : 109
1902. *Halobates flaviventris : Distant, Fauna Brit. India, Rhynchota*, **2** : 188

Material examined : 7 exs., Edge of a creek of Hooghly River, between Mutlah and Bidda Rivers at Basanti, South 24-Parganas Dist., 20. VII. 1918. *N. Annandale & S. W. Kemp* coll.

Diagnosis : Adult may attain a length of about 5.0 mm; body oblong, widest in the middle; heads with an oblique transverse reddish yellow mark on each side posteriorly; antennae with 1st joint longest and 3rd joint shortest while 2nd and 4th subequal in length; eyes large and touching the anterior angles of pronotum; 2nd tarsal joint of the front leg longer than the 1st joint and provided with a cleft before middle; hind leg with single tarsal joint.

Distribution : India : West Bengal (District-South 24-Parganas). Elsewhere : Madagascar, South Atlantic.

Genus ***Asclepios*** Distant, 1915

12. ***Asclepios annandalei*** Distant

1915. *Asclepios annandalei* Distant, *Ann. Mag. nat. Hist.*, (8)**15** : 504-505
1934. *Asclepios annandalei* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 370

Material examined : 4 exs., Edge of a creek of the river Hooghly at Basanti between Mutlah and Bidda rivers, South 24-Parganas Dist., 20. VII. 1918, *N. Annandale & S.W. Kemp* coll.

Diagnosis : Adults may attain a length of about 3.0-4.0 mm., head as long as broad and conically rounded anteriorly beyond the insertion of the antennae with the 1st joint longest, 2nd joint almost half as long as the 1st joint and a little longer than 3rd or 4th joints; pronotum considerable shorter than head and mid-longitudinally depressed; mesonotum about twice the length of pronotum; yellowish with large oblique dark oliavious characteristic spot on each lateral side on pronotum; anterior femora in male moderately incrassate and armed with a distinct, broad spine a little beyond middle but unarmed in female; hemelytra rudimentary.

Distribution : India : West Bengtal (Districts Calcutta, South 24-Parganas); Kerala.

Genus ***Metrocoris*** Mayr, 1865

13. ***Metrocoris stali*** (Dohrn) *

1860. *Halobates stali* Dohrn, *Stettin. ent. Ztg.*, **21** : 408
1865, *Metrocoris brevis* : Mayr *Verh. zool. bot. Ges. Wien*, **15** : 445
1902. *Metrocoris stali* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 190
1947. *Metrocors stali* : Hafiz and Pradhan, *Rec. Indian Mus.*, **45**:373

Material examined : 4 exs., Near Sureil, 5000ft., E. Himalayas, Darjiling Dist., 18.X.1917, *N. Annandale & F. Gravely* coll.

Diagnosis : Adults attain a length of about 7.0 mm.; body short and broad like *Halobates* sp.; head

with a large central and three smaller anterior black spots; pronotum provided with two anterior semi-circular spots and on posterior part provided with two parallel longitudinal comma shaped spots, other a few black and yellow markings which may vary; 1st femur of male without any tooth on the ventral side of the distral end; basal joint of anterior tarsi much shorter than the 2nd joint; intermediate tibiae and tarsi without fringe of long hairs; male genitalia with fringe of long hairs and moderately developed parameres bent upwardly almost at right angle.

Distribution : India : West Bengal (District - Darjiling); Bihar; Gujarat; Maharshtra; Punjab; Sikkim; Tamil Nadu; U.P. Elsewhere : Nepal, Sri Lanka.

Subfamily GERRINAE

Genus ***Rheumatotrechus*** Kirkaldy, 1908

14. ***Rheumatotrechus himalayanus*** Kirkaldy

1908. *Rheumatotrechus himalayanus* Kirkaldy, *Canad. ent.*, **11** : 452
1910. *Rheumatotrechus himalayanus* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 151

Diagnosis : Adult apterous forms attain a length of about 8.0 mm.; head with eyes slightly oblique and slightly emerginate, vertex elongate antennal 1st joint nearly 1/5th length longer than the 2nd joint; pronotum with rounded lateral margins and yellowish mid-longitudinal line; anterior femora scarcely longer than the anterior tibiae, middle femora scarcely longer than the second tibiae and tarsi together; middle and hind legs much shorter than those of *Ptilomera* sp.

Distribution : India : West Bengal (District - Darjiling); Sikkim.

Remarks : No material was available for present study but according to Distant (1910) in Fauna of British India it is reported from Kurseong, Darjiling District. Thus it has been included in the paper.

Genus ***Eotrechus*** Kirkaldy, 1902

15. ***Eotrechus kalidasa*** Kirkaldy *

1902. *Eotrechus kalidasa* Kirkaldy, *Entomologist*, : 137
1902. *Eotrechus kalidasa* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 182
1934. *Eotrechus kalidasa* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 370

Material examined : 10 exs., Pashok, 2000ft, Darjiling Dist., 26.V-4.VI.1916, *F.H. Gravely* coll.; 5 exs., Jalapahar, Darjiling Dist., 8.VI. 1923, *H.S. Rao* coll.; 4 exs., Pashok, Darjiling Dist., 11.VI. 1916, *L.C. Hartless* coll.

Diagnosis : Adult marcropterous forms attain a length of about 10.0-10.5 mm; head with emerginate prominent eyes; antennae with 1st and 2nd segments longest and subequal in length while 3rd and 4th segments a little shorter and sub-equal; 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 : West Bengal (District - Darjiling). Elsewhere : Burma.

Genus ***Chimarrhometra*** Bianchi, 1896

16. ***Chimarrhometra orientalis*** (Distant)*

1879. *Halobates orientalis* Distant, *Trans. ent. Soc.*, : 176
1896. *Chimarrhometra orientalis* : Binachi , *Annu. Mus. St. Petarsb.*, **1** : 71
1902. *Chimarrhometra orientalis* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 190.
1960. *Chimarrhometra orientalis* : Matsuda, *Kans. Univ. Sci. Bull.*, **41** (2) : 531

Material examined: 2exs., Jor Pokhri, 4800ft., Sitong, Darjiling Dist., 22-28.X.1917, *N. Annandale & F. Gravely* coll.; 2 exs., near Surcil, Darjiling Dist., 18.X.1917, *Annandale & Gravely* coll., 2 exs., Kurseong, 6000ft., Darjiling Dist., 8.III. 1924, *B.N. Chopra* coll.; 3 exs., Kurseong, 5000ft., Darjiling Dist., 9.V.1906, *N. Annandale* coll.

Diagnosis : Adult insect may attain a length of about 8.0 mm; head with semi-globular large eyes; antennal 1st joint curved, robust and about the length of head and pronotum together, other joints slender; 2nd and 3rd antennal joints subequal while 4th joint a little shorter than the 3rd joint; pronotum truncated anteriorly with mid-longitudinal pale line and mesonotum with paired oblique depressions near the anterior margin; basal joint of anterior tarsi nearly twice as long as the 2nd joint; anterior femora much incrassate and thicker than the middle femora; parameres of male genitalia greatly developed.

Distribution : India : West Bengal (District-Darjiling); Punjab.

Genus ***Limnometra*** Mayr, 1866

Key to the species of the genus ***Limnometra***

1. Vertex of the head with a yellowshih elongated patch bordered with dark margins; brownish yellow pronotum without any bright coloured magin along the mid-longitudinal black line; posterior tip of the pronotum more or less convex; middle coxa without any spine like projection on the dorso-lateral rear margin; connexival spines on the 7th abdominal segment small..... ..... *anadyomene* (Kirkaldy)

   Vertex of the head with a black elongated patch; dark yellowish brown pronotum with distinct light coloured linear margin along the mid-longitudinal black line; posterior tip of the pronotum more or less angular; middle coxa with a prominent spine like projection on the dorso-lateral rear margin; connexival spines on the 7th abdominal segment long..... *fluviorum* (Fabricius)

17. *Limnometra anadyomene* (Kirkaldy) *

1901. *Gerris anadyomene* Kirkaldy, *Entomologist*, : 117
1902. *Gerris anadyomene* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 177
1934. *Limnometra anadyomene* : Lundblad, *Arch. Hydrobiol., Suppl.*, **12** : 371
1958. *Limnometra anadyomene* : Hungerford & Matsuda, *Kans., Univ. Sci., Bull.*, **39** : 402.
1969. *Limnometra anadyomene* : Cheng & Fernando, *Oriental Ins.* **3** (2) : 105.

Material examined : 3 exs., Port Canning, Brackish water pool, South 24-Parganas Dist., 12.XI.1906, *Ind. Mus.* coll.

Diagnosis: Adults may attain a length of about 12.00 mm; antennal 2nd segment shortest while 1st, 3rd and 4th segments longest and sub-eqiual in length. Other diagnostic characters as in key.

Distribution : India : West Bengal (District-South 24-Parganas). Elsewhere : Burma, Malay, Philippines, Sri Lanka.

18. *Limnometra fluviorum* (Fabricius)

1798. *Hydrometra fluviorum* Fabricius, *Entomologia System Suppl.*, : 543
1902. *Gerris fluviorum* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 177
1958. *Limnometra fluviorum* : Hungerford and Matsuda, *Kans. Univ. Sci. Bull.*, **39** : 401

Material examined : 2 exs., Patla Survey, North 24-Parganas Dist., 21.VII.1939; 2exs., Eden Garden, Calcutta, 1.II.1965, *Saukat Ali* coll.

Diagnosis : Adults may attain a length of about 11.0 12.5 mm; antennae with 1st and 4th joints longest and sub-equal in length while 2nd joint distinctly shorter than 3rd which in turn shorter than 1st and 4th joints. Other diagnostic features as in key.

Distribution : India : West Bengal (Districts - Calcutta, North 24-Parganas); Kerala; Maharashtra; Pondicherry. Elsewhere : Java.

Genus *Limnogonus* Stal, 1868

Key to the species of the genus *Limnogonus*

1. Pronotum with the mid-longtudinal carination moderately prominent; posterior tip of pronotum remarkably angular; anterior part of pronotum with a pair of linear, small yellowish patches; 4th antennal segment slightly smaller than the 1st segment or subequal; 7th abdominal segment provided with connexival spines..... *nitidus* (Mayr)

   Pronotum with mid-longitudinal carination either conspicuous or indistinct; posterior tip of pronotum more or less convex; anterior part of pronotum with yellow patches otherwise; 4th antennal segment remarkably smaller than the 1st segment; 7th abdominal segment without connexival spine..... 2

2. Mid-longitudinal carination of the pronotum conspicous and prominently present all along the length; anterior part of pronotum with a pair of irregular yellowish patches; 4th antennal segment about 1/4th length shorter than the 1st segment..... *fossarum* (Fabricius)

Mid-longitudinal carination of the pronotum indistinct and present on the anterior half; anterior part of pronotum with a single roundish yellow patch; 4th antennal segment nearly half in length than the 1st segment..... *parvulus* (Stal)

19. *Limnogonus nitidus* (Mayr)

1865. *Hydrometra nitida* Mayr, *Verh.zool.-bot.-Ges.Wien*, **15**:443
1910. *Gerris nitida* : Distant, *Fauna Brit. India, Rhynchota* , **5**:142
1934. *Limonogonus nitidus* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 387
1969. *Limnogonus nitidus* : Cheng and Fernando, *Oiental Ins.*, **3** (2) : 101

Material examined ; 2exs., Calcutta, 25-26. XI.1926, *H.S. Pruthi* coll.; 1 ex., Zoological Garden, Alipore, Calcutta, 8.II.1911, *F.H. Gravely* coll.; 7 exs., Calcutta 12.II.1907; exs., Garia, South 24-Parganas Dist., 4.XII.1910, *Gravely* and *Kemp* coll.; 2 exs., Kurseong, 5000ft., Darjiling Dist., 7. IX. 1909, *N. Annandale* coll.; 18 exs., Purulia camp, Puruliya Dist., 2.XI.1985, *S.Sen* coll.; 14 exs., 2 kms. North of Joypur, Bankura Dist., 21.XII.1985, *D.K. Mondal* coll.; 14 exs., 4 kms. along the Southern Bank of Birla Jheel , East of Bishnupur Guest House, Bankura Dist, 25.XII.1985, *D.K. Mondal* coll.; 3 exs., Joypur Forest, Bankura Dist. 6. III. 1986, *K.P. Mukherjee* coll.; 6 exs., Ballavpur, Birbhum Dist., 15.III. 1986, *K.P. Mukherjee* coll.; 6 exs., Bartibill, Barrackpore, North 24-Parganas Dist., 2.XII.1986, *Mousumi De* coll.; 3 exs., Matiabazar, near Basirhat, North 24-Parganas Dist., 14.XII. 1987, *T Sengupta* coll.; 3 exs, Eden Garden, Calcutta, 1.1.1965, *Saukat Ali* coll.; 5 exs., Eden Garden, Calcutta, 11.XI.1964, *Saukat Ali* coll.; 1 ex. Sheoraphuly, Hughli Dist., 29.XII.1964, *K.R. Rao* coll.; 3 exs., Senchal water works, near Ghoom, 7400ft., Darjiling Dist. 11.VII.1918, *S. Kemp* coll.

Diagnosis : Body length of adult insects varies from 6.0 8.0 mm; antennae with 2nd and 3rd segments shortest and nearly sub-equal in length. Other diagnostic characters as in key.

Distribution: India: West Bengal (Districts - Bankura, Birbhum, Calcutta, Darjiling, Hughli, North 24-Parganas, Puruliya, South 24-Parganas); Assam; Bihar; Kerala; Orissa; U.P. Elsewhere : Bangladesh, Burma, Java, Malay, Sri Lanka, Sumatra.

20. *Limnogonus fossarum* (Fabricius)

1775. *Cimex fossarum* Fabricius, *Systema Entomologiae*, : 727
1868. *Limnogonus fossarum* : Stal, *K. Svenska Vet. - Akad. Handl.*, **7** : 133
1902. *Gerris fossarum* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 178
1969. *Limogonus fossarum* : Cheng and Fernando, *Oriental Ins.*, **3** (2) : 100

Material examined : 1 ex., Indian Museum Tank, Calcutta, 31.II.1914, *F.H. Gravely* coll.; 2 exs., Port Canning, Brackish water pool, south 24-Parganas Dist., 30.1.1906, *N. Annandale* coll.; 1 ex., Port Canning, South 24-Parganas Dist. 13 XII.1910, *Kemp* coll.; 1 ex, Kurseong, 5000ft., Darjiling Dist., 4.IX

1909, *N. Annandale* coll; 1 ex., Bartibill, Barrackpore, North 24-Parganas, Dist., 2.XII, 1986, *Mosumi De* coll.; 1 ex., Eden Garden, Calcutta, 24.XII.1964, *S. Ali* coll.; 3 exs., Eden Garden, Calcutta, 1.I.1965., *Saukat Ali* coll.; 1 ex., Botanic Garden, Shivpur, Haora Dist., 3.VIII. 1965, *K.S. Pradhan* coll.

Diagnosis : Length of adult insect body varies from 9.0 mm to 10.0 mm; 1st antennal joint longest while 2nd, 3rd and 4th joints shortest and sub-equal in length. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts - Calcutta, Darjiling, Haora, North 24-Parganas, South 24-Parganas); Maharashtra. Elsewhere : Australia, Burma, China, Formosa, Java, Malacca, Philippines, Sumatra.

21. *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 : 2exs., Zoological Garden, Alipore, Calcutta, 3.XI.1910, *Gravely* coll.; 2 exs., Garia, Brackish water pool, South 24-Parganas Dist., 3.XII. 1910, *Kemp* coll.; 4 exs. Calcutta, 12.II.1907, *Ind. Mus.* coll.; 6 exs., Matiabazar, near Basirhat, North 24-Parganas Dist., 14.XII.1987, *T. Sengupta* coll.; 1 ex., Port Canning, Lower Bengal, South 24-Pargnas Dist., 4.XII. 1910, *S.W. Kemp* coll.; 1 ex., Damanpur, Alipurduar, Jalpaiguri Dist., 9.I.1987, *V.D. Srivastava* coll.; 17 exs., Purulia camp, Puruliya Dist., 2.XI.1985, *S.Sen* coll.; 5 exs., Joypur Forest, Bankura Dist., 6.III. 1986, *K.P. Mukherjee* coll. ; 1 ex., Sevak, 1000ft, Darjiling Dist., March 1914. *Lord Carmichael* coll.; 1 ex., Calcutta, 6 XII. 1925, *R.B.S.* coll.; 9 exs., Eden Garden, Calcutta, 1.I.1965, *S.Ali* coll.; 1 ex., Nam Ting Pokhri, Sitang, 4600 ft., Darjiling Dist., 22-28.X.1917., *N. Annandale & F. Gravely* 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 in key.

Distribution : India : West Bengal (Districts Bankura, Birbhum, Calcutta, Darjiling, Jalpaiguri, Murshidabad, North 24-Parganas, Puryliya, South 24-Parganas); Assam; Bihar; Kerala; Orissa; U.P. Elsewhere : Bangladesh, Burma, China, Java, Malay Peninsula, Pakistan, Singapore, Sri Lanka.

Genus *Gerris* Fabricius, 1794

Key to the species of the genus *Gerris*

1. Anterior lobe of pronotum indistinct; mid-longitudinal carina dark coloured and distinct, present on both anterior and posterior lobes along the full length; anterior margin of pronotum without any protuberances..... *lepcha* Distant

Anterior lobe of pronotum distinct; mid-longitudinal carina on the pronotum otherwise; anterior of pronotum provided with a pair of protuberances 2

2. Antennal 1st segment nearly as long as the remaining three segments together; a black distinct carina on the posterior lobe of pronotum; posterior femur distinctly longer than the body length. ..... *spinolae* Lethierry and Severin

Antennal segments otherwise; pronotal carina otherwise; poserior femir not longer than the body length 3

3. Antennae with first joint longest and nearly half in length than the remaining three joints together; posterior lobe of pronotum with a distinct pale coloured carinae althrough the length; posterior femur half in length than the body length ..... *gracilicornis* (Horvath)

Antennae with first joint longest and slightly shorter than the remaining three joints together; posterior lobe of pronotum with a distinct brownish carina althrough the length; posterior femur nearly 1/6th length shorter than the body length ..... *adelaidis* Dohrn

22. *Gerris lepcha* Distant

1910. *Gerris lepcha* Distant, *Ann. Mag. nat. Hist.*, (8)5:140
1910. *Gerris lepcha* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 142

Material examined: 1 ex., Botanical Garden, 6900 ft., Darjiling Dist., 12.VIII.1909, *C. Paiva* coll.; 4 exs., Darjiling, 6000 ft., Darjiling dist., 3-7.VII.1914, *Carmichael* coll.; 2 exs., Lebong, 6000-6600 ft., E. Himalayas, Darjiling Dist. 17.VI.1914, *F.H. Gravely* coll.

Diagnosis : Body length of the adult insects varies from 11.5 mm to 14.0 mm; antenna with 1st segment longest; 2nd segment shortest while 3rd and 4th almost sub-equal or often 4th slightly longer than the 3rd; hemelytra longer than the posterior femora. Other diagnostic characters as in key.

Distribution : India : West Bengal (District - Darjiling); Sikkim.

23. *Gerris spinolae* Lethierry and Severin

1896. *Gerris spinolae* Lethierry and Severin, *Cat. Gen. Hem.*, 3:63
1902. *Gerris spinolae* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 180
1918. *Gerris spinolae* : Paiva , *Rec. Indian Mus.*, 14 : 24

Material examined : 2exs., Indian Museum Tank, Calcutta, 22. IV.1907, *J.C.* coll.; 2 exs., Port Canning, Brackish water pool, South 24-Parganas Dist., 12.XI.1906, *Annandale* coll.; 1 ex., Barbibill, Barrackpore, North 24-Parganas Dist., 2.XII.1986, *Mousumi De* coll.; 6 exs., Palta, North 24-Parganas Dist., 5.XI. 1935, *Ind. Mus.* coll.; 2 exs., Berhampore, Murshidabad Dist., Sept. 1912, *Southwell* coll.; 1 ex., Siliguri, Darjiling Dist., 29.VI.1906, *Ind. Mus.* coll.

Diagnosis : Body length may vary from 11.0 mm- 12.5 mm in adults; antennal 3rd segment much shorter than the 2nd segment and a little shorter than the 4th. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts Calcutta, Darjiling, Murshidabad, North 24-Parganas, South 24-Parganas); U.P. Elsewhere : Burma.

24. *Gerris gracilicornis* (Horvath)

1879. *Limnotrechus gracilicornis* Horvath, *Annu. Soc. ent. Belg.*, **22** : 109
1902. *Gerris gracilicornis* : Distant, *Fauna Brit. India, Rhynchota,* **2** : 178.
1934. *Gerris gracilicornis* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 370

Material examined: 1 ex., Botanical Garden, 6900 ft., Darjiling Dist., 12.VIII. 1909, *C. Paiva* coll.; 3 exs., Kurseong, 5000 ft., Darjiling Dist. 21-24.V.1906, *Annandale* coll.; 1 ex., Lebong, 5600-6000 ft., Darjiling Dist., 17.VI.1914, *F.H. Gravely* coll.

Diagnosis: Adult insects may attain a length of about 14.0 mm to 15.0 mm; a small brownish yellow spot in front of each eye. Other disgnostic characters as in key.

Distribution : India : West Bengal (District Darjiling); Assam; Sikkim. Elsewhere : China, Formosa, Japan.

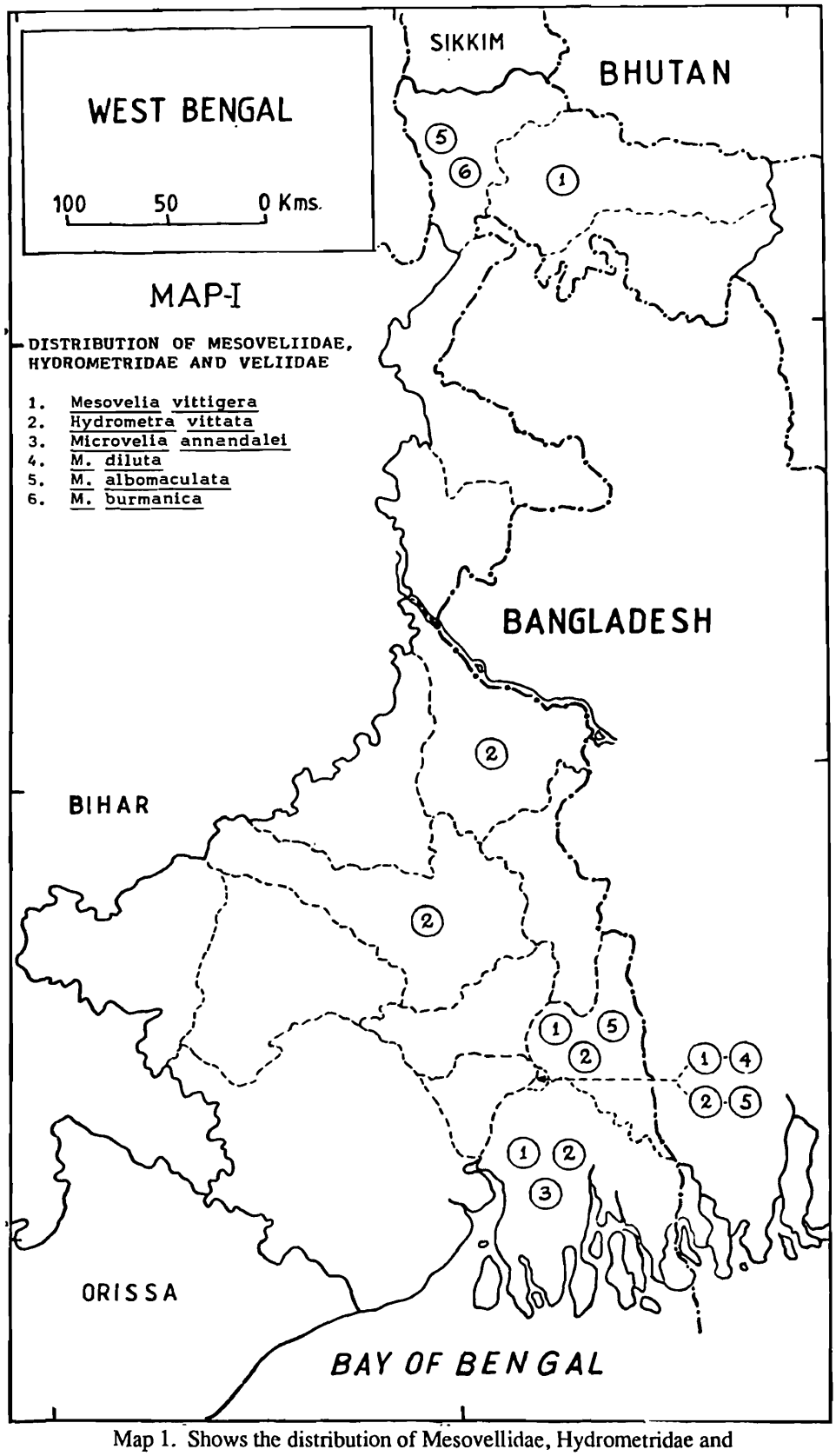
25. *Gerris adelaidis* Dohrn

1860. *Gerris adelaidis* Dohrn, *Stettin. ent. Ztg.*, **21** : 408
1902. *Gerris adelaidis* : Distant, *Fauna Brit. India, Rhynchota,* **2** : 181
1969. *Gerris adelaidis* : Cheng and Fernando, *Oriental Ins.*, 3(2) : 4

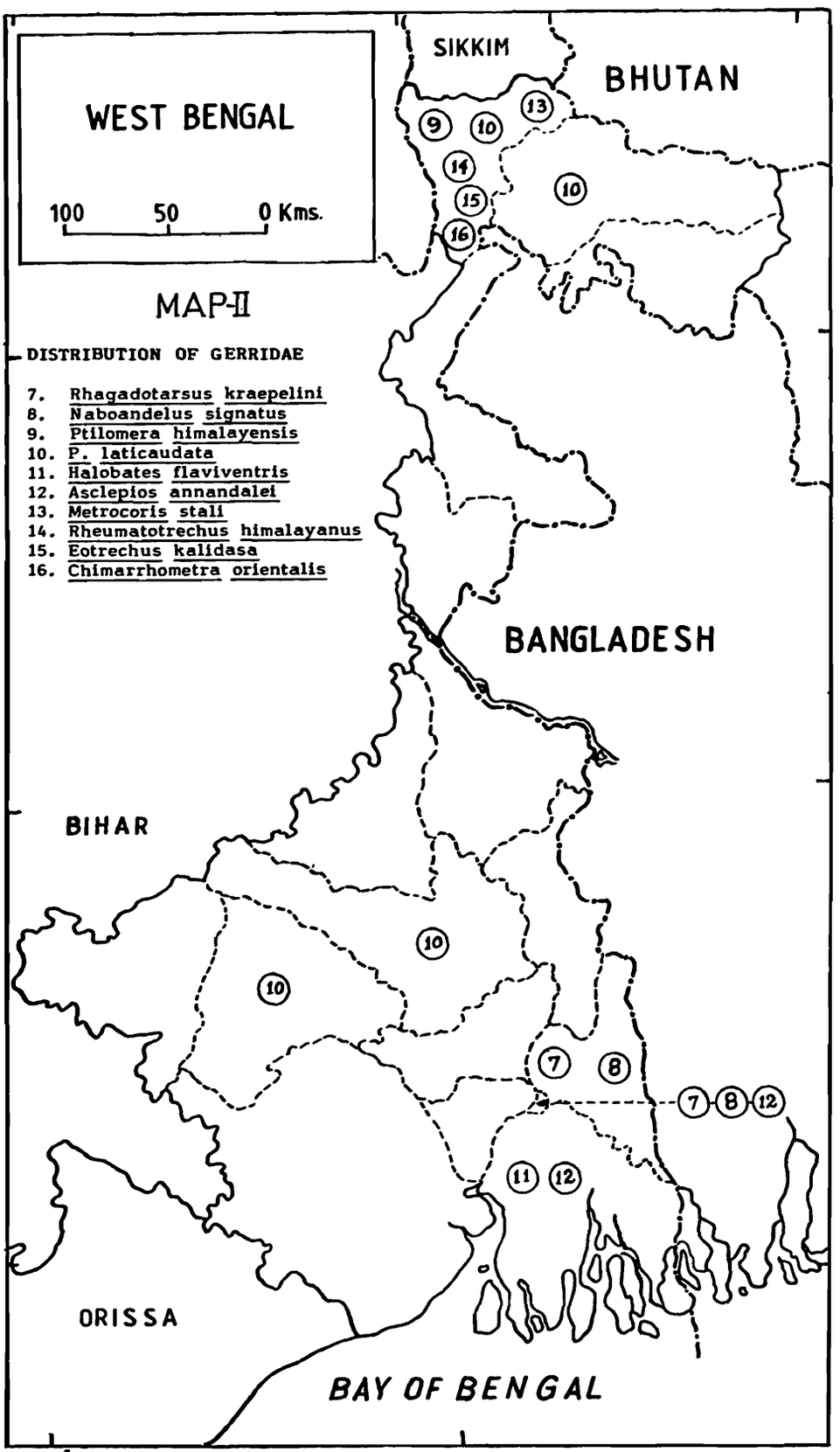
Material examined : 25 exs., Amdangra, Bankura Dist., 30.VII.1986, *P. Mukhopadhyay* coll.

Diagnosis: Adults may attain a length of about 11.5 mm; head with a basal semilunar pale yellow spot. Other diagnostic characters as in key.

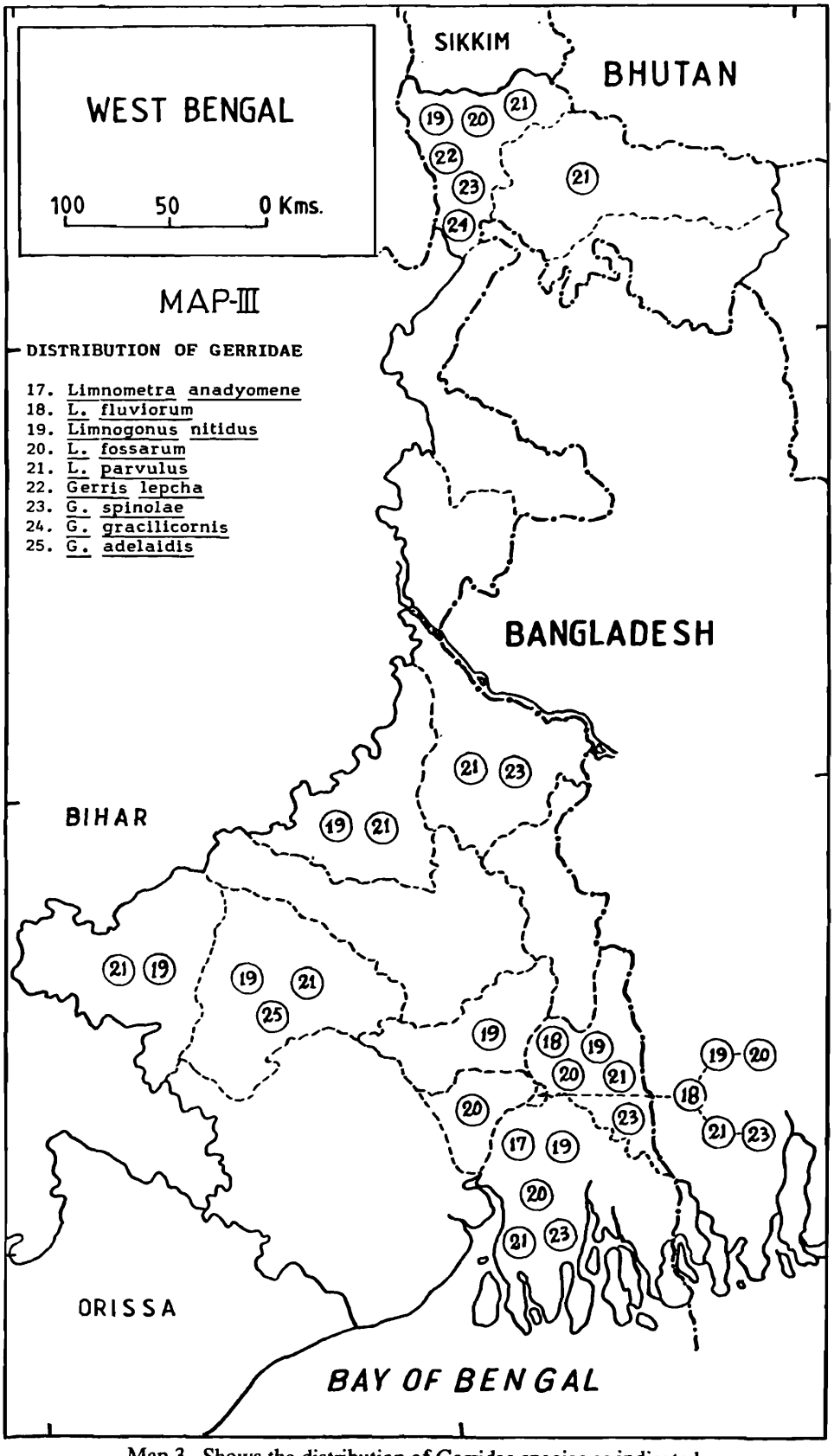
Distribution : India : West Bengal (District Bankura). Elsewhere : Borneo, Burma, Cambodia, China, Malay, Sri Lanka, Thailand.



Map 1. Shows the distribution of Mesovellidae, Hydrometridae and Veliidae species as indicated.



Map 2. Shows the distribution of Gerridae species as indicated.



Map 3. Shows the distribution of Gerridae species as indicated.

SUMMARY

The present work dealt with 25 species under 15 genera belonging to four semi-aquatic families, namely Mesoveliide, Hydrometridae, Veliidae and Gerridae of the order Hemiptera from the State of West Bengal. Eight species with asteric marks in the text, are being recorded for the first time from the State of West Bengal. Distribution of each species is also shown in the present paper in the map. Taxonomic keys for families, sub-families, genera and species have been given in the paper. This paper is the first comprehensive account of semi-aquatic hemipteran species under these four families from the State of West Bengal.

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INSECTA : HEMIPTERA : BELOSTOMATIDAE, NEPIDAE, NOTONECTIDAE AND PLEIDAE

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INTRODUCTION

The present paper is dealt with four aquatic families of Hemipteran insects, viz., Belostomatidae, Nepidae, Notonectidae and Pleidae from the State of West Bengal. The work is aimed to bring out a faunistic-cum-taxonomic study of the water-bug fauna of West Bengal, chiefly based on the collections made by various Mopping Survey parties of the Zoological Survey of India during 1985-1988 and other named and unnamed collections, housed in the National Zoological Collection. Wetland survey collections during 1986-1988, in and around Calcutta, were also available for the present studies.

Distant (1906, 1910) was the pioneer worker on Indian fauna of water-bugs along with his monumental works on Hemipteran fauna as a whole from the Indian Sub-continent. He had recorded some 37 species of water-bugs belonging to the concerned four families from India itself, of which 15 species were from West Bengal. Hafiz and Pradhan (1947) recorded 28 species belonging to eight families of water-bugs from Orissa, which included two new species of *Ranatra*. Later Brooks (1951) revised the genus *Anisops* (Notonectidae) of the world which included 18 species from India, some of them from West Bengal. No other comprehensive systematic work has been done yet on the fauna of water-bugs from West Bengal.

So far about 50 species have been recorded from India belong to the concerned four families, of which 23 species are representing from the State of West Bengal. A few have also been synonymised which are cited here in the paper.

The present paper is dealt with 30 species from West Bengal. Two species are recorded for the first time from the State, which are with asteric marks in the text.

MATERIAL AND METHOD

The water nets, the water screens and the light traps are useful methods of collecting acquatic hemipteran insects from both lentic and lotic water bodies.

Water nets made of nylon (mesh size 24-32 strands/inch) supported by sturdier ring and long pole can be used by the side of the water bodies or from boats. In streams the net can be held close to the bottom for collection by disturbing stones or trashes which harbour the insects. A portion of metalic screen two ends of which are fixed through slots on wooden handle can also be used in streams. The screen is generally used in dense acquatic vegetation to collect the insects. All the adult acquatic bugs are quite capable of flight over considerable distances. Because of their flying capability and light attracted instinct they can

be collected in large number on light traps made up of Petromax gas light or other sources of powerful light placed near the edge of the water bodies during night. The uniform method of periodical sampling by light traps may guide the workers to be acquainted with the seasonal occurrance of any specific group of insects.

Acquatic insects can be preserved both dry and wet, as in the case with other insects in general, depending upon purpose, nature of specimens, etc. Collected specimens in the field are generally kept dry in envelope after killing them in killing bottle (Benzene, Ethyl acetate, Carbon tetrachloride or Chloroform - any one can be used as killing agent). Acquatic bugs in the field are also kept in 70% or 80% Ethyl alcohol as wet collection, by directly pouring them from the net to the alcohol filled glass jar container. Each collection is provided with collection data.

Subsequently in the Laboratory the collected specimens are sorted out according to different taxa for further studies. After setting and pinning in the Laboratory the specimens are handled for detailed studies under Binocular Microscopes. Studies materials are kept in Dry Insect Cabinet with proper labels, or a number of specimens may be kept as wet collections after changing the alcohol in the Laboratory.

SYSTEMATIC ACCOUNT

Key to the families

1. Antennae shorter than head, usually hidden in a cavity beneath the eyes and not visiable from above. Series Cryptocerata (True acquatic bugs)..... 2

   Antennae longer than head, usually free and inserted in front of eyes which are easily visible from above. Series Gymnocerata (Terrestrial and semi-aquatic bugs).....Not dealt in the paper

2. Front legs chelate; femora enlarged and tibiae curved, articulating against femora; body subflattened above; abdomen with a pair of posterior appendages as respiratory siphon; adults vary from 10 mm to 85 mm in length..... 3

   Front legs not-chelate ; femora not enlarged and tibiae normal in shape and size; body strongly or moderately convex above; abdomen without any respiratory siphonal appendages; adult minute or moderate in size..... 4

3. Body elongately suboval in shape; abdomen with a pair of short and retractile strap like posterior appendages..... BELOSTOMATIDAE

   Body either flat, scorpion like or elongated cylindrical in shape; abdomen with a pair of long, slender, non-retractile strap like posterior appendages.....NEPIDAE

4. Adult moderate in size, varies from 6 mm to 17 mm; rostrum 4-segmented, hind legs very long and fringed with long swimming hairs; abdominal venter with median longitudinal narrow keel with long hairs; pronotum and hemelytra not punctured.....NOTONECTIDAE

   Adult minute, less than 3 mm in length; rostrum 3-segmented; hind legs normal and not fringed with

hairs; abdominal venter not narrowly keeled but rather elevated into variously formed carinae at the middle of each segment and not provided with long hairs; pronotum and hemelytra coarsely punctured.....PLEIDAE

Remarks : At present there is no subfamily division in any of the above mentioned four families of acquatic bugs. Previously the family Notonectidae was subdivided into two subfamilies, viz., Notonectinae and Pleinae (Distant 1906, 1910), but afterwards these two subfamilies have been considered as separate families.

Family I. BELOSTOMATIDAE

Key to the genera of the family Belostomatidae

1. Body moderate in size, generally attain 13 mm 22 mm in length, and more or less ovate or subovate; head in front of eyes subtriangularly produced; scutellum subequilateral ; hemelytra with distinct membrane often very small, occur areas moderately convexly ampliate; anterior tarsal claws two of equal length on each..... ***Sphaerodema***

   Body large in size, length may vary from 40 mm 110 mm and narrowly elliptical; head in front of eyes not conically produced; scutellum a little broader than long; hemelytra with distinct membrane provided with prominent longitudinal veins and not outwardly ampliate; anterior tarsal claw one on each..... ***Lethocerus***

Genus *Sphaerodema* Laporte, 1832

Key to the species of the genus *Sphaerodema*

1. Body not very broad and suboval in shape; greatest expanse of hemelytra together is shorter than their length; head shorter than the interocular space; anterior tarsus with single joint; hemelytra provided with shining round spot of fine close-set hairs beyond the middle of the inner margin 2

   Body very broad and oval in shape; greatest expanse of hemelytra together is almost equal to their length; head as long as the interocular space; anterior tarsus with two joints; hemelytra not provided with any shining spot beyond the middle of the inner margin..... *annulatum* (Fabricius)

2. Anterior tarsal claws very small; ventro-lateral stripe of fine hairs on the abdomen in narrower ..... *rusticum* (Fabricius)

   Anterior tarsal claws moderately well developed and longer; ventro-lateral stripe of fine hairs on the abdomen is broader..... *molestum* (Dufour)

1. *Sphaerodema annulatum* (Fabricius)

1803. *Nepa annulatum* Fabricius, *Syst. Rhyngo.*, : 106

1863. *Sphaerodema annulatum* : Dufour, *Annu. Soc. ent. Fr.*, **3** : 397
1940. *Sphaerodema annulatum* : Hafiz & Ribeiro, *Rec. Indian Mus.*, **41** : 431.

Material examined : 1 ex., Eden Garden, Calcutta, 28.X,1952, *Saukat Ali* coll. ; 2 exs., Bantala, near Tiljala, South 24-Parganas Dist., 1988, *Mousami De* coll. ; 2 exs., Ballygunge Science College Compound Tank, Calcutta, 29.VI.1987, *S.K. Raut* coll.; 1 ex., Asansol, Barddhaman Dist., 13-14.XI.1910, *Paiva* coll.; 1 ex., Bodo village, near Bandel, Chinsurah, Hughli Dist., 9.XI.1964, *N.N. Parui* coll. ; 1 ex. Singur, Hughli; Dist., 28.VIII.1967, *S.F.S.* coll;, 12 nymphs, Amdangra, Bankura Dist. 30.VIII.1986, *P. Mukherjee* coll. ; 2 exs., Berhampur Court, Murshidabad Dist. 3.IV.1910, *S.W. Kemp* coll; 1 ex., Bank of River Ganga, Berhampore, Murshidabad Dist. 25.II.1986, , *S.K. Mitra* coll.; 1 ex. Galsi paddy field, Barddhaman Dist., 14.X.1985, *S.K. Ghosh* coll. ; 1 ex., Sonarpur, South-24 Parganas Dist., 8.IX.1965, *K.S. Pradhan & party* coll ; 11 exs., Botanic Garden, Shibpur, Haora Dist., 31.VIII.1965, *K.S. Pradhan & party* coll.

Diagnosis : Adults may attain the body length of 21-22 mm and breadth is remarkably more than other two species of *Sphaerodema*, viz., *rusticum* and *molestum*. Other diagnostic characters as in the key.

Distribution : India : West Bengal (Districts-Bankura, Barddhaman, Calcutta, Haora, Hughli, Murshidabad, South 24-Parganas); Assam; Bihar; Orissa. Elsewhere : Bangladesh, Pakistan.

2. *Sphaerodema rusticum* (Fabricius) *

1803. *Nepa rustica* Fabricius, *Syst. Rhyngo*, : 106
1906. *Sphaerodema rusticum* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 36
1947. *Spaherodema rusticum* : Hafiz and Pradhan, *Rec. Indian Mus.*, **45** : 374.

Material examined : 1 ex., Ballygunge, Calcutta, VII.1947, *J. Dasgupta* coll., 1 ex., Bantala, near Tiljala, South 24-Parganas Dist., 23.VIII.1988. *Mousumi De.* coll.; 1 ex., Barrackpore, North 24-Parganas Dist., *T. Sengupta* coll ; 5 exs., Kadamtala, Berhampore, Murshidabad Dist., 28.II.1986, *S.K. Mitra* coll; 1 ex., Sonamukhi Forest, Bankura Dist. 8.III.1986, *K.P. Mukherjee* coll; 5 exs., 2 kms North of Joypur, Bankura Dist. 21.XII.1985, *D.K. Mondal* coll. ; 2 exs., Singur, Hughli Dist., 28.VIII.1967, *S.F.S.* coll.

Diagnosis : Body length of adults varying from 15 mm 17 mm ; a little narrower in width than *molestum* ; lateral and basal margins of pronotum and embolium are always pale in hue. Other characters as in key.

Distribution : India : West Bengal (Districts - Bankura, Calcutta, Hughli, Murshidabad, North 24-Parganas, South 24-Parganas); Orissa; Maharashtra. Elsewhere : Austria, Burma, China, Japan, Java, Malay Peninsula, Philippines, Sri Lanka, Sumatra, Thailand, New Guinea.

3. *Sphaerodema molestum* (Dufour)

1863. *Appasus molestum* Dufour. *Annu. Soc. ent. Fr.*, : 395
1906. *Sphaerodema molestum* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 36
1947. *Sphaerodema molestum* : Hafiz & Pradhan. *Rec. Indian Mus.*, **45** : 347

Material examined : 1 ex., Calcutta Tank, *Ind. Mus.* coll. ; 2 exs., Bantala, near Tiljala, South 24-Parganas Dist. 23.VIII.1988, *Mousumi De* coll.; 2 exs., Port Canning, Brackish water pool, South 24-Parganas Dist., 30.I.1906, *N. Annandale* coll.

Diagnosis : Body length varying from 13.5 mm - 17.5 mm; a little broader in width than *rusticum*; posterior angles of pronotum a little more obtuse and less acute than those of *rusticum*. Other morphological pecularities have been cited in key.

Distribution : India : West Bengal (Districts Calcutta, South 24-Parganas); Jammu & Kashmir, Orissa. Elsewhere : Mallaca, Sumatra.

Genus ***Lethocerus*** Mayr. 1853

4. ***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* : Usigner, *Acquatic Insects of California*, : 204

Material examined : 1 ex., Hastings, Calcutta, 28.VII.1914, *Bloon & Co.* coll. ; 1 ex., Calcutta, at light, XII. 1926, *R.B. S.S.* coll; 1 ex., Palta, North 24-Parganas Dist., 14.IX.1937; 2 exs., Dum dum Air Port, North 24-Parganas Dist., 1956, *Air Port Health Officer* coll.; 1 ex., Balarampur Puruliya Dist., 2.XI.1985, *S.Sen* coll.; 2 exs., Pasok, Darjiling Dist., 3500 ft., VI. 1916, *L.C. Hartless* coll.

Diagnosis : This giant Indian water-bug may vary in length from 62 mm 85 mm, head between eyes with parallel sides; pronotum with a transverse faciae at the basal end and a fine midlongitudinal carination ; intermediate and posterior legs provided with thick sets of swimming hairs on the ventral side.

Distribution : India : West Bengal (Districts - Calcutta, Darjiling, North 24-Parganas, Puruliya); Assam; Bihar; Kerala; Maharashtra; Mizoram; Orissa; Uttar Pradesh. Elsewhere : Burma, Java, Malay Peninsula, Pakistan, Philippines, Sumatra.

Family II. NEPIDAE

Key to the genera of the family Nepidae

1. Body elongately suboval and flattened; pronotum about as long as or a little shorter than broad; hind coxae widely separated; anterior femora incrassate and beneath longitudinally grooved to hold the tibiae; anterior femora provided with a round tubercle at the base on each; anterior coxae very short. ..... ***Laccotrephes***

   Body slender, subcylindrical; pronotum slender and much longer than broad; hind coxae very close; anterior femora a little incrassate but not grooved beneath; anterior femora provided with one or two pairs of sharp teeth; anterior coxae very long..... ***Ranatra***

Genus *Laccotrephes* Stal, 1865

Key to the species of the genus *Laccotrephes*

1. Adults attain a length about 30-35 mm; abdomen above yellowish red in colour; anterior area of prosternum provided with a small indistinct tubercle; abdominal appendages a little longer than the body.....*ruber* (Linnaeus)

   Adults never attain a length above 15-20 mm; abdomen above with light blusih tinge; anterior area of prosternum provided with a strong acute spine like structure; abdominal appendages than the body..... *griseus* (Guerin)

5. *Laccotrephes ruber* (Linnaeus)

1764. *Nepa ruber* Linnaeus, *Mus. Lud. Ulr.*, : 165
1868. *Laccotrephes ruber* : Stal, *Hem. Fabr.*, **1** : 135
1947. *Laccotrephes ruber* : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 364

Material examined : 1 ex., Khariberia, near Rajarhat, North 24-Parganas Dist., *T. Sengupta* coll ; 1 ex., Calcutta, 25.II.1950, *G.K. Manna* coll; 2 exs., Munghphu, Darjiling Dist., *Atkinson* coll.; 1 ex., Kalimpong, Darjiling Dist. 600-4500 ft., 24.IV.1910, *F.H. Gravely* coll. ; 1 ex. Pashok, Darjiling Dist., 3500 ft., VI.1916, *L.C. Hartless* coll.

Diagnosis : As in key

Distribution : India : West Bengal (Districts - Calcutta, Darjiling, North 24-Parganas); Himachal Pradesh; Jammu & Kashmir; Maharashtra; Meghalaya; Orissa. Elsewhere : China, Formosa, Japan, Sri Lanka.

6. *Laccotrephes griseus* (Guerin)

1829. *Nepa griseus* Guerin, *Iconogr Regne Anim. Ins.*, : 352
1910. *Laccotrephes griseus* : Montandon, *Annali Mus. zool. Napoli*, **3**(10) : 3
1947. *Laccotrephes griseus* : Hafiz & Pradhan, *Rec. Indian Mus.* **45** : 364

Material examined : 1 ex., Durgapur, near Calcutta, Brackish water Canal, Calcutta 12.II.1911, *N. Annandale* coll. ; 4 exs., Siliguri, Darjiling Dist. 29-30.VI-1.VII.1906, *Ind. Mus.* coll. ; 1 ex., Tank, East of Sealdah, Calcutta, 14.VIII,1909, *B.L. Choudhuri* coll. ; 1 ex., Barrackpore, North 24-Parganas Dist., 1962, *R.G. Michael* coll. ; 8 exs., Khariberia near Rajarhat, North 24-Parganas Dist., *T. Sengupta* coll.

Diagnosis : As in key.

Distribution : India : West Bengal (District - Calcutta, Darjiling, North 24-Parganas); Pondicherry; Tamil Nadu. Elsewhere : Burma, Mallaca, Seychelles, Sri Lanka, Thailand.

7. *Laccotrephes elongatus* Montandon

1907. *Laccotrephes elongatus* Montandon, *Bull. Soc. Sci. Buc.*, **15** : 330
1910. *Laccotrephes elongatus* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 313.

Diagnosis : Adults attain a length of 20 mm - 26 mm; abdominal appandages slightly shorter than the body length; intermediate tibiae much shorter than other femora; prosternum with a small conical tubercle in front, not like acute as it is found in *griseus*.

Distribution : India : West Bengal (Distant's coll.); Maharashtra.

Remarks : This species is not available in the present collection. It was mentioned by Distant (1910) in the Fauna British India, Vol. 5, as it was reported from West Bengal.

8. *Laccotrephes maculatus* (Fabricius)

1775. *Napa maculata* Fabricius : *Syst. Ent.*, : 692
1868. *Laccotrephes maculatus* : Stal, *Mem. Fabr.*, **1** : 135
1906. *Laccotrephes maculatus* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 19
1934. *Laccotrephes maculatus* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 20

Diagnosis : Body length of adult insect is about 15 mm - 20 mm, abdominal appandages slightly longer than the body; anterior area of prosternum straight and without any tubercle.

Distribution : India : West Bengal (District - Calcutta); Assam; Maharashtra. Elsewhere : Burma, Formosa, Java, Sri Lanka.

Remarks : This species is not available in the present collection. But Distant had reported it from Calcutta.

Genus *Ranatra* Fabricius, 1790

Key to the species of the genus *Ranatra*

1. Abdominal appendages much longer than the body; anterior femur armed with one spine like tooth; interocular space equal to the diameter of an eye; metasternal process subtriangular and mid-longitudinally foveately sulcate..... *elongata* Fabricius

   Abdominal appendages less than the body in length; anterior femur armed with two spine like teeth; interocular space slightly greater than the diameter of an eye; metasternal process otherwise 2

2. Adults with abdominal appendages 3-4 mm. shorter than the body in length; metasternal process posteriorly triangular with a distinct mid-longitudinal ridge..... *filiformis* Fabricius

Adults with abdominal appandages either 3-4 mm or 7-8 mm shorter than the body in length; metasternal process otherwise..... 3

3. Abdominal appendages 3-4 mm. shorter than the body; 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, thus not touching the inner tooth on the anterior femur..... *sordidula* Dohrn

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 bit rounded with no lateral concavity and mid-longitudinal carination less distinct; anterior tibia longer and clearly touching the inner tooth on the anterior femur..... *varipes* Stal

9. ***Ranatra elongata*** Fabricius

1790. *Ranatra elongata* Fabricius, *Skr. nat. Selsk. I*, **1** : 228
1906. *Ranatra elongata* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 20
1947. *Ranatra elongata* : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 368

Material examined: 2 exs., Debanandapur, Bandel, Hughli Dist., 26.X.1964, *Joseph & party* coll.; 1 ex., Belpahari, Medinipur Dist., 9.IX.1985, *S. Biswas* coll.; 6 exs., Santiniketan, Birbhum Dist., 13.X.1937.

Diagnosis: Adults attain a length about 40-45 mm and abdominal appendages may be about 10 mm more longer than the body; anterior area of pronotum with an obscure dark brown linear fascia. Other salinet features as in key.

Distribution : India : West Bengal (Districts Birbhum, Calcutta, Hughli, Medinipur); Bihar, Jammu & Kashmir; Maharashtra; Orissa; Tamil Nadu, Uttar Pradesh.

10. ***Ranatra filiformis*** Fabricius

1790. *Ranatra filiformis* Fabricius, *Skr. nat. Selsk, I*, **1** : 228
1906. *Ranatra filiformis* : Distant, *Fauna Brit. India , Rhynchota*, **3** : 21
1947. *Ranatra filiformis* : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 364
1974. *Ranatra filiformis* : Fernando & Cheng, *Fdn. Mus. J.*, **19** : 33

Material examined : 25 exs., Eden Garden, Calcutta, 7.V.1965, *Saukat Ali* coll.; 1 ex., Calcutta pond, 6.VI.1955, *D.D. Mukherjee* coll; 2 exs., Bartibill, Barrackpore, North 24-Parganas Dist., 2.XII.1986, *Mousumi De* coll; 1 ex. Botanic Garden, Shivpur, Haora Dist. 31.VIII.1965, *K.S. Pradhan & party* coll.

Diagnosis : Adult attain a length about 27-28 mm and abdominal appendages about 23 mm; both the teeth on anterior femur spinulose; head may be provided with a distinct tubercle on the vertex. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts - Calcutta, Haora, North 24-Parganas); Assam; Bihar; Maharashtra; Orissa; Uttar Pradesh. Elsewhere : Malay Peninsula, Phillipines, Sri Lanka, Thailand.

11. ***Ranatra sordidula*** Dohrn

1860. *Ranatra sordidula* Dohrn, *Stettin. ent. Ztg.*, **21** : 409
1906. *Ranatra sordidula* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 22

Material examined : 17 exs., Eden Gardens, Calcutta, 7.V.1965, *Saukat Ali* coll.; 1 ex., Calcutta Tank, *Ind. Mus.* coll.; 1 ex., Sheoraphuli, Hughli Dist., 29.XII.1964, *K.R. Rao* coll.; 4 exs., Bartibill, Barrackpore, North 24-Parganas, 2.X.1987, *Mousumi De* coll.

Diagnosis : Adult body 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 : West Bengal (Districts Calcutta, Hughli, North 24 -Parganas); Orissa. Elsewhere : Malay Peninsula, Sri Lanka, Thailand.

12. ***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 : 1 ex., Calcutta Pond, Calcutta, *Annandale* coll.; 1 ex., Indian Museum Compound Pond, Calcutta, 9.IV.1910, *Ind. Mus.*, coll. ; 1 ex., Dhappa, Brackish Water Pool, Calcutta, 4.XII.1906, *Annandale* coll. ; 1 ex., Port Canning, Brackish water, South 24-Parganas, 7.III.1907, *Annandale* coll.

Diagnosis : Adult body nearly 19-20 mm. in length and abdominal appendages reach upto 12 mm in length. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts - Calcutta, South 24-Parganas); Orissa; Tamil Nadu, Uttar Pradesh. Elsewhere : Burma, Malay Peninsula, Nepal, Sri Lanka, Thailand.

13. ***Ranatra longipes*** Stal

1861. *Ranatra longipes* Stal, *Ofvers. K.Vet.-Akad. Forh.*, **18** : 203
1910. *Ranatra longipes* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 315
1974. *Ranatra longipes* : Fernando & Cheng, *Fdn. Mus. J.*, **19** : 33

Diagnosis : This species is easily distinguished by its very long legs, the posterior femora reaching the extremity of the abdomen in the male, being a little shorter in the female; eyes strongly projecting; interocular space a little narrower than the eye; anterior femur bi-dentate beneath, a little beyond the

middle; pronotum nearly half the length of abdomen. Adult insect attains a length of about 22-23 mm; abdominal appendages a little shorter than the length of abdomen.

Distribution : India : West Bengal (District Calcutta); Uttar Pradesh.Elsewhere : Bangladesh, Burma, Borneo, China, Java, Malay Peninsula, Sri Lanka, Vietnam.

Remarks : This species is not available in the present collection but Distant (1910) had mentioned its occurrence in Calcutta. Hafiz & Ribeiro (1939) had also reported its occurrence from Calcutta.

Family III. NOTONECTIDAE

Key to the genera of the family Notonectidae

1. Hemelytra commissure with a definite hair-lined pit at the anterior end just behind the scutellum; pronotum more longer than wide thus it is a bit longer in shape; ventral abdominal keel extending to the last abdominal segment; anterior tarsus of male one segmented.....***Anisops***

   Hemelytra commissure without any hair-lined pit at the anterior end; pronotum more wider than long thus it is transverse in shape; ventral abdominal keel not extending to the last abdominal segment; anterior tarsus of male otherwise..... 2

2. Pronotum with its anterior angles foveately excavate; eyes with rounded angles but having wide gap in between; posterior margin of eye not E-shaped; elytra with well defined clavus and membrane; antannae 4 segmented.....***Enithares***

   Pronotum with concave anterior angles; eyes with rounded angles, touching each other at the inner basal angle; posterior margin of each eyes E-shaped; elytra without clavus; antennae 3 segmented. ..... ***Nychia***

Genus ***Anisops*** Spinola, 1837

Key to the species of the genus ***Anisops***

1. Synthlipsis wide, one third or more the anterior width of vertex; cephalic horn absent..... 2

   Synthlipsis narrow, less than one third the anterior width of vertex; cephalic horn may or may not be present..... 4

2. Labrum short; rostral prong longer than the 3rd rostral segment; facial tubercle laterally compressed; stridulatory comb composed of about 28 teeth..... *lipovskyi* Brooks

   Labrum long or as long as wide; rostral prong shorter than the 3rd rostral segment; facial tubercle not laterally compressed; stridulatory comb otherwise..... 3

3. Facial tubercle flat and not provided with any tufts of hair; labrum long and apex truncate;

stridulatory comb increase in width from base to apex and composed of about 18 teeth..... .....*campbelli* Brooks

Facial, tubercle not flat and provided with two tufts of hair which extend posteriorly to the base of labrum; labrum nearly as long as wide with apex more or less tapering; stridulatory comb composed of about 21 even shaped teeth..... *barbata* Brooks

4. Cephalic horn present..... 5

Cephalic horn absent..... 8

5. Cephalic horn short..... 6

Cephalic horn much prominent or moderately prominent..... 7

6. In the cephalic horn frons excavated with a median oval depression which is bordered laterally by a single carina on each side; rostral prong shorter than 3rd rostral segment; stridulatory comb widest at the middle, composed of about 14 teeth.....*nasuta* Fieber

In the cephalic horn frons excavated triangularly with rounded apex, bordered on each side by two carinae, the inner two carinae meet apically to form a median commissure; rostral prong slightly longer than the 3rd rostral segment; stridulatory comb composed of 13 teeth, basal 6 teeth much longer than the apical 7 teeth..... *batillifrons* Lundblad

7. Much prominent cephalic horn with frons excavate of its entire length and bordered laterally by two carinae; rostral prong slightly shorter than the 3rd rostral segment; stridulatory comb gradually narrow towards the apex, composed of about 18 teeth..... *sardea* Herrich-Shaffer

Moderately prominent cephalic horn with frons excavate triangularly and bordered laterally by two carinae; rostral prong as long as the 3rd rostral segment; stridulatory comb composed of about 12 teeth.....*bouvieri* Kirkaldy

8. Eyes not holoptic; facial tubercle flat and covered with small hairs; lateral margins of pronotum diverging; rostral prong shorter than the 3rd rostral segment; apex truncate; stridulatory comb composed of 9 even shaped teeth..... *crinita* Brooks

Eyes holoptic; facial tubercle otherwise; lateral margins of pronotum either diverging or parallel; rostral prong long and flap like; apex tapering; stridulatory comb otherwise..... 9

9. Facial tubercle swollen prominently; lateral margins of pronotum parallel; stridulatory comb irregular in shape, composed of 7 irregular teeth where 4th and 5th teeth largest and flattened.... ..... *breddini* Kirkaldy

Facial tubercle slightly raised; lateral margins of pronotum diverging; stridulatory comb irregular,

composed of 5 irregular teeth, of which basal 4 teeth are prominent while 5th tooth is minute..... ..... *kempi* Brooks

Remarks: Male *Anisops* are best to study the morphological pecularities for their identification upto species level, so the above mentioned key is based on males.

14. *Anisops lipovskyi* Brooks

1951. *Anisops lipovskyi* Brooks, *Kans. Univ. Sci. Bull.*, **34** (8) : 379

Material examined : 3 exs., (3 M), Jor Pokri, near Sitong, 4800 ft., Darjiling Dist., 6.VII.1918, *S. Kemp* coll.

Diagnosis : Body length for males 5.4 - 6.0 mm, for females 6.0 mm.; greatest body width 1.5 - 1.6 mm.; general body colour pearlaceous. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts - Calcutta, Darjiling).

Remarks : Brooks (1951) mentioned that one male is reported from Calcutta pool, deposited in the Snow Entomological Museum at Brisbane, Australia.

15. *Anisops campbelli* Brooks

1951. *Anisops campbelli* Brooks, *Kans. Univ. Sci. Bull.*, **34** (8) : 322

Material examined : 7 exs., (3 F; 4 M) Nam Ting Pokhri above Sitong near Mongpu, 4800 feet, Darjiling Dist., 3.VII.1918, *S.Kemp* coll.

Diagnosis : Body length for males 7.3 - 8.1 mm, for females 8.1 - 8.4 mm ; greatest body width between one-third and half the body length; general body colour may be pale yellow or greyish. Other diagnostic characters as in key.

Distribution : India : West Bengal (District - Darjiling) ; Haryana; Himachal Pradesh; Karnataka, Punjab; Uttar Pradesh. Elsewhere : Burma.

16. *Anisops barbata* Brooks

1951. *Anisops barbata* Brooks, *Kans. Univ. Sci. Bul.*, **34**(8) : 387
1974. *Anisops barbata* : Fernando & Cheng. *Fdn. Mus. J.*, **19** : 36

Material examined : 2 exs., (2 F), Berhampur, Murshidabad Dist., IX.1912, *Southwell* coll.

Diagnosis : Body length for males 8.6 - 9.3 mm, for females 8.0 - 9.1 mm, greatest body width at the middle of the body length; general body colour may be greyish or pale yellowish. Other morphological pecularities as in the key.

Distribution : India : West Bengal (District - Murshidabad); Andhra Pradesh; Bihar; Himachal Pradesh; Haryana; Karnataka; Orissa. Elsewhere : Burma, Formosa, Java, Malay Peninsula, Sri Lanka.

17. *Anisops nasuta* Fieber

1851. *Anisops nasuta* Fieber, *Abh. K. Bohm. Ges. Wiss.*, **5** : 485
1906. *Anisops fieberi* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 46
1951. *Anisops nasuta* : Brooks, *Kans. Univ. Sci. Bull.*, **34** (8) : 416
1974. *Anisops nasuta* : Fernando & Cheng, *Fdn. Mus. J.*, **19** : 35.

Material examined : 1 ex. (M) Siliguri, Darjiling Dist. Reg. No. 8643/16, 1.VII.1906

Diagnosis : Body length for males 6.0-7.8 mm for females 6.0-6.9 mm; greatest body witdth which at about midway of the body length; general body colour pale yellowish or pearlaceous. Other diagnostic characters as in key.

Distribution : India : West Bengal (District-Darjiling); Orissa. Elsewhere : Australia, Celebes, China, Formosa, Guam, Java, Malay Peninsula, Nepal, New Guinea, Samoa, Sri Lanka, Sumatra.

18. *Anisops batillifrons* Lundblad

1933. *Anisops batillifrons* Lundblad, *Ann. Mag. nat. Hist.*, (10) **12** : 463
1951. *Anisops batillifrons* : Brooks, *Kans. Univ. Sci. Bull.*, **34**(8) : 420

Material examined : 2 exs., (M), Sitong ridge, 4700 ft., Darjiling Dist., X.1922, *N. Annandale & F.H. Gravely* coll.; 5 exs., (2 M, 3 F) Mongpoo, 4000 ft, Darjiling Dist., 11-13.X.1917, *N. Annandale & F.H. Gravely* coll.

Diagnosis : Body length for males 5.6-6.4 mm for females 5.4-6.3 mm; greatest body width at about two-fifth of the body length; general body colour pale or pale yellowish or greyish. Other characters as in the key.

Distribution : India : West Bengal (District Darjiling); Assam. Elsewhere : Burma, China, Formosa, Japan, Phillipines.

19. *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 : 119 exs. (77 F, 42 M), Ranijheel, Bantala, near Tiljala, South 24-Parganas Dist., 6.V.1987, *Mousumi De* coll. ; 1 ex (M), Port Canning, Brackish water pool, South 24-Parganas Dist. 12.XI.1906, *Ind. Mus.* coll. ; 31 exs., (11 M, 20 F) Berhampore, Murshidabad Dist., IX.1912, *Southwell* coll.

Diagnosis : Males vary in length from 7.5 - 8.4 mm while females vary from 7.2 - 7.5 mm ; greatest body width about mid way the length of body; general body colour pale yellow or brownish yellow. Other diagnostic characters in the key.

Distribution : India : West Bengal (Districts - Calcutta, Darjiling, Murshidabad, South 24-Parganas); Orissa; Punjab; Uttar Pradesh; South India. Elsewhere : Africa, Albania, Burma, Canary Islands, Corfu, Pakistan, Syria, Turkey.

20. ***Anisops bouvieri*** Kirkaldy

1904. *Anisops bouvieri* Kirkaldy, *Wein ent. Ztg.*, **23** : 116
1951. *Anisops bouvieri* : Brooks, *Kans. Univ. Sci. Bull.*, **34**(8) : 430
1974. *Anisops bouvieri* : Fernando & Cheng., *Fdn. Mus. J.*, **19** : 35

Material examined : 2 exs. (M); Calcutta, 9.VIII.1906; 3 exs., (2 F, 1 M) Eden Gardens, Calcutta, *F.H. Gravely* coll.; 1 ex (M) Berhampur Court, Murshidabad Dist., *S. Kemp* coll.; 4 exs. (3 F, 1 M), Berhampur, Murshidabad Dist., IX.1912, *Southwel* coll.

Diagnosis : Body length for males 6.0 - 6.3 mm, for females 5.7 - 6.0 mm; greatest body width at about two-fifth of the body length; general body colour pearlaceous. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts - Calcutta, Murshidabad); Assam; Andhra Pradesh; Andaman Islands; Bihar; M.P.; Orissa. Elsewhere : Bangladesh, Burma, New Guinea, Thailand.

21. ***Anisops crinita*** Brooks

1951. *Anisops crinita* Brooks, *Kans. Univ. Sci. Bull.*, **34** (8) : 443.

Material examined : 2 exs. (1 M , 1 F), Berhampore, Murshidabad Dist. IX.1912, *Southwell* coll.

Diagnosis : Body length for males 4.9-5.4 mm for females 4.8-5.7 mm, greatest width of the body at about middle of the body length; general body colour pale yellow or brownish yellow. Other pecularities as in key.

Distribution : India : West Bengal (District - Murshidabad); Orissa. Elsewhere : Greece, New Caledonia, Pakistan.

22. ***Anisops breddini*** Kirkaldy

1901. *Anisops breddini* Kirkaldy, *Entomologist*, **34** : 5-6
1910. *Anisops breddini* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 333
1951. *Anisops breddini* : Brooks, *Kans. Univ. Sci. Bull.*, **34**(8) : 439
1974. *Anisops breddini* : Fernando & Cheng.,*Fdn. Mus. J.*, **19** : 35

Material examined: 50 exs., (10 M, 40 F), Ranijheel, Bantala, near Tiljala, South 24-Parganas Dist.,

6.V.1987, *Mousumi De* coll.; 8 exs., (5 M, 3 F), Matibazar, near Basirhat, North 24-Parganas Dist., 15.XII.1987, *Mousumi De* coll.; 1 ex. (F), Calcutta, 9.VIII.1906, *Ind. Mus.* coll.

Diagnosis : Body length for males 5.7-6.6mm., for females 5.4-5.7 mm, greatest width about one and half the body length; general body colour pearlaceous. Other characters as in key.

Distribution : India : West Bengal (Districts - Calcutta, North 24-Parganas, South 24-Parganas); Kerala; Orissa. Elsewhere : Burma, Malay Peninsula, Sri Lanka.

23. ***Anisops kempi*** Brooks

1951. *Anisops kempi* Brooks, *Kans. Univ. Sci. Bull.*, 34(8) : 441

Material examined : 3 exs. (2 M, 1 F), Eden Gardens, at light, Calcutta, 14.X.1911, *F.H. Gravely* coll.; 1 ex. (F), Medinipur Dist., VIII.1961, *A.K. Gorai* coll.

Diagnosis : Body length for males 5.7-6.6 mm, for females 5.4-6.0 mm, greatest body width about midway its length; general body colour pale yellowish. Other diagnostic characters as in key.

Distribution : India : West Bengal (Districts - Calcutta, Medinipur); Assam; Orissa; Uttar Pradesh. Elsewhere : Burma, Thailand.

24. ***Anisops cavifrons*** Brooks

1951. *Anisops cavifrons* Brooks, *Kans. Univ. Sci. Bull.*, 34(8) : 418

Diagnosis : Body length for males 5.1-5.7 mm, for females 5.4-6.0 mm; greatest width at mid way of body length; general body colour pearlaceous; synthlipsis of the head narrow; frons triangularly excavate with rounded apex, bordered on each side by two carinae, inner two carinae meet apically to form a median commissure in males; rostral prong as long as 3rd rostral segment; stridulatory comb with about 14 teeth which decreases in length from base to apex.

Distribution : India : West Bengal (District-Darjiling); Bihar; Himachal Pradesh; Kerala; Maharashtra; Punjab; Tamil Nadu; Uttar Pradesh.

Remarks : This species is not available in the present collection but Brooks (1951) had mentioned its occurrence in Darjiling District. One male was collected by Bueno which is presently housed in the Snow Entomological Collection, Brisbane, Australia.

Genus ***Enithares*** Spinola, 1837

25. ***Enithares abbreviata*** (Kirby)

1894. *Notonecta abbreviata* Kirby, *J. Linn. Soc.*, **24** : 126
1906. *Enithares indica* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 42

1910. *Enithares paivana* : Distant, *Fauna Brit. India, Rhynchota,* **5** : 329
1919. *Enithares lactea* : Paiva, *Rec. Indian Mus.*, **16** : 155
1933. *Enithares abbreviata* : Hutchinson, *Rec. Indian Mus.*, **35** : 395

Material examined: 2 exs. (M), Nam Ting Pokri, above Sitong in Mongpu, 4800 ft., Darjiling Dist., 2.VII.1918, *S.Kemp* coll.; 2 exs. (M, F), Nam Ting Pokhri, Sitong, 4600 ft, Darjiling Dist., *N. Annandale* coll.

Diagnosis : General body length varies from 8.5-10.0 mm for both the sexes, males are a little smaller than females in length; head rounded with large eyes, posterior margin of eyes truncated with the anterior margin of pronotum; pronotum more than twice as broad between the humeral angles than the median length, with prominently foveately excavation at the anterior angles; a prominent anteapical tooth on the intermediate femur; male provided with a moderately distinct protuberance at the posterior three fourth position on the ventro-lateral margin of the posterior femur.

Distribution : India : West Bengal (District - Darjiling); Andaman Islands; Bihar; Kerala; Maharashtra; Uttar Pradesh. Elsewhere : Java, Sri Lanka, Sumatra.

Genus ***Nychia*** Stal, 1859

26. ***Nychia marshalli*** (Scott) *

1872. *Antipalocoris marshalli* Scott, *Entomologist's mon. Mag.*, **8** : 245
1900. *Nychia marshalli* : Kirkaldy, *Annu. Soc. ent. Belg.*, : 435
1934. *Nychia marshalli* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 155
1969. *Nychia marshalli* : Julka, *Entomologist's Rec. J. Var.*, **81** : 175-176.

Material examined : 1 ex. (M), Tarapith, Birbhum Dist., 8.III.1986, *T. Roy* coll; 2 exs. (M, F), Bartibill, Barrackpore, North 24-Parganas Dist., 2.XI.1987, *Mousumi De* coll.

Diagnosis: Males are little longer than females, attain a length of about 5.2 mm while females reach upto 4.8 mm. approximately but females are a bit wider at the middle of the body than males which are more slender in apearance; head with vertex a little raised; eyes holoptic, postero-lateral margin of eye E-shaped; pronotum short and transverse with concave anterior angles; hemelytra without any clavas; posterior legs slender and longer than the body length; hemelytra fully cover the body in the females while in males last three abdominal segments remain uncovered.

Distribution : India : West Bengal (Districts - Birbhum, North 24-Parganas). Elsewhere : Africa, Europe, Sri Lanka.

Family IV- PLEIDAE

Key to the genera of the family Pleidae

1. Body sub-ovate, sub-convexly raised, a bit laterally compressed dorsally; 3 segmented rostrum

distinctly longer than broad; pronotum antero-medially scarcely convex; clavus of hemelytra very prominently present..... ***Plea***

Body more ovate, strongly convexly raised, sub-hemispherical dorsally; 3 segmented rostrum scarcely longer than broad; pronotum antero-medially strongly convex; clavus of hemelytra absent ..... ***Helotrephes***

Genus ***Plea*** Leach, 1817

Key to the species of the genus ***Plea***

1. Front of the head with no markings; pronotum with reticulum like punctures; abdominal keels compact and not much prominent, no spine like process on abdominal sternites..... ..... *indistinguenda* Matsumura

Front of the head provided with markings; pronotum with punctures otheriwse; abdominal keel otheriwse..... 2

2. A faint chestnut brown mid-longitudinal streak on the front of the head which often extends on the top of the vertex; pronotum with fine punctures spread all over; abdominal keels prominent and not compact, moderately prominent spine like process on 4th, 5th & 6th abdominal sternites..... ..... *liturata* (Fieber)

A small brown mid-longitudinal streak on the front of the head and two pairs of small irregular brownish patches just above the streak on the vertex; pronotum with coarse punctures and a puncture free zone at the anterior half on the mid-longitudinal axis; abdominal keels very prominent and provided with backwardly directed prominent spine like process on the 3rd and 6th abdominal sternites, 4th sternite with less prominent spine..... *frontalis* (Fieber)

27. ***Plea indistinguenda*** Matsumura

1905. *Plea indistinguenda* Matsumura, *J. Sapporo agric. Coll.*, **2** : 59
1906. *Plea pallescens* : Distant, *Fauna Brit. India, Rhynchota*, **3** : 48
1934. *Plea indistinguenda* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 127
1947. *Plea indistinguenda* : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 347

Material examined : 2 exs., Calcutta Tank, *N. Annandale* coll. ; 3 exs., Indian Museum Compound Tank, Calcutta, 14.VIII.1906, *Ind. Mus.* coll. ; 1 ex., Museum Compound Tank, Calcutta, 8.IV.1910, *Ind. Mus.* coll.

Diagnosis : General, body length upto 1.5 mm, pale yellowish above, elytra less punctata, other diagnostic characters as in key.

Distribution :: India : West Bengal (District - Calcutta); Bihar; Kerala; Uttar Pradesh. Elsewhere: Bangladesh, Japan.

28. ***Plea liturata*** (Fieber)

1844. *Plea liturata* Fieber, *Ent. Monogr. Leipzig,* (5) **3** : 296
1910. *Plea metiadusa* : Distant, *Fauna Brit. India, Rhynchota,* **5** : 337
1918. *Plea quinquenotata* : Pavia, *Rec. Indian Mus.*, **14** : 29
1934. *Plea (Paraplea) liturata* : Lundblad, *Arch. Hydrobiol. Suppl.,* **12** : 129
1974. *Plea liturata* : Fernando & Cheng, *Fdn. Mus. J.*, **19** : 40

Material examined : 2 exs., Indian Museum Compound Tank, Calcutta, 14.VIII.1906, *Ind. Mus.* coll. ; 2 exs., Museum Compound Tank, Calcutta, 8.VIII.1906, *Ind. Mus.* coll., 2 exs., Diamond Harbour, South 24-Parganas, 10.VIII.1964, *P. Parui* coll.

Diagnosis : Body length upto 2 mm and dull yellowish grey in colour; elytra coarsely but prominently punctate. Other morphological pecularities as in key.

Distribution : India : West Bengal (Districts - Calcutta, South 24-Parganas). Elsewhere : Bali, Java, Sumatra, Malay Peninsula.

29. ***Plea frontalis*** (Fieber)

1844. *Plea frontalis* Fieber, *Ent. Monogr. Leipzig,* (5) **3** : 296
1910. *Plea pelopea* : Distant, *Fauna Brit. India, Rhynchota,* **5** : 336
1934. *Plea (Paraplea) frontalis* : Lundblad, *Arch. Hydrobiol. Suppl.,* **12** : 138
1947. *Plea (Paraplea) frontalis* : Hafiz & Pradhan, *Rec. Indian Mus.*, **45** : 349

Material examined : 1 ex., at light, Calcutta, 3.IX.1906, *C.A. Paiva* coll; 1 ex., Calcutta, *Ind. Mus.* coll.

Diagnosis : Body length upto 2.5 mm; pronotum unspotted and shallow punctures; elytra and coarsely reticulately punctate. Other characters as in key.

Distribution : India : West Bengal (District - Calcutta); Nicobar Islands; Orissa; Pondicherry; Tamil Nadu. Elsewhere : Burma, Formosa, Java, Sumatra.

Genus ***Helotrephes*** Stal, 1859

30. ***Helotrepehes indicus*** Distant

1910. *Helotrephes indicus* Distant, Fauna, *Brit. India, Rhynchota,* **5** : 338
1907. *Helotrephes indicus* : Esaki & China, *Trans. R. ent. Soc. Lond.*, **75** : 281

Material examined : 1 ex., Indian Museum compound Tank, Calcutta, 8.VIII.1906, *Ind. Mus.* coll.; 2 exs., Indian Museum Compound Tank, Calcutta, 14.VIII.1906, *Ind. Mus.* coll.; 3 exs., Indian Museum Compound Tank, Calcutta, 8.IV.1910, *F.H. Gravely* coll.

Diagnosis : Body length upto 1.5 mm, short, obovate, highly raised anteriorly than posteriorly;

distinct by punctate and strongly deflected with a prominent concavity at the anterior margin of the head; pronotum less coarsely punctate; clavus of elytra absent; scutelum brownish oliavious with basal margin pale, coarsely punctate; corium dull yellowish; abdomen black under side, lateral margins yellowish.

Distribution : India : West Bengal (District - Calcutta). Elsewhere : Burma.

SUMMARY

The present work dealt with the 30 species under 9 genera belonging to four acquatic families, viz., Belostomatidae, Nepidae, Notonectidae and Pleidae of the Order Hemiptera from the State of West Bengal. Two species with asteric marks have been recorded for the first time from the State of West Bengal. Distribution of each species is also shown in the present paper in the map.Taxonomic keys to families, genera and species are also given. This paper is the first comprehensive account of Acquatic Hemipteran species under these four families from West Bengal.

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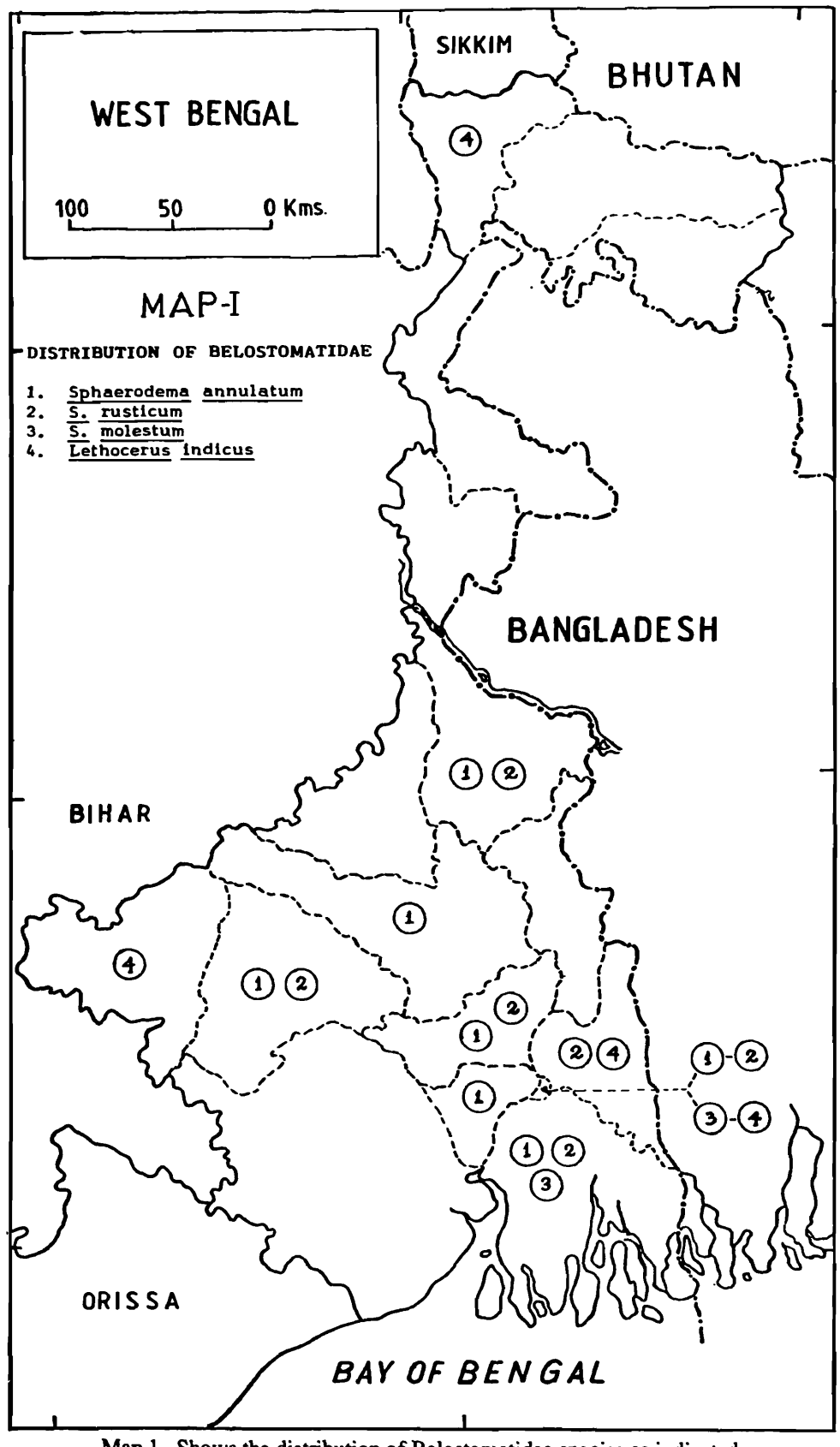
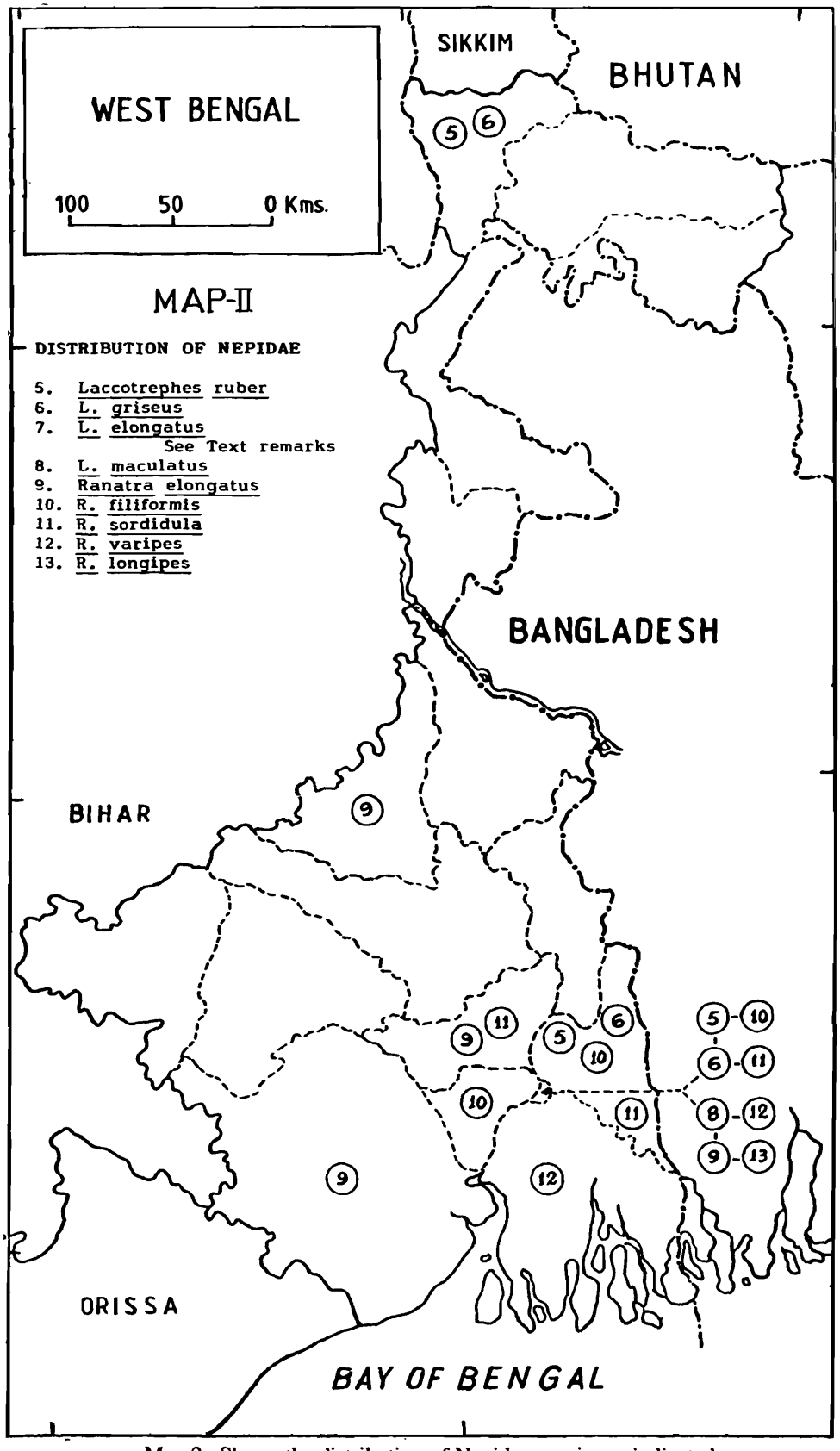
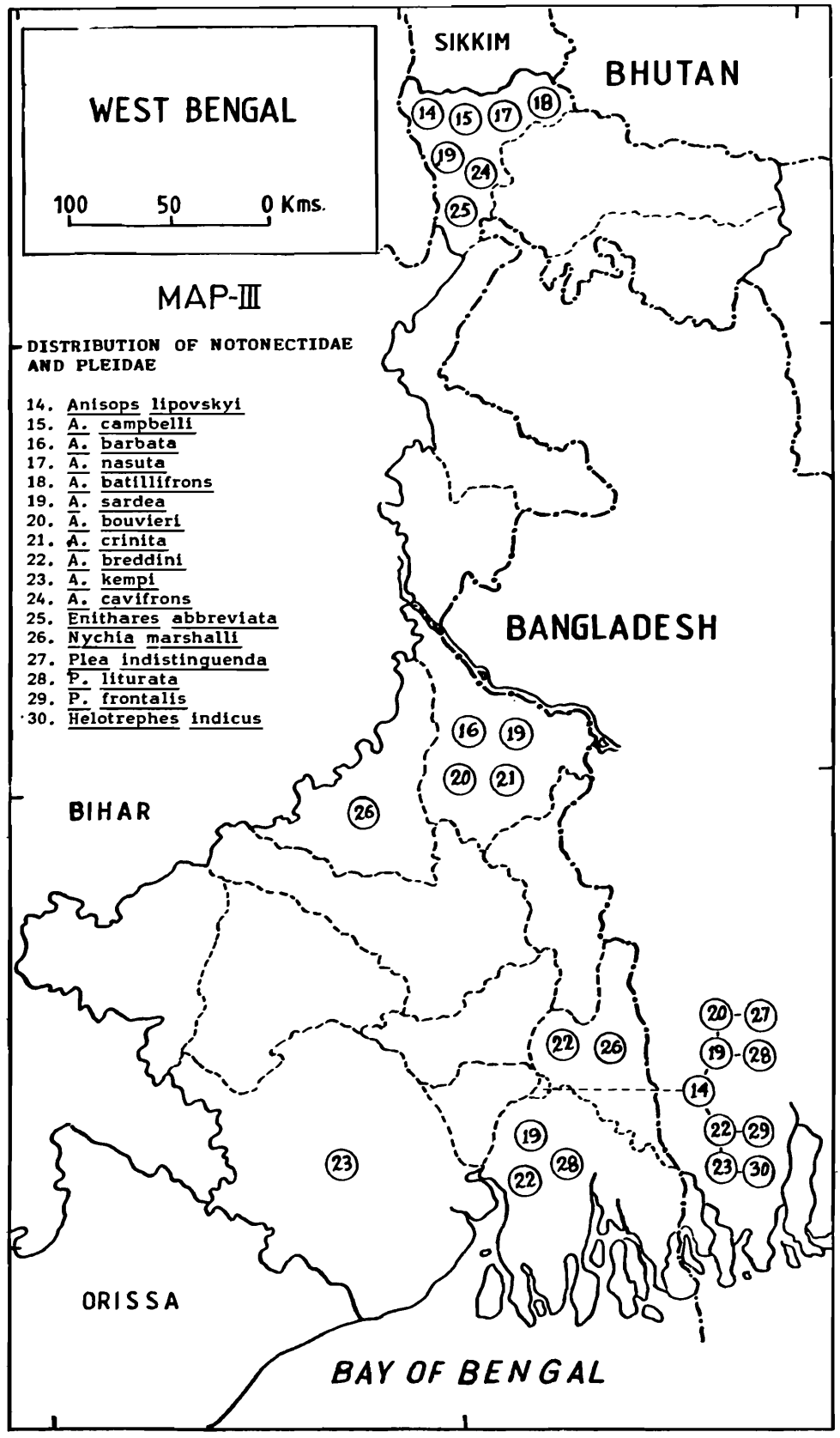


Map 1. Shows the distribution of Belostomatidae species as indicated.



Map 2. Shows the distribution of Nepidae species as indicated.



Map 3. Shows the distribution of Notonectidae and Pelidae species as indicated.

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