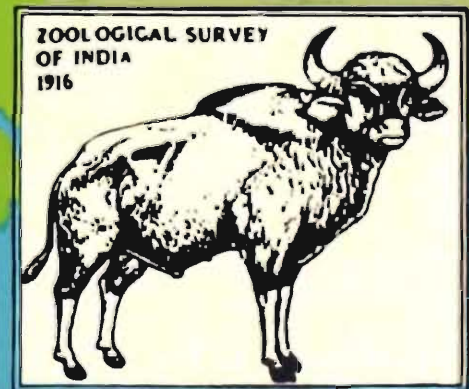


STATE FAUNA SERIES 3

FAUNA OF WEST BENGAL

PART-4

ZOOLOGICAL SURVEY OF INDIA
1993



STATE FAUNA SERIES 3

FAUNA OF WEST BENGAL

PART - 4

(INSECTA : APTERYGOTA, EXOPTERYGOTA, ORTHOPTERA,
DERMAPTERA, DICTYOPTERA, ISOPTERA, PSOCOPTERA)

Edited by
Director, Zoological Survey of India
Calcutta



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FAUNA OF WEST BENGAL

PART - 4

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INSECTA : THYSANURA

A.K. HAZRA

Zoological Survey of India, Calcutta

INTRODUCTION

The order Thysanura comprises popularly known insects of 'silver-fish and 'bristle-tail' belonging to the Sub-Class Apterygota. There are two suborders in this order. Under suborder Microcoryphia, there is one superfamily Machiloidea, which consists two families Machilidae and Meinertellidae. The suborder Zygentoma has one superfamily Lepismatoidea, under which there are three families Lepidotrichidae, Nicoletiidae and Lepismatidae. These insects generally have very long, many segmented antennae, cerci and median tail (Figs. 1 and 2). Blind as well as eyed forms occur and most species are heavily clothed with scales which give these insects a mottled black, brown, silvery or golden appearance. The free living forms are found in the forest floor, under bark of trees, under rocks in the nests of ants and of termites. Some species often cause damage to books, and other household articles.

Escherich (1903) studied the Indian Thysanuran fauna for the first time and Silvestri 1913, '38, '48) has contributed to our knowledge of Indian species. Since then works on Indian Thysanuran Fauna was neglected for a long time. After that Hazra (1980) has described a new species from West Bengal and Mendes (1990) described some zoogeographic affinities of Indian thysanura. It is astonishing that from this department different parties have visited all the districts of the state of West Bengal during the period from 1983-1988, under a scheme of the department for the extensive and intensive faunistic survey of West Bengal but not a single party has brought the collections of Thysanura. This is probably due to their concealed habits, which needs special efforts for their collections.

Therefore, the present study is mostly based on the small collections of about 200 examples made by the present author during 1974 from some districts of West Bengal particularly Southern districts of West Bengal and also some old collection present in the section. So, the present report will not reflect the total state fauna of this order. Thus remains an ample scope for further study of this order from the state. Particularly the districts of North Bengal, where it is expected to be more richer than southern districts.

The present paper deals with only 7 species of Thysanura under two families and 5 genera, of which a genus and a species are recorded for the first time from the state and are marked with one asterisk and one genus and a species are recorded for the first time from India and marked with double asterisk. Detailed descriptions of all the seven species are provided with the necessary drawings. The work also provides key to families, genera and species. The distribution of each species in different districts of West Bengal has been plotted on the map. The classification followed in the present study is after Paclt, 1967.

As it is very neglected group in India therefore, the methods used for measurements may be useful for the future workers. The length of the species is measured from the anterior border of the head or if the head is hidden from pronotum to the apex of the tenth tergite. Antennae and caudal appendages never included. The soft-bodied Lepismatidae are generally preserved in alcohol and may either shrink or extend after death. When measurements are made, it is always endeavoured to use specimens which have

preserved their natural size and shape as far as possible, the same applies to drawings of the body out lines. Even thus, a variations of $\pm 10\%$ for total length should be allowed because of the fact that these insects never stop growing, even after physiological maturity.

Description of colour is described in two categories a)chitin colour and the presence or absence of hypodermal pigment, and b) the formation of pattern by the scales.

SYSTEMATIC ACCOUNT

Order THYSANURA
Sub-order ZYGENTOMA
Super family LEPISMATOIDEA

Key to the families

1. Eyes and ocelli absentNicoletiidae
- Eyes present 2
2. Ocelli present ; scales absentLepidotrichidae
- Ocelli absent ; scales presentLepismatidae

Family LEPISMATIDAE

Key to the Sub families

1. Eyes absent ; general body colour white or yellowish, hypodermal pigment absent, scales, if present, white or yellowish, never forming a patternNicoletiinae
- Eyes present ; general body colour whitish, hypodermal pigment mostly present; scales always present, often forming a definite pattern Lepismatinae

Key to the genera of Lepismatidae

1. Dorsal and abdominal setae or bristles arranged singly4
- Dorsal and abdominal setae or bristles arranged in 1+1 or 2+2 bristle combs 2
2. Last tergum not sharply pointed with only 1+ 1 bristle combs*Ctenolepisma* Esch.,1905
- Last tergum sharply pointed with more than 1 + 1 bristle combs3
3. Submedian fields of macrochaetae of head capsule narrowly elongated, not attaining the anterior border of head capsule*Acrotelsa* Esch., 1905

- Submedian fields of macrochaetae of head capsule broadly triangular, attaining anterior border of head capsule *Stylifera* Stach, 1932
- 4. Body limuloid, macrochaetae bifid or trifid apically, last tergum trapizoidal
..... *Tricholepisma* Paclt, 1967.

Genus *Ctenolepisma* Escherich, 1905

Key to the species

1. Abdominal terga II-VI with 3+3 bristle combs ; maximum length more than 6 mm2
Abdominal terga II-V with 3+3 bristle combs ; maximum length 6 mm *nigra* (Oudm.)
2. Maximum length about 10 mm ; antennae and caudal filaments not longer than body ; distinct violaceous hypodermal pigment on head, body and appendages *ciliata* (Dufour)
- Maximum length 13-15 mm ; antennae and caudal appendages longer than body ; head, body and appendages without hypodermal pigment *longicaudata* Escherich

* 1. *Ctenolepisma longicaudata* Escherich, 1905
(Fig. 3, Map 1)

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

1940. *Ctenolepisma cerbana* Slabaugh, *Ent. News*, Vol. 51 : 95.

Material examined : Bankura Dist. : 12 exs. (7 (male), 5 (female), panchubag near Bankura town, under bark of "*Shorea robusta*", 22. xi. 1974, Dr. A.K. Hazra. Bardhaman Dist. : 5 exs. (3 male, 2 female), Dewandighi, under old books, 9. ix. 1983, Dr. A.K. Hazra. Calcutta dist. : 1 ex. (2 female), from the wall of Jabakusum House 9. i. 1974, P.H. Roy. Darjiling dist. : 10 exs. 6 male, 4 female) Birch Hill, 22. viii. 1975, from old paper, B.K. Biswas ; 1 ex (1 female and several immature forms), Birch Hill, 22. viii. 1978, B.K. Mondal. Murshidabad dist. : 2 exs. (1 male, 1 female), Hazardwari Campus, under bark of mango tree, 4. xi. 1974, Dr. A.K. Hazra. 24-Parganas dist. : 5 exs. (2 males, 3 females), Barrackpore, from old books, 31. iii. 1974, C.R. Basu.

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

Distribution : India : West Bengal (Bankura, Bardhaman, Calcutta, Darjiling, Murshidabad, 24-Parganas) ; USA, South Africa, Australia.

Remarks : This species is widely distributed in the tropics and subtropics of old and New World. The distribution of this species in India is likely to be wide spread, but due to lack of proper survey it appears to be restricted in distribution. In West Bengal this species also supposed to be occurred from all the districts. This species is very common in houses and libraries and a very serious pest in India.

**** 2. *Ctenolepisma ciliata* (Dufour, 1831)**
(Fig. 4A, Map. 1)

1831. *Lepisma ciliata* Dufour, *Ann. Sci. nat.* Vol. 22 : 420.
1838. *Lepisma ciliata* Burmeister, *Handb. d. Entomol.*, Vol. 2 : 458
1846. *Lepisma quadrilineata* Lucas. *Rev. Zool.* IX : 254.
1890. *Lepisma ciliata* Grassi et Rovelli, *Nat. Sci.* Vol. 9 : 80

Material examined : Bankura dist. : 2 exs (1 male, 1 female). Bhatapur village on the bank of river Darkeswar from leaf litter 20. xi. 1974, coll. Dr. A.K. Hazra. Birbhum Dist. : 2 exs (2 females), Gonpur village under bark of *Shorea robusta* 10. xi. 1974 coll. Dr. A.K. Hazra. Calcutta Dist.: 2 exs (females) from wall of old Z.S.I. office at Jabakusum House 26. vii. 1976 coll. D.C. Bhattaharyya. Darjiling dist.: 1ex. (1 female) from the wall of Darjiling Govt. College room 4. vii. 1976, coll. B.G. Kundu. Murshidabad dist. : 2 exs (1 female 1 male) Beldanga, under bark of mango tree, coll. Dr. A.K. Hazra, 3 exs (3 females, 2 males) Hazardwari Campus under the bark of mango tree 14. xi. 1974, Coll. Dr. A.K. Hazra. 24 Parganas : 1 ex. (1 female) Kakdwip from river side muddy road, 123. iii. 1977, Coll. Dr. A.K. Sanyal. Puruliya dist. : 2 exs (1 female, 1 male) Ghatiali Hills (Digha forest) alt. 800 ft. under bark of teak plant coll. Dr. A.K. Hazra.

Diagnosis : Body enlongated, head broad, eyes clearly projecting. Thorax broader than the abdomen. Tergite IX small, half the length of tergite VIII. Tergite 'X' is as long as those of IX and VII together, trapizoidal shape, Hypodermal pigment on head, body and appendages. Antennae and cerci shorter than body. Abdominal terga II-VI with 3+3 bristle combs. Stylets 2 pairs on VIII and IX. Ovipositor long and slender. Body length : 10 mm.

Distribution : India : West Bengal (Bankura, Birbhum, Calcutta, Darjiling, Murshidabad, 24-Parganas, Puruliya) ; U.S.A.; Mexico ; Africa ; Spain.

Remarks : This species is recorded for the first time from India. It is widely distributed in Mediteranean. In West Bengal I have collected this species from bark of different trees and in the houses in almost all the districts of West Bengal (South Bengal). This species is likely to occur in other states of India.

3. *Ctenolepisma nigra* (Oudemans, 1890)
(Fig. 5, Map. 1)

1890. *Lepisma nigra* Oudemans, *Weber Zoolog., Ergebnisse* Vol. I : 82
1905. *Ctenolepisma nigra* Escherich, *Zoologica* (Stuttgart) Vol. 18 : 98
1913. *Ctenolepisma nigra* Sievestri, *Rec. Indian Mus.* (Calcutta) 9 : 56-57.

Diagnosis : Body covered with dorsal scales. base of the legs, antennae and cerci are pale yellow in colour. Antennae and caudal appendages are shorter than the body length. Thorax is not wider than the abdomen more or less equal in width. Posterior margin of each thoracic segment with few short and long simple setae. The middle portion of the metasternum is slightly narrower and posterior is rounded. Posterior part of abdomen is very little narrower than the anterior abdomen part. First tergum with 2+ 2 bristle combs tergite II-V with 3 + 3 bristle combs and tergite VI-VIII with 2 + 2 bristle combs. Sternite 3-8 with 2-3 sub-lateral bristle comb. Internal part of sub-coxae IX long, triangular, narrow and pointed at the tip. Tergite X short, sub-trapizoidal, angular portion rounded, posterior margin truncate. Ovipositor long, slender, body length : 6 mm.

Distribution : India : West Bengal (Calcutta) ; Sri Lanka ; Java.

Remarks : This species has not been collected during the present study. The description is based on the literature of Silvestri, who has described the species from a material of Calcutta present in the collection of the Indian Museum in the year 1913. The species was first described by Oudemans during 1890 from the Indo-Malayan region.

Genus *Acrotelsa* Escherich, 1905

This genus is represented by single species from West Bengal. Hence no species key is provided.

* 4. *Acrotelsa collaris* (Fabricius, 1793) (Fig. 4 B-E, Map. 2)

1793. *Leppisma collaris* Fabricius, *Ent. Syst.*, II. p. 64.

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

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

Material examined : Calcutta 8 exs. (5 males, 3 females) insect room Indian Museum, 29. vi. 1911. coll. F.H. Gravely. 24-Parganas dist. : (North : 5 exs. (3 females, 2 males), Barrackpore, 31. iii. 1974, coll. C.R. Basu.

Diagnosis : Body long and robust. Base of the body is light yellowish in colour and covered with dark brown scales. The macrochaetae in submedian field of the head capsule are arranged in a narrow elongated strip, which do not touch the anterior border of the head capsule (Fig. 6B)/ The prosternum is covered by the fore coxae from underside. A bunch of solitary macrochaetae is present in the middle of the prosternum. The species can also be recognised by the arrangement of macrochaetae on legs and cerci which are in distinct whirled, this type of arrangement of setae on these appendages are not found in other Lepismatids. Tergum X is triangular and sharply pointed with at least 5 pairs of bristle combs.

Ovipositor with forsorial spines apically on posterior gonapophyses and male with parameres.

Body length : 16 mm 18 mm.

Distribution : India ; West Bengal (24 Parganas (N) and Calcutta), USA, Carribean Islands.

Remarks : It is a tropicopolitan species. It is present only in two districts of West Bengal in the present sutdy. But it is likely to occur in almost all the districts of West Bengal, except Hilly districts of North Bengal.

Genus *Stylifera* Stach, 1932

This genus is also represented by a single species from West Bengal.

5. *Stylifera wygodzinskyi* Hazra, 1980.
(Fig. 6, Map 2)

1980. *Stylifera wygodzinskyi* Hazra, *Bull. Zool. Surv. India*, 2 (2 & 3) : 187-91.

Material examined : Bankura dist. : 11 exs. (5 males, 6 females), Bishnupur under bark of *Shorea robusta* (Saal) tree, 24. xi. 1974, coll. A.K. Hazra. Medinipur dist. : 35 exs. (18 females, 127 males), Arabari forest under bark of 'Saal' trees , 27 xi. 1974, coll. Dr. A.K. Hazra. Murshidabad dist. : 1 ex. (1 male) Golapbag, on termite mound 4. xi. 1974, coll. Dr. A.K. Hazra. Puruliya dist: 1 ex (1 female), Matha Protected forest from stream side litter, 16. xi. 1974, coll. Dr. A.K. Hazra ; 59 exs (40 females, 19 males) Bundwan forest under bark of 'Saal' trees, 11. xi. 1974, coll. Dr. A.K. Hazra.

Diagnosis : Head broad. Thorax is little wider than the abdomen, general body colour light yellow, Scales are dark brown in colour. Hypodermal pigments are distinct on antennae, on the labial palp and on the caudal appendages. Antennae more or less as long as body. Prosternum triangular posteriorly not narrow, lateral borders with 3+3 bristle combs each composed of setae. Mesosternum more wider than prosternum lateral border with 2+2 bristle combs. Metasternum wide and apically rounded with 1+1 bristle combs. Abdominal terga II-VII with 3+ 3 bristle combs. Tergum I with 1 + 1 bristle comb. Tergum VIII with 2 + 2 bristle combs, tergum IX without any bristle comb. Tergum VIII and IX with stylets. Tergum X long, triangular and pointed lateral margin with 4 pairs of 1 + 1 bristle combs (Fig. 7A). Urosternum 3-8 with 1 + 1 sublateral bristles combs.

Ovipositor is as long as the inner process of coxite IX and covered by it. Anterior gonapophyses with 6-7 pointed fossorial spines.

Distribution ; India : West Bengal (Bankura, Medinipur, Murshidabad, Puruliya).

Remarks : The species occurs in the forests of southern part of West Bengal. It is likely that this species will also occur from other districts of West Bengal and also in other states of India where 'Saal' trees prevailed.

Genus *Tricholepisma* Paclt, 1967

** 6. *Tricholepisma gravelyi* (Silvestri, 1913)
(Fig. 5C, Map 2)

1913. *Lepisma gravelyi* Silvestri, *Rec. Ind. Mus.* 9 : 53.

1967. *Lepisma* (*Tricholepisma*) *ggravelyi* Paclt, *Genera Insectorum* 218 : 23.

1981. *Asterolepisma* (*Asterolepisma*) *ggravelyi* Mendes, *Rev. Zool. afr.* 95 (1) : 200.

Diagnosis : Body limuloid, thorax not much shorter than abdomen and clearly wider than it. Scales present, macrochaetae bifid. Antennae medium size. Head small, free, eyes well developed and highly pigmented. Maxillary palp 5 segmented, labial palp 4 segmented. Trichobothrial area on all the nota are open type. Last segment of labial palp with 5 sensory papillae in two rows. Terga II-VIII with 12 macrochaetae in hind border. The length of 'X' tergum is more or less equal to the width of the base of the same. Its distal margin only a little concave with several thin setae along the lateral margins with 1 + 1 posterolateral macrochaetae with a inner of lesser setae.

Urosternum 1 glabrous, the 2nd with a median comb with 5 setae. Urosterna 3-7 with a median comb with 7-9 setae and 1 + 1 lateral combs, each one with 1-3 setae. Abdominal stylets are two pairs in coxites VII and IX.

Ovipositor strong, surpassing clearly the apex of the IX stylets.

Distribution : India : West Bengal (Calcutta)

Remarks : The species has not been recorded during the present study from any other place of West Bengal. Since its discovery (Silvestri, 1913) it has not been recorded so far from any other parts of the world. The description is purely based on the holotype which is at present at Portici Museum, Italy and detail description was given by Mendes, 1988.

Family NICOLETIIDAE

Genus *Atelura* Vonheyden, 1855

7. *Atelura typhloponis* Silvestri, 1913 (Fig. 5E, Map. 2)

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

Ovipositor robust attaining more or less the half of the length of IX stylets, not conspicuously annulated and with short setae.

Body length : 3 mm.

Distribution : India : West Bengal (Siliguri)

Remarks : No specimens of this species have been collected during the present survey. The description is based on Silvestri 1913. The specimen was collected from the nest of *Dorylus (Typhlopone) labiatus*.

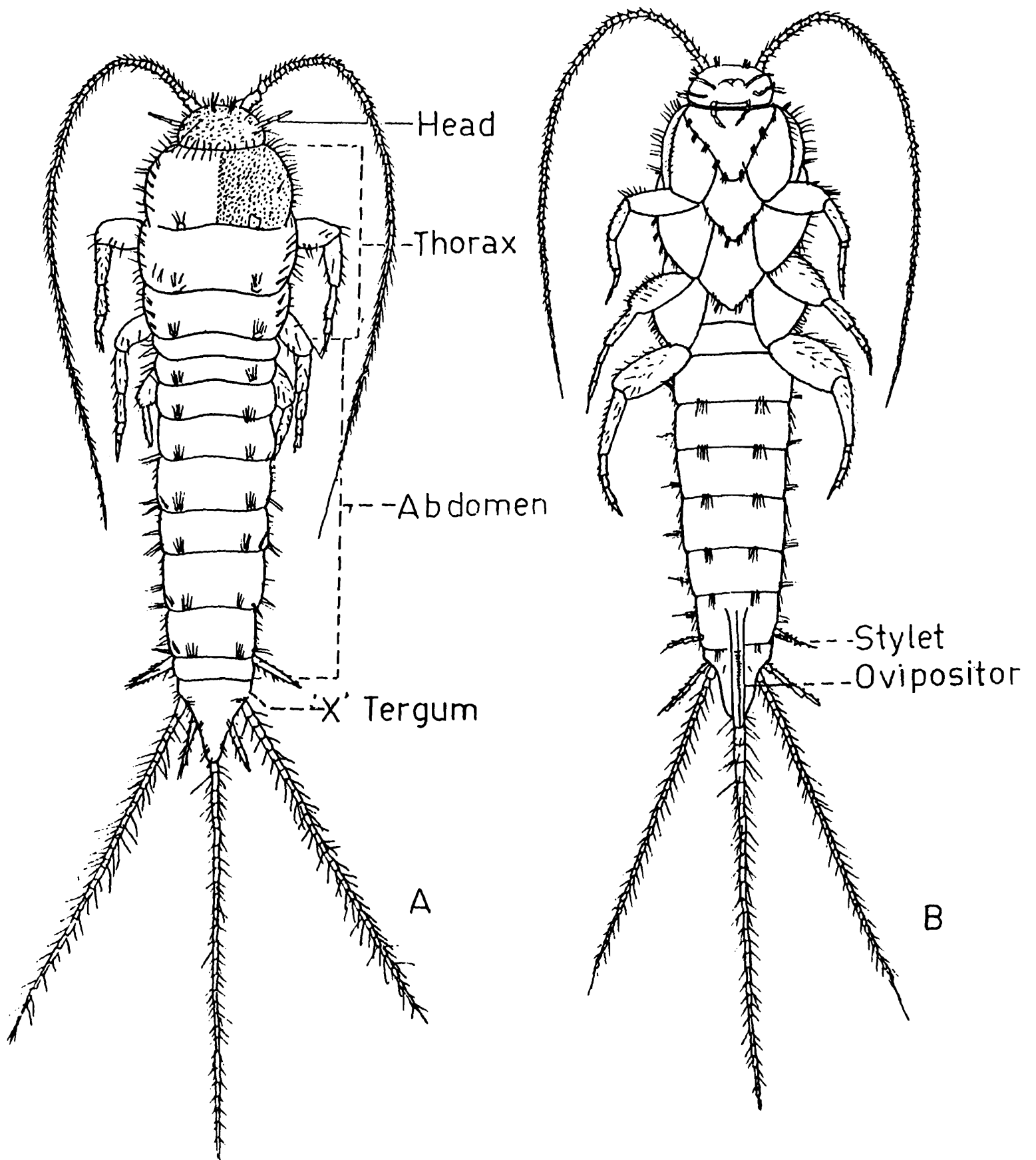


Fig. 1. Showing external morphology of a typical Thysanura, A. Dorsal view ; B. Ventral view.

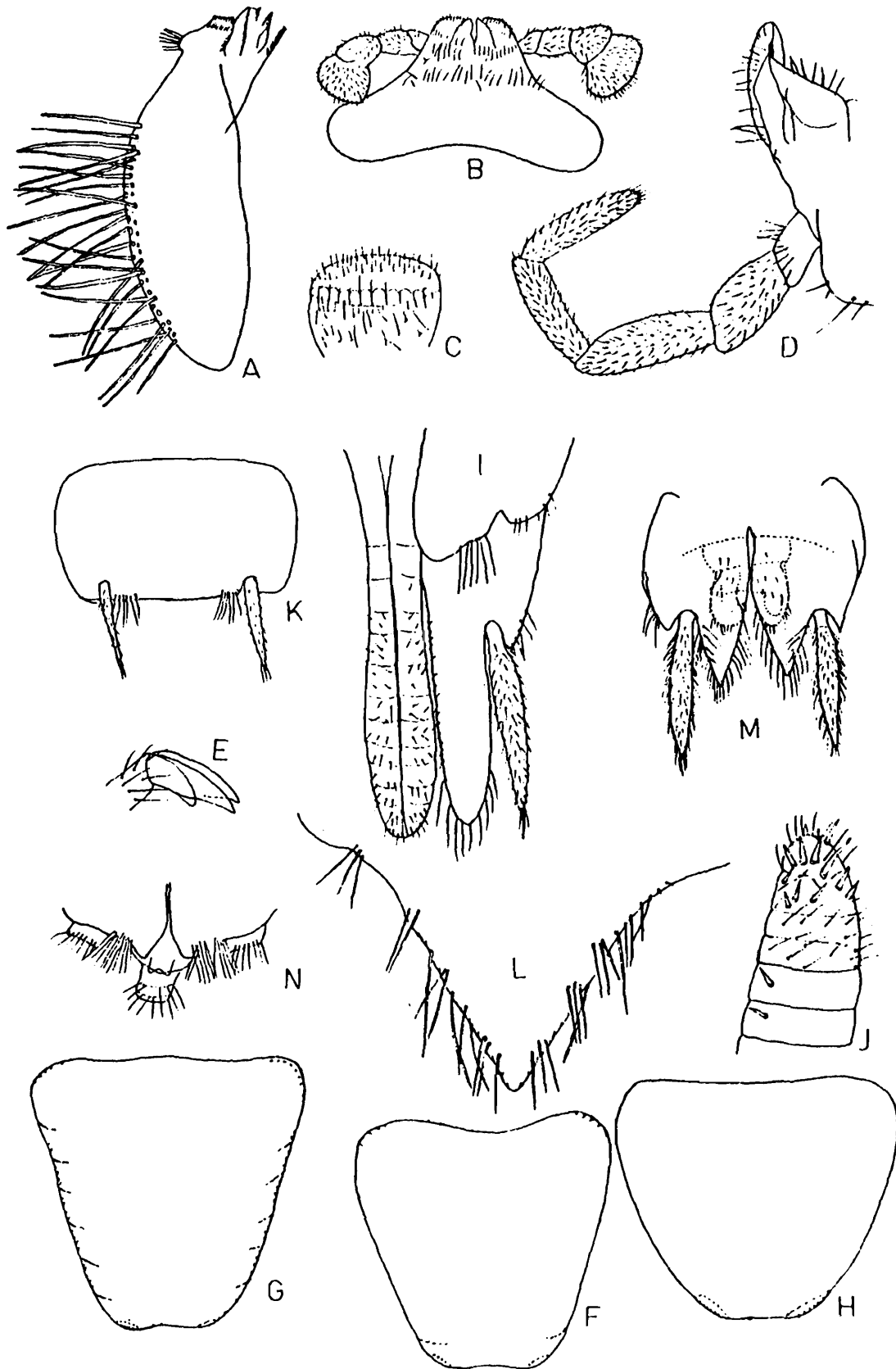


Fig. 2. Different body parts of *Thysanura* used in studying their taxonomy. A. mandible; B. labium and labial-palp; C. tip of labial palp; D. maxillary palp; E., claws; F. Prosternum; G. mesosternum; H. metasternum; I. female ovipositor and right half of sternum VIII and IX; J. tip of female gonapophysis; K. Sternum VIII; L. tergum 'X'; M. male genitalia; N. anal plates.

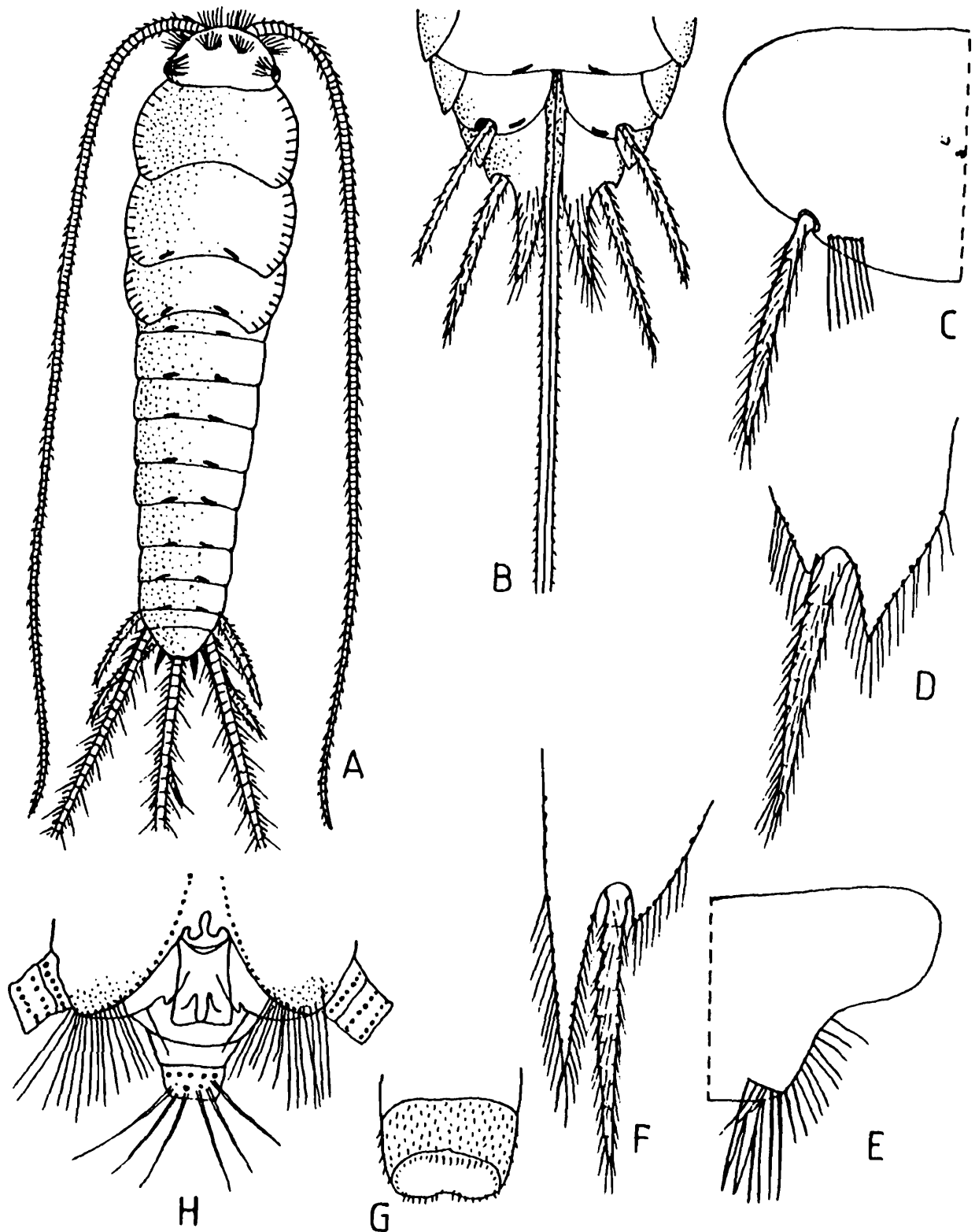


Fig. 3. *Ctenolepisma longicaudata* and their different parts of the body. A. general morphology ; B. female ovipositor ; C. Sternum VIII, left half and stylet ; D. subcoxae and stylet of sternum IX of male, right half ; E. half of 'X' tergum ; F. subcoxae and stylet of sternum IX of female ; G. Penis ; H. anal plates.

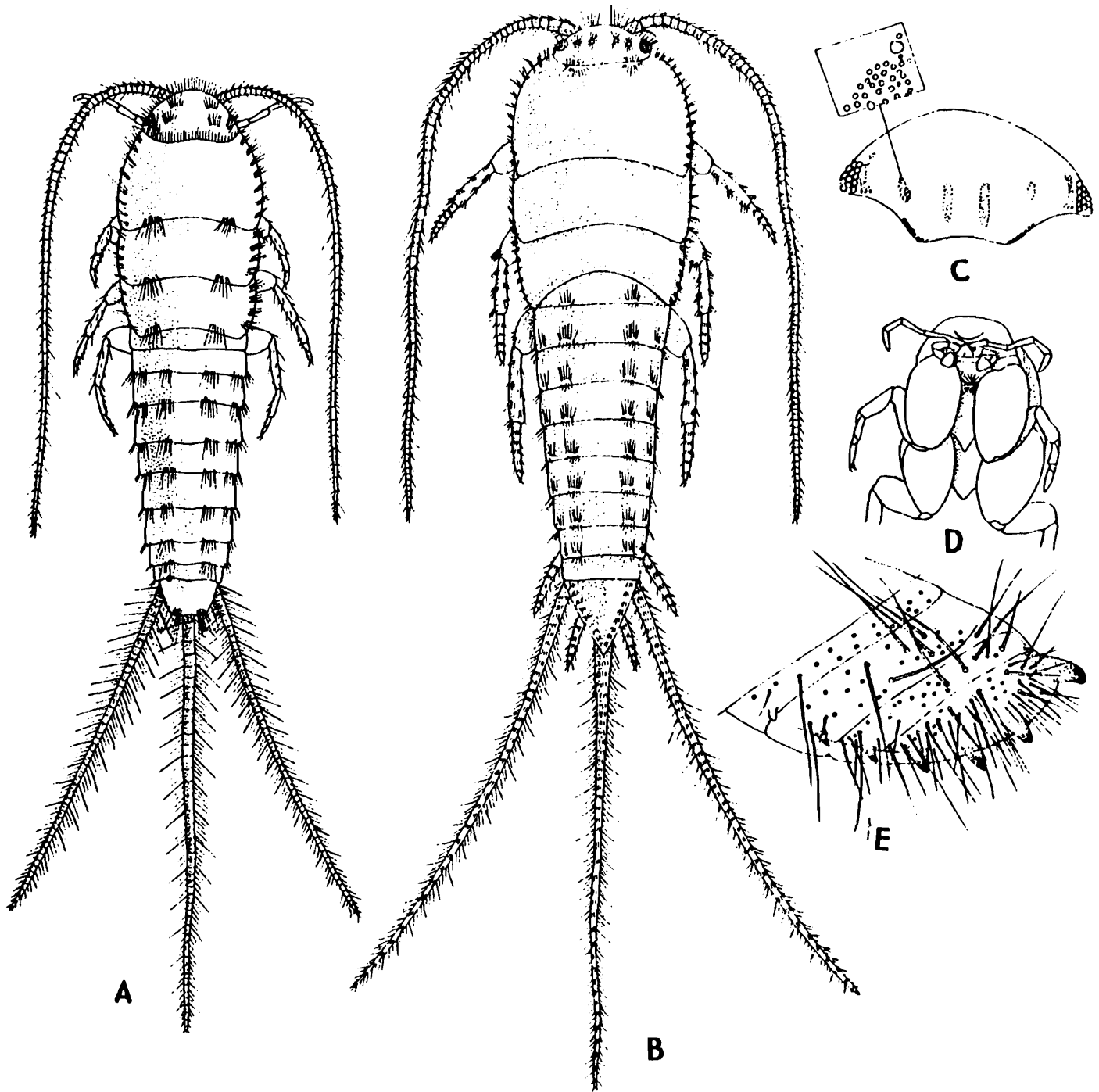


Fig. 4. A. Showing external morphology of *Ctenolepisma ciliata*. B. General morphology of *Acrotelsa collaris*; C. head capsule with fields of macrochaetae. D. Anterior portion of the body seen from below with a tuft of macrochaetae at the centre. E. apex of posterior gonapophysis.

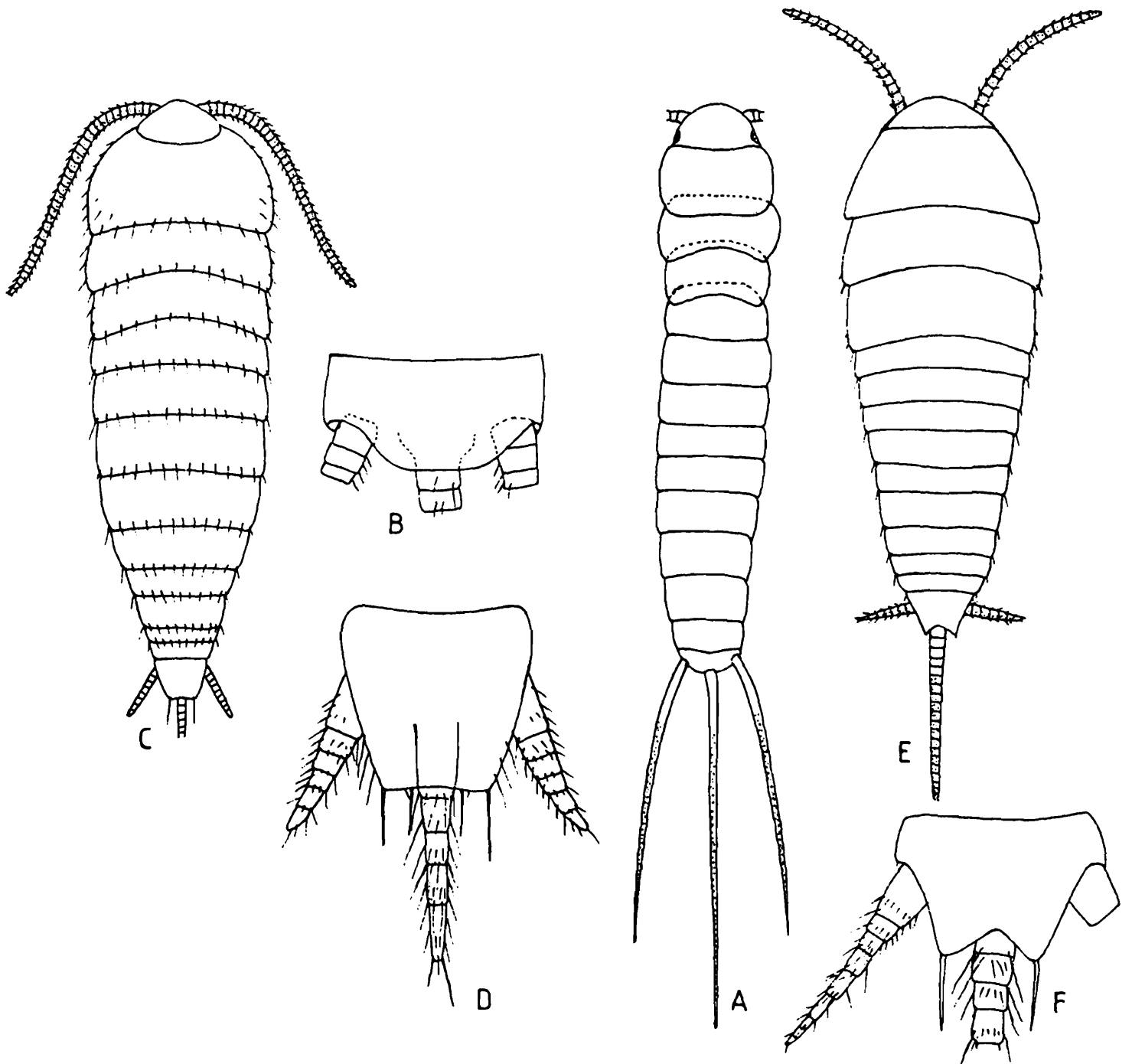


Fig. 5. Showing different Lepismatids from West Bengal. A. General morphology of *Ctenolepisma nigra*; B. tergum 'X' of *C. nigra*; C. general morphology of *Tricholepisma gravelyi*; D. Tergum 'X' of *T. gravelyi*; E. General morphology of *Atelura typhloponis*; F. tergum 'X' of *A. typhloponis*.

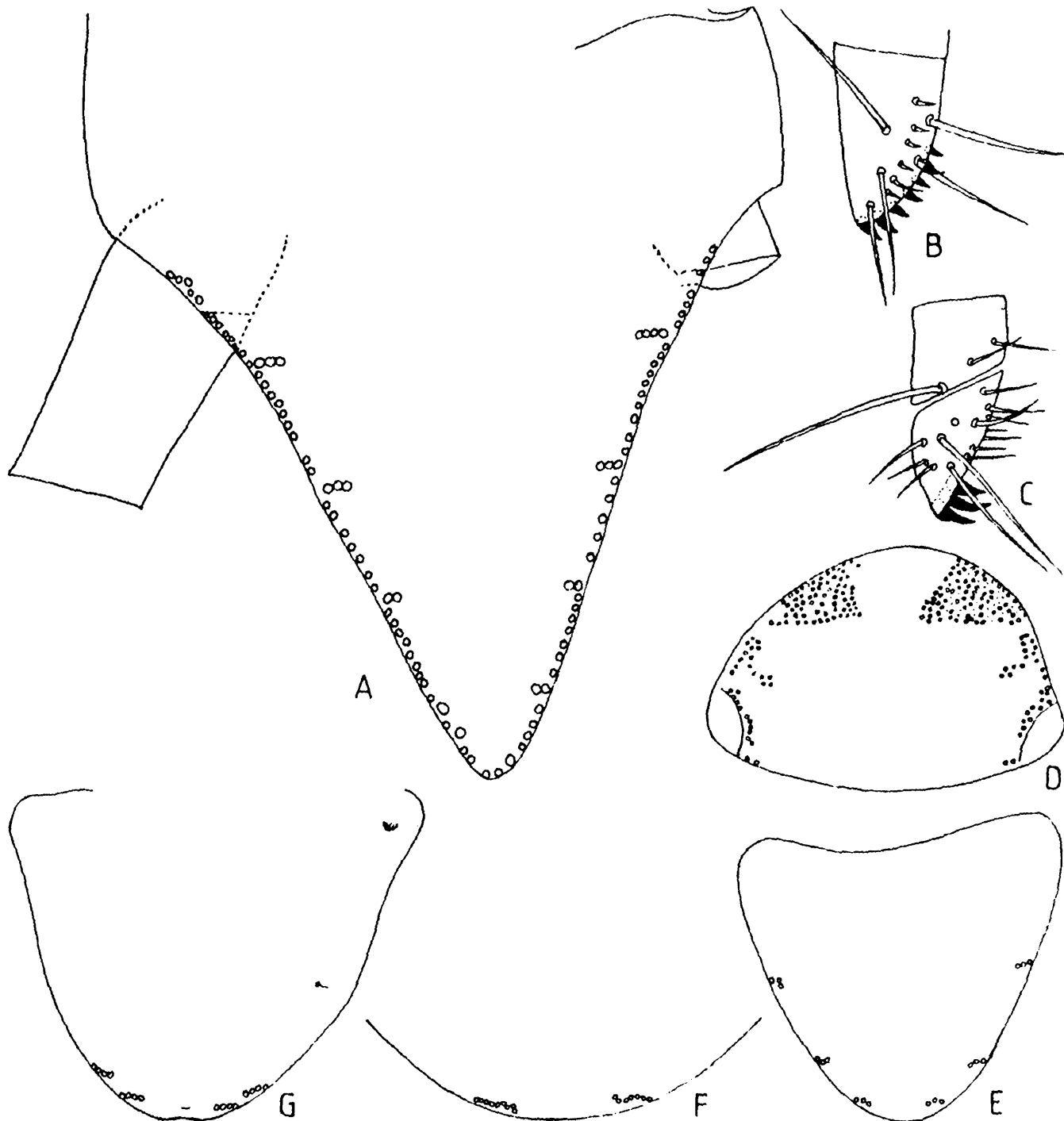
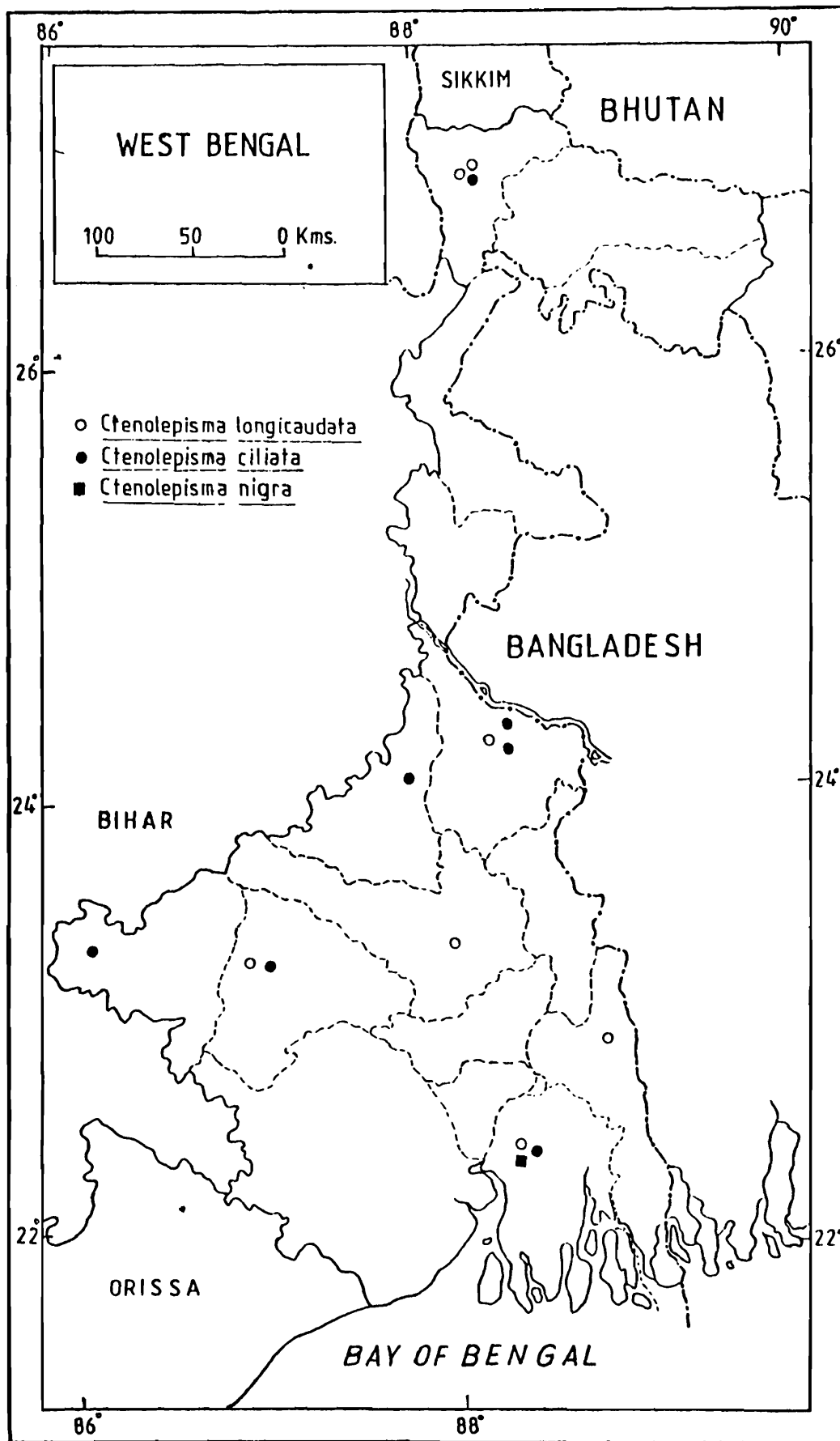
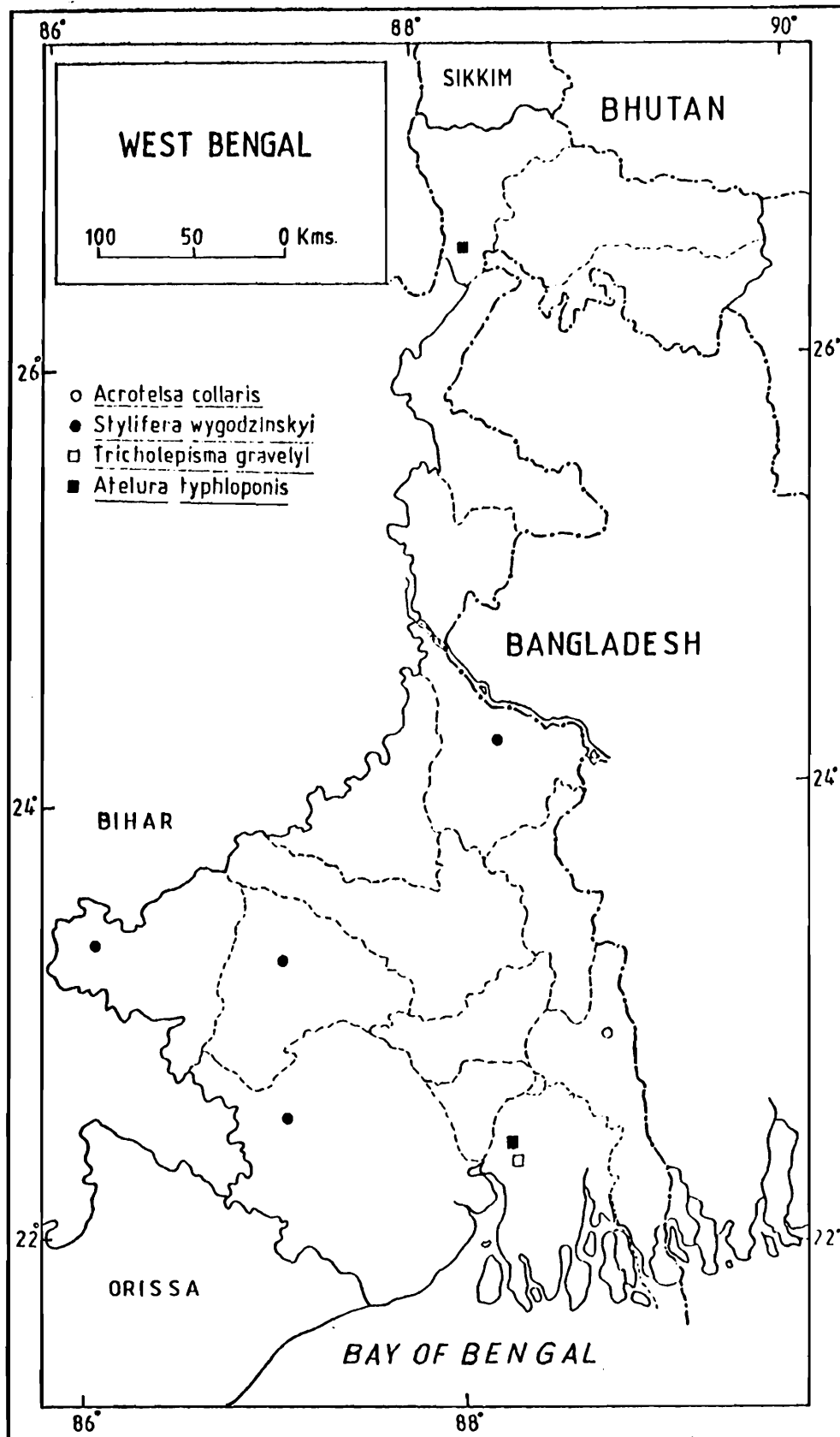


Fig. 6. A. showing tergum 'X' of *Stylifera wygodzinskyi* ; B. apex of the anterior gonapophysis ; C. apex of the posterior gonapophysis ; D. head capsule with fields of macrochaetae ; E. Prosternum ; F. mesosternum ; G. metasternum.



Map. 1. Showing distribution of *Ctenolepisma longicaudata*, *C. ciliata* and *C. nigra* in different districts of West Bengal.



Map. 2. Showing distribution *Acrotelsa collaris*, *Stylifera wygodzinskyi*, *Tricholepisma graveyli* and *Atelura typhloponis* in different districts of West Bengal.

LIST OF SPECIES OF THYSANURA OF WEST BENGAL DISTRICT WISE

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
Lepismatidae :																	
1. <i>Ctenolepisma longicaudata</i> Esch., 1905	+	-	-	-	-	+	-	-	+	-	+	-	-	+	-	-	+
2. <i>Ctenolepisma ciliata</i> (Dufour, 1831)	+	-	-	-	-	+	+	-	-	+	+	-	-	-	+	-	+
3. <i>Ctenolepisma nigra</i> (Oudemans, 1890)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
4. <i>Acrotelsa collaris</i> (Fabricius, 1793)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+
5. <i>Stylifera wygodzinskyi</i> Hazra, 1980	-	-	-	-	-	+	-	-	-	+	+	-	-	-	-	+	-
6. <i>Tricholepisma graveleyi</i> (Silvestri, 1913)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nicoletidae :																	
7. <i>Atelura typhloponis</i> Silvestri, 1913	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SUMMARY

The present paper deals with 7 species of Thysanura distributed over 2 families and five genera recorded from different districts of West Bengal. The species *Ctenolepisma ciliata* and the genus *Tricholepisma* are recorded for the first time from India and one genus and one species is recorded for the first time from the state of West Bengal. This paper is the first detailed attempt on this order from India.

REFERENCES

- Burmeister, H.C. 1838. Handbuch der Entomologie. Band. II.
- Dufour, L. 1931. Descriptions et figures de deux especes nouvelles du genre *Lemisma*. *Ann. Sci. natur. (Zool.)* 22 : 419-421.
- Escherich, K. 1903. Beitrage zur kenntnis der Thysanuren. I. Reihe. *Zool. Anz.* 26(697) : 345-366.
- Escherich, K. 1905. Das System der Lepismatiden. *Zoologica (Stuttgart)* 83 : 1-164.
- Fabricius, J.C. 1793. *Entomologia Systematica* Copenhagen, Vol. 2, 519 pp.
- Grassi, B. and Rovelli, G. 1890. II Sistema dei Tisanuri fondato soprattutto sullo studio dei Tisanuri italiani. 2 Taf. Natural. Siciliano. Palermo Bd. IX.
- Hazra, A.K. 1980. On a new species of *Stylifera* (Lepismatidae : Thysanura : Insecta) from India. *Bull. Zool. Surv. India*, 2 (2 & 3) : 187-1912.
- Lucas, H. 1846. Aperen des especes nouvelles d'Insectes qui se trouvent dans nos possessions francaises du Nord de ('Afrique). *Rev. Zool.* IX.
- Mendes, L.F. 1988. Revisao Do Genero *Lepisma* Lin., 1758 S. Lat. (*Zygentoma*, Lepismatidae) *Suplemento No. 2 ao Bolm Soc. Port. Ent.* 1-236 pp.
- Mendes, L.F. 1990. On the Zoogeographic affinities of the Thysanurans (*Microcoryphia* and *Zygentoma* from India. In : *Advances in Management and Conservation of soil fauna* (eds. G.K. Vecresh et al) : 15-24.
- Oudemans, J.T. 1890. Apterygota des indischen Archipelagus *Weber Zool. Ergeb.* Bd. I.
- Paclt, J. 1967. Thysanura. Fam. Lepidotrichidae, Maindroniidae, Lepismatidae. In : *Wylsman., P. Genera Insectorum*, fase 218 : 3-86.
- Slabaugh, R.E.A. 1940. A new Thysanuran and a key to the domestic species of Lepismatidae (Thysanura). *Ann. Mus. Zool. Polonici*, 9 : 341-349.
- Silvestri, F. 1913. On some Thysanura in the Indian Museum. *Rec. Ind. Mus.* 9 ; 51-62.

INSECTA : EPHEMEROPTERA

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INTRODUCTION

Introduction and material

Ephemeroptera fauna of West Bengal is comprised of elements of Gangetic plains, as well as those of submontane and montane zone. Present work has been undertaken to provide comprehensive picture of the faunal element of ephemeroptera represented in West Bengal, along with keys to various levels of taxa involved, which was hitherto lacking altogether for this group of insect.

Material on which this work is based was mainly collected by the author from in and around Calcutta, 24-Parganas, Jalpaiguri, Alipurduar and from various other districts of West Bengal by other survey parties under departmental programmes. Material from Calcutta area was collected from Eden Garden and its vicinity in 54 weekly samplings of lentic (=placid) aquatic ecosystem for a period of one year from September 77 to August 78. A paper on aspects of ecology and larval, subimago emergence has already been published (Srivastava & Ray, 1981). Another set of ephemeroptera material were collected from lentic ecosystem of vast area of Ravindra Sarobar, Dhakuria in South Calcutta during 54 weekly surveys for a period of one year from January - December, 1980. A paper on population dynamics of mayfly species has also been published (Srivastava, 1986). Faunistic aspects of material collected from these areas have also been included in the present work. The author has also based this work on large series of ephemeroptera collected from lotic aquatic ecosystem of Alipurduar, Rajabhatkhawa, Buxadwar, Jaianti, New Jalpaiguri area during January, 87. Other material on which this work is based were either present in the National Zoological Collection, (including type specimens) or collected by various survey parties of the department from districts of Bankura, Birbhum, Burdhaman, Calcutta, 24-Parganas, Jalpaiguri, Medinipur, Nadia, Purulia. Certain species which have not been examined are also included to provide a comprehensive faunal account. These are obviously based on literature review, along with inclusion of certain distributional remarks.

Historical Background

Perusal of literature reveals that some work on taxonomy of ephemeroptera's faunal component has been made. First important work was by Kimmins (1947), which included new species from West Bengal, besides from other parts of India. Among these, 3 species were under family Baetidae, under genus *Cloeon* Leach, one of which *C. viridis* was changed to *Cloeon kimminsi* Hubbard (1947) and 1 species was under genus *Procloeon* Bengtsson. Kimmins (1971) also recorded from West Bengal (Mirik) a species of genus *Isca* Gillies (Leptophlebiidae) which was earlier known only from its type locality, Hongkong (Gillies,

1951). Gillies (1949) has also contributed on family Baetidae from India, of which 5 species are known from West Bengal viz., 3 species under genus *Baetis* Leach, 1 species under genus *Pseudocloeon* Klapalek, 1 species now under *Gilliesia* Peters & Edmunds (1975). A Heptageniidae species under genus *Eceyonurus* Eaton was described by Ulmer (1920). Chopra (1924) recorded a species of *Cloeon* Leach (*C. marginalis* Hagen from this state) and provided additional description of female imago with figures. This species has wide distribution in many parts of orient.

Ephemeroptera fauna of West Bengal vis-a-vis- India

Ephemeroptera fauna of West Bengal is known to be represented by 17 species under 5 families. Baetidae is represented by maximum number of species i.e. 10 out of 17 under 4 genera : *Baetis* leach, *Cloeon* Leach, *Procloeon* Bengtsson, *Pseudocloeon* Klapalik. Family Caenidae is represented by 3 species under genus *Caenis* Stephens and family Leptophebbiidae by 2 species, one each under genus *Gilliesia* Peters & Edmunds and *Isca* Gillies. The families Heptageniidae and Palingeniidae are known by a single species each under genus *Ecdyonurus* Eaton and *Anagenesia* Eaton, respectively.

Indian ephemeroptera fauna is on whole represented by 94 species, under 36 genera and 12 families. Srivastava (1983,1986) has discussed in detail the faunal composition of Indian ephemeroptera vis-a-vis world, familiwise account, high altitude component, known larval forms, endemism of Indian component. West Bengal component of Mayflies vis-a-vis rest of India stands at ca 1 : 4. 5 (i.e. 17 + 77 = 94).

MATERIAL AND METHOD

Collection techniques

Collection techniques which have been adapted were totally different for immature stages (larvae) and for the adult (subimago/imago), as their ecological niche and habitat are totally different. Immature forms inhabit both lotic (=running water) and Lentic (=placid water) while adults winged formes are mostly found in the vicinity of water body, resting among vegetation or flying.

Imago are very short lived, though winged forms, but are not good fliers hence normally remain very much in the vicinity of water bodies to which they are associated. These remain sitting/resting amongst vegetation, mostly on the undersides of leaves. These were collected by forceps, soft brush and even with delicate pressure of thumb and fore finger (if the specimen are big viz. Ephemerids, Heptageniids etc.) by getting hold of vertically folded wings over their trunk. Some smaller members such as *Baetids* and *Caenids*, which are in conspicuous among vegetation because of their size, colour, imovability, were collected by gently beating bushes, herbs, shrubs & grasses etc, by the side of water bodies, over a enamel tray or on a sheet of blotting paper, they were latter collected in vials using the previous method. Occassionally, when adults were seen flying in numbers in the evening hours, collection was made by gentle swing of insect net. At night some emerged imagos are attracted to light, and could be collected from the light source using previously mentioned picking method.

Immature larval forms inhabiting placid waters (Ponds, lakes) in the littoral zone amongst rooted vegetation were effectively collectd by using gentle sweep of water net. On such occassion use of net was difficult due to the aquatic part of the vegetation, so alongwith some water was scooped in a tray and then material was collected by tilting the tray and picking up the insects with fine, soft brush. Containers

with measurable column could also be used for having the idea of their quantum and fluctuation when the collections are made at regular periodicity. Some of the larva when brought alive to the laboratory made emergence into adult. Details of methodology are mentioned in Srivastava & Ray (1981) and Srivastava (1986).

Immature larval forms inhabiting running water (streams, rivers etc.) in the littoral zone, mostly crawling/swimming among rooted vegetation or clinging underneath pebbles, stones etc., were collected by keeping mouth of the water net against the current. This process helps to dislodge the insects and carry the same into the net. Collections were also made gently plucking vegetations or pebbles and placing them in enamel tray.

Study techniques

Imago are best studied either by setting and pinning of larger forms e.g. Heptagenids, Leptophlebid, Ephemerids. In smaller forms such as Baetids, Caenids they are best studied by putting them in glycerine mount ; at times teasing by fine needle gave desired-orientation of wings on the slide. In both the cases, wing venation, antennae, cerci and genitalia are best studied in mounts, indicated above. Some of colouration pattern specially pigmentation lodged in the hypodermal layer can be also observed best in spirit-preserved specimens, as these characters tend to fade with passage of time in dry preserved specimens.

Immature larval forms are invariably examined in glycerine whole mount and abdominal gills are best oriented for examining tracheal pattern by teasing and separating from their tergo-sternal joint. In case of caenids, where gills are covered by overlapping protective cover, that has to be removed first to expose gills to facilitate further processing.

MORPHOLOGY AND TERMINOLOGY

General Morphology

Morphology of Ephemeroptera commonly known as mayflies, are adapted to the environment they inhabit. These insects live major part of their life in aquatic media in their immature stages (larvae) and have extremely short lived terrestrial adults called 'imagos' & 'subimagos'.

Adult (Imago) : Imago and subimagos are small to medium size (2-12 mm. in Baetidae and Caenidae ; and 10-235 mm. in Ephemeridae, Heptageniidae, Leptophlebiidae). These are air breathing, soft bodied insects. Small setaceous antennae with two basal segments and multiarticulate filament. Eyes much larger in male than female, divided into upper larger and lower smaller lobes and mounted on cylindrical stalk distinctly found in Baetid genera (*Baetis cloeon*). Mouth parts non-functional, atrophied, though are derived from biting type.

Thorax with much larger mesothorax but prothorax and metathorax small. Wings membranous fragile, held vertically upwards at rest. Forewing proportionately much larger than hind, latter either reduced to small size or altogether lacking in members of *Baetids*. Wing has number of longitudinal veins, in between these there are intercalary veins which are very characteristic feature and are not

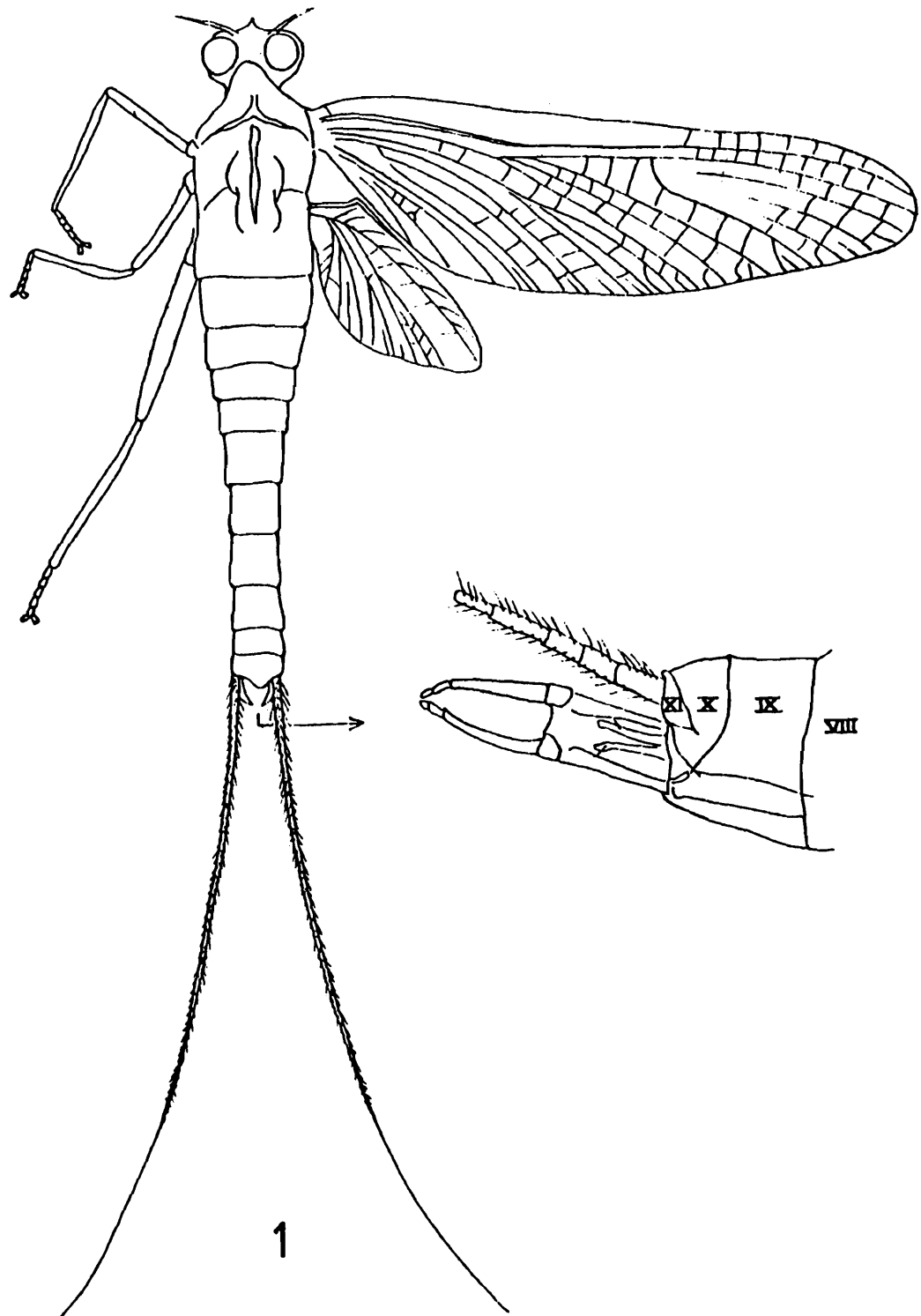


Fig. 1. Generalized diagram of imago of a Ephemeroptera, with wings of right side and legs of left side and the enlarged genital foreceps.

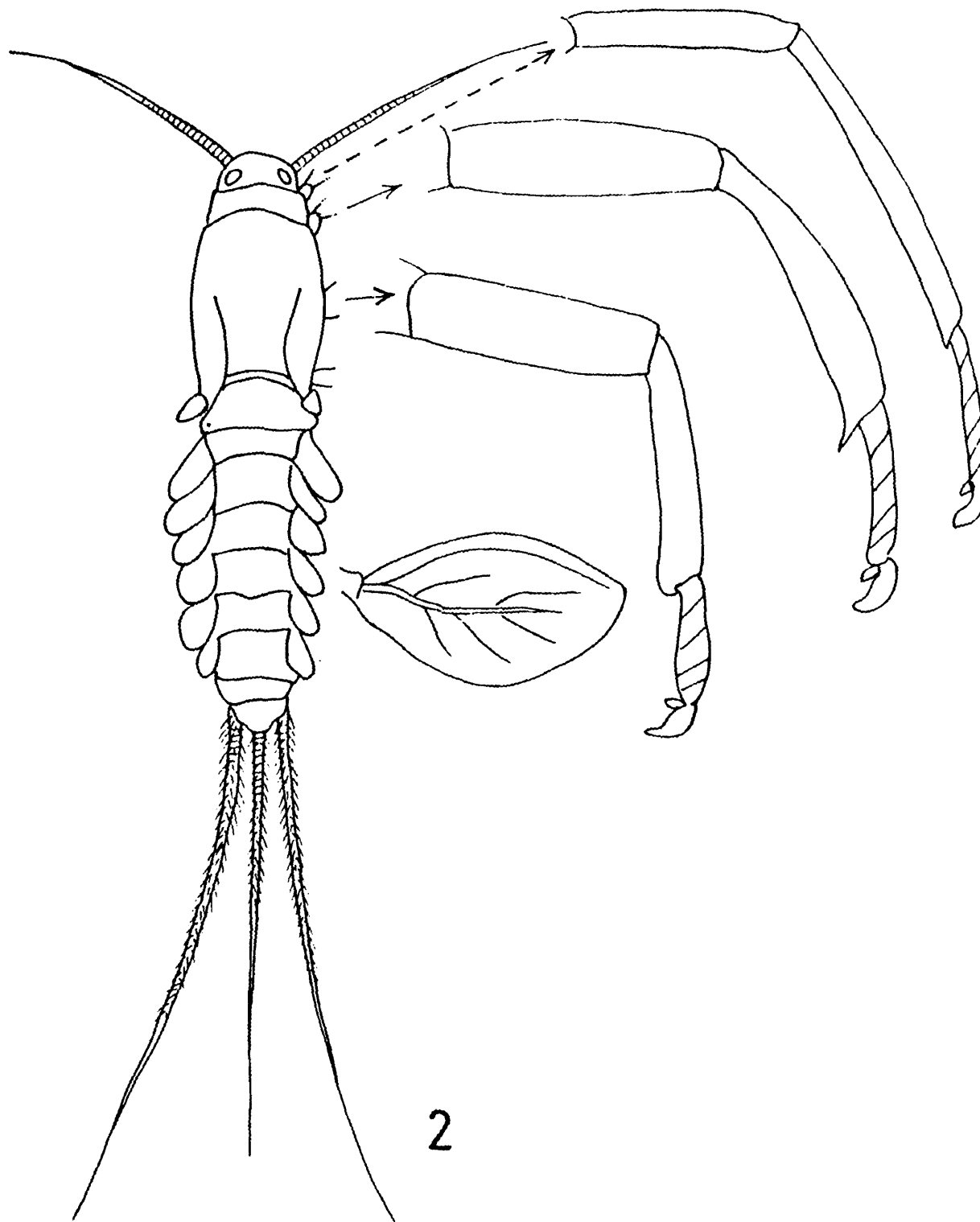
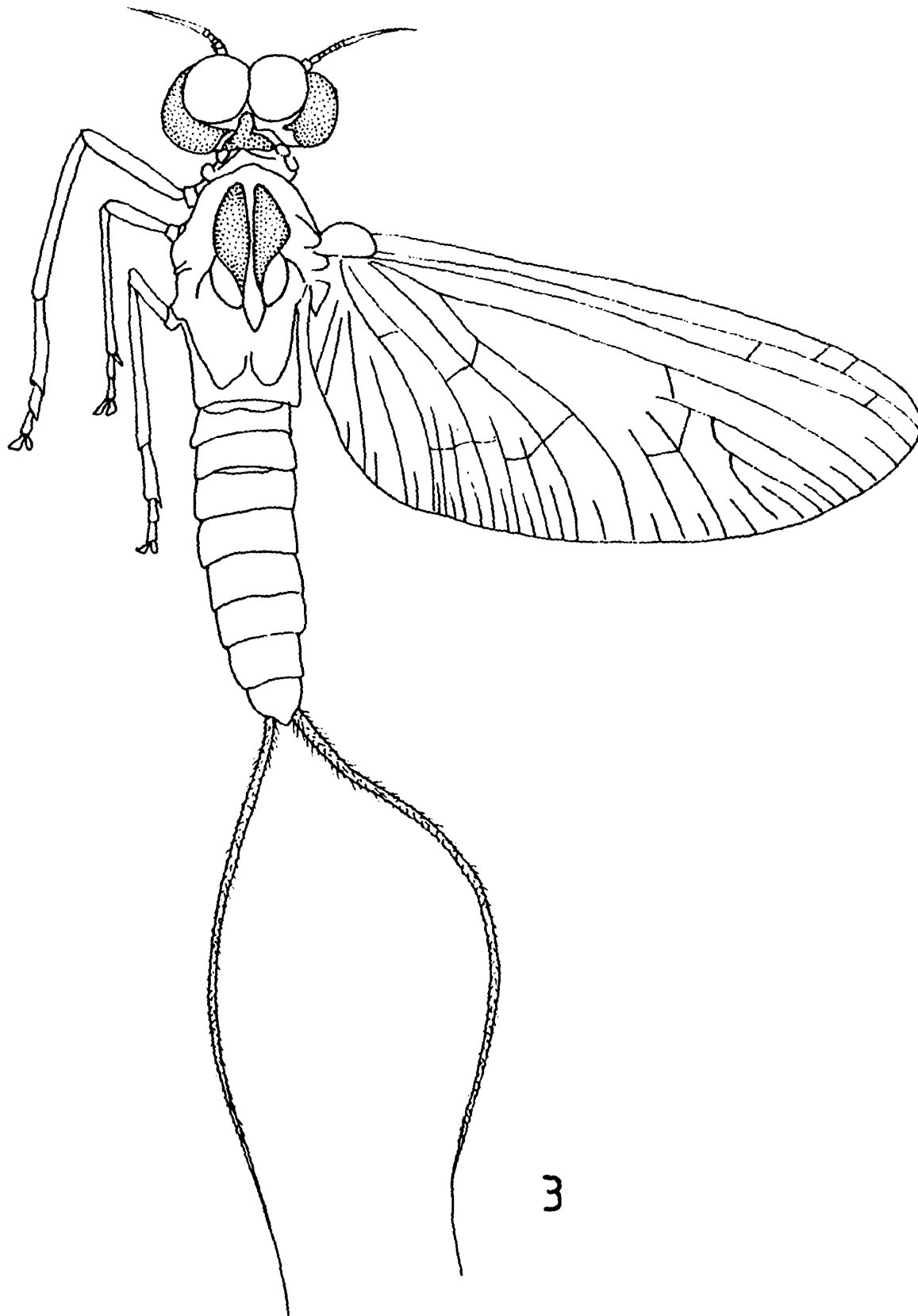


Fig. 2. Generalized diagram of larvae, with right side legs and one abdominal gill (enlarged).



3

Fig. 3. Male imago of *Cloeon kimminsi* Hubbard showing left side legs and right side wing

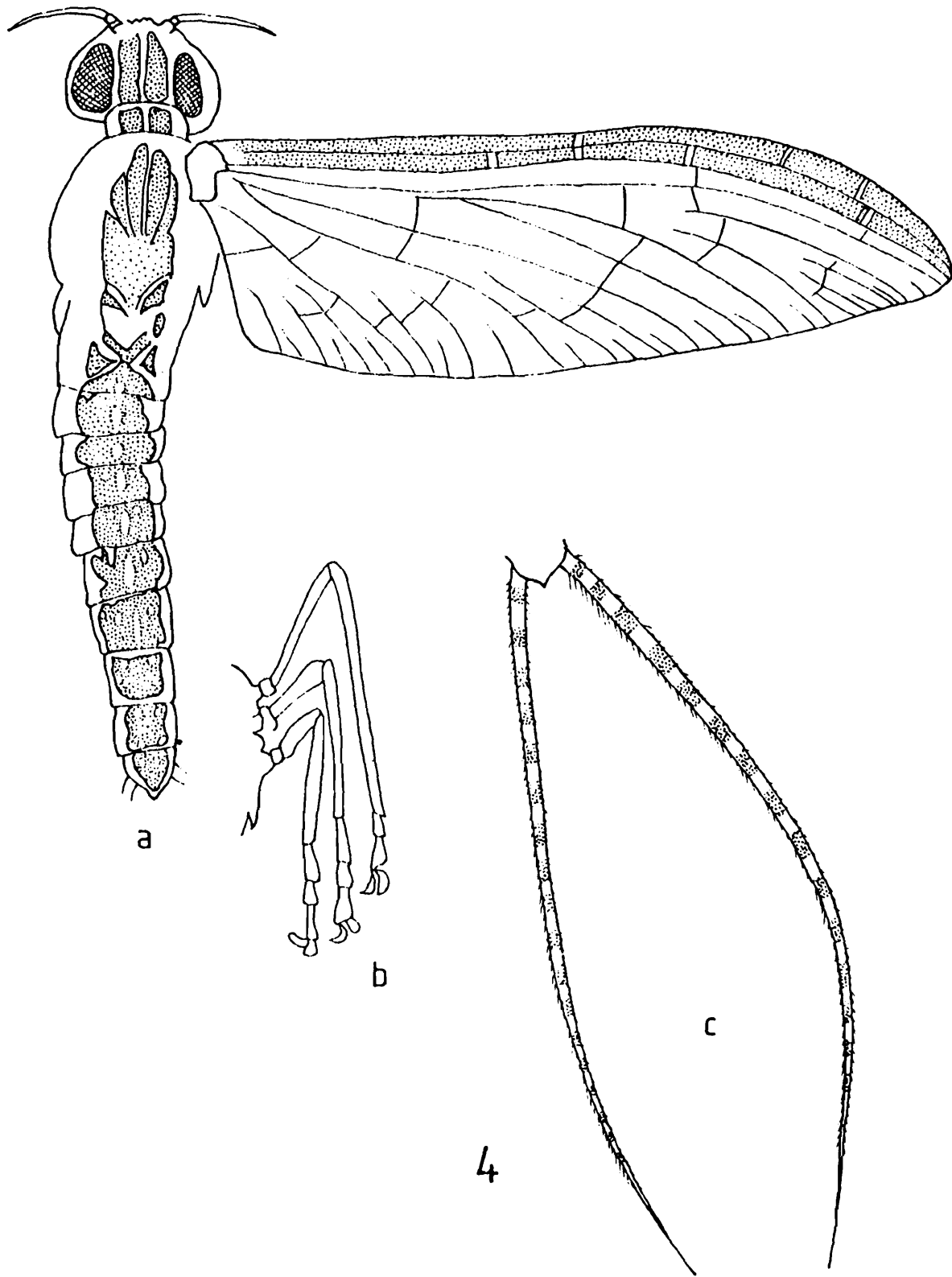


Fig. 4. Female imago of *Cloeon kimminsi* Hubbard. a. Imago with right wing; b. legs; c. cerci

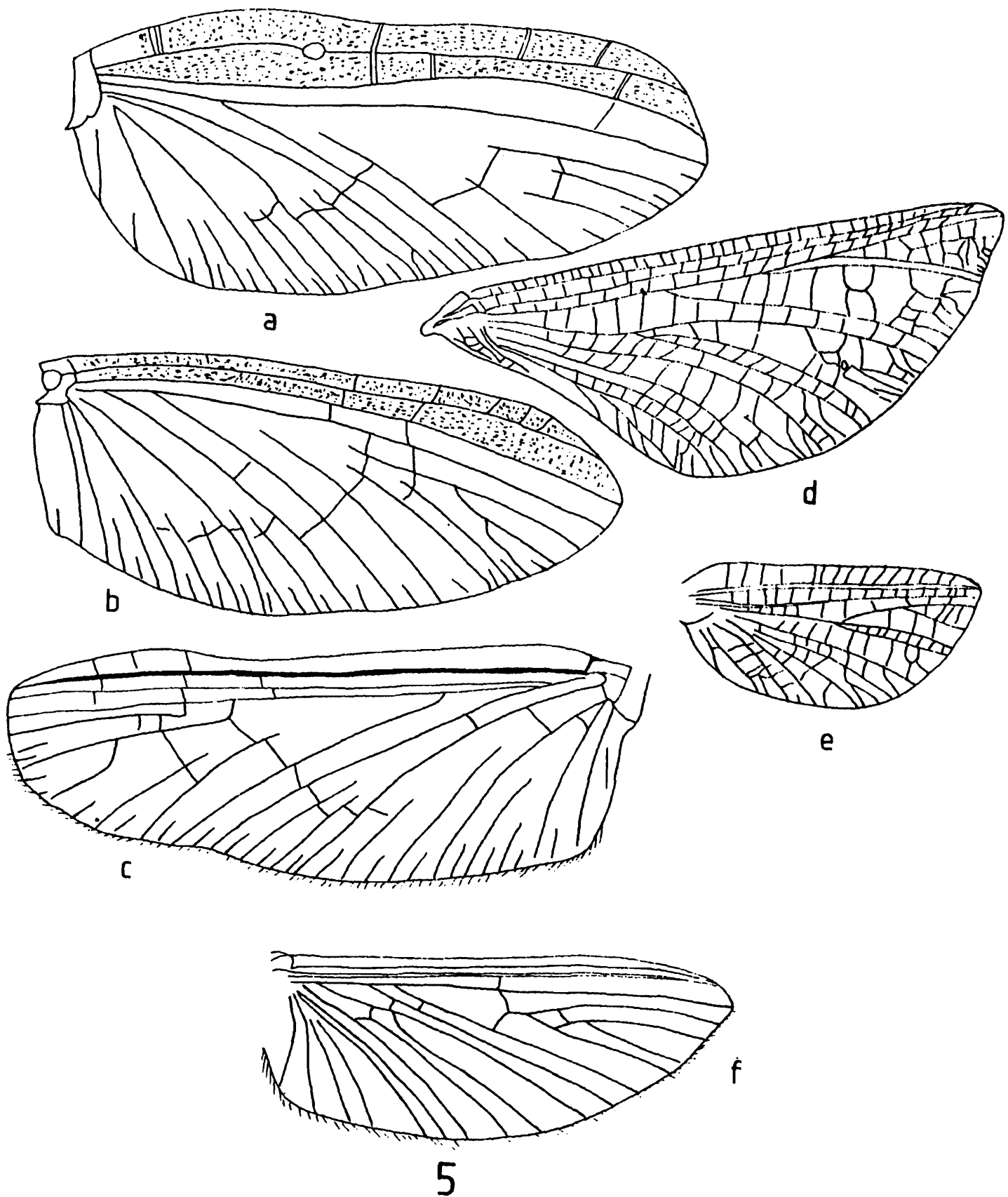
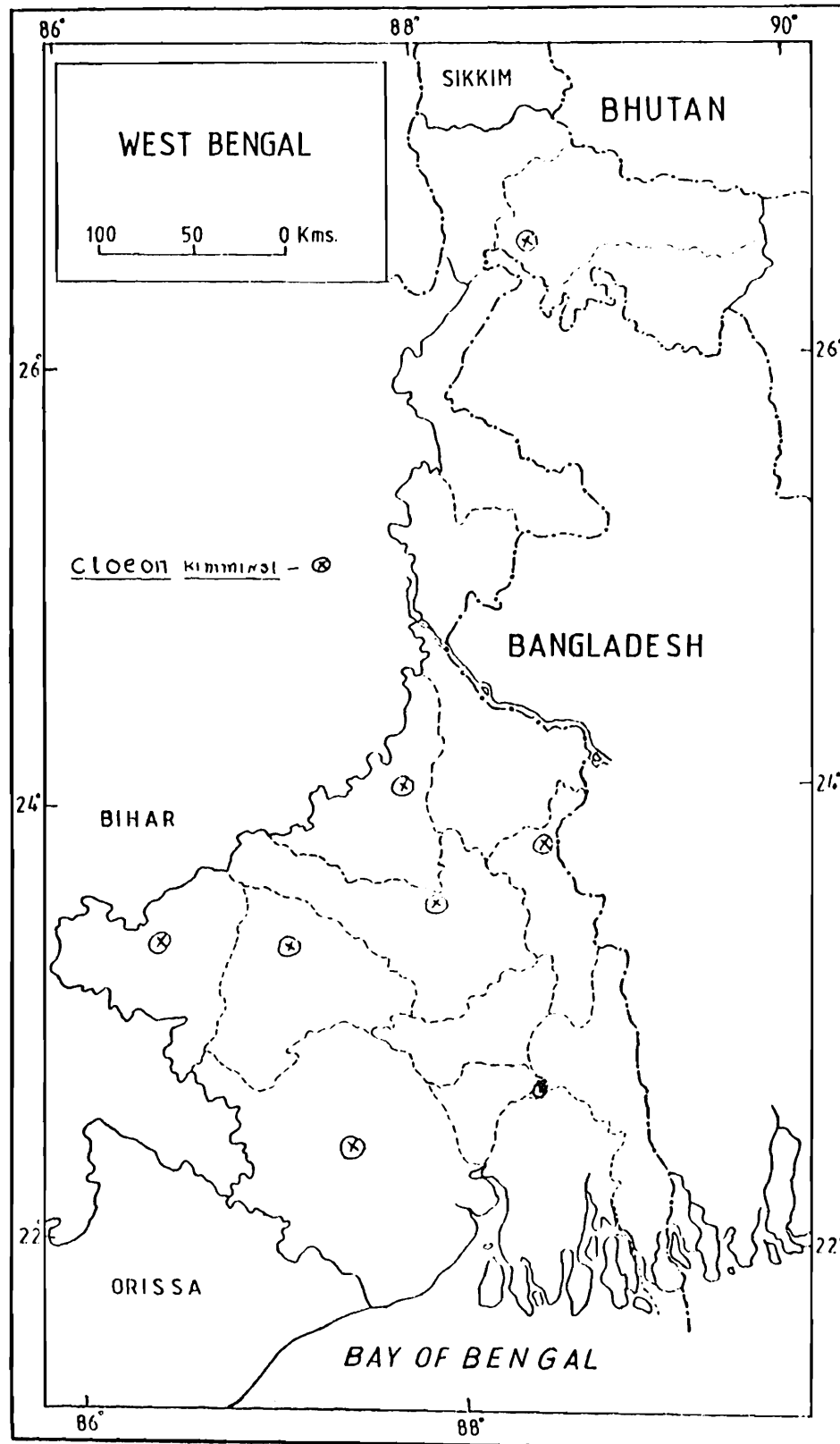
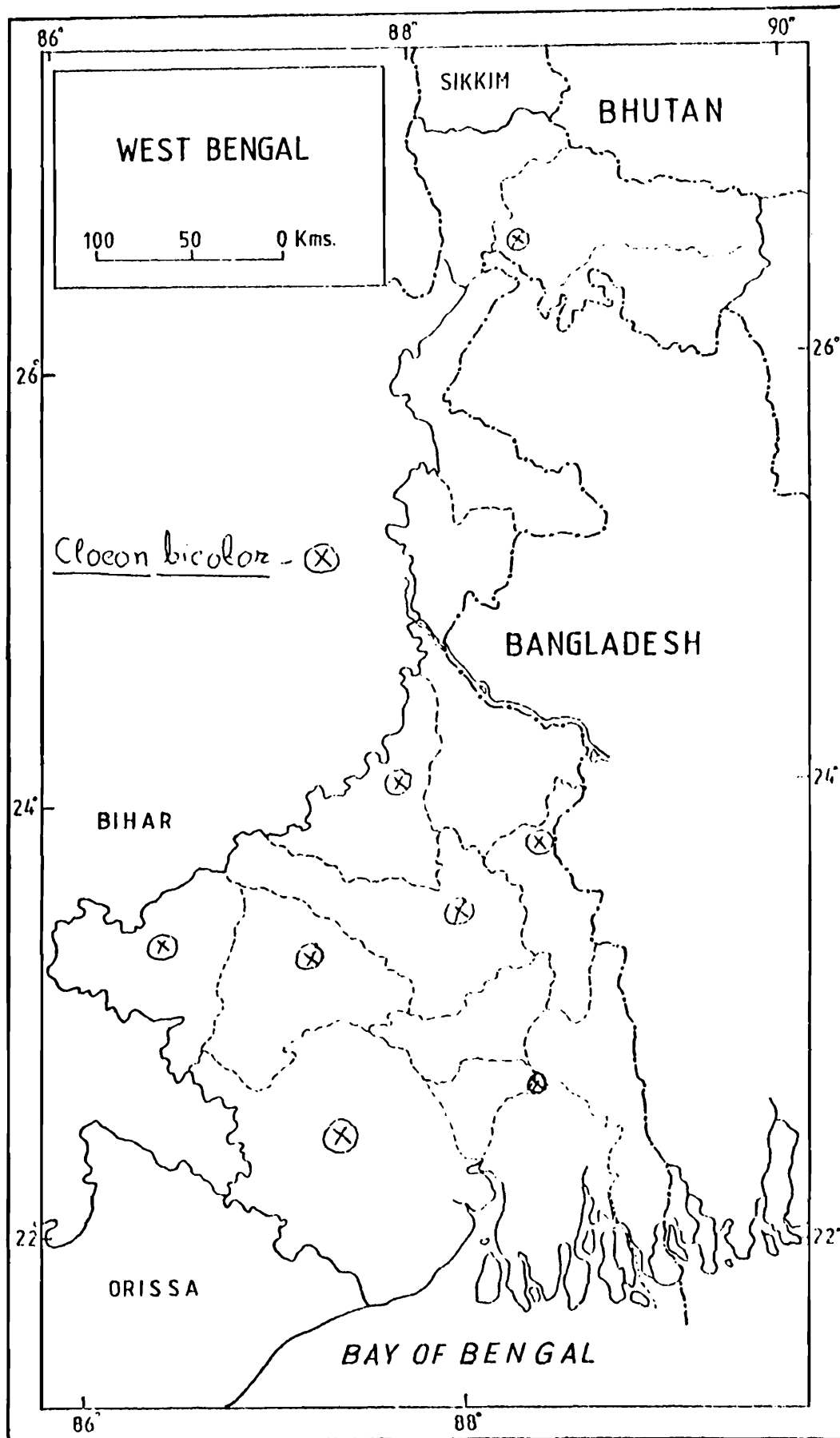


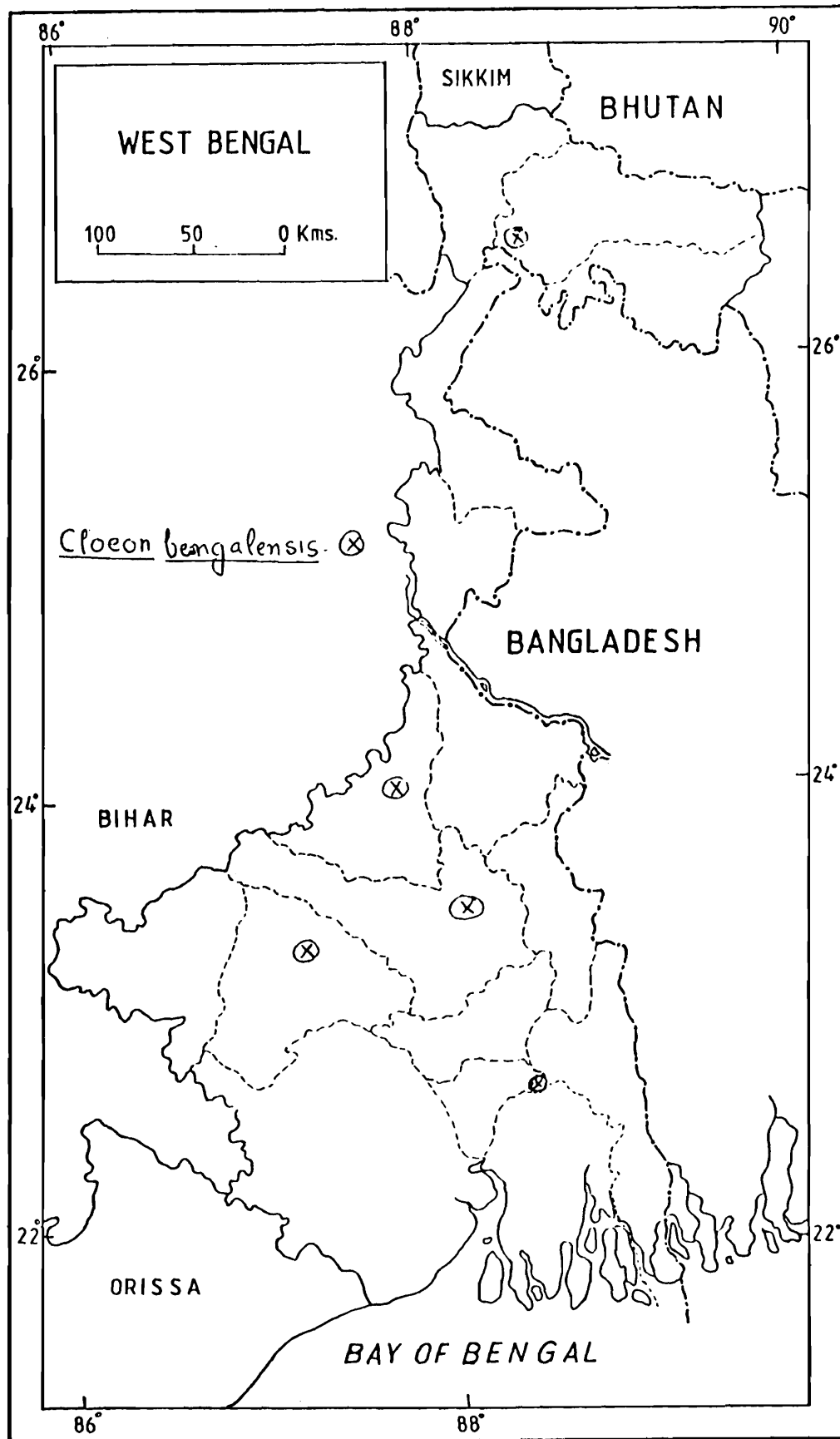
Fig. 5. Wings of certain ephemeropterans from West Bengal.



Map 1. Distribution map of *Cloeon kimminisi* Hubbard in West Bengal



Map 2. Distribution map of *Cloeon bicolor* Kimmins in West Bengal



Map 3. Distribution map of *Cloeon bengalense* Kimmins in West Bengal

connected at basal end as do main longitudinals. There are number of cross veins, in between longitudinals. Such complex wing reticulation is more conspicuous in forewing than hind wing of Ephemeroidea, Heptageniids, Leptophlebiids. Net work of cross veins are much less in Baetids, Caenids, both in their fore & hind wing ; some hind wing does not possess any crossvein. Legs are not so well developed because Ephemeroidea are not using them for walk, fore leg of male is though much longer to enable them to grip female form below during mating in air. Tarsal segments are 4-5, two pretarsal claws one of these are generally not well developed and instead being pointed are actually blunt ending.

Abdomen 11 segmented, last reduced and fused with 10. Epiproct is tergal part of 11, truncate at posterior margin, this is called supra-anal plate or pygidium. On it is based the stump of median caudal filament, the tail or 'telogilum'. Paraprocts are lateral portion of vestigial 11th, they support two lateral tails or cerci.

Male genitalia is comprised of forceps and penes. Forceps consists of a pair of 4 jointed, filiform processes rising from posterolateral corners of subgenital plates. Basal segment shortest and second is longest. Penes are bilobed minute arising from antero-dorsal border of sub genital plate and are located between forceps. Gonopore opens separately at the tip of each lobe. Tip of each lobe may also have titillators, which are prolonged sclerites pointed or hooked. Female genitalia simple, separately two oviducts open between VII & VIII sternites. Egg valves are formed by prolongation of VII sternite so as to cover the opening. IX sternite may be prolonged to form a ventral plate.

Immature (Larvae): Immature stages of ephemeroidea are called larvae ; sometimes these are also referred as nymph. These inhabit both lotic and lentic water body. These are soft bodied, spindle or torpedo shaped in Baetids, which inhabits rooted vegetation in littoral zone. Body may be broad, dorsoventrally compressed in Caenids, Heptageniids, Leptophlebiids which inhabit at the bottom or clinging underneath of pebbles, stones. Mouth parts developed, functional unlike their adults. Abdomen with variously shaped gills. Abdomen terminates in a pair of long cerci and generally with or without a median caudal filament.

Following is a list of technical terms used in key and text alongwith their explanation.

Name of Term	Explanation
Annulated	With annules (ring) like external marking without corresponding internal septa/well.
Bimaculate	Double shaded/ coloured.
Bistre	Pigment of warm brown colour.
Buff	Light yellow colour.
Bulla	A weak spot on principal vein midway their length, increases flexibility of wing tip.

Chesnut	Light brown nut of genus <i>Castanea</i> .
Costal space	Space between costa and subcosta of wing.
Costal spur	A projection of costal vein.
Cross vein	Veins running across between longitudinal veins.
Cubitoanal area	Lower basal portion of wing where anal and cubital veins are present.
Egg valves	Prolongation of VII sternite so as to cover the opening.
Emarginate	Inward cleft or dent in the margin.
Endemic	Confined to particular area.
Epiproct	Plate covering anus from above primarily tergite XI, but often regarded as part of tergite X.
Fuscous	Brown
Irridescent	Multi coloured reflection.
Lentic	Placid water body.
Littoral	Shore/marginal zone.
Lotic	Running water body.
Luteous	Clay like/coloured.
Paraprocts	A pair of ventral plates of abdomen XI on the sides and below abdomen.

Diagram : Generalized diagram of Mayfly (*Ephemeroptera*) showing body, wings, appendages, gills etc. is provided to facilitate examination. These are adequately labelled (Figs. : 1, 2)

Pterostigma crossveins	Cross veins in pterostigmatic area of fore wing.
Pygidium	It is term equivalent to Epiproct, in <i>Ephemeroptera</i> and <i>Isoptera</i> .
Sagittate markings	Markings shaped as arrow head.
Stigmatic area	Very slightly chitinised area in apical side of Costal space.

Subcostal space	Space between subcoastal and radius first veins.
Subimago	A stage of life cycle in mayflies (before adult imago stage) emerges from last stage aquatic larvae.
Titillators	Spines to penes in Ephemeroptera ; it may be also in shape of small plates or slender processes in others.
Ventral plate	IX sternite is prolonged to form ventral plate.

Please Note : In *Material examined*, (M) = Male/Males and (F) = Female/Females

SYSTEMATIC ACCOUNT

Ephemeroptera fauna of West Bengal comprises of 17 species under 9 genera and 5 families viz., Baetidae, Caenidae, Heptageniidae, Leptophlebiidae and Palinageniidae, as against 94 species, 36 genera and 12 families from India and 2146 species, 213 genera and 20 families from World. Detial family wise qualitative composition of Ephemeroptera from West Bengal, India, and world is indicated in Table I. A systamatic list of West Bengal Ephemeroptera, their distributional and altitudinal record and known male, female, larvae of respective species is indicated in table -II.

Family BAETIDAE

This is single largest Ephemeropotera family represented in India by 35 species under 6 genera. Representation of this family in West Bngal is by 10 species under 4 genera ; out of total state component of 17 species and 9 genera. Of these there are 3 species under genus *Baetis* Leach, 4 species under *Cloeon* Ldech one each under Genera *Procloeon* Bengtsson, *Pseudocloeon* Klalpalck ; their account is given hereunder.

Key to genera of the family BAETIDAE

1. Hind wing prsent, though highly reduced, *Baetis* Leach
Hind wing all together lacking 2
2. Posterior margin of head emarginate *Cloeon* Leach
Posterior margin of head not emarginate 3
3. Wing venation pale fuscous, red-brown spot at the junction of radius and humeral crossing
..... *Procloeon* Bengtsson
Wing venation amber, red-brown spot lacking *Pseudocloeon* Klalpalck.

1. Genus *Baetis* Leach, 1815

1815. *Baetis* Leach, *Brewsters Edinburgh Encyclop.*, 9 : 137.

1840. *Brachyphlebia* Westwood, *Introd. Class. Ins.*, 2 : 25.
 1912. *Acentrella* Bengtsson, *Ent. Tidskr.*, 33 : 110.
 1978. *Baetis* : Hubbard & Peters, *Orient. Ins., Suppl.*, 9: 41.

Remarks : The single largest genus known from India is represented by 18 species. Out of these, 3 species are represented in West Bengal, all of which are endemic to the state and were recorded at an altitude of Ca 1800 m. Male of all three species, female of only one land arave of none are described.

Key to species of genus *Baetis*

1. Smaller body and wings (4-5mm.), Hindwing small (0.5 x 0.2), ovoid, well formed costal spur, 2 veins to hind-wing*B. solitarius* Gillies.
 Larger body and wing (6-8mm.) 2
2. Hindwing spatulate, costal spur more centrally located - 2/3 from base, wing bimaculatte, c and sc area and veins sooty brown*B. tigroides* Gillies.
 Hind wing ovoid, costal spur not centrally located. 1/3 from base, wing not bimaculate, c and sc are faintly milky, veins pale amber yellow*B. thurbonis* Gillies

1. *Baetis tigroides* Gillies, 1949.

1949. *Baetis tigroides* Gillies, *Trans. R. Ent. Soc., London*, 100 : 167.
 1963. *Baetis tigroides* : Kapur and Kripalani, *Rec. Indian Mus.* 59 : 189.
 1971. *Baetis tigroides* : Kimmins, *Bull. Brit. Mus. (Nat. Hist) Ent.*, 25 : 321.

Material examined : 8(M), 2 (F), Jalpaiguri (Jaintia), St. I., 16.i.87, V.D. Srivastava & Party coll., 6(M), 3(F), Jalpaiguri (Jaintia), St. I., 17.i.87, V.D. Srivastava & Party coll.

Diagnosis : This is medium sized Baetid species (6-7 mm). Fore wing has bimaculate pigments in wings ; area around wing base and outer one fourth of costal and subcostal space is sooty brown ; 7-9 cross vein in stigmatic area ; Hind wing 1/8.5-1/10 in relation to forewing. Abdomnial tergites red yellow, cerci little less then or thrice body length ; 3rd segment of genital forcep has a sharp bent at basal 1/3.

Distribution : India, West Bengal (Jalpaiguri, Darjiling dists.)

Remarks : This is second record of this species after its description by Gillies (1949). It differs from *B. thurbonis*, also described from West Bengal, in having 7-9 cross vein in stigmatic area instead of 3-7; Hindu wing 1/8.5 - 1/10 instead of 1/6 to 1/7. From *B. solitarius*, also described from West Bengal, it differs in having abdomen red and yellow instead of lemon yellow.

2. *Baetis thurbonis* Gillies 1949.

1949. *Baetis thurbonis* Gillies, *Trns. R. Ent. Soc. London*, 100 : 168.
 1963. *Baetis thurbonis* : Kapur and Kripalani, *Rec. Indian Mus.*, 59 : 163.
 1971. *Baetis thurbonis* : Kimmins, *Bull. Brit. Mus. (Nat. Hist.) Ent.*, 25 : 321.

Material examined : 5(M), 2(F), Jalpaiguri (Buxa duar) Santalbarri, St. I, 2.i.87, V.D. Srivastava & Party coll., 4(M), Jalpaiguri (Jantia), St. I., 16.i.87, V.D. Srivastava and party coll.

Diagnosis : This is a medium sized species (6-7 mm) with 3-7 cross veins in stigmatic area. Forewing and hindwing in ratio of 6:1 to 7:1 ; second longitudinal vein of hindwing not forked. Dark mesosternal ring on thorax.

Distribution : India : West Bengal (Jalpaiguri, Darjiling dists.)

Remarks : This is second record of this species after its original description. This differs from *B. tigroides* and *B. solitarius*, both described from West Bengal, in having unforked second longitudinal vein of hind wing.

3. *Baetis solitarius* Gillics, 1949.

1949. *Baetis solitarius* Gillics, *Trans. R. Ent. Soc. London*, 100 : 170.

1963. *Baetis solitarius* : Kapour and Kripalani, *Rec. Indian Mus.*, 59 : 188.

Material examined : 4(M), 1 (F) Jalpaiguri (Sobhaganj,) New Alipur Duar, St. I. 14.i.87, V.D. Srivastava & party coll., 5(M),2(F), Jalpaiguri (Jaintia), St. 16-i-87, V.D. Srivastava & Party coll.

Diagnosis : This is medium sized species (3-5mm.). Fore wing and hindwing ration 6 : 1 to 10 : 1 ; 6-7 cross veins in stigmatic area ; 2 longitudinal vein to hind wing, abdominal segments lemon yellow.

Distribution : India : West Bngal (Jalpaiguri, Darjiling distt.).

Remarks : This is second record of this species after its description it differs from other two species also dscribed from same locality viz., *B. thurbonis* (6-7mm) and *B. tigroides* (6-7mm) in smaller range of its size (3-5mm) in having only 2 longitudinal veins in the hind wing from above two species and its also differs from other 14 species of genus *Baetis* described from India. Two other Indian species of genus viz. *B. dipsicus*, *B. Palniyrae*, share this feature of two wing veins.

2. Genus *Cloeon* Leach, 1815.

1815. *Cloeon* Leach, *Brewsters Edinburgh encyclop.*, 9 : 137.

1866. *Cloeopsis* Esaton, *Ann. Mag. Nat. Hist.* (3) 18 : 146.

1932. *Neocloeon* Traver, *J. New York Ent. Soc.*, 40 : 365.

1978. *Cloeon* : Hubbsard and Peters, *Orient. Ins., Suppl.* 9 : 7.

Remarks : This genus is represented in India by 10 species, the second largest group of species represented of the genus of the family Bactidac. Out of these, 5 species are represented in West Bengal - 2 amongst these are endemic to West Bengal and 1 has extended distribution to many countries in the orient. Male and female of all 5 species known from West Bengal and larve of only 1 species are described.

Keyto species of the genus *Cloeon*

1. Wings hyaline with no specific pigmentation2

- Wings not hyaline, vitreous with bistre brown costal and subcostal space including basal humeral cross vein *C. marginale* (Hagen)
- 2. Costal and subcostal space clear with somewhat faint pigments only
..... *C. kimminsi* Hubbard.
- Costal and subcostal space not clear 3
- 3. Whitish neuration in costal region pale, olive buff posteriorly, highly irridiscent
..... *C. varigatum* Chopra
- No white neuration in costal region, not irridiscent 4
- 4. Costal space luteous, subcostal space dark brown *C. bicolor* Kimmins
- Base of costal space and radius of male pale fuscous, whole of C and Sc area in female dark brown
..... *C. bengalense* Kimmins

4. *Cloeon kimminsi* Hubbard, 1947.

1947. *Cloeon viridis* Kimmins, *Proc. R. Ent. Soc. London*, (B) 16 : 98,

1974. *Cloeon kimminsi* Hubbard, *J. Kanss Ent. Soc.*, 47 : 358.

Material examined : 4(M), Bishnupur, "in and around of P.W.D. I.B. " at light, 18-xii-85, D.K. Mandal & party coll., 2(M), Rampur, N. Dinajpur, 25.xi.87, T.R. Mitra coll., 1(M), 1(F), Eden Garden Calcutta, 18-ix-79, coll. V.D. Srivastava, 2(M) EdenGarden, Calcutta. 6.ii.80, V.D. Srivastava coll. 20(M), 6(F), (larvae) Jalpaiguri, (Alipur Duar, Netaji Colony, St. Ii) 18.i.87, V.D. Srivastava, & party coll, 50(M), 10(F) (Larvae), Jalpaiguri (Bhaktigarh ; New Jalpaiguri), 22.i.87, St. I., V.D. Srivastava & party coll.

Diagnosis : This is of moderate size (6mm). Head pale yellow with narrow brown stripe, thorax yellowish green, this in males are green to dark green with two parallel robust stripe lacking a margin at middorsam. wings slightly shorter (5mm), band of yellow green present in the area of costal & subcostal space ; wing hyaline, venations dark brown but costa, subcosta and radius pale. Abdomen yellowish green, superimposed on it is a broad dorsal band of reddish brown. Tergite of male subimago 2-9 and female 2-7 with darker pigmentation pattern ; in male imago, these markings becomes obscure. Wing marking at costal, subcostal also less prominent. Male of this was not included in original description ; latter male subimago, imago were dealt with by Srivastava & Ray (1981). These are supported here by little more description and figures of male & female imago. Female larger then that of male in ration of 6 : 2 : 4 : 2 mm., while wings in rratio of 3 : 2.9. Cerci slightly longer than body, filiform, finely annulated that of female with dark band inter spread between these annules.

Distribution : India : West Bengal (Bankura, Birbhum, Burdhaman, Calcutta. 24-Parganas, Dinajpur, Jalpaiguri, Medinipur, Nadia, Puruliya distts); Maharashtra (Western Ghats). Malaysia.

Remarks : This species has resemblance with *C. bicolor* in body marking, specially that of the abdomen. It is known in having costal area yellowish green instead of luteous costal and dark brown subcostal streak ; venation dark brown, except pale, costa, subcosta, radius and cross veins ; with relatively broader pale area dividing the head region in two by longitudinal narrow brown stripes instead of 2 chesnut red long stripes on each side of median line.

5. *Cloeon bicolor* Kimmins, 1947.

1947. *Cloeon bicolor* Kimmins, *Proc. R. Ent. Soc. London*, 16 : 97.
1949. *Cloeon bicolor* : Gillies, *Trans. R. Ent. Soc. London*, 100 : 173.

Material examined : 1(M), 1(F), Calcutta, Dist (24-Parganas) x. 1945, BM(NH), 1(M), Bishnupur, Camp site Ahalya Bai Road, 5 km. South of Madan Mohan Guest House, 26. xii. 85, D.K. Mondal & party coll., 19 (M), Bhrtow, W. Dinajpur, 28.xi.87 T.R. Mitra. coll.; 9(M), Ramgopalpur, Camp I, Burdhaman 7.ix.86, K.K. Ray party coll., 3(M), 4(F), Eden Garden, Calcutta. 18.ix.79, V.D. Srivastava coll, 45(M), 15(F), (larvae), Jalpaiguri (Sobhaganj, New Alipur duar), St. I, 15.i.87, V.D. Srivastava & party coll.

Diagnosis : Small sized (0.5mm), wing slightly smaller than body length, costal & subcostal space, pterostigmatic cross veins 5 -slightly slanting, white in male, pale yellow in female. Eyes orange in male, light gray in female. Thorax pale brown with dark brown median stripe, abdomen white translucent except 8 to 10 reddish or orange brown above with variable markings on others. Genital forcep.

Distribution : India : West Bengal (Bankura, Birbhum, Burdhaman, Calcutta, 24-Parganas, Jalpaiguri, Medinipur, Nadia, Puruliya distt.), Karnataka, Madhya Pradesh. Bangkok.

Remarks : This species can be distinguished from the closely related *C. bengalense* by pale female rather than light blue green, costal band lighter and sub costal darker instead of uniformly, mid-dorsal dark band on abdomen 3 to 6 laterally expanded as in *bengalense*, there are no reddish spots on segment ; 3 and 6 of abdomen of male as in later case. Material of this species, belonging to original series with paratype label in vial, was studied from B.M.N.H./London material.

6. *Cloeon bengalense* Kimmins, 1947.

1947. *Cloeon bengalense* Kimmins, *Proc. R. Ent. Soc. London*, (B) 16 : 95.
1978. *Cloeon bengalense* : Hubbard and Peters, *Orient Ins.*, Suppl. 9:8.

Material examined : 1(M), Bishnupur, "In & around P.W.D. , I.B. , light trap ; 7-xii-85, D.K. Mondal & party coll, 8(M), 1(F), Timidighi, W. Dinajpur, 26.xi.87 T.R. Mitra coll., 4(M), 4(F), Eden Garden, Calcutta, 4.iii.80, V.D. Srivastava coll., 8(M), 7(F), Eden Garden, Calcutta, 5.xii.79, V.D. Srivastava coll, 10(M), 8(F), Jalpaiguri (Jaintia), 16.i.87, V.D. Srivastava coll, 10(M), 8(F), Jalpaiguri (Janitia), 16.i.87, V.D. Srivastava & party coll.

Diagnosis : Small (5-6), Eyes dark brown in male, whitish in female, thorax dark brown in male dorsally but without markings in female ; there is double dark reddish brown band almost contiguous with the pronotum, broad dark brown median band on meso and metanotum. Wings in male hyaline with base of costa and radius and rest of veins pale brown but in female costal & subcostal areas dark brown.

Abdomen 3 to 6 (in male) with dark reddish sports in female dorsal reddish brown stripe on 3-6 expanded laterally to margin of respective tergite.

Distribution : India : West Bengal (Bankura, Birbhum, Burdhaman, Calcutta, 24-Parganas, Jalpaiguri, Malda, Medinipur, Nadia, Puruliya dists).

Remarks : This species can be differentiated from closely related *C. marginale* by the absence of white bulla in darker costal, subcostal space, 3 cross vein instead of 5 in stigmatic area.

7. *Cloeon variegatum* Chopra, 1924

1924. *Cloeon variegatum* Chopra, *Rec. Indian Mus.*, 26 : 420

1957. *Cloeon variegatum* : Van Bruggen, *Nova Guinea*, (N.S.) 8 : 37

Material examined : 1(M) Nishipur, Malda, 23.xi.87. T.R. Mitra coll.

Diagnosis : Small sized (4-5 mm.Male, 5-5.5 mm.-Female), thorax luteous dorsally with variegation of bistre brown in pattern of two light parallel, longitudinal bands on median line with darker line circularly disposed outside. Three simple slanting cross vein in stigmatic area of wing ; neuration whitish in costal area of male, whole of the wing in female, highly iridescent. Hind margin of wing with single intercalary vein and fringed. Abdomen in male 5/7-10 light brown at the proximal end and part of lateral margin of respective segments. Cerci long, filamentous (7-9mm), whitish, black joints and annulations,

Distribution : India : West Bengal (Calcutta, 24-Parganas, Jalpaiguri, Medinipur dists); Uttar Pradesh ; Orissa.

Remarks : This species has varicagated markings on the thorax, which is not found in any known species. Size wise it is equal to bicolor, slightly smaller than *bengalense* and *kimminsi*, distinctly smaller than *kashmiri*; stigmatic area with 3 cross veins as compared to 4-5 in *kashmiri*, 5 in *marginale* and bicolor. Material of this species was also studied from Lachiwala, N. Dehradun, Uttar Pradesh and was found to be smaller than present material (body 3 mm. instead of 4-5.5 mm).

8. *Cloeon marginale* (Hagen, 1859).

1859. *Cloeon marginale* Hagen, *Verh. Bot. Zool. Ges. Wien* ; 8 : 477.

1855. *Cloeon marginale* : Eaton, *Trans. Linn. Soc. London*, (Ser 2) Zool. 3 : 181.

1909. *Cloeon marginale* : Needham, *Rec. Indian Mus.* 3 : 191.

1924. *Cloeon marginale* Chopra, *Rec. Indian Mus.* 26 : 419.

Material examined : 5(M), Mucha, Malda, 12.xii.85, T.R. Mitra coll ; 5(M) 4(F), Eden Garden, Calcutta, 5.xi.79, V.D. Srivastava coll.

Diagnosis : Small species (4-6 mm). Forewing with his characteristic darker band in costal and subcostal space. A prominent white bulla present in otherwise darker marginal band. Five cross veins present in the stigmatic area.

Distribution : India : West Bengal (Calcutta, 24-Parganas, Jalpaiguri, Malda dists); Maharastra. Bangladesh, Sri Lanka, Java, Sumatra, Phillippines, Taiwan, Tonkin China.

Remarks : This species can be differentiated from *C. bengalense* and *C. varieagatm* in having 5 cross veins to stigmatic area instead of 3. It differs in having prominent white bulla, which is lacking in the above two species mentioned.

3. Genus *Procloeon* Bengtsson, 1914.

1914. *Pseudocloeon* Bengtsson, *Ent. Tidskr.* 35 : 218.

1915. *Procloeon* Bengtsson, *Ent. Tidskr.* 36 : 34.

1978. *Procloeon* : Hubbard and Peters, *Orient. Ins ; Suppl.* 9 : 10.

Remarks : This genus is represented in India by 3 species, relatively much less representative vis-a-vis genera *Baetis* and *Cloeon* of the family Baetidae. Only 1 species among these are represented in West Bengal, which has also extended distribution to Thailand, Malaysia and Hong Kong in Orient.

Key to species of genus *Procloeon*

Since there is only one species, represented in West Bengal under this genus, no key is provided; however it has characteritic red brown spot at the junction of radius and humeral crossing, wing venation pale fuscous, male genital forcep white, besides other detaills under species.

9. *Prolcoeon harveyi* Kimmins, 1947.

1947. *Proclocon harveyi* Kimmins, *Proc. R. Ent. Soc. London*, (B) 16 : 94.

1949. *Procloeon harveyi* Gillies, *Trans. R. Ent. Sec. London*, 100 : 176.

Material examined : 10(M),10(F), Calcutta (Dist. 24-Parganas), x. 1945.

Diagnosis : This is smalll species (5mm-Male) (6-7mm.Female) like *P. bimaculatum* - another species under this genus from India, besides *P. debils*. Head is luteous, eyes in male has brown pigments of upper lobe, green of lower but in female black. Thorax brown on dorsam, with pale patch on each side. Wings smaller than body length (4mm.), hyaline, venation pale brown, a red spot at junction of radius and humeral cross veins, stigmatic area dark brown, 3-4 simple slanting cross veins. Abdomen translucent white with considerable reddish brown markings as in figure. Genital forcep white, pointed chitinous process between two forcepi Cerci whitish, reddish in male, with alternating long and short blackish mark.

Distribution : India : West Bengal (Calcutta. 24-Parganas, Jalpaiguri dists); Madhya Pradesh; Maharashtra. Thailand, Malaya, Hongkong.

4. Genus *Pseudocloeon* Klapalek, 1905.

1905. *Pseudocloeon* Klapalek, *Mitt. Nat. Mus. Hamburg*, 22 : 105.

1978. *Pseudocloeon* : Hubbard and Peters, *Orient Ins. Suppts.*, 9 : 11.

Remarks : This genus is represented by 2 species from India. One of these is known from West Bengal and is endemic to it.

Key to species of genus *Pseudocloeon*

Since there is only one species, represented in West Bengal under this genus, no key is provided; however characteristic wing venation is amber, red spot at the junction of radius and humeral crossing, (characteristic of *Procloeon*) lacking and the male genital forcep appear brownish, besides other details given under species.

10. *Pseudocloeon inoponium* Gillies, 1949.

1949. *Pseudocloeon inopinum* Gillies, *Trans. R. Ent. Soc. London*, **100** : 171.

1971. *Pseudocloeon inopinum* : Kimmins, *Bull. Brit Mus. (Nat. Hist) Ent.* **25**: 315.

Material examined : 8(M), Plassey, P.W.D. I.B., Murshidabad, at light, A.R. Lahiri & party coll.

Diagnosis : Small sized mayflies (3.5-5mm.). Eyes of male turbinate large female small widely separated, posterior margin of head not emarginate. Hind wing absent ; 1-2 incomplete cross vein in stigmatic area ; forewing with amber neuration, marginal intercalaries in pairs except only in cubital space, and in second interspace. Genital forcep with basal joint large, slightly longer than broad, second joint short, conical, tapered apically, third longest, slender, slightly arched, fourth smaller than preceding ones but twice as long as broad.

Distribution : India : West Bengal (Darjiling, Jalpaiguri, Murshidabad dists).

Remarks : This species is endemic to India ; this is the second record, after its original description also from West Bengal at an altitude of Ca 1800 meters. There is only one more species under this genus (*P. rubellum* Navas) also described from India, (Khandala : Maharashtra) from which it is distinguishable in being relatively bigger in size and in having characteristic markings on notum and abdomen.

Family CAENIDAE

This family has relatively much smaller representation than that of previous-Baetidae. In West Bengal this has representation only by 3 species under single genus *Caenis* Stephens. Family has 7 species under 2 genera viz. *Caenis* Stephens, *Clypeocaenis* Soldon within Indian limits.

Key to genera of the family CAENIDAE

A key to two genera represented in India is provided, hereunder, for comprehensiveness; though only one viz, *Caenis* has its representation in West Bengal :-

1. Fore-wing elongate, narrow ; prosternum narrow, 2 to 3 times longer than broad, Head with produced clypeus*Caenis* Stephens
2. Fore-wing not so elongate and narrow only 1 to 1 1/2 than broad, head without produced clypeus*Clypeocaenis* Soloen

5. Genus *Caenis* Stephens, 1835.

1835. *Caenis* Stephens, *Illus. Brit. Ent. Mndib.*, 60.

1923. *Ordella* Champion, *Ann. Mag. Nat. Hist.*, (9) 11 : 518.

1978. *Caenis* : Hubbard & Peters, *Orient. Ins. Supp.* 9:11.

Remarks : This genus is represented in India by 5 species ; three of these are represented in West Bengal - 2 out of these three are only known from West Bengal. These are being reported for the second time in present work, alongwith detail drescription (redescription) and additional diagrams based on the study of their types in the National Zoological Collections.

Key to species of Genus *Caenis*

1. Pair of hyaline protuberance a little anterior to the point of two eyes, throax of male uniformly dark brown and of female pale brown with additional sagittate marking
.....*C. picea* Kimmins
- Pair of hyaline protuberance anterior to eyes lacking, thorax pale brown greyish to pruplish
.....2
2. Very small species (2 mm.) Head thorax pale yellowish brown, abdomen translucent, no distinct markings*C. piscina* Kimmins
- Relatively larger species (3-5 mm) white with sooty black markings on head, thorax and abdomen
.....*C. perpusilla* Walker

11. *Caenis picea* Kimmins, 1947

1947. *Caenis picea* Kimmins, *Proc. R. Ent Soc. London*, (B)16 : 99.

1954. *Caenis Picea* : Van Bruggen, *Zool. Mededel*, 33 (2) : 13.

Material examined : 1(M), Calcutta (Baranagar), Coll. W/W 29. xii. 1945, B.M.N. H. London.

Diagnosis : Head and compound eyes dark brown, pale in female. Antennal base, base of style grey, rest white. Thorax dark brown, partly white on sides, ventrally in males but in female its pale brown with paler markings, sagittate shaped, its end and drawn into a process. Wings single pair hyaline, venation white, subcosta and radius purplish red. Abdominal tergites 1-8 white, 9-10 pale brown in males in female whole abdomenn creamy white with only greyish pigments on 1-2. Cerci white except brown basal segmentgs.

Distribution : India : West Bengal (Calcutta dist).

Remarks : Material of this species, belonging to original series, was studied from B.M.N.H., London material. This species is closely related to *C. piscina* Kimmins (also described from Calcutta). It is distinguishable in having abdominal tergite of 1-8 white and 9-10 pale brown and by the absence of coloured spot on apex of femora of leg 2 and 3.

It differs from not only *piscina* but form other members as well, of the genus, in presence of pair of hyaline protuberance, just anterior to the line of eyes.

12. *Caenis piscina* Kimmins, 19471947. *Caenis piscina* Kimmins, *proc. R. Ent. Soc. London* (B) 116 : 991954. *Caenis picea* : van Bruggen, *Zool ; Mededel.*, 33(2) : 13.*Material examined* : 1(M), Calcutta (Dist. 24-Parganas) Oct. 1945, B.M.N.H.*Diagnosis* : Head pale brown in male with purple eyes, in female more greyish ; abdomen in male more distinctly translucent whitish lateral margin of sternites and basal tergites masked with black pigments. Wings hyaline, veins whitish, sub-costa & radius purple black, equal to length to body (2 : 2mm), cerci more than three times longer (2 : 7). Female femora 2 : 3 with purple spot on their apical ends.*Distribution* : India : West Bengal (Calcutta).*Remarks* : Material of this species, belonging to original series, was studied from B.M.N.H., London. This species is closely related to *C. picea* Kimmins (also described from Calcutta). This is distinguishable from the said species in the abdomen being translucent whitish instead of 1-8 white 9-10 pale brown and presence of purple spot on species of femora 2,3.13. *Caenis perpusilla* Walker, 1853.1853. *Caenis perpusilla* Walker, *List Neuropt. Ins. Brit. Mus.*, 585.1909. *Caenis perpusilla* : Needham, *Rec. Indian Mus.*, 3 : 191.1924. *Caenis perpusilla* : Chopra, *Rec. Indian Mus.*, 26 : 418.*Material examined*: 1(M), Puruliya, "Velladih, Shillage" st. 7, 19.ix.87, M. Prasad coll., 8(M)(larvae), Eden Garden, Calcutta 5.xi.79, V.D. Srivastava coll., 1(M),(1 larva) Jalpaiguri (Netaji colony, Alipurduar), st. I. 18.i.87, V.D. Srivastava & party coll.*Diagnosis*: This is a small species (3.5-3.5 mm). Head white with black stripe dorsally in-between two eyes. Basal antennal segment yellowish brown, terminal flagellare part white. Thorax whitish-pale yellow. Mesonotum with pale narrow middorsal line. Sooty black lines on side of prothorax, dorsolateral side of mesothorax and across apically on metanotum. Wings single pair, colourless, hyaline, purple costal band, purple pigment patch at subapical subcostal space. Abdominal segments on sides and on apical segments sooty black. Cerci 3-4 times body length.*Distribution* : India : West Bengal (Calcutta, Puruliya distts) ; Orissa. Bangladesh, Sri Lanka.*Remarks* : This species differs from *C. picea* and *C. piscina*, (also described and known only from Calcutta, West Bengal), in having prominent distinctive sooty marking on head, thorax, abdomen and small purple patch at subapical subcostal area of forewing and in the very long Cerci (11-12 mm).

Family HEPTAGENIIDAE

This is third biggest family among Indian Ephemeroptera with 13 species under 7 genera. Representation of this family in West Bengal is only by one species under the genus *Ecdyonurus* Eaton.

Since there is only one genus, represented in West Bengal, no key is provided ; however the member

of the genus *Ecdyonurus* has basal joint of fore tarsus of male $1/3$ to $1/2$ as long as second and penes more or less distinctly L-shaped.

6. Genus *Ecdyonurus* Eaton, 1868.

1868. *Ecdyonurus* Eaton, *Trans. Ent. Soc.*, 1868 : 142.
 1931. *Cinygmoides* Matsumura, 6000 III. *Ins. Jap. Emp.*; 1477.
 1978. *Ecdyonurus* Hubbard and Peters, *Orient. Ins. Suppl.* 9 : 19.

Since there is only one species, represented in West Bengal under this genus, no key is provided; however characteristically it has 2 parallel pair of intercalaries between two branches of cubitus and has penes lobe dilated, besides other details given under the species.

14. *Ecdyonurus bengalensis* Ulmer, 1920.

1920. *Ecdyonurus bengalensis* Ulmer, *Archiv. Naturges.* ; (A) 85 (11) : 75.
 1962. *Ecdyonurus bengalensis* : Weidner, *Mitt. Hambarg Zool. Mus. Ins.* ; 60 : 99.

Material examined : 5(M), Alipurduar Jalpaiguri 9.v.87, Raja Ram Coll ; 16(M), (Larvae) Jaintia, Jalpaiguri, St. I. 16.i.87, V.D. Srivastava & party coll.

Diagnosis : Moderate sized (10-12 mm ; Wings 15-17 mm, Cerci 30-36 mm) body in general brown, head blackish brown, distal part of abdominal segment 1 and 2, whole of segment 8 to 10 dark pigmented, wing light brown ; pterostigmatic region in costal & subcostal area and bulla rich brown. Penes lobe's apical and dorsal aspect slightly darker, dilated at apex ; genital forcep 4 segmented, basal broadest and smallest, second longest and slightly arched inwards.

Distribution : India : West Bengal (Darjiling, Jalpaiguri dists).

Remarks : This is the second record, of the species after it was described, also from West Bengal. There are three more species under this genus from India of which two (*E. eatoni* Kimmins and *E. indicus* Hubbard) are from Meghalaya and one *E. annulifer* (Walker) is from Maharashtra. In size, this species is definitely larger than *E. eaotai* and *E. indicus* in ratio of 10-12 : 9 : 7. In having penes lobe being broad it differs from above two species.

Family LEPTOPHLEBIIDAE

This family is represented in India by 10 species under 9 genera. Out of these West Bengal component of Leptophlebiid Ephemeropterans are comprised of only 2 species under 2 genera.

Key to genera of LEPTOPHLEBIIDAE

1. Only one pair of wing (forewing) present, hindwing entirely lacking, apex rounded, cubitoanal area poorly developed *Isca* Gillies.
- Two pair of wings-both (fore and hindwing) present, apex not rounded, cubitoanal area well developed *Gilliesia* Peters and Edmunds.

7. Genus *Isca* Gillies, 1951.

1951. *Isca* Gillies, *Proc. R. Ent. Soc. London*, (B) 20 : 127.

1978. *Isca* : Hubbard & Peters, *Orient. Ins. Suppl.* 9 : 23.

Since there is a single species under this genus from West Bengal, no separate key is provided, besides those under concerned species. Size minute to small (2.2-5 mm.) only forewings present, anterior & posterior margin of forewing parallel, apex rounded, cubitoanal area poorly developed. Distinguishable from closely related *nathanella* (from South India) in having dissimilar claws & in the absence of cross-vein in basal half of costal space.

15. *Isca (Isca) purpurea* Gillies, 1951.

1951. *Isca purpurea* Gillies : *Proc. R. Ent. Soc. London* (B) 20 : 128.

1971. *Isca (Isca) purpurea* : Kimmins, *Bull. Brit. Mus. (Nat. Hist) Ent.* 25 : 128

Material examined : 4(M), Alipurduar, Jalpaiguri, 8.v.87, Raja Ram coll. 12(M), 10(F) (Larvae), Jalpaiguri, (Buxaduar) St. I, 11.v.87, V.D. Srivastava & Party coll.

Diagnosis : Small (4.5-5 mm), head dark brown, shallow in dorsoventral view. Eyes orange-brown above, purple below in male, black in female. Pronotum dark reddish-brown, deeply excavated posteriorly at margin, mesonotum with single median and two diverging, lateral, reddish-cream coloured markings. Metanotum uniformly brown. Wings single pair, translucent pinkish brown, pigmentation darker in costal & subcostal areas, cross-vein few, none before bulla, which has 6-7 simple veinlets, hind-margin ciliated, longest in cubitoanal area. Abdominal 9-10 produced distally to form lateral spine of male, in female 9 tergite forms subanal plate with two rounded lobes and deeply dividing cleft.

Distribution : India : West Bengal (Jalpaiguri, Darjiling dists).

Remarks : This species is the genotype & is being reported for the second time from India. In the absence of hindwing this species has similarity with two other genera of Leptophebiidae (*Nathanella indica* Demoulin and *Notophylbia hyalina* Peters and Edmund); but in spite of this similarity it differs from the former in having relatively larger genital forcep, incurving, apically not straight and closely apposed, subacute instead of acute and from the latter, it is distinguishable by the absence of enlargement of forewing posteriorly in the anal area and penes being divergent distally.

8. Genus *Gilliesia* Peter and Edmunds, 1951.

1951. *Gilliesia* Peter and Edmunds, *Pacific Ins.* 12 : 189.

1978. *Gilliesia* : Hubbard and Peters, *Orient. Suppl.* 9 : 23.

Since there is a single species under this genus represented in West Bengal, no separate key is provided, medium size (5.5-8 mm), forked 1/7 from base to margin, MA forked 1/2 distance into asymmetrical branches, MP 2 and MP 1 independent, cross vein numerous, IX sternum deeply cleft apically, ovipositor lacking.

16. *Gilliesia hindustanica* (Gillies, 1951).

1951. *Thraulius hindustanicus* Gillies, *proc. R. Ent. Soc., London*(B) 20 : 124.

1970. *Gilliesia hindustanica* Peter and Edmunds, *Pacific Ins.*, 12 : 190

1971. *Thraulius hindustanicus* : Kimmins, *Bull. Brit. Mus. (Nat. Hist) Ent.* 25 : 315.

Material examined : 5(M), Alipurduar, Jalpaiguri 5.v.87 Raja Ram Coll.; 40(M), 9(F) (Larvae), Buxaduar (Santalbari), Jalpaiguri West, st. I, 11.i.87, V.D. Srivastava and party coll ; 30(M), 10 (F), Jalpaiguri (Jaintia), St. I. 16.i.87, V.D. Srivastava & party coll., 13(M), 20(F) (larvae), Jalpaiguri Jaintia), St. I. 16.i.87, V.D. Srivastava & party coll.

Diagnosis : Medium species (6-7mm). Eyes of male blackish grey in upper and darker in lower, in female brownish-black, thorax creamish, pronotum unmarked, mesonotum deep brown at sutures, metanotum brown in posterior half. Wings translucent with characters dark spots of brownish-yellow in costal, subcostal and median space, venation amber yellow, faint milky in outer fifth of costal & subcostal area of forewing. Hind wing small, ovoid, translucent, costal projection 1/2 distance from base, acute. Abdominal tergite 1-7 dark brown, 8-9 chocolate brown. Genital forcep 3 segmented, IX sternum deeply cleft apically.

Distribution India : West Bengal (Jalpaiguri, Darjiling dists); Arunachal Pradesh; Assam.

Remarks : This species is the sole representative of the genus in India described from an altitude of c. 1800 m. and placed under genus as its type species. It is the second record of this species. *Gilliesia* is more akin to *Habrophleboides* Ulmer and *Dipterophleboides* Demoulin, none of which are represented in India. It can however, be distinguished from the latter in the presence of well developed hindwing and penes.

Family PALINGENIIDAE

This family has relatively very little representation among Indian Ephemeroptera under the single genus *Anagenesia* Eaton. In West Bengal only 1 out of 3 Indian Palinguids is represented.

Since there is only one genus represented not only in West Bengal, but also in whole of India, no key is provided.

9. Genus *Anagenesia* Eaton, 1883.

1883. *Palingenia* (*Anagenesia*) Eaton, *Trans. Linn. Soc. London* (Ser-2) *Zool.* 3 : 25.

1920. *Anagenesia* : Ulmer, *Stettin. Ent. Z.* 81 : 101.

Since there is only one species, under this genus represented in West Bengal, no key is provided; however the genus *Anagenesia* has characteristically 5 jointed tarsi, 3 jointed genital forcep, besides other details under species.

17. *Anagenesia minor* (Eaton).

1892. *Palingenia minor* Eaton, *J.R. Asiatic Soc. Bengal*, 60 : 408.

1920. *Anagenesia minor* : Ulmer, *Stettin. Ent. Z.*, 81 : 102.

Material examined : 1(M), (9689/5) Sakaghat, Bengal, J. Vovan May 1911 (damaged), 1(M), (9690/5) Karachi/Museum Pinned not intact., 40(M), 15(F), (larvae), Jalpaiguri, (Jaintia) St. I. 17.i.87, V.D. Srivastava and party coll.

Diagnosis : Large sized (18/22 (M), 20-24 (F)). Head, thorax brown, abdomen light brown, segmental margins darker, abd. 7-9 prominently marked with grey pigments. Wings dirty white, venation opaque but in costal region pale-brown. Penes lobes short and broad, triangular, genital forcep 3 segmented.

Distribution : India : West Bengal (Calcutta, Jalpaiguri dists); Bihar, Maharashtra. Bangladesh, Pakistan.

Remarks : It is relatively smaller in size in relation to other Indian species of the genus (*A. robusta* 28-30 mm; *A. lata* 22-25., *A. picta* 22-26mm). This species is also paler and has characteristic clouding of posterior abdominal segments with grey which is more prominent in female in contrast to *Apicta* being reddish brown and *A. lata* light brown. Type material of this species present in national Zoological collections was examined and figures of wings and genital forcep are provided.

TABLE I- Qualitative Composition of Ephemeroptera from West Bengal, India and World

Families	West Bengal		India		World	
	G	S	G	S	G	S
AMEOTROPIDAE	-	-	-	-	1	4
* BAETIDAE	4	10	6	35	17	519
BAETISCIDAE	-	-	-	-	1	12
BEHNINGIDAE		-	-	-	3	5
* CAENIDAE	1	3	2	7	6	81
* EPHEMERELLIDAE			2	3	7	120
** EPHEMERIDAE			3	14	8	99
** EUTHYPLOCIDAE			1	1	7	12
*HEPTAGENIIDAE	1	1	8	14	28	378
*LEPTOPHLEBIIDAE	2	2	9	10	62	377
METROTROPIDAE	-	-			2	7
NEOPHEMERIDAE	-	-	-	-	2	8
OLIGONEURIIDAE	-	-	-	-	2	49
*PALINGENIIDAE	1	1	1	3	6	31
*POLYMITARCYIDAE	2	-	2	3	6	70
** POTAMANTHIDAE			1	7	7	27
*PROSOPISTOMATIDAE	-		1	1	1	11
SIPHLANIGMATIDAE	-				1	1
** SIPHLONURIDAE			1	1	26	163
TRICORYTHIDAE		-	-		13	122
<hr/>						
<u>Total</u>						
F-5 : 15 : 20	9	17	36	94	213	2146

F= Families, G = Genera, S= Species; *= Represented in West Bengal and India; ** = not represented in West Bengal though occurs in India.

TABLE -II Ephemeroptera Fauna of West Bengal with Distribution, Altitude etc.

Family	Genus	Species	(M)	(F)	(L)	DistriBution/Altitude	
1. BAETIDAE	1. <i>Baetis</i> Leach	1. <i>B. Solitaius</i> Gillies	+	-	-	West Bengal (Jalpaiguri, Darjling Mirik), 1800 M.	
		2. <i>B. thurbonis</i> Gillies	+	-	-	West Bengal (Jalpaiguri, Darjling Mirik) 1800 M.	
		3. <i>B. tigroides</i> Gillies	+	-	-	West Bengal (Jalpaiguri, Darjling, Mirik), 1800 M.	
	2. <i>Cloeon</i> Leach	4. <i>C. bengalensis</i> Kimmins	+	-	-	West Bengal (Bankura, Birbhum, Burdhaman, Calcutta, Jalpaiguri).	
		5. <i>C. bicolor</i> Kimmins	+	-	-	West Bengal (Bankura, Birbhum, Burdhaman, Calcutta, Jalpaiguri, Medinipur, Nadia, Purulia)	
		6. <i>C. kimminsi</i> Hubbard	+	+	+	West Bengal (Bankura, Birbhum, Burdhaman, Calcutta, Jalpaiguri, Medinipur, Nadia, Puruliya), Western Ghats, Malaysia.	
		7. <i>C. marginale</i> (Hagen)	+	+	-	W.B. (Calcutta, Jalpaiguri) Bangladesh, Sri Lanka, Java, Sumatra, Philippines, Taiwan, Toinkin, China.	
	3. <i>Procloeon</i> Bengtsson	9. <i>P. hsarveyi</i> Kimmins	8. <i>C. variagatum</i> Chpra	+	+	-	W.B. (Calcutta, Jalpaiguri, Medinipur) Orissa, (Bar-kuda), Uttar Pradesh.
			9. <i>P. hsarveyi</i> Kimmins	+	+	-	W.B. (Calcutta, Jalpaiguri) M.P. (Bhopal), Maharashtra (Poona). Thailand, Malaysia, Hongkong.
			10. <i>P. inopinium</i> Gillies	+	-	-	W.B. (Drjiling, Mirik, Jalpaiguri, 1800M).
2. CAENIDAE	5. <i>Caenis</i> Stephens	11. <i>C. perusilla</i> Walker	+	+	-	W.B. (Calcutta, Puruliya, Jalpaiguri) Orissa (Barkuda). Bangladesh, Sri Lanka.	
		12. <i>C. picea</i> Kimmins	+	+	-	W.B. (Baranagar, Calcutta)	
		13. <i>C. piscina</i> Kimmins	+	+	-	W.B. (Calcutta).	
3. HEPTAGENIIDAE	6. <i>Ecdyonurus</i> Eaton	14. <i>E. Bengalensis</i> Kimmins	+	+	-	W.B. (Darjeeling, Mirik, Jalpaiguri, North Bengal). 2178M.	
4. LEPTOPHLEBIIDAE	7. <i>Gilliesia</i> Peters & Edmunds	15. <i>G. hindustanica</i> (Gillies)	+	+	-	W.B. (Darjiling, Mirik, North Bengal) Assam 210-1800 M.	

8. <i>Isca</i> Gillies	16. <i>I. (I) purpurea</i> (Gillies)	+	+	-	W.B. (Mirik). Hong-Kong, 1350-1800M.
5. PALINGENIIDAE					
9. <i>Anagenesia</i> Eaton	17. <i>A. Minor</i> (Eaton)	+	+	-	W.B. (Calcutta, Jalpaiguri), Bihar, Maharashtra. Bangladesh, Pakistan.
5	9	17	17	14	- W.B. only —9, W.B. + India — 6, W.B. + India + Orient— 6, Plain to Ca 2000 M.

SUMMARY

The present paper deals with diagnostic features, distribution pattern and distinguishing features of 17 species of Ephemeroptera, known so far within limits of West Bengal, representing 9 genera and 5 families. Of these families Baetidae has single largest representation with 10 species and 4 genera; besides, family Leptophlebiidae is represented by 2 genera 2 species. Caenidae 3 species under single genus and single species each under the families Heptageniidae and Palingeniidae. Of these 17 species, males of all, females of 14 and larvae of only one is known from plains to Ca 2000 m., keys have been provided for various level of taxa concerned. Two tables and 3 distribution maps are also provided.

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REFERENCES

- Bengtsson, S. 1912. New Ephemeriden aus Schweden. *Ent. Tidske.* 33 : 107-117.
- Bengtsson, S. 1914. Bemerkungen uber die nor dischen Arten der Gattung *Cloeon* Leach, *Etn. Tidske.* 35: 210-220.
- Bengtsson, S. 1915. Eine Namensanderung ; *Ent. Tidskr.* 36 : 34.
- Campion, H., 1923. On the use of genericraus in Plecoptera and Orthoptera. *Ann. Mag. Nat. Hist.* (9), (11): 515-518.
- Chopra, B. 1924. The fauna of an island in the chilka Lake. The Ephemeroptera of Barkuda Island. *Rec. Indian Mus.*, 26 : 415-422.

- Eaton, A.E. 1966. Notes on some species of the orthopterous genus *Cloeon* Leach. *Ann. Mag. Nat. Hist.*, (3) 18 : 145-148.
- Eaton, A.E. 1868. An outline of a re-arrangement of the genera of Ephemeridae. *Ent. Monthly Mag.* 5 : 82-91.
- Eaton, A.E. 1883-88. A revisional monograph of recent Ephemeridae or may-flies. *Trans. Linn. Soc. London*, (Ser 2) Zool. 3 : 1 - 352.
- Eaton, A.E., 1892. Notes on some native Ephemeridae in the Indian Musuem, Calcutta. *J. R oy. Asiatic Soc. Bengal*, 60 : 406-413.
- Gillies, M.T. 1949. Notes on some Ephemeroptera Baetidae from India and South East Asia. *Trans, R. Ent. Soc. London.* 100 : 161-177.
- Gillies, M.T. 1951. Further notes on Ephemeroptera from India and South East Asia. *Proc. R. Ent. Soc. London.*, (B) 20 : 121-130.
- Hagen, H.A. 1959. Synopsis der Neuroptera Ceylons. (Pars II) *verh. Bot. Zool. Ges. Wein* ; 9 : 199-212.
- Gubbard, M.D. 1974. Some specific homonyms in mayflies (Ephemeroptera). *J. Kansas Ent. Soc.* 47 : 357-359.
- Hubbard, M.D. & Peters W.L. 1978. A catalogue of the Ephemeroptera of the Indian Sub region *Orient. Ins., suppl.* 9 : 1-43.
- Kapur A.P. & Kripalani, M.B. 1963. The Mayflies (Ephemeroptera) from the North-Western Himalaya. *Rec. Indian Mus.*, 59 : 183-221.
- Kimmins, D.E. 1971. A list of the type -specimens of Ephemeroptera in the British (Natural History). *Bull. Brit. Mus. (Nat. Hist.) Ent.*, 25 : 309-324.
- Leach, W.E. 1815. *Entomology Brewsters Edinburgh Encyclop* ; 9 : 57-172.
- Matsumura, S. 1931. 6000 Illustrated Insects of the Japanese, Tokyo.
- Needham, J.G. 1909. Notes on the Neuroptera in the collection of the Indian Museum. *Rec. Indian Mus.*, 3 : 185-210.
- Peter, W.L. & Edmunds, G.F. , Jr. 1979. Revision of the generic classification of the Eastern Hemisphere Leptopohlebiidae (Ephemeroptera). *Pacific Ins.*, 12 : 157-240.
- Stephens, J.F. 1835. *Illustrations of British Entomology*, 6.
- Srivastava, V.D. 1983. Analysis of the faunal component of Indian Ephemeroptera and their role in aquatic ecosystem. *Proc. symp. Ins. Ecol. & Resoruce Manage.*, 153-168. (Tab. 5, Fig. 2).

- Srivastava, V.D. 1983. High altitude Ephemeroptera of India. *Proc. Wkshp. High Alt. Ent. & Wildl. Ecol. zool. Surv.. India* ; 137-149.
- Srivastava, V.D. 1986. Ephemeroptera larvae as component of aquatic environments and their role as bio-indicator of pollution. *Proc. Sym. Pest. Resid. & Env. Pollu.* 206-218.
- Srivastava, V.D. & Ray K.K. 1981. Biocological observation on *Cloeon kimminsi* Hubbsrd (Baetidae : Ephemeroptera) *Proc. Suym. Ecol. Annim. Popul. zool. Surv. India*, II : 117-126.
- Traver, J.R. 1932. *Neocloeon*, a new mayfly genus (Ephemera). *J. New York Ent. Soc.*, 40 : 365-372.
- Ulmer, G. 1920. Übersicht über die Gattungen der Ephemeroptera, nebst Bemerkungen über einzelne Arten. *Stett. Ent. z.* 81 : 97-144.
- Van Bruggen, 1954. *Caenis demoulini*, a new Ephemeroptera from Thailand. *Zool. Mededel.* 33 (2) : 11-15.
- Van Bruggen, A.C. 1957. On two new species of myflies from the Wissel Lakes, Central New Guinea (Ephemeroptera). *Nova Guinea (N.S.)* 8 : 31-39.

INSECTA : ODONATA

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INTRODUCTION

Odonata fauna of West Bengal comprises of elements of Gangetic plains as well as those of submontane and montane zone. Present work has been undertaken to provide a comprehensive picture of the faunal element of the odonata in West Bengal along with key to various level of taxa involved, salient digonastic characters, distributions etc.

Material on which this work is based was mainly collected by various Zoological Survey of India parties in systematic way covering various districts of West Bengal, important physiographic zone of the state. Study has also been made on material present in National Zoological collection, including 'type material' of certain species, besides inclusion of earlier important work so as to make it more comprehensive. Details of material studied are indicated under each species in the 'systemic account' of present contribution.

Perusal of literature reveals that no consolidated account is available on the Odonata fauna of West Bengal, though number of contributions are there based on material from certain parts of this state. Some of these works are to the credit of Laidlaw (1916; a & b; 1919, 1922), Fraser (1933, 1934, 1936), Bhasin (1953). Relatively in the near past Lahiri & Mitra (1972) gave note on an Aeshnid, Mitra & Lahiri (1975) dealt with a new species of *Gynacantha*; Mitra & Lahiri (1974) recorded distribution of the Anisoperous Odonates of West Bengal and Rajaram, Srivastava, Prasad (1982) have recorded 59 species of Odonata spread over 8 families and 34 genera from Calcutta and surroundings; with 9 new records for the area, one new record for India with field notes, variations and keys. Mitra (1983) also listed odonates of Calcutta and an account on ecological reconnaissance of odonata from Calcutta has been given in Mitra (In press).

MATERIAL AND METHOD

Collection techniques : Collection technique which have been adopted were totally different for imago (adult : male & female) than their larval counterparts, as their ecological niche and habitat are totally different. Former inhabit aquatic vegetation in vicinity of water body-mostly. Zygoptera (Damselfly) were best collected by sweeping with insect net. Anisoptera (dragonfly) were collected amongst vegetation near water body or even quite away, flying fast. In these cases insect net was effectively used by stroking head-backwardly by using water net by side of water body amongst aquatic vegetation, under localized shelter of pebbles, stones or by scooping and washing bottom mud / sub-stratum for benthic forms. Some specimens of emerging imagosteneral forms are attracted to light and were collected by gentle swing of net as these were observed not to be good fliers as compared to the imagos during day time.

Study technique : Material of imagos (adult male and female) are best studied by usual process of relaxing, properly spreading, setting and pinning. Set specimens are examined under binocular microscope by fixing at desirable angle, level over plastacine cone/mounds fixed on slide or over convenient size of pith/ thermocol plate. External genitalia are examined sometimes directly by adjusting specimens under desirable angle or by dissection out and mounting onto the slides. Wings, their venation were examined in transmitted light while pigmentation pattern were best observed under reflected light. Observation of wing's nodal index was invariably made to ascertain nodal variations. Irridescence and metallic pigmentation pattern, in most of Zygopterans and some Anisopterans, were also best observed under reflected light.

MORPHOLOGY AND TERMINOLOGY

General Morphology : Morphology of odonata, commonly known as dragonfly are adapted to suit their environment. These pass their adult life as swift flyers in vicinity of aquatic ecosystem and larval stages within water bodies.

A brief morphological features are, though, indicated here for convinence and ready reference. For detailed morphological features of both adult and larvae work of Fraser (1933, 34, 36, 57) and Tillyard (1917) need be referred, which have been also basis of present work, specially in respect of wing venation and nomenclature thereof.

Adult are air breathing, head large, linked with thorax by delicate connection, antennae minute, filiform. Eyes large almost covering major part of dorsal surface of head in all Libellulids and other families of Anisoptera; while these are not so large in most of Zygopterans and are separated by wide gap. Prothorax mesothorax and metathorax are fused, angled forwardly, so are their respective legs. Wings are paired, reticulated, almost of same shape and size in almost all the Zygopterans; while most of the Anisopterans have the posterior pair of wing wider, specially in their anal area. Abdomen is long, slender, ten segmented terminating in paired anal appendages. Most characteristic feature of male accessory genitalia is that these are shifted to the underneath of 2,3 abdomen, while gonopore are in their usual position. This necessitates their peculiar bending and coupling, in male-female forming some sort of loop called 'tandem' Ovipositors are simple for exophytic forms (most of Anisopterans) or strong, serrated for endophytic forms (most of Zygopterans).

Larvae are long, elongated cylindrical in littoral and stout, broad bodied in benthic forms. These have extensible, prehensile labium, Zygopterans have abdominal gills and caudal filament, which are lacking in Anisopterans; these breathe by cloacal chamber provided with necessary exchange of dissolved oxygen.

List of technical terms : A list of technical terms used in key and or text are indicated, here-under, along with their explanation. Same are arranged alphabetically :-

<i>Name of Term</i>	<i>Explanation</i>
Ananal appendage	Male of Zygopterans with 2 pairs, male of anisoptera with 1 pair & single inferior and one pair in female uniformly - at the end of abdomen. Anal loop An area of cells at the base of hindwing just adjacent to discoidal cell.

Anal triangle	Triangle at extreme base of hind wing in male of Anisoptera.
Antenodal nervures	Short transverse nervures running from the costal to radius proximal to node.
Caudal gill	Accessory respiratory organs at the distal end of Zygopteran larvae.
Cubital space	Space posterior to basal space, extending to base of discoidal cell.
Discoidal cell	Triangular or quadrilateral space near the wing base, distal to cubital space. It is four sided in Zygoptera, three sided in Anisoptera.
Discoidal field	Space distal to discoidal cell, bounded by MA and Cuii and border of wings.
Enfumed	Smoky or brownish in tint.
Hypertrigone	Narrow triangular cell above discoidal cell of Anisopterans.
Imago	Adult
Nodal index	Count of ante- and post-nodal nervure in fore and hind-wings
Node	Thickening at costal margin nearer base of Zygoptera but in middle of Anisopterans.
Ocellus	Simple eye, three uniformly in all dragonfly and damselflies, disposed in a line in front of vesicle or in a triangle around vesicle on vertex of head.
Postnodal nervures	Short transverse nervures running from the costal to radius distal to node.
Pterostigma	Small, thickened spot on the apical side on costal border.
Teneral	Freshly emerged adult prior to hardening and acquiring full adult pigmentation.
Tornus	Part of basal and posterior part of wing-either angular or rounded, of Anisopterous wings.
Vertex	Dorsal surface of head, bearing vesicle and ocelli.
Vesicle	Small protuberance/eminence on vertex of head overhanging ocelli or located between them.
Vulvar scales	Sheath covering ovipositor formed of two plates attached to ventral segments of 8,9 abdomen.

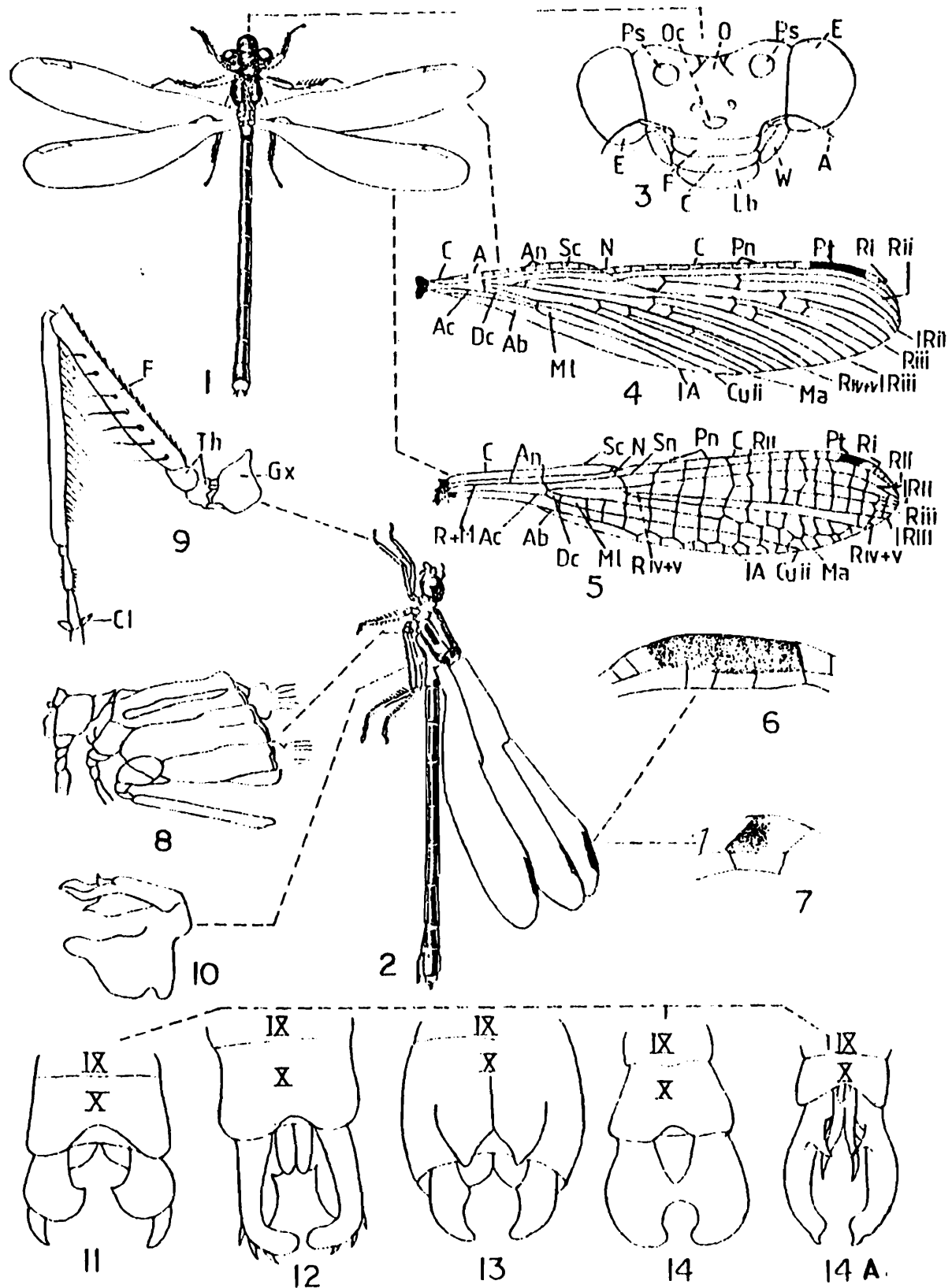


Fig. A 1. Zygoptera (Dorsal view). 2. Zygoptera (Lateral view). 3. Head of Zygoptera (Dorsal view). 4. Wing of Zygoptera - (Coenagrioniidae) 5. Wing of Zygoptera - Agriiidae 6. Pterostigma of a Lestid damselfly 7. Pterostigma of a Ischnurid damselfly 8. Lateral view of thorax of Zygoptera 9. One of the leg of Zygoptera 10. Male accessory genital structure of Zygoptera 11-14A. Dorsal view of anal appendages of Zygoptera *Ceriagrion coromandalianum*, *Ischnura senegalensis* and *Lestes umbrina* respectively.

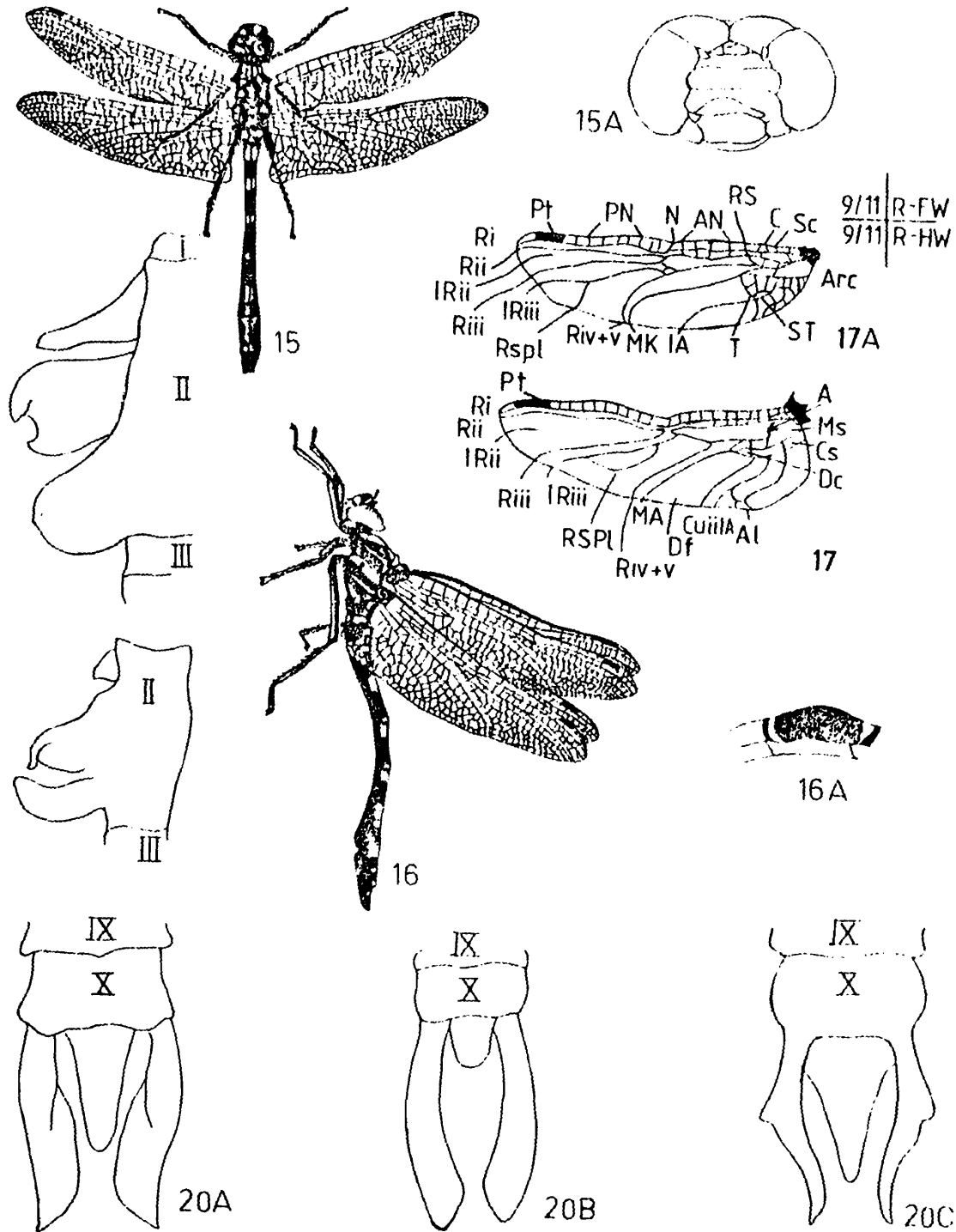


Fig. B

Fig. B 15. Anisoptera (dorsal view) 15A. Head of Anisoptera (dorsal view) 16. Anisoptera (Lateral view) 16A. Pterostigma of *Bradinopyga geniinata* 17. Fore and hind-wing of anisoptera showing main venation 17A. Nodal index-Count of Antenodal and Postnodal nervure of all wings. 18. Male accessory genital structure of Anisoptera - *Orthetrum glaucum* 19. Male accessory genital structure of Anisoptera - *Trithemis aurora* 20 A-C. Dorsal view of anal appendages of Anisoptera *Anax guttatus*, *Gynacantha hyalina* and *Macromia moorei* respectively.

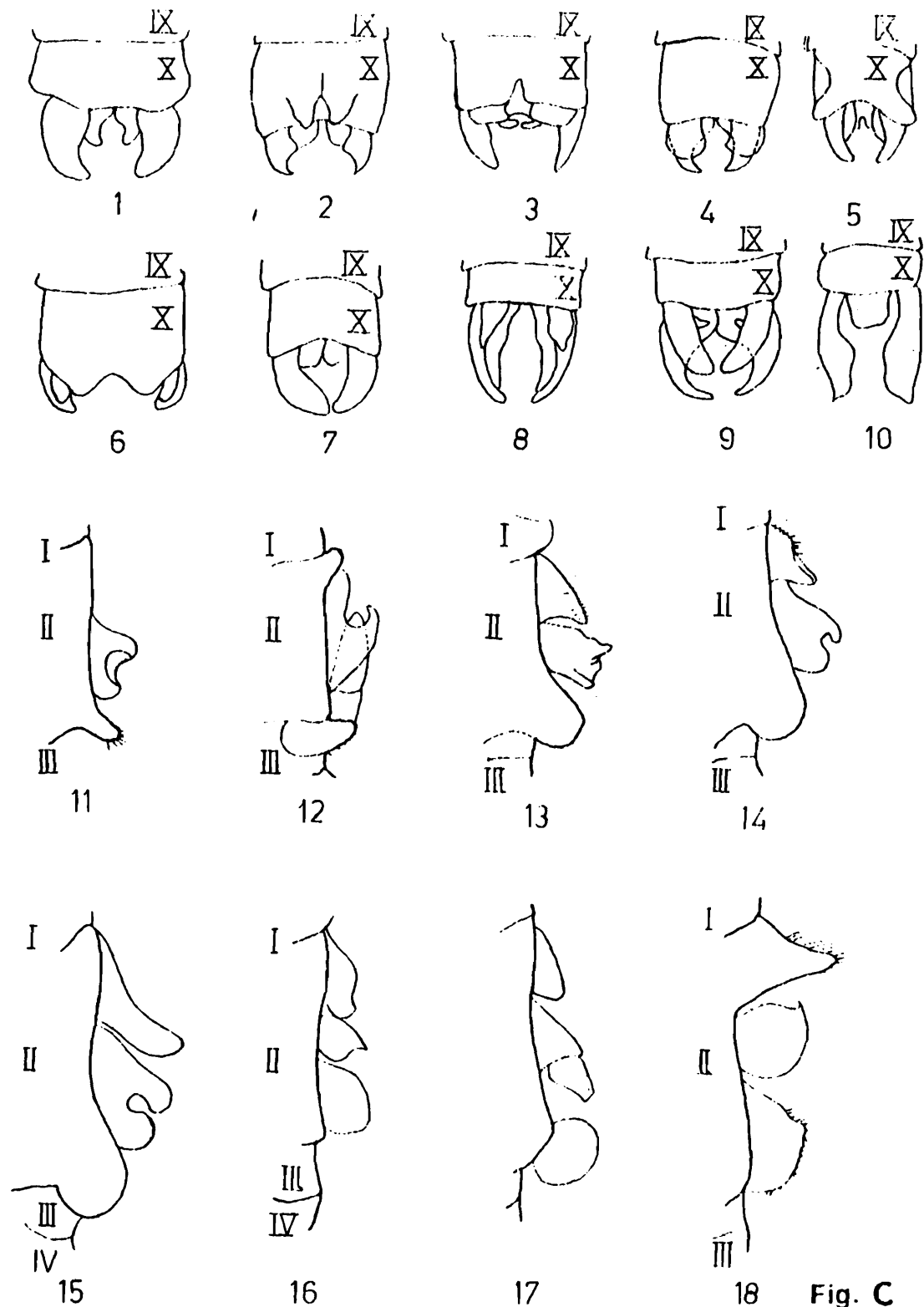


Fig. C

Fig. C Certain representative anal appendages : dorsal view.

Figs 1 to 10 [Fig. 1 - *Aciagrion pallidum*, 2 - *Ischnura senegalensis*, 3 - *Enallagma cyathigerum*, 4 - *Ceriagrion coromandelianum*, 5 - *Pseudagrion malabarium*, 6 - *Onychargia atrocyna*, 7 - *Agriocnemis splendidissima*, 8 - *Copera annulata*, 9 - *Calicnemia eximia*, 10 - *Anax guttatus*].

Certain representative external genitalia of male in lateral profile Figs. 11 to 18 [Fig. 11 - *Brachydiplax sobrina*, 12 - *Acisoma P. panorpoides*, 13 - *Orthetrum sabina*, 14 - *O. pruinatum neglectum*, 15 - *O. glaucum*, 16 - *Brachythemis contaminata*, 17 - *Urothemis s. signata*, 18 - *Trithemis festiva*]

Diagram : Generalized diagram of a dragonfly and a damselfly imago showing head, thorax, abdomen, wings. Another generalized diagram of a dragonfly and damselfly larval showing head, thorax, abdomen extended prehensile labium, abdominal and caudal gills.

Explanation of abbreviations used in figure 1 & 2.

A = (Head) Antennae, A = (Wings) arc, Ab = Anal bridge, Ac = (Head) Anteclypeus, Ac = (Wings) Anal crossing Al = Anal loop, An = Antenodal nervures, C = (Head) Clypeus, C = (Wings) Costa, Cuii = Second cubitus Cl = Claw, CS = Cubital Space, Cx = Coxa, Dc = discoidal Cell Df = Discoidal field, E = Eye, F = (Head) Frons, F = (Leg) Femur. IA = First anal, IRii and IRiii = Branches and intercalated branches of radius, Lb = Labrum, M = basis of Mandibles, MA = Anterior median, MI = Principal Sector, MS = median Space, N = node, O = Occiput, Oc = Ocelli, PN = Postnodal Nerves, PS = Postocular spots. Pt = Pterostigma, Ri = Radius, Rii, Riii & Riv + v = Branches and intercalated branches of radius, R + M = Radius median, RS = Radial Sector, Rspl = Supplementry nervure to radius, SC = Subcosta, Sn = Subnode, S. T. = Subtrigone, T = Trigone, Tb = Tibia, Th = Trochanter, Tr = Tarsus

SYSTEMATIC ACCOUNT

Odonata fauna of West Bengal comprises of 180 species under 91 genera and 15 families. Among these, Zygopterans (damselflies) families are by 10 families viz.- Platystictidae, Platynemidae, Coenagrinoidea, Agriidae Chlprocyphidae, Protoneuridae, Lestidae, Amphipterygidae, Chlorolestidae, Epallidae. These families together represent approximately 1/2.5 of (68:185) known odonates from west Bengal; Coenagrinoidea is the single largest family with representation of 33 species under 11 genera i.e. 1/2.1 (33:68) of known west Bengal component of damselflies.

Anisoptera (dragonfly) component of West Bengal odonates comprises of 116 species under 60 genera and 5 families; this is 1/1.6 of the known odonates from this state. Six families of the anisopterans are Aeshnidae, Gomphidae, Cordulegasteridae, Corduliidae, Macrodiplactidae and Libellulidae. Last family is having by far largest species component, among not only anisopterans but also amongst the whole constituents including Zygopterans; this is represented by 51 species. This is thus a little more than 1/2 of (52: 116) anisopterans and a little more than 1/3 (52: 185) of all known odonates from West Bengal. West Bengal Odonates vis-a- vis India's whole component of this group of insects is 185: 490 i.e. a little less than 1/3.

Family wise systematic account of West Bengal component of odonates are dealt, hereunder, along with original and recent reference, material examined and or reviewed literature, a brief diagnosis, distribution pattern within west Bengal, elsewhere in India and extended distribution in orient or other zoogeographical zones. Distribution maps of certain odonates species (abundant or rare) are also provided for west Bengal districts. Keys of various level of taxa involved i.e. families, subfamilies, genera, species, are formulated partly on basing Fraser (1933, 34, 36, 57), and partly modified on basis of authors own observations/interpretation.

A consolidated list of systematically arranged list of West Bengal component of the odonate insects; followed by citation of certain most important relevant references.

TAXONOMIC ACCOUNT

ORDER ODONATA

Key to the Suborders, Super Families and Families

1. Fore and hind-wings more or less of same shape and venation, head transversely elongated, both superior and inferior anal appendage in male paired2
 Fore and hind-wings are distinctly different in shape and venation-hindwings broader specially in anal area, head not transversely elongated rather globular; paired superior and single inferior anal appendage in male *Anisoptera* 5
2. Eyes widely separated, frons not rigid nor markedly raised, larvae with abdominal and caudal gill3
 Eyes not so widely separated, frons is rigid and markedly raised, larvae without abdominal and caudal gill.....*Anisozygoptera*
3. Antenodals more than 2, postnodals not coinciding with veins below *Calopterygoidea*7
 Only 2 antenodals, postnodals coinciding with veins below4
4. Iriiii and R IV + V more near node than arce, Males anterior hamules subquadrate *Coenagrionoidea* 10
 Iriiii and R IV + V more near arce than node, Males anterior hamules elongate *Lestoididea* ...12
5. Labial mask of larvae flattened without setae, lateral lobes narrow with long robust movable hook *Aeshnoidea* 13
 Labial mask of larvae broad, concave with numerous setae, lateral lobes broad with tuft of setae.....6
6. Costal and subcostal veins not coinciding, eyes are slightly separated or meeting only at a point; anterior and posterior hamules of genitalia well developed, ovipositor lacking or only pseudovipositor*Corduletgasteroidea*
 (* contains only a single family - Cordulegastridae)
 Costal and subcostal veins coinciding, eyes are broadly meeting on its dorsum, males with obsolete anterior hamules of genitalia, ovipositor inconspicuous *Libelluloidea* 14
7. 2 primary antenodal, distinct from secondaries8
 2 primary antenodal, not distinct from secondaries9
8. Petiolation at the level of arc or slightly proximal to it*Amphipterygidae*
 Petiolation far proximal from the level of arce*Chlorocyphidae*
9. First lateral suture of synthorax incomplete, not distinctly seen upto the spiracle ...*Euphaeidae*
 First lateral suture of synthorax complete, not distinctly seen beyond spiracle ...*Calopterygidae*
10. IA, Cu ii reduced, former even absent.....*Protoneuridae*
 IA, Cu ii neither reduced nor absent.....11
11. Discoidal cell with costal and hinder side subequal, inner distal angle obtuse ...*Platycnemididae*
 Discoidal cell with costal side much shorter than hinder side, inner distal angle acute or sub-acute*Coenagrionidae*

12. IRii and R IV + V arises nearer node than arc, Cuii arched costal-ward distal to discoidal cell, anal vein arising proximal to arce*Chlorolestidae*
 IRiii and R IV + V arises nearer arc than node, Cuii not arched costal-wards distal to discoidal cell, anal vein arising at the level of arc*Lestidae*
13. Eyes are well separated on dorsum-vertex, occipital plate large, trapezoidal*Gomphidae*
 Eyes are meeting all along inner side on dorsum-vertex, occipital plate small, triangular*Aeshnidae*
14. Eyes with a projection at posterior border, thorax metallic blue/green, long membranous keel on flexor surface of tibiae in male*Corduliidae*
 Eyes without a projection at posterior borders, Thoracic non-metallic (rarely metallic), no membraneous to tibiae*Libellulidae*

Suborder ZYGOPTERA
 Superfamily COENAGRIONOIDEA

This super family is represented in West Bengal, by four families viz., Coenagrionidae, Platystictidae, Protonuridae and Platycnemididae. Key to these families are already given earlier in general “keys to suborders, superfamilies and families”

Family COENAGRIONIDAE

This family is represented in West Bengal, by 33 species and 11 genera under 5 subfamilies viz., Cocnagriinae, Pseudargiinae, Ischnurinae, Agriocneminae and Argiinae.

Key to the subfamilies of Coenagrionidae

1. Valvar spine present on eighth abdomen of female, 10th abdomen often raised into a bifid tubercleISCHNURINAE
 Valver spine absent on eighth abdomen of female, 10 abdomen not with tubercle2
2. Legs relatively short and robust3
 Legs relatively long and slender4
3. Wing petiolation longer, ab arising at the hind border of wing at the point where ac meetsPSEUDARGIINAE
 Wing petiolation shorter ab arising at the hind border of wing where ac meets it.....COENAGRIINAE
4. Pterostigma differing in shape and size in fore and hind wings; postocular colour spot well developed.....AGRIO CNEMINAE
 Pterostigma differing in shape and size in fore and hind-wing, post ocular colour spot well developedARGIINAE

Subfamily ISCHNURINAE

This subfamily has four representative genera in West Bengal viz., *Aciagrion* Selys and *Ischnura* Charpentier, *Enallagma* Charpentier and *Rhodischnura* Laidlaw.

Key to genera of ISCHNURINAE

1. Ab originates at the point where ac meets the hinder border of wing.....*Aciagrion* Selys
Ab originates much proximal to the point where ac meets hinder margin of wing2
2. Pterostigma differing in fore and hind-wing3
Pterostigma not differing in fore and hind wing, a robust ventral apical spine on abdomen eighth*Enallagma* Charpentier
3. Postocular coloured spot present, closely apposed tubercle on apical border of abd. 10.....
.....*Ischnura* Charpentier
Postocular coloured spot absent, widely separated tubercle by a notch on the apical border of abd 10.*Rhodischnura* Laidlaw

Genus 1. *Aciagrion* Selys

1896. *Pseudagrion* Selys, *Bull. Acad. Belg. Sci.* (2), 42 : 509 (pars).

1891. *Aciagrion* Selys, *Ann. Mus. Civ. Genova* (2), 10 (32) : 509.

1933. *Aciagrion* Fraser, *Fauna Brit. India, Odon.* (1) : 333.

This genus is represented in West Bengal by three species.

Key to the species of the genus *Aciagrion*

1. Ground-colour of the body pale brown, no black markings on head and thorax ...*pallidum* Selys
Ground colour of the body blue, distinct black markings on head, thorax abdomen2
2. Slender species, black elongate dorsal triangular mark to the abdomen 8 marks base at apex and almost extending to base of segment*occidentale* Laidlaw
More robust species, no black marking on to the segment 8 or only with short lateral black stripe on each side*olympicum* Laidlaw

1. *Aciagrion pallidum* Selys

1891. *Aciagrion pallidum* Selys, *Ann. Mus. Civ. Genova* (2), 10 (30) : 512.

1933. *Aciagrion pallidum* Fraser, *Fauna Brit. India, Odon.* (1) : 344.

Material : 1 Female, Jaintia hills forest of river big side, Jalpaiguri dist., 20.iii.86, A. K. Hazra & Party coll.; 1 Female, Bania forest, Chilapata, Jalpaiguri dist., 14. x. 1987, S. K. Tandon & Party coll.; 1 Female, Menolabari forest Chilapata, 16. x. 1987, S. K. Tandon & Party coll.; 6 Females, Hasimara (Torsa), Jalpaiguri, 15. x. 1987, S. K. Tandon & Party.; 1 Female, Rampur Hat, 5. iv. 86, M. S. Shishodidia & Party coll.; 1 Female, 4 Kms. along the southern bank of Birai Jheel, 1 Km. east of Bishnupur Guest House, Bankura dist., 25. xii. 85, D. K. Mondal & Party coll.; 1 Female, Bishnupur Sericulture Nursery, 26. x. 85, M. Datta & Party coll.; 1 Female, Subhas pally, Islampur, W. Dinajpur, 12. xii. 86, B. C. Das & Party coll.; 1 Female, Kodgram, Raiganj, W. Dinajpur, 14. xii. 87, B. C. Das & Party Coll. 1 Female, Birpara, Jalpaiguri, 4. i. 87, M. Dutta coll.; 1 Female, Hasimara, Jalpaiguri dist., 2. i. 87, M. Dutta coll.

Diagnosis : Moderate size (29-31 mm., hindwing 18-20 mm.)

Distribution : India : West Bengal (Bankura, Birbhum, West Dinajpur, Jalpaiguri dists.), Arunachal Pradesh, Assam, Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh. Elsewhere : Nepal, Burma.

Remarks : It normally inhabits dry areas amongst grass, other vegetation. It has cryptic colouration making it remarkably inconspicuous.

2. *Aciagrion occidentale* Laidlaw

1919. *Aciagrion hisopa* (Selys) ? race *occidentalis* Laidlaw, *Rec. Indian Mus.*, XVI : 186.

1933. *Aciagrion occidentale* : Fraser, *Fauna Brit. India, Odon.* (1) : 335.

Material : 1 Male, Medinipur dist., 1985, B. C. Das and Party coll.

Diagnosis : Smallest among species found in West Bengal (Abd. 23-24 mm. Hindwing 15-16 mm.). Abdomen attenuated, triangular black spot on the dorsum of abdomen 8.

Distribution : India : West Bengal (Medinipur dist.), Tamil Nadu, Andhra Pradesh, Karnataka and Kerala. Elsewhere : Ceylon.

Remarks : Legs are palest blue, femora black on extensor surface in which it differs from *A. pallidum* which has white legs, distal ends of anterior two pairs of femora stripped with black.

3. *Aciagrion olympicum* Laidlaw

1919. *Aciagrion olympicum* Laidlaw, *Rec. Indian Mus.*, XVI : 171.

1933. *Aciagrion olympicum* : Fraser, *Fauna Brit. India, Odon.* (1) : 337.

Distribution : India : West Bengal (Darjiling dist.), Sikkim.

Remarks : This is included on the basis of literature review. Moderate sized (32-34 mm. abd., 20-22 hind-wing).

Genus 2. *Ischnura* Charpentier

1940. *Ischnura* Charpentier, *Lib. Europ.*, : 20.

1933. *Ischnura* Charp. : Fraser, *Fauna Brit. India, Odon.* (1) : 346.

Key to the species of genus *Ischnura*

1. Species with ground colour of both sexes bright orange red, abdominal segments 8-10 black*rufostigma rufostigma* Selys
Species with ground colour of male and isochrome female blue or pale grass green.....2
2. Abd. 3 to 6 citron yellow; inferior analappendage shorter than superiors ...*aurora aurora* (Brauer)
Abd. 3 to 6 black on dorsum3
3. Segment 10 with blue spot on dorsum, Pterostigma of forewing has shortest costal.....
.....*forcipata* Morton
Segment 10 without blue mark, Pterostigma of fore-wing not with shortest costal side.....
.....*senegalensis* (Ramb.)

Ischnura rufostigma rufostigma Selys

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

1933. *Fauna Brit. India, Odon.*, (1) : 362.

1977. *Ischnura rufostigma rufostigma*, Lahiri, *Rec. zool. Surv. India*, 72 : 413.

Material : 1 Female, Nelhati, Birbhum, W. B., 21. i. 86, S. B. Roy & Party coll.; 1 Male, Malda Agric. Farm, W. B. 21. xii. 86, B. C. Das coll.; 1 Male, Kod Gram, Raiganj, W. Dinajpur, 14. xii. 86, B. C. Das & Party coll.

Disgnosis : Pterostigma of fore-wing narrow, elongate, diamond shape, outer angle acute, bright brick red. Abdomen 10 prolonged into two apical blunt spine.

Distribution : India : West Bengal (Calcutta, Malda, Birbhum, Haora & 24 Parganas dists.), Assam, Bihar, Himachal Pradesh, Kashmir, Madhya Pradesh, Manipur, Uttar Pradesh. Elsewhere : Burma.

4. *Ischnura forcipata* Morton

1907. *Ischnura forcipata* Morton, *Trans. Ent. Soc., London* : 306.

1933. *Ischnura forcipata* Fraser, *Fauna Brit. India, Odon.* (1) : 354.

Distribution : India : West Bengal (Calcutta dist.), Punjab, Northern India, Himachal Pradesh, Uttar Pradesh. Elsewhere : Baluchistan, Quetta.

Remarks : This species is included on the basis of the literature review. In its strongly keeled segment 10 of abdomen and blue dorsal spot on same segment it differs from other species of the genus represented in West Bengal.

Ischnura aurora aurora (Brauer)

1858. *Agrion delicatum* Hagen, *Verh. Zool. -bot. Ges. Wien*, VIII : 479.

1933. *Ischnura delicata* (Hagen) : Fraser, *Fauna Brit. India, Odon.* (1) : 360.

1954. *Ischnura aurora aurora* Lieftinck, *Treubia*, XXII : 74.

Material : 6 Males, Hansimara (Torsa), Jalpaiguri & West Dinajpur dists., 15. x. 1987, S. K. Tandon & Party coll.; 1 Male, Joygaon, Jalpaiguri dist., 13. x. 1987, S. K. Tandon & Party coll.; 1 Male, Hamiltongunge, Jalpaiguri dist., 28. xii. 86, M. Dutta coll.; 1 Male, Alipur Duar, Jalpaiguri dist., 1. i. 87, M. Dutta coll.; 1 Male, Naprakata, Jalpaiguri dist., 7. i. 87, M. Dutta coll.; 1 Male, Gangajal Ghat, Bankura dist., 11. ix. 86, R. S. Barman & Party coll.; 1 Male, Bishnupur, Bankura dist., 25. x. 85, M. Dutta & Party coll.; 2 Males, Simlapal S. W. of Bankura Town, Bankura dist., 8. x. 85, K. K. Ray & Party coll.; 1 Male, Central Nursery Bishnupur Range, Bankura dist., W. B., 17. x. 1985, D. K. Mondal & Party coll.; 1 Male, Ketugram, Barddhaman dist., 10. xii. 85, B. N. Das & Party coll.; 1 Male, Dhatrigram, Barddhaman dist., 12. xii. 85, B. N. Das & Party coll.; 1 Male, Potapur colony, Raghunathgunj, Murshidabad dist., 7. ii. 86, I. J. Gupta & Party coll.; 1 Male, Jangipur, Dhanpatnagar, Murshidabad dist., 12. xii. 86, I. J. Gupta & Party coll.; 1 Male, Jiyaganj, Raichandpur, Murshidabad dist., 6. ii. 86, I. J. Gupta & Party coll.; 1 Male, Sericulture Institute Campus, Barhampore, Murshidabad dist., 26. ii. 86, S. K. Mitra & Party coll.; 1 Male, Cossimbazar, Dayanagar, Murshidabad dist., 26. ii. 86, S. K. Mitra & Party coll.; 1 Male, Sainthia, Birbhum dist., 29. iii. 86, M. S. Shishodia & Party coll.; 1 Male, Bhachapur, Birbhum dist., 30. iii. 86, M. S.

Shisodia & Party coll.; 1 Male, Birchandrapur, Birbhum dist., 1. iv. 86, M. S. Shishodia & Party coll.; 1 Male, Mallarpur, Birbhum dist., 4. iv. 86, M. S. Shishodia & Party coll.; 1 Male, Bolpur, Birbhum dist., 6. iv. 86, M. S. Shishodia & Party coll.; 2 Males, Muhmmadbazar, Birbhum dist., 3. iv. 86, M. S. Shishodia & Party coll.; 1 Male, Mallarpur, Birbhum dist., 4. iv. 86, M. S. Shishodia & Party coll.; 2 Males, Chibkigari forest, Medinipur dist., 20. xii. 85, A. K. Hazra & Party coll.; 1 Male, Keranitola, Midnapoe dist., 30. iii. 85, B. Nandi & Party coll.; 1 Male, Mahadipur, Malda dist., 5. xii. 87, T. R. Mitra coll.; 1 Male, Malda Agric. Farm, Malda, dist., 19. xii. 86, B. C. Das & Party coll.; 1 Male, Raiganj, Kodgtram, W. Dinajpur dist., 14. xii. 86, B. C. Das & Party coll.

Diagnosis : Smallest species (abd. 16-20 mm., hind-wing 10-15 mm.) Pterostigma kite shaped, rose-red for its proximal half but hyaline in distal half. Abd. 8-10 entirely azure blue, 10 with broad quadrate black dorsal spot.

Distribution : India : West Bengal (Bankura, Birbhum, Barddhaman, Medinipur, Malda, West Dinajpur dists.), Andhra Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Kerala, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Tamil Nadu, Uttar Pradesh. Elsewhere : Nepal, China, SriLanka, Malaysia, Indonesia, Australia, New Zealand, Pacific Islands.

5. *Ischnura senegalensis* (Ramb.)

1842. *Agrion senegalensis* Rambur, *Ins. Nevrop.*, 276.

1933. *Ischnura senegalensis* : Fraser, *Fauna Brit. India, Odon.* (1) : 348.

Material : 1 Male, Chatna, N, W. of Bankura, Bankura dist., 10. x. 85, K. K. Ray & Party coll.; 1 Male, around Jhargram (cast), Medinipur, 19. ix. 85, S. Biswas & Party coll.

Diagnosis : Pterostigma diamond shaped, black outer angle and costal border narrowly white, covering less than one cell. Abd. 2 metallic blue black on dorsum, abd. 10 black on dorsum, its apical border raised into two tubercles.

Distribution : India : West Bengal (Hughli, Haora, 24 Parganas dists.), Himachal Pradesh, Maharashtra, Manipur, Rajasthan, Uttar Pradesh. Elsewhere : Burma, SriLanka Malaysia, Philippines, Japan, Africa.

Genus 3. *Enallagma* Charpentier

1840. *Enallagma* Charpentier., *Lib. Europ.*, : 21.

1933. *Enallagma* Fraser, *Fauna Brit. India, Odon.* (1) : 371.

Key to the species of genus *Enallagma*

1. Small species, abdomen 17 mm. or less, postnodal nervus in forewing only 6 or 7.....
.....*parvum* Sclys
Larger species, abdomen 20 mm. or more, postnodal nervure in forewing more than 72
2. A small subapical quadrate black spot on the dorsum of abdomen second, this may be linked with apical pigmented ring by a narrow connection in some 14-15 postnodal nervous.....
.....*cyathigerum* Charp.
Broad black stripe on dorsum of abdomen second, this extends from base to appex, only 6-9 post nodal nervure.....*malayanum* Sclys

6. *Enallagma parvum* Selys

1876. *Enallagma parvum* Selys, *Bull. Acad. Belg.* (2) Vol. xii. 537.

1933. *Enallagma parvum* : Fraser, *Fauna Brit. India, Odon.* (1) : 376.

Material : 1 Female, Futi Sagar, Barddhaman dist., 11. xii. 85, B. N. Das & Party coll.; 1 Female, Dhatrigram, Barddhaman dist., 12. xii. 85, B. N. Das & Party coll.; 1 Female, Bankura dist., 29. x. 85, M. Dutta & Party, coll.; 1 Female, Bishnupur, Bankura dist.; 25. x. 85, M. Dutta & Party coll.; 1 Male, 3 Females, Simlapal, S. W. of Bankura Town, Bankura dist., 8. x. 85, K. K. Ray & Party coll.; 1 Female, Chatna, N, W. of Bankura dist., Bankura, 10. x. 85, K. K. Ray & Party coll.; 1 Female, Ranibandh, S. of Bankura, Bankura dist., 4. x. 85, K. K. Ray & Party coll.; 1 Female, Sushunia Hills, North Bankura, Bankura dist., 9. x. 85, K. K. Ray & Party coll.; 1 Female, Uluberia, Haora dist., 26. i. 86, B. Datta & Party coll.; 1 Female, Ramgopalpur, S. of Barddhaman, Barddhaman dist., 7. ix. 86, K. K. Ray & Party coll.; 2 Males, Dhulian, Malda dist., W. B., 17. vi. 87, K. P. Mukherjee & Party coll.; 1 Male, Bhaluk, Station, Maldha dist., 26. vi. 87, K. P. Mukherjee & Party coll.; 1 Female, Raiganj, Birnagar, W. Dinajpur, 16. xii. 86, B. C. Das coll.; 2 Males, 1 Female, Malda Agric. Farm, Malda dist., 21. xii. 86, B. C. Das coll.; 1 Female, Malda Sahapur, Malda dist., 18. xii. 86, B. C. Das coll.; 1 Male, Raijanj, Kod gram, W. Dinajpur, 14. xii. 86, B. C. Das & Party coll.; 2 Males, Muhmmad bazar, Biebhum dist., 3. iv. 86, M. S. Shishodia & Party coll.; 3 Males, Rampurhat, Birbhum dist., 5. iv. 86, M. S. Shishodia & Party coll.; 1 Female, Sainthia, Birbhun dist., 29. iii. 86, M. S. Shishodia & Party coll.; 1 Female, Bhadrapur, Birbhum dist., 30. iii. 86, M. S. Shishodia & Party coll.; 2 Males, 1 Female, Narayanpur Birbhum dist., 2. iv. 86, M. S. Shishodia & Party coll.; 1 Male, 1 Female, Mallarpur, Birbhum dist., 4. iv. 86, M. S. Shishodia & Party coll.; 1 Male, 1 Female, Bolpur, Birbhum dist., 6. iv. 86, M. S. Shishodia & Party coll.; 3 Males, Bhadrapur, Birbhum dist, 30. iii. 86, M. S. Shishodia & Party coll.; 1 Female, Birchandrappur, Birbhum dist., 1. iv. 86, M. S. Shishodia & Party coll.; 2 Males, Maureswar, Birbhum dist., 31. iii. 86, M. S. Shishodia & Party coll.; 1 Female, Raja Bhatkhawa, Jalpaiguri dist., 27. iv. 86, B. C. Das & Party coll.; 1 Female, Kaliaganj, W. Dinajpur, 1. ii. 87, T. R. Mitra coll.; 1 Male, 1 Female, Paglaghat, Malda dist., 8. xii. 87, T. R. Mitra coll.; 19 Kod gram, Raiganj, W. Dinajpur, 14. xii. 86, B. C. Das & Party coll.; 1 Female, Sahapur, Malda, 18. xii. 86, B. C. Das coll.

Diagnosis : Abd. pale sky-blue, segment 1 with brown quadrate dorsal spot and narrow blue apical annule, segment 2 with broad thistle shaped spot., 3-7 with fine apical annules confluent with a rounded spot, its apex extends into a narrow strips, 8-10 azure blue topped with mid dorsal narrow black stripe on segment 10.

Distribution : India : W. Bengal (Darjiling, Barddhaman, Bankura, Birbhum, Malda, West Dinajpur, Murshidabad, Haora, Calcutta) Gujrat, Madhya Pradesh, Manipur, Uttar Pradesh. Elsewhere : Burma, Ceylon.

Remarks : It is the smallest species of the genus. It is distinguishable by shape of its anal appendages and small postocular colour spots confluent by a narrow stripe.

7. *Enallagma cyathigerum* Charpentier

1782. *Agrion aereus* Harris, *Expos. Eng. Ins.* pl. XXIX, figs 3,4.

1840. *Enallagma cyathigerum* : Charp, *Lib. Europ.* : 163.

1933. *Enallagma cyathigerum* : Fraser, *Fauna Brit. India, Odon.*, (1) : 373.

Material : 1 Male, Shamsi, Malda dist., 21. vii. 86, M. S. Shishodia coll.

Diagnosis : Large pyriform postocular pale blue spots, in between, present a similar coloured streak but not connecting two spots. 8 to 10 fine spines on hind femora and tibiae. Abdomen bright glossy azure blue. Superior anal appendage 1/3 of abd. 10, quadrate, hollowed out within.

Distribution : India : West Bengal : (Malda), Kashmir. Elsewhere : Europe, Central Asia, Tibet, North America and British Isles.

Remarks : It inhabits stagnant water bodies and also amongst marshy habitats.

8. *Enallagma malayanum* Selys

1876. *Enallagma malayanum* Selys, *Bull. Acad. Belg.* (2) Vol. XI, 536.

1933. *Enallagma malayanum* : Selys, *Fauna Brit. India, Odon.*, (1) : 375.

Material : 1 Male, Mallarpur, Birbhum dist., 4. iv. 86, M. S. Shishodia & Party coll.

Diagnosis : Bluish-green oval postocular colour spots, not connected but a narrow stripe present. Legs bluish-white marked broadly with black on extensor surface of femora and flexor surface of tibiae. Inferior anal appendages almost as long as superior. A robust ventral spine at the apex of segment 10.

Distribution : India : W. Bengal (Birbhum), Maharashtra, Madhya Pradesh, Assam. Elsewhere : Sri Lanka.

Remarks : This species is distinguishable from *E. cyathigerum* the broad complete bands on abdomen and from *E. parvum* by the broad oval post-ocular spots.

Genus 4. *Rhodischnura* Laidlaw

1919. *Rhodischnura* Laidlaw, *Rec. Indian Mus.*, 171, 177.

1933. *Rhodischnura* : Fraser, *Fauna Brit. India, Odon.*, (1) : 368.

This genus has sole representative species viz., *R. nursei* (Morton) not only from West Bengal, but for whole of India. No key is therefore, provided.

9. *Rhodischnura nursei* (Morton)

1907. *Inshnura nursei* Morton, *Trans. Ent. Soc. London*, 306, 307.

1919. *Rhodischnura nursei* Laidlaw, *Rec. Indian Mus.*, XVI : 171, 177.

1933. *Rhodischnura nursei* : Fraser, *Fauna Brit. India, Odon.*, (1) : 369.

Distribution : India : West Bengal, Assam, Bihar, Uttar Pradesh, Madhya Pradesh. Elsewhere : Pakistan.

Remarks : This species is included on the basis of literature review. Species is confined to mostly dry habitat.

Subfamily PSEUDAGRINAE

This subfamily has two representative genera in West Bengal - *Pseudagrion* Selys and *Ceriagrion* Selys.

Key to the genera of PSEUDAGRINAE

- 1 (a) Prominent frontal ridge on frons, no postocular coloured spot on head, head and thorax of uniform colour, without any dark markings *Ceriagrion* Selys
 1 (b) Frontal ridge not present, postocular coloured spot present on head, head and thorax on not uniform colour, black or dark markings on body present *Pseudagrion* Selys

Genus 5. *Ceriagrion* Selys

1876. *Ceriagrion* Selys, *Bull. Acad. Belg. Sci.*, 42 : 525.

1933. *Ceriagrion* : Fraser, *Fauna Brit. India, Odon.*, (1) : 313.

Key to the species of the genus *Ceriagrion* Selys

1. Ab arising distinctly proximal to the point where ac meets, abdomen yellow changing to black on segments 7-10 *fallax* Ris
 Ab arising at the point where ac meets, abdomen marking absent or variable 2
 2. Abdomen uniformly dull olivaceous in both sexes *olivaceum* LaidLaw
 Abdomen not uniformly dull olivaceous of variable colour and markings present or absent ... 3
 3. Abdomen without any marking 4
 Abdomen with marking 5
 4. Abdomen bright citron yellow *coromandelianum* Fabricius
 5. Abdomen not bright citron yellow but pale azure blue *azureum* (Selys)
 Abdomen bright red at base and anal ends, black on dorsum inbetween ... *cerinorubellum* Braner

10. *Ceriagrion fallax* Rsi

1914. *Ceriagrion fallax* Ris, *Ent. Metteil.*, (3) (2) : 47.

1933. *Ceriagrion fallax* : Fraser, *Fauna Brit. India, Odon.*, (1) : 321.

Distribution : India : West Bengal, Assam, Himachal Pradesh, Meghalaya, Sikkim. Elsewhere : Nepal, China, Burma, Thailand, Malaysia, Indochina, Taiwan.

Remarks : This species is included on the basis of literature review. Mostly inhabits hilly tracts.

11. *Ceriagrion olivaceum* LaidLaw

1914. *Ceriagrion olivaceum* Laid, *Rec. India Mus.*, VIII : 345.

1933. *Ceriagrion olivaceum* : Fraser, *Fauna Brit. India, Odon.*, (1) : 324.

Material : 1 Male, 1 Female, Sonapur, Cooch Bihar, 1. v. 87, Raja Ram & Party coll.; 1 Female, Bankura, 29. x. 85, M. Datta & Party coll.; 2 Females, Ramsagar, S. E. of Bankura, Bankura dist., 7. x. 85, K. K. Roy & Party coll.; 1 Males, 1 Female, Bania Forest Chilapata, Jalpaiguri, 14. x. 87, S.

K. Tandon & Party coll.; 1 Female, Palasbari, Salpaiguri, Jalpaiguri dist., 24. xii. 86, R. S. Barman & Party coll.; 1 Male, 2 Females, Noorpur, Jainti, Jalpaiguri dist., 18. xii. 86, R. S. Barman & Party coll.; 1 Male, Fansidewa, Darjiling, 6. xii. 86, R. S. Barman & Party coll.; 1 Female, Jangipur, Dhanpatnagar, Murshidabad dist., 12. ii. 86, I. J. Gupta & Party coll.; 1 Female, Amaspur, Murshidabad dist., 8. ii. 86, I. J. Gupta & Party coll.; 1 Female, Maureswar, Birbhum dist., 31. iii. 86, M. S. Shishodia & Party coll.

Diagnosis : It is distinguishable from all other species of the genus in having uniform olivaceous colouring.

Distribution : India : West Bengal (Jalpaiguri, Koch Bihar, Bankura, Murshidabad), Assam, Kerala, Manipur, Maharashtra, Meghalaya, Uttar Pradesh. Elsewhere : Burma, Thailand, Vietnam, Laos, Cambodia, Malaysia.

Remarks : Quite frequently inhabiting long grasses in vicinity of water body. Fraser (1933) remarked that quite contrary to habits of genus this species "appear to breed in streams" Author has also observed them in abundance by the side of river in Jalpaiguri dist. (-Rajabhath Kawa, Buxa etc.).

12. *Ceriagrion coromandelianum* (Fabricius)

1798. *Agrion coromandelianum* Fabr., *Ent. Syst. Suppl.* : 287.

1919. *Ceriagrion coromandelianum* : Laidlaw, *Rec. Indian Mus.*, : XVI : 190.

1933. *Ceriagrion coromandelianum* : Fraser, *Fauna Brit. India. Odon.*, (1) : 315.

Material : 1 Male, Kanak shyaguri, Jalpaiguri dist., 7.v. 87, Raja Ram & Party coll., 1 Male, Dhalua, S. 24 Parganas dist., 19. iv. 86, B.N. Das & Party coll., 2 Males, Lakshikantapur, S. 24 Parganas dist., 28. iv. 88, B.N. Das & Party coll., 2 Females, Bakkhali, S. 24 Parganas dist., 1.v. 86, B. N. Das & Party coll., 3 Males, Joka, S. 24 Parganas dist., 30. iv. 86, B.N. Das & Party coll., 1 Male, Madhabpur, S. 24 Parganas dist., 3.v.86, B.N. Das & Party coll.; 3 Males, Ramdharua, 20 Km. S. E. of Baruipur, S. 24 Parganas dist., 18. iv. 86, B.N. Das & Party coll.; 1 Male, Bankura dist., 29. x. 85, M. Dutta & Party coll., 1 Female, Bishnupur, Bankura dist., 25. x. 85, Dutta & Party coll.; 1 Female, Simlapal, Bankura dist., 31. x. 85, M.Dutta & Party coll.; 2 Males, Chatna, N.W. of Bankura, Bankura dist., 10. x. 85, K.K. Ray & Party coll.; 5 Males, Kutumdengra, S. of Bankura, 12. vii. 85, K. K. Ray & Party coll.; 4 Males, Sushumia Hill, North Bankura, Alt. 300ft., 9. x. 85, K. K. Ray & Party coll.; 2 Females, Joypur forest, Bankura, 6. iii. 86, K. P. Mukherjee & Party coll.; 1 Male, 1 Female, Ballarpur, Birbhum, 15. iii. 86, K. P. Mukherjee & Party coll.; 1 Male, Dhuldanga, Bankura dist., 14. ix. 86, R. S. Barman & Party coll.; 2 Males, Hansimara (Torsa), Jalpaiguri dist., 15.x. 87, S. K. Tandon & Party coll.; 1 o, Dhatrigram, Barddhaman dist., 12.xii. 85, B. N. Das & Party coll.; 1 Male, Adhrahati, West of Barddhaman, Barddhaman dist., 8. ix. 85, K. K. Ray & Party coll.; 1 Male, Katwa, Barddhaman dist., 4. ix. 86, K.K. Ray & Party coll.; 2 Males, Mehspur, Haora dist., 25. i. 86, B.Datta & Party coll.; 1 Male, 1 Female, Jalpai, Haora dist., 29. i. 86, B. Datta & G. Sen coll.; 2 Females, Alipurdwar, Jalpaiguri, 26. iv. 86, B. C. Das & Party coll.; 1 Male, Agric. Farm, Malda dist., 21. xii. 86, B. C. Das coll.; 1 Male, Raigang, Kod gram, W. Dinajpur, 14. xii. 86, B. C. Das & Party coll.; 1 Male, Raiganj, Birnagar, W. Dinajpur, 16. xii. 86, B.C. Das & Party coll.; 1 Female, Kodampur, Jiaganj, Murshidabad dist., 1. iii. 86, S. K. Mitra & Party coll.; 1 Female, Cossimbazar, Dayanagar, Murshidabad dist., 26. ii. 86, S. K. Mitra & Party coll.; 1 Female, Sainthia, Birbhum dist., 29. iii. 86, M. S. Shishodia & Party coll.; 1 Male, Bolpur,

Birbhum dist., 6. iv. 86, M. S. Shishodia & Party coll.; 1 Female, Nalhati, Champlet Bagan, Birbhum dist., 21. i. 86, S. B. Ray & Party coll.; 3 Males, Dhulian, Malda dist., 17. vi. 87, K. P. Mukherjee & Party coll.; 1 Male, 2 Females, Alal, Malda dist., 19. vi. 87, K. P. Mukherjee & Party coll.; 1 Male, Ratua, Malda dist., 13. vi. 87, K. P. Mukherjee & Party coll., 1 Female, South West of Digha, Midnapur dist., 26. xii. 85, A. K. Hazra & Party coll., 2 Females, Keranitola, Midnapur dist., 30. iii. 83, B. Nandi & Party coll.

Diagnosis : This species has whole of its abdomen pale citron (lemon)-yellow devoid of any markings. In this character it is distinguishable from all other species of the genus.

Distribution : India : West Bengal (Jalpaiguri, South 24 Parganas, Medinipur, Bankura, Malda, West Dinajpur, Murshidabad, Birbhum, Bardhaman, Haora, Calcutta dists.), Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Orissa, Punjab, Tamil Nadu, Tripura, Uttar Pradesh. Elsewhere : Nepal, Sri Lanka, Burma, Malaysia, Indochina and Thailand.

Remarks : One of very common damselfly in vicinity of weedy ponds, tanks. Among green grass vegetation these are vividly seen by their lemon yellow abdomen.

13. *Ceriagrion azureum* (Selys)

1891. *Pseudagrion azureum* Selys, *Ann. Mus. Civ. Genova*, (2), x(xxx) : 513.

1933. *Ceriagrion azureum* : Fraser, *Fauna Brit. India, Odon.*, (1) : 328.

Distribution : India : West Bengal (Darjiling dist.), Assam. Elsewhere : Burma.

Remarks : This species is included on the basis of the literature review. In having uniform glossy turquoise-blue abdomen, with dorsal shield-like black spot on abd. 9 and abd. 10 black it differs from other species of the genus.

14. *Ceriagrion cerinorubellum* (Brauer)

1865. *Pyrrhosoma cerinorubellum* Brauer *Verh. zool. bot. Ges. Wien.*, 15 : 511.

1933. *Ceriagrion cerinorubellum* : Fraser, *Fauna Brit. India, Odon.*, (1) : 326.

Material : 1 Female, Shamsi, Malda dist., 21. vii. 86, M. S. Shishodia coll.

Diagnosis : Abdomen multi-coloured : seg. 1, 2, 3 (basal half) bright brick red, 3 (apical half), 4, 6 black on dorsum, 7 to 10 bright brick red, blue on sides of abd. 3-7. Apices of inferior anal appendage incurving with terminal small back tooth.

Distribution : India : West Bengal (Malda, Hughli, Haora and 24 Parganas dists.), Assam, Himachal Pradesh, Uttar Pradesh. Elsewhere : Borneo, Burma, Sri Lanka, Java, Malaysia and Sumatra.

Genus 6. *Pseudagrion* Selys

1876. *Pseudagrion* Selys, *Bull. Acad. Belg. Sci.* (2), 42 : 490.

1933. *Pseudagrion* : Fraser, *Fauna Brit. India, Odon.*, (1) : 274.

Key to the species of the genus *Pseudagrion*

There is distinct sexual dimorphism amongst species of the genus *Pseudagrion*. It is, therefore, befitting to have key based on males and females of these species separately.

Key to the species based on male

1. Face, frons and vertex mainly black.....*hypermelas* Selys
Face, frons and vertex not mainly black.....2
2. Face, frons and vertex bright redish orange or ochreous, thorax golden green on dorsum, azure blue on sides*rubriceps* selys
Face, frons vertex and occiput blue or green marked with black3
3. Thorax palest blue, three fine black line on mid-dorsal carina and a thicker black humeral stripe*decorum* (Rambur)
Thorax not palest blue, but azure blue on dorsum and sides three fine black line on mid-dorsal carina lacking4
4. Superior anal appendage as long as abdomen 105
Superior anal appendage shorter than abdomen 10.....6
5. Superior anal appendage bifid*australasiae* Selys
Superior anal appendage not bifid*malabaricum* Fraser
6. Superior anal-appendage expanded on inner side 1-3 small spine near base on this border.....
.....*microcephalum* (Rambur)
Superior anal appendage not expanded on inner side, a long robust spine near base on inner side*spencei* Fraser

Key to species based on female

1. Thorax with a single thick black stripe on the mid-dorsum, segment 8 wholly black except a blue apical ring*malabariam* Fraser
Thorax with fine black line on mid-dorsum2
2. Thorax with only one fine black line on mid-dorsum3
Thorax with three fine black line on mid-dorsum5
3. Orange pigments on head and upper surface of eyes segment 9 with a bifid black markings.....
.....*microcephalum* (Ramb.)
No orange pigments on head and upper surface of eyes4
4. Abdomen segment 2 with a black arrow-head shaped markings on dorsum ...*decorum* (Rambur)
Abdomen segment 2 with a broad black marking on dorsum-broader at base ...*australasiae* Selys
5. Abdomen 2 to 7 with fine dorsal black lines.....*spencei* Fraser
Abdomen 2 to 7 with broad dorsal black markings6
6. Segment 9 with black bifid dorsal marking.....*rubriceps* Selys
Segments 9 with black dorsal marking not bifid*hypermelas* Selys

15. *Pseudagrion hypermelas* Selys

1876. *Pseudagrion hypermelas* Selys, *Bull. Acad. Belg.*, (2), XLII : 519.

1933. *Pseudagrion hypermelas* : Fraser, *Fauna Brit. India, Odon.*, (1) : 289.

Material : 1 Female, Mathabhangi, Koch-Bihar, 11. xii. 86, R. S. Braman & Party coll.

Diagnosis : Face, frons, vertex bright redish - orange or dark ochreous. Abdomen violaceous brown, broadly marked by black on dorsum 2 lateral and dorsal confluent, 3 to 7 with black mark widned subapically and then confluent with black annules apically, 8-9 with black lateral spots confluent with dorsal black markings. Anal appendage bifid, black at apices. Vulvar scales inconspicuous, pale - brown.

Distribution : India : West Bengal (Koch Bihar dist.) Madhaya Pradesh, Maharashtra, Uttar Pradesh.

Remarks : Inhabits grassy edges of running water bodies, such as small streams, rivulets, canals.

16. *Pseudagrion malabaricum* Fraser

1924. *Pseudagrion malabaricum* Fraser, *Rec. Ind. Mus.*, XXVI, 428, 494 -5.

1933. *Pseudagrion malabaricum* Fraser, *Fauna Brit. India, Odon.*, (1) : 284.

Material : 1 Female, Kathambari, Jalpaiguri, 11. X 87, S. K. Tandon & Party coll.

Diagnosis : Thorax azure blue on dorsum and sides, marked with medial and humeral stripes. Superior appendage shorter than abd. 10, not bifid apically, diverging strongly, curving inwards at apical end into a robust spine.

Distribution : India : West Bengal (Jalpaiguri, dist.) throughout Western Ghats, Tamil Nadu, Karnataka, Kerala. Elsewhere : Burma.

Remarks : Inhabits lentic water body in submontane and montane habitats. In non - bifid superior anal appendage it differs from closely akin *P. microcephalum*, *P. bengalense*.

17. *Pseudagrion rubriceps* Selys

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

1933. *Pseudagrion rubriceps* : Fraser, *Fauna brit. India, Odon.*, (1) : 296.

Material : 1 Male, Malda Agri. Farm., 21. XII. 86, B. C. Das coll.

Diagnosis : Thorax golden green on dorsum, azure blue on sides marked sparingly with black on dorsum, each side of mid - dorsal carina with pale lilaccous line, a sinuous narrow black humeral stripes. Abd. 10 with narrow X - shaped black marking on dorsum.

Distribution : India : West Bengal (Malda, Hughli, Haora, 24 Parganas & Calcutta), Himachal Pradesh, Madhya pradesh, Uttar Pradesh. Elsewhere : Java, Indochina, Malaysia.

Remarks : Female have similiarity with *P. hypermelas* (but it is distinguisishable by absence of head markings); and *P. spenci* from which it is distinguish able by broader abdominal markings.

18. *Pseudagrion decorum* (Rambur)

1842. *Agrion decorum* Ramb., *Ins. Nevrop*, 258.

1916. *Pseudagrion decorum* : Laidlaw, *Rec. Ind. Mus.*, XII : 24.

1933. *Pseudagrion decorum* : Fraser, *Fauna Brit. India, Odon.*, (1) : 286.

Material : 1 Male, Raiganj, Birnagar, W. Dinajpur, 16. xii. 86, B. C. Das coll.; 1 Male, Nishipur, Malda, 23. xi. 87, T. R. Mitra & party coll.; 1 Male, Kodgram, Raiganj, 14. xii. 86, B. C. Das & Party coll.; 1 Male, Amtala, south 24 Parganas dist., 19. iv. 86, B. N. Das & party coll.; 1 Male, Tulshihata, Malda dist., 25. vi. 87, K. P. Mukherjee 7 party coll.

Diagnosis : Thorax palest blue, with three fine black lines on mid - dorsal carinal ridge and a thicker black humeral stripe. Anal appendage of carneous, superiors azure blue, tipped apically with black, a small basal spine, narrowly bifid at apex. Inferior anal appendage also with a minute black spines on inner side.

Distribution : India : West Bengal (Darjiling, Jalpaiguri, West Dinajpur and Malda, South 24 parganas dists.) Karnataka, Himachal Pradesh, Tamil Nadu, Uttar Pradesh. Elsewhere : Burma, Sri Lanka.

Remarks : Abundantly found in plains, mostly near placid water body, also inhabits in submontane habitats. Male of the species are distinguishable by arrow - head markings on abd. 2. Female are distinguishable by similar marking on abd. 2 from closely similiar species viz. *P. bengalense*, *P. malabaricum* and *P. bengalense*.

19. *Pseudagrion microcephallum* Rambur

1842. *Agrion microcephalum* Ramb., *Ins. Nevrop*, 259.

1976. *Pseudagrion microcephallum* Selys, *Bull. Acad. Belg.* 2, XLii : 504.

1933. *Pseudagrion microcephallum* : Fraser, *Fauna Brit. India, Odon.*, (1) : 278.

Material : 1 Male, Moregram, Phul Bari, Murshidabad dist., 9. ii. 86, i. J. Gupta & party coll., 1 Male, Alipurduar, jalpaiguri dist., 1. i. 87, M. Datta coll., 1 Male Mukutmanipur, Puruliya dist., 28. x. 85, M. Dutta & Party coll.; 1 Male Dhaldanga, Bankura dist., 14. ix. 86, R. S. Barman & party coll.; 1 Male, Amaspur, Murshidabad dist., 8. ii. 87, I. J. Gupta & Party coll., 1 Female Azimganj, Murshidabad dist., 5. ii. 86, I. J. Gupta & party coll.

Diagnosis : Abd. 2 with a goblet shaped dorsal black mark, its stem very short, confluent with a narrow apical black ring, a fine mid - dorsal carinal stripe from middle of cup of goblet extending upto and confluent with a narrow basal ring. Superior anal - appendage expanded on the inner side, 2 to 3 small spines on the inner basal border.

Distribution : India : West Bengal (Bankura, Hughli, Haora, 24 Parganas, Murshidabad Jalpaiguri, Puruliya dists.), Plains of Uttar Pradesh, Bihar, Maharashtra, Madhya Pradesh. Elsewhere : Burma, Sri Lanka, Australia, Java.

Remarks : Inhabits plains, submontane zones. Males are distinguishable by characteristic marking of abd., 2 Females are distinguishable by the black bifid mark on abd. 9 coupled with orange suffusion on the vertex and the upper part of the eyes.

20. *Pseudagrion australasiae* Selys

1876. *Pseudagrion microcephalum* race ? *Bull. Acad. Belg. Sc.* (2) : 42 : 506 (Pars).

1916. *Pseudagrion australasiae* Laidlaw, *Rec. Ind. Mus.* 12 : 21.

1933. *Pseudagrion bengalense* : Fraser, *Fauna Brit. India, Odon.*, (1) : 282.

Material : 1 Female, Illambazar, Birbhum dist., 2. x. 87, M. Prasad coll.

Diagnosis : Face, Frons, vertex and occiput blue/green, marked with black. Thorax azure blue on dorsum and sides marked with humeral and medial black stripes. Two black spots in the middle of mesepimeron and upper end of postero-lateral sutures. Superior anal appendage half the length of abd. 10, apically bifid, hooded strongly inward.

Distribution : India : West Bengal (Birbhum dist.), Assam, Manipur, Meghalaya. Elsewhere : Burma, Indonesia, Thailand, Malaysia, Australia.

Remarks : This species has some similarity with *P. microcephalam*, but is distinguishable from same by elongate vase-shaped spot on abd. 2 instead goblet-shaped and in absence of basal spines.

21. *Pseudagrion spencei* Fraser

1922. *Pseudagrion spencei* Fraser, *Mem. Dep. Agric. India (Ent.)*, 7 : 47.

1933. *Pseudagrion spencei* : Fraser, *Fauna Brit. India Odon.*, (1) : 292.

Distribution : India : West Bengal (Jalpaiguri dist.), Assam, Bihar, Madhya Pradesh, Meghalaya, Uttar Pradesh. Elsewhere : Nepal.

Remarks : This species is included on the basis of the literature review. It has in males unexpanded superior anal appendages inwardly but beset with a long, robust basal spine, pointed acutely.

Subfamily ARGIINAE

This subfamily is represented, in West Bengal, by a single genus viz., *Onychargia* Selys, hence no key is provided. Genus again has got only a single species represented.

Genus 7. *Onychargia* Selys

1865. *Onychargia* Selys, *Bull. Acad. Belg.* (2), XX : 416.

1933. *Onychargia* : Fraser, *Fauna, Brit. India, Odon.* (1) : 416.

22. *Onychargia atrocyana* Selys

1865. *Onychargia atrocyana* Selys, *Bull. Acad. Belg.* (2), XX : 416

1933. *Onychargia atrocyana* : Fraser, *Fauna, Brit. India, Odon.* (1) : 417.

Diagnosis : Hind tibiae with 9 or 10 long, slim spines. Claw hooks at the extreme end of claws, making claw appear bifid. Head, thorax velvety or mat black except labrum and clypeus being glossy black and deep purplish reflex on dorsum of thorax. Abd. too black unmarked in adult; superior anal appendage slightly shorter than abd. 10, unguulate. Inferiors broad at base, subacute at apex.

Material : 1 Female, Hatipahari, Bankura dist., 9. iii. 86, K. P. Mukherjee and Party Coll.; 1 Male, Khajuria, Malda dist., 23. vii. 86, M. S. Shishodia coll.; 1 Female, Belpahari, Medinipur dist., 9. ix. 85, S. Biswas and Party coll.; 1 Male, Puruliya dist.; 14. ix. 87, M. Prasad coll.

Distribution : India : West Bengal (Bankura, Hughli, Haora, Puruliya, Malda, Medinipur dists.), Assam, Karnataka, Kerala. Elsewhere : Burma, Sri Lanka.

Remarks : Inhabits wet sub-montane areas in scattered colonies. These were also observed to follow moving vehicles/trains.

Subfamily AGRIOCNEMINAE

This subfamily is represented in West Bengal by two genera viz., *Argiocnemis* Selys and *Argiocnemis* Selys.

Key to the genera of the AGRIOCNEMINAE

1. Moderately large species, abdomen 28-32 mm. in length, 10 to 12 postnodal nervure in forewing.....*Argiocnemis* Selys
- Relatively smaller species, abdomen 20-25 mm. in length, 6 to 8 postnodal nervure in forewing.....*Argiocnemis* Selys

Genus *Argiocnemis* Selys

1877. *Argiocnemis* Selys, *Bull. Acad. Belg.*, (2), XLIII : 135.

1933. *Argiocnemis* : Fraser, *Fauna Brit. India, Odon.*, (1) : 405

This genus has sole representative viz., *A. rubescens* Selys, not only in West Bengal, but for the whole of India, hence no key is provided.

23. *Argiocnemis rubescens* Selys

1877. *Argiocnemis rubescens* Selys, *Bull. Acad. Belg.*, (2), XLIII : 136.

1933. *Argiocnemis rubescens* : Fraser, *Fauna Brit. India, Odon.*, (1) : 406.

Distribution : India : West Bengal (Calcutta, Darjiling dists.), Assam. Elsewhere : Burma, Malaysia, Indochina, Australia, Java.

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

Genus *Agriocnemis* Selys

1869. *Agriocnemis* Selys, *Pollen and Van Dam, Faune Mad. Ind.*, 24.

1933. *Agriocnemis* : Fraser, *Fauna Brit. India, Odon.*, (1) : 379.

Key to the species of the genus *Agriocnemis* Selys

1. Labrum metallic blue2
- Labrum non-metalic3
2. Superior anal appendages longer than inferiors*pygmaea* (Rambur)
- Superior anal appendage shorter than inferiors.....*femina* (Brauer)
3. Abdomen palest blue, with much restricted black dorsal markings, not obscuring ground colour abd. 4 to 10 unmarked with black*lacteola* Selys
- Abdomen darker blue, black dorsal markings much expanded, obscuring ground colour4
4. Black dorsal markings on abdominal segment 2 without blue eye spots.....
-*splendidissima* LaidLaw
- Black dorsal markings on segments 2 of abdomen with a pair of blue eye spots5
5. Postnodal nervure 8-9 abdominal segment 8 with ventral border azure blue.....
-*aborensis* (LaidLaw)
- Postnodal nervure less than/or 7, abdominal segments 8 entirely black*clauseni* Fraser

24. *Agriocnemis pygmoea* (Ramb.)

1842. *Agriocnemis pygmoea* Ramb. *Ins. Nevrop.*, 278.

1877. *Agriocnemis pygmoea* : Selys, *Syn. Agr. 5 me Legion : Agrion*, (Suite etfin), 52.

1933. *Agriocnemis pygmoea* : Fraser, *Fauna Brit. India, Odon.*, (1) : 398.

Material : 1 Male, Dalringpara, Jalpaiguri dist., 31. xii. 86, M. Datta coll.; 2 Males, Hamiltongunje, Jalpaiguri dist., 28. xii. 86, M. Datta coll.; 2 Males, Balaghat, Tufangonj, Cooch Bihar dist., 12. xii. 86, R. S. Barman and Party coll.; 1 Male, Agri. Farm, Malda dist., 21. xii. 86, B. C. Das coll.; 1 Male, 3 Females, Raiganj, Birnagar, W. Dinajpur dist., 16. xii. 86, B. C. Das & Party coll.; 1 Male Adra, Barddhaman dist., 6. ix. 85, K. K. Ray & Party coll.; 8 Males, 4 Females, Katwa, Budhaman dist., 4. ix. 86, K. K. Ray & Party coll.; 2 Females, 4 Kms. along the southern bank of Birai Jheel, 1 Km east of Bishnupur guest house, Bankura dist., 18. xii. 85, D. K. Mondal & Party coll., 1 Male, Balsur, Birbhum dist., 6. iv. 86, M. S. Shishodia & Party coll.; 1 Male, Mureswar, Birbhum dist., 31. iii. 86, M. S. Shishodia & Party coll.; 1 Male, Rai Dighi, S. 24 Parganas, 26. iv. 86, B. N. Das & Party coll.; 1 Female, Gobindapur, S. 24 Parganas, 27. iv. 86, B. N. Das & Party coll.; 1 Male, 1 Female, Hansimara (Torsa), Jalpaiguri dist., 15. x. 87, S. K. Tandon & party coll.; 2 Males, 1 Female, Mandabari Forest, Chilapata, Jalpaiguri dist., 16. x. 87, S. K. Tandon & Party coll.; 1 Male, 2 Females, Chilkigarl forest, Medinipur dist., 20. xii. 85, A. K. Hazra & Party coll.

Diagnosis : Labrum brilliant metallic blue. Pterostigma pale-yellow in the fore-wing, black in hind. Abd. 1-6 pale greenish yellow (with black marking-broadly on abd. 1, thisle shaped on abd. 2, 3 to 6 broad stripe expanded subapically), abd. 7-10 and anal appendages brick-red in male yellow in female, vulvar scale robust.

Distribution : India : West Bengal (Cooch Bihar, Jalpaiguri, Malda, West Dinajpur, Birbhum, Bankura, Barddhaman, South 24 Parganas, Haora, Calcutta dists.), Assam, Himachal Pradesh, Tamil Nadu, Kerala, Manipur, Nicobar, Punjab, Rajasthan, Uttar Pradesh. Elsewhere : Sri Lanka, China, Burma, Malaysia, Indonesia New Guinca, Taiwan, Philippines, Australia, Pacific Island, Seychelles.

Remarks : This is one of the smallest damselfly (abdomen 15-18 mm.) found in India. This inhabits wide ranging aquatic ecosystems. Males are distinguishable by different colour in pterostigma of fore and hind wings and female with and unenclosed antehumeral stripes.

25. *Agriocnemis femina* (Brauer)

1868. *Ischnura femina* Brauer, *Verh. Zool. bot. Ges. Wien*, XVIII : 554.

1890. *Agriocnemis femina* : Kirby, *Cat. Odon.*, : 158.

1933. *Agriocnemis femina* : Fraser, *Fauna Brit. India, Odon.*, (1) : 402.

Distribution : India : West Bengal, Assam. Elsewhere : Burma, South China, Philippines, Annam, Sumatra, Java, Borneo, Singapore, Lombok, N. Celebes, Amboina and Darnley Island.

Remarks : This species is included on the basis of the literature review. The male anal appendages are of remarkable shape by which it is distinguishable from all other species. Superior narrow at base expands apically with a small curved blackish spine at the upper outer angle, a short spine at lower and a long thin narrow spine below at base. Inferior twice in length of superior with obtuse apex, beset with tuft of stiff bristles.

26. *Agriocnemis lacteola* Selys

1877. *Agriocnemis lacteola* Selys, *Bull. Acad. Belg.* (2), XLIII : 144.

1933. *Agriocnemis lacteola* : Fraser, *Fauna Brit. India, Odon.*, (1) : 381.

Material : 1 Male, Taldangra, Bankura dist., 4. ix. 87, M. Prasad coll.; 1 Male, Birbhum dist., 6. x. 87, M. Prasad coll.

Diagnosis : Labrum non-metallic. Anterior lobe of prothorax creamy white, posterior lobe finely margined with white and is produced squarely back at its central part. Legs white. Anal appendages blue or pale blue. Superior broadly triangular laterally, obtusely pointed. Inferior very short almost entirely covered under abd. 10 beset with a robust spine directed upwards, another shorter directed inward.

Distribution : West Bengal (Jalpaiguri and 24 Parganas dists.), Assam, Bihar, Meghalaya, Sikkim, Tripura.

27. *Agriocnemis splendidissima* Laidlaw

1919. *Agriocnemis splendidissima* Laidlaw, *Rec. Ind. Mus.*, XVI : 180.

1933. *Agriocnemis splendidissima*, Fraser, *Fauna Brit. India, Odon.*, (1) : 392.

Material : 1 Male, 1 Female, Bijan Bari Forest, Raja Bhathkhawa Jalpaiguri dist., 19. iii. 86. A. K. Hazra and Party coll., 1 Male, Sonapur, Koch Bihar, Dist., 1. v. 87, RajRam and Party coll., 1 Male, Kanakshyaguri, Jalpaiguri dist., 7. v. 87, Raja Ram & Party coll.

Diagnosis : Comma-shaped blue post-ocular spots with a line of same colour in between but not connecting. Posterior lobe of prothorax produced quadrately in its middle. Superiors long, narrow, curved slightly inwards devoid of ventral spine. Inferior less than half in length of superior, with a rudimentary upper and posterior obtuse spine.

Distribution : India : West Bengal (Koch Bihar, Haora, Jalpaiguri dists.), Madhya Pradesh, Maharashtra, Kerala.

Remarks : Frequently inhabits bed of running water body; streams etc. in shallow zone with sprouting aquatic vegetation. This species is distinguishable from *A. clauseni* by absence of enclosed eye spot on dorsum of abd. 2 and also by presence of alternating black and blue stripes on abdomen laterally. From *A. pygmaeae* and *A. femina* it is distinguishable by absence of anal spines on anal appendages, besides certain other features as well.

28. *Agriocnemis aborensis* (Laidlaw)

1914. *Agriocnemis aborensis* Laidlaw, *Rec. Ind. Mus.*, VIII : 347.

1933. *Agriocnemis aborensis* : Fraser, *Fauna Brit. India, Odon.*, (1) : 394.

Distribution : India : West Bengal (Jalpaiguri dist.), Assam.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from all other species of the genus by two large black spots on labrum, abd. 9 blue with black row of spines, abd. 10 blue with black at apical border and mid-dorsal carina narrowly black and also by the shape of anal appendages.

29. *Agriocnemis clauseni* Fraser

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

1933. *Agriocnemis clauseni* : Fraser, *Fauna Brit. India, Odon.*, (1) : 390.

Distribution : India : West Bengal, Assam, Meghalaya, Punjab, Uttar Pradesh. Elsewhere : Burma, Thailand.

Remarks : This species is included on the basis of the literature review. This species has characteristic markings on abd. 7 (blue, less than apical 1/4 ringed with black, with a quadrate mid-dorsal basal black spot connected to base and apical black by a fine carinal black line) which differentiates it from closely allied *A. nana* and *A. naia*. These are known only from Burma.

Subfamily COENAGRINIINAE

This subfamily is represented in West Bengal by 2 genera viz., *Coenagrion* Kirby and *Himalagrion* Fraser.

Key to the genera of COENAGRINIINAE

- 1 (a) Basal side of discoidal cell in fore wing equal to costal ab arising slightly proximal to ac, 15-17 postnodal nervure *Himalagrion* Fraser
 1 (b) Basal side of discoidal cell in fore wing shorter than costal side, ab arising well proximal to ac, 7-10 postnodal nervure..... *Coenagrion* Kirby

Genus *Himalagrion* Fraser

1919. *Himalagrion* Fraser, *Rec. Ind. Mus.*, XVI : 452.

1933. *Himalagrion* : Fraser, *Fauna Brit. India, Odon.*, (1) : 330.

This genus has sole representative viz., *H. exclamatoris* Fraser, not only in West Bengal but for the whole of India, hence no key is provided.

30. *Himalagrion exclamatoris* Fraser

1919. *Himalagrion exclamatoris* Fraser, *Rec. Ind. Mus.*, XVI : 453.

1933. *Himalagrion exclamatoris* : Fraser, *Fauna Brit. India, Odon.*, (1) : 331.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This species, due to its bold and beautiful blue markings in clear contrast of black ground colour, large triangular postocular spots, shape and size of annal appendages, is distinguishable from species of closely look-alike coenagrionid species of the genera *Pseudagrion* and *Ceragrion*.

Genus *Coenagrion* Kirby

1775. *Agriion* Fabricius, *Syst. Ent.*, : 425.

1890. *Coenagrion* Kirby, *Cat. Odon.*, (1) : 148.

1933. *Coenagrion* : Fraser, *Fauna Brit. India, Odon.*, (1) 412.

This genus has sole representative viz., *C. dyeri* Fraser, not only in West Bengal but for the whole of India, hence no key is provided.

31. *Coenagrion dyeri* Fraser

1919. *Agriocnemis dyeri* Fraser, *Rec. Ind. Mus.*, XVI : 451.

1923. *Coenagrion dyeri*, Fraser, *J. Bombai nat. Hist. Soc.*, XXIX : 748.

1933. *Coenagrion dyeri* : Fraser, *Fauna Brit. India, Odon.*, (1) 413.

Material : 1 Female, Barhampur, Gorabazar, Murshidabad dist., 25. ii. 86, S. K. Mitra coll.; 1 Male, Jiyaganj, Raichandpur, Murshidabad dist., 6. ii. 86, I. J. Gupta coll.

Diagnosis : Labrum with a minute medial basal spot of black pyriform blue postocular spots, no frontal ridge on head. Superior anal appendage widely divaricate, truncate ending in a acute apex, inner border produced into a long robust spine. Inferior very short, white, tumid processes.

Distribution : India : West Bengal (Haora, Murshidabad dists.), Himachal Pradesh, Madhya Pradesh, Uttar Pradesh and Western Ghat. Elsewhere : Upper Burma, Maymyo.

Remarks : This species is known to inhabit submontane water body-stagnant weedy ponds.

Family PLATYSTICTIDAE

This family is represented under single sub-family Platystictinae, hence no key is provided. This subfamily is characterised by having "Origin of Irii nearer to node than pterostigma and cup markedly reduced-ending at or before halfway along posterior border of wing"

Key to genera of subfamily PLATYSTICTINAE

- 1 (a) Nervure ab entirely absent in all wings, body coloured steel black marked with white and turquoise blue*Protosticta* Selys
 1 (b) Nervure ab present in all wings, body coloured blackish brown marked with ochreous, yellow and light blue*Drepanosticta* Selys

Genus *Protosticta* Selys

1885. *Protosticta* Selys, *C. R. Soc. Ent. Belg.*, XXIX., CXLV.

1933. *Protosticta* : Fraser, *Fauna Brit. India, Odon.*, (1) 101.

This genus is represented in West Bengal by a single species, hence no key is provided. Species in particular is characterised by having a long inwardly directed finger-like medial spine to inferior appendage.

32. *Protosticta himalica* Laidlaw

1917. *Protosticta himalica* Laidlaw, *Rec. Indian Mus.*, XIII : 342.

1933. *Protosticta himalica* : Fraser, *Fauna Brit. India, Odon.*, (1) 115.

Distribution : India: West Bengal (Darjiling dist.), Assam, Sikkim.

Remarks : This species is included on the basis of the literature review. This is a species inhabiting montane and sub-montane zone. Anal appendage of male of the species are strikingly different from other species of genus. This coupled with the abdominal marking makes it easily distinguishable.

Genus *Drepanosticta* Selys

1860. *Platysticta* Selys, Pars, *Bull. Acad. Belg.* (2), X : 436.

1933. *Platysticta* : Fraser, *Fauna Brit. India, Odon.*, (1) : 141.

This genus is represented by one species in West Bengal, hence no key is provided. Same is characterised by reddish brown body marked with blue, well defined blue stripes on thorax.

33. *Drepanosticta polychromatica* Fraser

1931. *Drepanosticta polychromatica* Fraser, *J. Bombay Nat. Hist. Soc.*, XXXV : 338.

1933. *Drepanosticta polychromatica* : Fraser, *Fauna Brit. India, Odon.*, (1) : 144.

Material : 1 Male, Andharikhola Stream, Rangpoo, Darjiling dist., 15. v. 87, Raja Ram and Party coll.

Diagnosis : Pterostigma : Pterostigma quadrate, dark brown, finely framed in creamy white and thick black nervures vein Cuii only 7 cells long in fore-wing, 10 in the hind. Abd. 8, 9 broadly pale azure blue, abd. 10 black.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is distinguishable from closely allied species *D. carmichali* in having well defined blue stripes on thorax, thorax pale on the under surface (instead of blackish brown), pterostigma almost squared (instead being longer than broad) in the shape of superior anal appendages of male.

Family PROTONURIDAE

This family is represented, in West Bengal by a single genus under subfamily Caconeurinae, hence no key is provided. Later is characterised by having long obtuse ventral process to the superior anal appendage.

Genus *Caconeura* Kirby

1890. *Caconeura* Kirby, *Cat. Odon.*, 132.

1933. *Caconeura* : Fraser, *Fauna Brit. India, Odon.*, (1) : 210.

This genus has a single species in West Bengal, hence no key is provided. Same is characteristically small species with Cuii extending to the middle of the wing, post nodal not more than 12.

34. *Caconeura o'doneli* Fraser

1923. *Caconeura O'doneli* Fraser, *J. Bombay Nat. Hist. Soc.*, XXIX : 743.

1933. *Caconeura O'doneli* : Fraser, *Fauna Brit. India, Odon.*, (1) : 225.

Distribution : India : West Bengal.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from *C. nigra* Fraser (known from lower Burma) in having 12 to 13 postnodal nervures fore-wing, 11 to 12 in hind (instead of 15 and 13 respectively) and complete absence of nervure ab in all wings.

Family PLATYCNEMIDIDAE

This family has two subfamilies under which 8 species, 3 genera are represented in West Bengal.

Key to subfamilies and genera

1. Male tibiae dilated, often greatly so PLATYCNEMININAE Fraser 2
Male tibiae never dilated CALICNEMINAE Fraser 3
2. Second antennal segment as long as or even longer than third, anal appendage in male less homogeneous, variable..... *Copera* Kirby
3. Wings petiolated to the level of ac, RIV + V arising only a little proximal to the level of node *Coliccia* Kirby
Wings petiolated a little proximal to ac, RIV + V arising well proximal subnode.....
..... *Calicnemia* Selys

Subfamily PLATYCNEMININAE Fraser

Genus *Copera* Kirby

1863. *Psilocnemis* Selys, *Bull. Acad. Belg. Sci.* (2) 16 : 168.

1890. *Copera* Kirby, *Syn. Cat. Neur. Odon.*, : 129.

1933. *Copera* : Fraser, *Fauna Brit. India, Odon.*, (1) : 191.

Key to the species of *Copera*

1. Meso and Meta-thoracic tibiae white and widely dilated2
Meso and Meta-thoracic tibiae yellow, reddish or brownish3
2. Legs very long, second abd. black on dorsum without marking/spot, inferior anal appendage arched and black at apical extremity *annulata* Selys
Legs very short, second abd. black on dorsum and marked with 2 dorsal blue spot, inferior anal appendage straight, white at apical extremity *superplatypes* Fraser
3. Superior anal appendage only 1/4 on length of inferiors, prothorax of female with no spine on posterior lobe *marginipes* Rambur
Superior anal appendage at least 1/2 in length of inferiors, prothorax of female with a pair of divergent slender, forwardly directed spine *vittata* Selys

35. *Copera annulata* Selys

1863. *Psilocnemis annulata* Selys, *Bull. Acad. Belg. Sci.* (2) : 16 : 172.

1890. *Copera annulata* : Kirby, *Syn. Cat. Neur., Odon.*, : 129.

1933. *Copera annulata* : Fraser, *Fauna Brit. India, Odon.*, (1) : 203.

Material : 1 Male, Kanchanpur forest, Bankura dist., 10. iii. 86, K. P. Mukherjee and Party coll.

Diagnosis : Frons and vertex with a broad bronzed black triangular area. Two hind pairs of tibiae white and widely dilated, hind femora extending nearly to end of abd. 2. Abd. 2 wholly black on

dorsum. Superiors conical, triangular, apex acute, inferiors broad at base, tapered to acute apex, curved strongly downwards and very slightly inwards.

Distribution : India : West Bengal (Bankura, Hughli, Haora & 24 Parganas dists.), Assam, Himachal Pradesh, Manipur, Meghalaya, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu. Elsewhere : China, Indochina, Malaysia, Indonesia, Japan, Taiwan.

Remarks : This species inhabits weedy ponds and small lakes. This species is distinguishable from other species of the genus in having marked black colour marked by pale blue markings, possessing broadly dilated white tibiae.

36. *Copera superplatypes* Fraser

1927. *Copera superplatypes* Fraser, *Rec. Indian Mus.*, XXIX, 88.

1933. *Copera superplatypes* : Fraser, *Fauna Brit. India, Odon.*, (1) : 206.

Distribution : India : West Bengal (Jalpaiguri dist.).

Remarks : This species is included on the basis of the literature review. This species is distinguishable from *C. annulata* by having broad pale blue stripes traversing the vertex from eye to eye (instead of broad black triangular markings), short legs, tibiae of two hind legs enormously dilated (instead of long legs and not so enormously dilated tibiae) and inferior anal appendage straight (instead of incurved).

37. *Copera vittata* (Selys)

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

1890. *Copera vittata* (Selys) : Kirby, *Syn. Cat. Neur. Odon.*, 129.

1933. *Copera vittata* (Selys) : Fraser, *Fauna Brit. India, Odon.*, (1) : 198.

Material : 1 Male, Chilapali, Bania Forest, Jalpaiguri dist., 14. x. 87, S. K. Tandon and Party coll.

Diagnosis : Postclypeus, frons and vertex jet black, broad bluish green stripe extending from eye to eye on vertex. Posterior lobe of prothorax rounded in male, in female deeply notched, angles of lobes with fine, widely divergent spines underneath of thorax pale with 3 large black spots. Inferior anal appendage almost double in length of superior.

Distribution : India : West Bengal (Jalpaiguri dist.), Kerala, Karnataka, Tamil Nadu, Assam. Elsewhere : Lower Burma, Siam.

Remarks : This species is distinguishable from its closely alike species *C. assamensis*, in having shorter legs, tibiae dilated, citron-yellow or brick-red (instead of tibiae not dilated, brownish), and female with divergent species to the posterior lobe of prothorax (instead of less divergent spines).

38. *Copera marginipes* Rambur

1842. *Platycnemis marginipes* Rambur, *Hist. nat. Ins. Nevrop.*, 240.

1863. *Psilocnemis marginipes* (Rambur) : Selys, *Bull. Acad. Belg. Sci.* (2), 16 : 168.

1890. *Copera marginipes* (Rambur) : Kirby, *Syn. Cat. Neur. Odon.*, : 129.

1933. *Copera marginipes* : Fraser, *Fauna Brit. India, Odon.*, (1) : 192.

Material : 1 Male, Banglagram, Batanagar, 24 Parganas dist., 30. x. 74, Raja Ram coll., 1 Male, Hamiltongunge, Jalpaiguri dist., 28. xii. 86, M. Datta coll.

Diagnosis : Inferior anal appendages at least four times in length of superior, broad at base, tapering but a slightly to a rounded obtuse apex. Superior vestigial, tiny rounded tubercles, apex pointed hooked strongly inwards.

Distribution : India : West Bengal (Calcutta, 24 Parganas & Jalpaiguri dists.), Assam, Bihar, Goa, Himachal Pradesh, Maharashtra, Meghalaya, Tamil Nadu, Uttar Pradesh. Elsewhere : China, Sri Lanka, Burma, Thailand, Malaysia, Indonesia, Taiwan, Java, Siam.

Remarks : This species is known to have number of varities. Fraser (1933) has recognized and described "Ceylon form" West coast form; Deccan form, Assam form, Bengal form, Present material agrees with the Bengal form of Fraser.

Subfamily CALICNEMINAE Fraser
Genus *Coellicia* Kirby

1857. *Trichocnemis* Selys, Sagra, *Hist. Cuba, Ins.*, : 464.

1980. *Coellicia* Kirby, *Cat. Odon.*, : 128.

1933. *Coellicia* : Fraser, *Fauna Brit. India, Odon.*, (1) : 152.

This genus is represented by a single species in West Bengal, hence no key is provided.

39. *Coellicia renifera* Selys

1886. *Coellicia renifera* Selys, *Mem. cour.*, XXXVIII : 119.

1890. *Coellicia renifera* Kirby, *Cat. Odon.*, : 128.

1933. *Coellicia renifera* : Fraser, *Fauna Brit. India, Odon.*, (1) : 156.

Distribution : India : West Bengal (Darjiling dist.), Assam, Sikkim, Himachal Pradesh.

Remarks : This species is included on the basis of the literature review. This species has characteristic paired, oval pale blue spots, on two sides of mid-dorsal carina.

Genus *Calicnemia* Selys

1863. *Calicnemia* Selys, *Bull. Acad. Belg. Sci.*, (2), 16 : 159.

1926. *Calicnemia* Strand, *Arch. Naturgesch.*, 92A : 46.

1987. *Calicnemia* : Lahiri, *Rec. zool. Surv. India, Occ. Paper No. 99* : 78.

Key to the species of the genus *Calicnemia*

1. Head entirely black underneath, abdomen black without markings*pulverulans* Selys
Head yellow underneath, abdomen red2
2. Abdomen bioght vermilion-red, without markings, thorax with a small but conspicuous upper post-humeral spot 14 to 17 postnodal nervures in fore-wing, 13 in the hin ...*eximia* Selys
Abdomen red, with black markings on abd. 7 to 10, thorax without upperpost, humeral spot, 19-20 postnodal nervure to fore-wing, 17 to 18 in hind*miniata* Selys

40. *Calicnemia eximia* Selys

1863. *Calicnemia eximia* Selys, Bull. Acad. Belg., (2), XVI : 160.

1963. *Calicnemis (Calicnemia) eximia* : Fauna Brit. India, Odon., (1) : 174.

1987. *Calicnemis eximia* : Lahiri, Rec. zool. Surv. India, Occ. Paper No. 99 : 79.

Material : 2 Females, Andheri Khola, stream, Darjiling dist., 15. v. 87, Raja Ram and Party coll.

Diagnosis : Thorax black on dorsum, abdomen bright vermilion red, without any markings. Anal appendage bright yellow of equal length, superior acute at apex with a long ventral subbasal spine.

Distribution : India : West Bengal (Darjiling dist.), Himachal Pradesh, Meghalaya, Uttar Pradesh. Elsewhere : Nepal, Burma, Vietnam.

Remarks : This species is quite distinguishable by its conspicuous bright vermilion red abdomen, without markings.

41. *Calicnemia pulverulens* Selys

1886. *Calicnemis pulverulans* Selys, Mem. Cour., 38 : 133.

1936. *Calicnemis pulverulans* : Fraser, Fauna Brit. India, Odon., (1) : 175.

Distribution : India : West Bengal (Darjiling dist.), Sikkim.

Remarks : This species is included on the basis of the literature review. Known to inhabit submontane and montane upto an altitude of 1500 meters. Male of this species have extreme melanism.

42. *Calicnemia miniata* Selys

1886. *Calicnemis miniata* Selys, Mem. Cour., 38 : 132.

1933. *Calicnemis (=calicnemis) miniata* : Fraser, Fauna Brit. India, Odon., (1) : 177.

Material : 1 Male, 1 Female, Andheri Khola stream Rangpoo, Darjiling dist., 19. v. 87, Raja Ram and Party coll., 2 Males, 2 Females, Mallikhola, Rangpoo, Darjiling dist., 16. v. 87, Raja Ram and Party coll.; 1 Female, Balarpur, Birbhum, 15. iii. 86, K. P. Mukherjee and Party coll.; 1 Male, 1 Female, Bankura, 11. iii. 86, K. P. Mukherjee and Party coll.

Diagnosis : Prothorax, thorax black; former with a large reddish spot on each side of middle lobe, later with narrow bright red antehumeral stripes. Pterostigma distinctly diamond-shaped. Abdomen blood red 1 to 7 (basal 1/3), 8-10 black. Pterostigma in female longer, not diamond shape. Abd. 1-6 (2/3 basal), 7-10 black.

Distribution : India : West Bengal (Bankura, Birbhum, Darjiling dists.), Sikkim.

Remarks : This species has anal appendages similar to *C. eximia*, but inferiors are much longer sinuous, apices sloping inwards and meeting. From *C. miles* by higher postnodal nervures (18-21 : 14-15) and pterostigma longer, rhomboidal instead of being diamond shaped, shorter.

Superfamily LESTOIDEA
Family CHLOROLESTIDAE

This family is represented by 2 species under a single genus and the single family of Megalestinae, hence no key is provided.

Genus *Megalestes* Selys

1862. *Megalestes* Selys, *Bull. Acad. Belg. Sci.*, (2), 13 : 293.
 1933. *Megalestes* : Fraser, *Fauna Brit. India, Odon.*, (1) : 20.

Key to species of genus *Megalestes*

- 1 (a) Thorax black beneath not pruinosed, inferior anal appendages not rudimentary, with two long strongly imbericated spine*irma* Fraser
 Thorax pale yellow beneath or pruinosed white inferior anal appendage rudimentary, rounded with a moderately robust short spine*major* Selys

43. *Megalestes irma* Fraser

1926. *Megalestes irma* Fraser, *J. Darjiling Nat. Hist. Soc.*, 32 : 38.
 1933. *Megalestes irma* : Fraser, *Fauna Brit. India, Odon* (1) : 23.

Distribution : India : West Bengal (Darjiling dist.), Sikkim.

Remarks : This species is included on the basis of the literature review. Inferior appendages with two-apical subapical, spines instead of only on of *M. major*. It also differs in length of abdomen (60-65 : 48-54 mm.) and more post nodal nervure (18-24 : 16-21).

44. *Meglestes major* Selys

1862. *Meglestes major* Selys, *Bull. Acad. Belg.* (2) XIII : 293.
 1933. *Meglestes major* : Fraser, *Fauna Brit. India, Odon.*, (1) : 21.

Distribution : India : West Bengal (Darjiling dist.), Assam, Uttar Pradesh, Sikkim. Elsewhere : Nepal, Bhutan, China, Burma, Vietnam, Taiwan.

Remarks : This species is included on the basis of the literature review. This species is montane and submontane and known to occur upto an approximate altitude of 3000 meters.

Family LESTIDAE

This family is represented in West Bengal by 4 genera under subfamily Lestinae. Since there is only one subfamily represented no key is provided, however key to genera and species involved are provided.

Key to genera of LESTINAE

1. Pterostigma quadrate or subquadrate thoracic marking reduce to scattered spots.....
*Platylestes* Selys
 Pterostigma elongate, thoracic marking when present not scattered but lineate or irregular2
 2. Riii arising 3 to 4 cells beyond node3
 Riii arising 7 or more cells beyond node, wings of males broadly branded or spotted.....
*Orolestes* Needham
 3. Pterostigma unicolours narrow more than twice the width not broad in middle, wing hyaline untinged, ab meeting ac*Ceylonolestes* Kenedy
 Pterostigma rectangular a little broad in middle, wing hyaline, may be partly enfumed, ab at or proximal to ac*Lestes* Leach

Genus *Platylestes* Selys

1862. *Platylestes* Selys, *Bull. Acad. Belg.* (2), XIII : 337.

1933. *Platylestes* : Fraser, *Fauna Brit. India, Odon.*, (1) : 58.

There is only one species under this genus, hence no key is provided.

45. *Platylestes platystyla* (Rambur)

1842. *Lestes platystyla* Rambur, *Ins. Nevrop.*, : 254.

1862. *Platylestes patystyla* Selys, *Bull. Acad. Belg.* (2), VIII : 338.

1933. *Platylestes platystyla* : Fraser, *Fauna Brit. India, Odon.*, (1) : 59.

Distribution : India : West Bengal (Calcutta and Jalpaiguri dists.). Elsewhere : Burma, Iraq.

Remarks : This species is included on the basis of the literature review. This species has quadrate pterostigma which distinguishes it from all species of *Lestes*.

Genus *Orolestes* Mc Lachlan

1895. *Orolestes* Mc Lachlan, *Ann. Mag. nat. Hist.*, (6) : 16.

1933. *Orolestes* : Fraser, *Fauna Brit. India, Odon.*, (1) : 25.

There is only one species under this genus, hence no key is provided.

46. *Orolestes selysi* McLachlan

1895. *Orolestes selysi* Mc Lachlan, *Ann. Mag. nat. Hist.*, (6) : 16.

1933. *Orolestes selysi* : Fraser, *Fauna Brit. India, Odon.*, (1) : 26.

Distribution : India : West Bengal (Darjiling dist.)

Remarks : This species is included on the basis of the literature review. Wings of this species are known to be partly hyaline partly blackish brown (which differentiates it from other members of Lestids having wholly hyaline and uncoloured).

Genus *Ceylonolestes* Kennedy

1920. *Ceylonolestes* Kennedy, *Ohio Journ. Sci.*, 16 (2) : 84.

1933. *Ceylonolestes* : Fraser, *Fauna Brit. India, Odon.*, (1) : 62.

There is only one species under this genus represented in West Bengal, hence no key is provided. This single species is characteristically much larger than all other species of the genus.

47. *Ceylonolestes cyanea* (Selys)

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

1930. *Ceylonolestes cyanea* Fraser, *J. Bombay Nat. Hist. Soc.*, XXXIV : 99.

1933. *Ceylonolestes cyanea* : Fraser, *Fauna Brit. India, Odon.*, (1) : 74.

Distribution : West Bengal (Darjiling dist), Himachal Pradesh, Punjab.

Remarks : This species is included on the basis of the literature review. This species is montane and submontane and is known to occur upto an approximate altitude of 3000 meters.

Genus *Lestes* Leach

1815. *Lestes* Leach, in Burmeister, Edinb. *Encycl.*, 9 : 137.

1933. *Lestes* Leach : Fraser, *Fauna Brit. India, Odon.*, (1) : 29.

There is only one species under this genus represented in West Bengal, hence no key is provided. This single species has characteristically vertex of head mat black.

48. *Lestes thoracica* Laidlaw

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

1933. *Lestes thoracica* : Fraser, *Fauna Brit. India, Odon.*, (1) : 56.

Distribution : India : West Bengal, Orissa, Bihar, Uttar Pradesh.

Remarks : This species is included on the basis of the literature review. This species is devoid of metallic pigments on the thorax and mat black on the vertex of head.

Superfamily CALOPTERYGOIDEA

Family AMPHIPTERYGIDAE

This family is represented, in West Bengal, by a single subfamily-Philoganginae and again a single genus *Philoganga* Selys single species viz., *Philoganga montana* (Selys). It is therefore, key of respective taxa are not provided.

Genus *Philognaga* Kirby

1859. *Anisoneura* Selys, *Bull. Acad. Belg.*, (2) VII : 444.

1890. *Philoganga* Kirby, *Cat. Odon.*, : 111

1934. *Philoganga* : Fraser, *Fauna Brit. India, Odon.*, (2) : 114.

49. *Philoganga montana* (Selys)

1859. *Anisopleura montana* Selys, *Bull. Acad. Belg.*, (2) : Vii : 445.

1890. *Philoganga montana* Kirby, 1 c. p. 111.

1936. *Philganga montana* : Fraser, *Fauna Brit. India, Odon.*, (2) : 114.

Distribution : India : West Bengal (Darjiling dist.), Assam, Meghalaya.

Remarks : This species is included on the basis of the literature review. It inhabits vegetation in vicinity of the montane streams.

Family CHLOROCYPHIDAE

This family is represented in West Bengal by a single genus *Rhinocypha* Rambur, there is no subdivision of this into subfamily. No key is, therefore, provided. Key to species under above genus is given.

Genus *Rhinocypha* Rambur

1831. *Agrion* Guerin *Mag. Zool. Ins.* 1 : 15.

1842. *Rhinocypha* : Rambur, *Ins. Nevrop*, 232.

1936. *Rhinocypha* : Fraser, *Fauna Brit. India, Odon.*, (2) : 5.

Key to species under genus *Rhinocypha*

Rhinocypha is represented in West Bengal by 9 species, whose key are indicated hereunder :-

1. Wings coloured in male2
Wings uncoloured in both sexes.....*immaculata* Selys
2. Dorsal mesothoracic triangle coloured, extending as far as base of wings.....3
Dorsal mesothoracic triangle absent, uncoloured or extending not more than half way upto wing base8
3. Hindwings of male with opaque vertical bands4
Hindwings of male as whole opaque with vitreous spots5
4. Hindwing narrowly black apically, black vertical band halfway between pterostigma and node...
.....*bifasciata* Selys
Hindwing, besides above, has additional incomplete black band at level of node5
5. Apical, medial and nodal bands separated*trifasciata* Selys
Above three bands connected narrowly on costal and hinder wing borders*bifenestrata* Fraser
6. Large apical vitreous spot on costal side separated by not more than 1 or 2 rows of cells.....
.....*cuneata* Selys
Large apical vitreous spot on costal side separated by 3 or 4 row of cells.....7
7. Apical vitreous spot moderately small, located just underneath pterostigma.....
.....*fenestrella* Rambur
Apical vitreous spot moderaterly large, located partly proximal to pterostigma.....
.....*quadrifasciata* Selys
8. Hindwing a large subquadrate violetgreen vitreous spot at its centre larger species (abdomen : 24-26 mm., hindwing : 26-30 mm.)*unimaculata* Selys
Hind-wing with a medial row of vitreous spots and an inner linear spot, smaller species (abdomen 20-22 mm., hindwing : 22-23 mm.)*ignipennis* Selys

50. *Rhinocypha bifasciata* Selys

1879. *Rhinocypha bifasciata* Selys, *Bull. Acad. Belg.* (2), XLViii : 386.

1933. *Rhinocypha bifasciata* : Fraser, *Fauna Brit. India, Odon.*, (2) : 29.

Distribution : India : West Bengal (Darjiling dist.), Assam.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from other Indian species of the genus by two bands, one at apex another a little distance on inner side of pterostigma, of hind-wings.

51. *Rhinocypha immaculata* Selys

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

1933. *Rhinocypha immaculata* : Fraser, *Fauna Brit. India, Odon.*, (2) : 35.

Distribution : India : West Bengal (Darjiling dist.), Meghalaya, Uttar Pradesh.

Remarks : This species is included on the basis of the literature review. This species is characteristic in its wing lacking any marking or even vitreous iridescence in quite contrast to other Indian species of the genus.

52. *Rhinocypha trifasciata* Selys

1853. *Rhinocypha trifasciata* Selys, *Syn. Cal.*, 61.

1934. *Rhinocypha trifasciata* : Fraser, *Fauna Brit. India, Odon.*, (2) : 31.

Distribution : India : West Bengal, Punjab, Uttar Pradesh.

Remarks : This species is included on the basis of the literature review. There are three opaque bands on the hind-wings, which are variable in shape and length and differs from *R. bifasciata* Fraser, with two bands only.

53. *Rhinocypha bifenestrata* Fraser

1922. *Rhinocypha bifenestrata* Fraser, *Mem. Dept. Agric. India, (Ent.)*, VII (7) : 63.

1934. *Rhinocypha bifenestrata* : Fraser, *Fauna Brit. India, Odon.*, (2) : 39.

Material : 1 Male, 1 Km. W. of Rayang, F. R. House, 30. 4. 72, H. S. Sharma and Party coll.

Diagnosis : Prothorax black, unmarked. Thorax and abdomen black, Former marked with yellow. Wings opaque, Two large vitreous spots enclosed in opaque zone formed by fasion of 3 broad bands. Area of opaque band and vitreous spot variable. Pterostigma black, its outer 3/4 white.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This is known to occur at an altitude upto 3200 meters. This species has more similarity with *R. cuneata*, from which it differs in having opaque area of fore-wing covering lesser area.

54. *Rhinocypha cuneata* Selys

1853. *Rhinocypha cuneata* Selys, *Syn. Cal.*, 60.

1934. *Rhinocypha cuneata* : Fraser, *Fauna Brit. India, Odon.*, (2) : 9.

Distribution : India : West Bengal (Darjiling dist.), Assam.

Remarks : This species is included on the basis of literature review. This species is having its apical vitreous spot of fore-wing extending upto one or two cells of costal margin.

55. *Rhinocypha fenestrella* Rambur

1842. *Rhinocypha fenestrella* Rambur, *Ins. Nevrop*, 236.

1936. *Rhinocypha fenestrella* : Fraser, *Fauna Brit. India, Odon.*, (2) : 17.

Material : 1 Male, 1 Female, Serek forest, Darjiling dist., 12. v. 87, Raja Ram amd Party coll.

Diagnosis : The opaque area in the fore-wing extends to anterior 3/4 to 1/2. Underneath the thorax of female has two yellow long spots of broad dagger shape in which it differs from the female of *R. quadrimaculata*.

Distribution : India : West Bengal (Darjiling dist.). Elsewhere : China Borneo, Burma.

Remarks : This species has much wider expanse distribution. It has characteristic apical spot on the hind-wing just underneath pterostigma.

56. *Rhinocypha quadsimaculata* Selys

1853. *Rhinocypha quadsimaculata* Selys, *Syn. Cal.*, 60.

1933. *Rhinocypha quadsimaculata*, Fraser, *Fauna Brit. India, Odon.*, (2) : 14.

Material : 1 Male, Andherikhola stream, Rangpo, Darjiling dist., 15. v. 87, Raja Ram and Party coll., 1 Male, Jayanti, Jalpaiguri dist., 17. xii. 88, R. S. Barman and Party coll.

Diagnosis : Reticulation very close, hind-wing broader, dilated in the middle, apical vitreous spot transversely elongate, extending one cell row posterior to IRiii, Middle row of spots 3 in number, of these middle one shorter than the hinder spot. Vitreous stripes extending distalwards into opaque area for a distance of 7-8 cells.

Distribution : India : West Bengal (Darjiling, Jalpaiguri dists.), Assam, Himachal Pradesh, Kashmir, Meghalaya, Sikkim, Uttar Pradesh. Elsewhere : Nepal, Burma.

Remarks : This species is one of the smallest representative of the genus. It can be distinguished from *R. spuria* in having very close reticulation instead of open, vitreous strip extending in opaque area upto 7-8 cells instead of 3-5 and apical vitreous spot transversely elongate instead of nearly square.

57. *Rhinocypha unimaculata* Selys

1853. *Rhinocypha unimaculata* Selys, *Syn. Cal.*, 61.

1934. *Rhinocypha unimaculata* : Fraser, *Fauna Brit. India, Odon.*, (2) : 27.

Material : 1 Female, Andherikhola, stream, Rangpo, Darjiling dist., 4. v. 87, Raja Ram and Party coll. Male Mollikhola, Darjiling dist., 16. v. 87, Raja Ram and Party coll.

Diagnosis : Wings enfumed. Fusion of middle series of vitreous spot results in a large median spot. Prolong, diffused, streak between Iriii and Riv+V, same area considerably darker in the hind wings, brilliant coppery red in both wings.

Distribution : India : West Bengal (Darjiling dist.), Assam.

Remarks : This is a montane species known to occur upto an altitude of 1500 meters. This is largest species of the genus. In absence of mesothoracic triangle and coppery colour of wings it resembles with trimaculata but is distinguishable by its striking markings and body and wings colour.

58. *Rhinocypha ignipennis* Selys

1879. *Rhinocypha ignipennis* Selys, *Bull. Acad. Belg.*, (2) XLVII : 387.

1934. *Rhinocypha ignipennis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 23.

1987. *Rhinocypha ignipennis* : Lahiri, *Rec. zool. Surv. India, Occ. Paper No.* 99, 28.

Material : 1 Male, Andharikhola stream, Rangpo, Darjiling dist., 15. v. 87, Raja Ram and Party coll.

Diagnosis : Prothorax and thorax velvety black marked with orange. Abdomen black or steely blue. Wings opaque dark brown from node to apex, appears brilliant coppery in reflected light. Hind-wings with two rows of vitreous spots, 16-18 Antenodal nervures, discoidal cells tranversed thrice or four times.

Distribution : India : West Bengal (Darjiling dist.), Meghalaya. Elsewhere : Burma.

Remarks : This inhabits montane streams, in a relatively open habitat.

Family EUPHAEIDAE

This family is represented in West Bengal by 2 genera *Anisopleura* Selys and *Bayadera* Selys, there is no further subdivision of this into subfamily.

Key to the genera of EUPHAEIDAE

- 1 (a) Rii+iii of wing fused, IRiii arising more close to arc than node, discoidal cell about half the length of median space *Bayadera* Selys
 1 (b) Rii+iii of wing not fused, IRiii arising midway between arc and node, discoidal cell about one third the length of median space..... *Anisopleura* Selys

Genus *Bayadera* Selys

1853. group *Bayadera* Selys, *Syn. Cal.*, 219.

1934. *Bayadera* Selys : Fraser, *Fauna Brit. India, Odon.*, 2, 78.

This genus is represented in West Bengal by 2 species; there is only one more species under this genus from Meghalaya - *B. hyalina* Selys.

Key to species of genus *Bayadera*

- 1 (a) Apices of all wings black to about middle of pterostigma, Riii arises slightly proximal to subnode..... *indica* (Selys)
 1 (b) Only apices of hind pair of wing enfumed, Riii arises well distal to subnode... *longicauda* Fraser

59. *Bayadera indica* (Selys)

1853. *Epallage indica* Selys, *Syn. Cal.*, 49.

1890. *Bayadera indica* : Kirley, *Cat. Odon.*, 108.

1933. *Bayadera indica* : Fraser, *Fauna Brit. India, Odon.*, (2) : 79.

Distribution : India : West Bengal (Darjiling dist.), Himachal Pradesh, Meghalaya, Uttar Pradesh. Elsewhere : Nepal.

Remarks : This species is included on the basis of literature review. This species is distinguishable from its closely allied - *B. hyaline* by larger size (Abd. 38-40 : 34 m.) and all wings being tipped with black instead of being wholly hyaline.

60. *Bayadera longicauda* Fraser

1928. *Bayadera longicauda* Fraser, *J. Bombay Nat. Hist. Soc.* XXXiii : 53.

1933. *Bayadera longicauda* : Fraser, *Fauna Brit. India, Odon.*, (2) : 83.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of literature review. It is distinguishable from other Indian species by its superior anal appendage - having a robust sub-ventral spine near base not quite as long as *B. indica* and devoid of medial tubercle on inner side.

Genus *Anisopleura* Selys

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

1934. *Anisopleura* : Fraser, *Fauna Brit. India, Odon.*, (2) : 84.

Key to species of *Anisopleura*

- 1 (a) One cubital nervure in all wings, no humeral stripe, superior anal appendage with short spine at its middle*lestoides* Selys
- 1 (b) Several cubital nervure in all wings, humeral stripe present, superior anal appendage without spine*comes* Selys

61. *Anisopleura lestoides* Selys

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

1933. *Anisopleura lestoides* : Fraser, *Fauna Brit. India, Odon.*, (2) : 86.

Distribution : India : West Bengal, Assam, Sikkim.

Remarks : This species is included on the basis of literature review. The superior anal appendages of male has a robust spine at about middle on ventro-lateral face, directed anal wards in which it differs from *A. comes*, where spine is absent.

62. *Anisopleura comes* Selys

1880. *Anisopleura comes* Selys, *C. R. Soc. Ent. Belg.*, XXIII, 63.

1933. *Anisopleura comes* : Fraser, *Fauna Brit. India, Odon.*, (2) : 87.

Distribution : India : West Bengal (Darjiling dist.), Assam, Sikkim, Punjab:

Remarks : This species is included on the basis of literature review. It has 3 to 4 cubital nervures in fore-wing, 4-5 in hind in contrast to only cubital nervures in all wings *A. lestoides*.

Family CALOPTERYGIDAE

This family is represented in West Bengal by 3 genera; out of which one is under subfamily Caliphacinae and two under Calopteryginae.

Key to subfamilies of CALOPTERYGIDAE

- 1 (a) 1A fused with inner border of wing, discoidal cell half the length of median space, discoidal cell traversed once only, 1A simple not branched or pectinate *Caliphaeinae*
 1A not fused with inner border of wing, discoidal cell subequal to median space but not half of it, discoidal cell traversed at least 4 times, 1A usually branched and pectinate.....
 *Calopteryginae*

Subfamily CALIPHAEINAE

Caliphacinae is represented in West Bengal by a single species, genus and family hence no key is provided.

Genus *Caliphaea* Selys

1859. *Caliphaea* Selys, *Bull. Acad. Belg. Sci.* (2), 7 : 430.

1934. *Caliphaea* : Fraser, *Fauna, Brit. India, Odon.*, (2) : 149.

63. *Caliphaea confusea* Selys

1859. *Caliphaea confusa* Selys, *Bull. Acad. Belg. Sci.* (2), 7 : 440.

1934. *Caliphaea confusa* : Fraser, *Fauna Brit. India Odon.*, (2) : 149.

Distribution : India : West Bengal (Darjiling dist.), Meghalaya. Elsewhere : Nepal, Bhutan, Tibet, China, Burma, Laos.

Remarks : This species is included on the basis of the literature review. This is submontane and montane species known upto an altitude of 2000 meters. Prothorax, thorax and abd. 1 to 7 metallic coppery green - 8 to 10 pruinose white on dorsum.

Subfamily CALOPTREYGINAE

This subfamily is represented in West Bengal by 2 genera and 3 species.

Key to genera of CALOPTREYGINAE

- 1(a) Arc oblique, median space entire, 1A pectinate intercalated sector fewer and generally restricted only on apical half of wing. *Vestalis* selys
 1(b) Arc angulated, median space traversed or reticulated. 1A simple not branched, intercalated sectors many and not restricted to only apical half of wing *Neurobasis* selys

Genus *Vestalis* Selys

1853. *Vestalis* Selys, *Syn. Cal.*, 24.

1934. *Vestalis* : Fraser, *Fauna Brit. India, Odon.*, 2 : 124.

Key to species of genus *Vestalis*

- 1 (a) Wings tinted uniformly with golden yellow, abdominal segment 10 neither keeled nor spined...
 *smaragdina* Selys
 1 (b) Wings untinted or partially so, abdominal segment 10 with a robust keel at its apical end with a spine at its terminal end..... *gracilis* (Rambur)

64. *Vestalis smaragdina* Selys

1879. *Vestalis smaragdina* Selys, *Bull. Acad. Bel.* (2), XLvii : 362.

1934. *Vestalis smaragdina* : Fraser, *Fauna Brit. India, Odon.*, (2) : 133.

Distribution : India : West Bengal, Assam, Meghalaya. Elsewhere : Burma, Tibet.

Remarks : This species is included on the basis of the literature review. Wings are wholly hyaline but tinted with golden yellow instead of green tint with irridescence of colour of mother of pearl or blue as in *V. gracilis gracilis*.

65. *Vestalis gracilis gracilis* Rambur

1842. *Calopteryx gracilis* Rambur, *Hist. nat. Ins. Nevrop.*, 224.

1853. *Vestalis gracilis* (Rambur) : Selys, *Syn. Cal.*, : 26.

1929. *Vestalis gracilis gracilis* : Fraser, *J. Bombay nat. Hist. Soc.*, 33 : 582.

1934. *Vestalis gracilis gracilis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 126.

Material examined : 1 Male Sevak Forest, Darjiling dist., 12.v. 87, Raja Ram and Party coll.

Diagnosis : Major part of head on dorsum, thorax and abdomen metallic green. Discoidal cell traversed in fore - wing and hind as 4-6, 3-5 respectively instead of traversed only once in *V. smaragdina* higher nodal index than latter species $\left[\frac{66 - 28/30 - 67}{53 - 26/24 - 54} \right]$

Distribution : India : West Bengal (Darjiling dist .), Andhra Pradesh, Assam Gujarat, Karnataka, Maharashtra, Meghalaya, Tamil Nadu. Elsewhere : Burma, Siam, Annam and Tokin, Thailand, Vietnam, Malaysia.

Remarks : This species is distinguishable from *V. smaragdina* Selys in having untinted wings and from *V. amaena* Selys in having two rows of cells between origins of Cuii and IA instead of a single row.

Genus *Neurobasis* Selys

1853. *Neurobasis*, *Syn. Cal.*, 17

1934. *Neurobasis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 119.

This genus is represented by single species in West Bengal, hence no key is provided.

66. *Neurobasis Ch. chinensis* (Linnaeus)

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

1915. *Neurobasis chinensis chinensis* : Ris., *Tijdschr. Ent.*, 58 : 6.

1934. *Neurobasis chinensis chinensis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 121.

1987. *Neurobasis chinensis chinensis* : Lahiri, *Rec. zool. Surv. India, Occ. Paper No.* 99 : 48.

Material : 2 Males, 1 Female Sevok Forest, Darjiling dist., 12.v.87, Raja Ram and Party coll.

Diagnosis : Fore-wing of both sexes hyaline, hind- wings opaque or hyaline, pterostigma absent in male or totally lacking in female. Basal space of wing traversed. Body metallic emerald or bronzy green.

Distribution : India : West Bengal (Darjiling dist.). Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Tamil Nadu, Uttar Pradesh. Elsewhere : Sri Lanka, Burma, Thailand, Malaysia, Indonesia.

Remarks : Character of Lack of pterostigma in male and false or absent in female is shared by allied genus *Matrona* Selys.

Suborder ANISOZYGOPTERA
Super family HETROPHLEBIOIDEA
Family EPIOPHLEBIIDAE
Genus *Epiophlebia* Calvert

1893. *Epiophlebia* Calvert, *Trans. Amer. Ent. Soc.*, 20 : 150.

This genus has single representative species not only in West Bengal but whole of India, hence no key is provided.

67. *Epiophlebia laidlawi* Tillyard

1921. *Epiophlebia laidlawi* Tillyard, *Rec. Indian Mus.*, XXII : 93.

Distribution : India : West Bengal (Darjiling dist.). Elsewhere : Nepal.

Remarks : This species is included on the basis of the literature review This species was described on the basis of larvae in vicinity of Ghoom river, Darjiling but adult was reported in 1963 from Nepal This species is one of the two surviving relict dragonfly also under same genus having intermediate position and liking factor between Zygoptera and Anisoptera. The other species is *E. supersti* (Selys) known to occur in Japan. Species has been protected under "wild life protection act", considering the urgent need to save this surviving member of the suborder in India.

Suborder ANISOPTERA
Super family CORDULEGASTEROIDEA
Family CORDULEGASTERIDAE

This family has got three subfamilies, of which two are represented in West Bengal.

Key to the subfamilies of the CORDULEGASTERIDAE

- 1 (a) Discoidal cell of similar shape and size in fore and hind-wings, anal loop ill developed, tibiae without keel, a long pseudo - ovipositor presentCORDULEGASTERINAE
- 1 (b) Discoidal cell of dissimilar shape and size in fore and hind-wings, anal loop well developed, tibiae of male with keel, ovipositor obsoleteCHLOROGOMPHINAE

Subfamily CORDULEGASTERINAE

This subfamily has got two genera represented in West Bengal viz., *Allogaster* Selys and *Anotogaster* Selys.

Key to the genera of the subfamily CORDULEGASTERINAE

- 1 (a) Base of hind-wing in male not rounded, anal triangle and oreillets present ...*Allogaster* Selys
 1 (b) Base of hind-wing in male rounded, anal triangle absent, oreillets absent...*Anotogaster* Seijs

Genus *Allogaster* Selys

1878. *Allogaster* Selys, *Bull. Acad. Belg.*, (2): XLVI: 684.

1936. *Allogaster*: Fraser, *Fauna Brit. India, Odon.*, (3): 37.

Key to the species of the genus *Allogaster*

- 1 (a) Abd. segment 2 with 4 yellow spots on dorsum, anal loop 15 celled*latifrons* Selys
 1 (b) Abd. segment 2 with a single saddle shaped spot and a pair of apical lunules on the dorsum,
 anal loop 6 celled*hermionae* Fraser

68. *Allogaster latifrons* Selys

1878. *Allogaster latifrons* Selys, *Bull. Acad. Belg.*, (2), XLVI: 684.

1936. *Allogaster latifrons* : Fraser, *Fauna Brit. India, Odon.*, (3): 38.

Distribution : India : West Bengal (Darjiling dist.), Sikkim.

Remarks: This species is included on the basis of the literature review. This is a montane species, known to occur upto an altitude of 3500 meters. This is larger species than *A. hermionae* Fraser (Abd. 52: 44 mm.), Pterostigma covering 4-5 : 3 cells, anal loop 4: 6 celled.

69. *Allogaster hermionae* Fraser

1927. *Allogaster hermionae* Fraser, *Rec. Indian Mus.*, XXIX: 76.

1936. *Allogaster hermionae*: Fraser, *Fauna Brit. India, Odon.*, (3): 43.

Distribution: India : West Bengal (Darjiling dist.).

Remarks: This species is included on the basis of the literature review. It is related to *A. latifrons* from which it is distinguished as remarked under said species. This species is smallest in size amongst members of the family Cordulegasteridae.

Genus *Anotogaster* Selys

1854. *Anatogaster* Selys, *Bull. Acda. Belg.* (2), XXI: 101.

1936. *Anatogaster*: Fraser, *Fauna Brit. India, Odon.*, (3):44.

This genus is represented in West Bengal by a singal species, hence no key is provided.

70. *Anatogaster nipalensis* Selys

1850. *Anatogaster nipalensis* Selys, *Bull. Acad. Belg.* (2), XXI: 102.

1936. *Anatogaster nipalensis*: Fraser, *Fauna Brit. India, Odon.*, (3): 50.

Distribution: India: West Bengal (Darjiling dist.), Sikkim. Elsewhere : Nepal.

Remarks : This species has basically a montane habitat, associated with running water bodies-streams rivulets etc. It is known to occur at an altitude upto 2000 meters. This species is distinguishable from *A. basilis basilis* Selys and *A. basilis palampurensis* Ris in having costal and first antenodal nervures, arc, costal and distal sides of discoidal cell and basal portions of IA and MA bright yellow instead of black.

Subfamily CHLOROGOMPHUS

This subfamily has only one genus viz., *Chlorogomphus* Selys, represented in West Bengal, hence no key is provided.

Genus *Chlorogomphus* Selys

1854. *Chlorogomphus* Selys, *Bull. Acad. Belg.*, XXI, (2):99.

1936. *Chlorogomphus*: Fraser, *Fauna Brit. India, Odon.*, (3):5.

Key to the species of the genus *Chlorogomphus*

1. Inferior appendage of male shallowly bifurcated and with a robust basal spine, only the extreme base of wings of female golden yellow*fraseri* St. Quentin
 Inferior appendage of male not bifurcated, atleast the basal half of wings of female golden-yellow2
2. Thorax marked with an antehumeral and two lateral yellow stripes3
 Thorax marked with a humeral, an antehumeral, a post humeral and 2 lateral yellow strips. Discoidal cell traversed by a nervure.....*selysi* Fraser
3. Face dull brown without yellowmarkings.....*atkinsoni* (Selys)
 Face citron-yellow marked with black, posterior borders of thorax yellow*preciosus* Fraser

71. *Chlorogomphus fraseri* St. Quentin

1936. *Chlorogomphus fraseri* St. Quentin, *Konowia*, XV, (1/2): 103.

1936. *Chlorogomphus fraseri*: Fraser, *Fauna Brit. India, Odon.*, (3): 16.

Distribution : India : West Bengal (Darjiling dist.), Assam.

Remarks : This species is included on the basis of the literature review. This species is easily distinguishable, from other species of the genus, by character of its anal appendage: superior short, robust, obtuse cone; inferiors tipped at apex with three mandibulate teeth and a very robust spine between branches of inferior.

72. *Chlorogomphus atkinsoni* (Selys)

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

1936. *Chlorogomphus atkinsoni*: Fraser, *Fauna Brit. India, Odon.*, (3): 26.

Distribution: India : West Bengal (Darjiling dist.), Assam, Meghalaya, Uttar Pradesh.

Remarks: This species is included on the basis of the literature review. Entire lack of incomplete basal antenodal put this species into the bracket with *A. selysi*, but it has face light brown unmarked by yellow.

73. *Chlorogomphus selysi* Fraser

1929. *Chlorogomphus selysi* Fraser, *Mem. Indian Mus.*, IX(3): 158.
 1936. *Chlorogomphus selysi*: Fraser, *Fauna Brit. India, Odon.*, (3): 22.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This species is similar to *A. atkinsoni*, as remarked under said species, but is distinguishable by bright greenish yellow marking of its face.

74. *Chlorogomphus preciosus* (Fraser)

1915. *Orgomphus speciosus* Laidlaw (nec Selys), *Rec. Indian Mus.*, XI: 198.
 1929. *Chlorogomphus preciosus* Fraser, *Mem. Indian Mus.*, IX; 73: 154.
 1936. *Chlorogomphus preciosus*: Fraser, *Fauna Brit. India, Odon.*, (3):19.

Distribution: India : West Bengal (Darjiling dist.), Sikkim. Elsewhere : Nepal.

Remarks : This species is included on the basis of the literature review. The anal loops 8 celled in male 10 to 12 celled in female.

Superfamily AESHNOIDEA
 Family AESHNIDAE

This family is divided into two divisions namely Brachytrini and Aeshnini. Brachytrini is further subdivided into 3 subfamilies Brachytrinae, Neopetalinae and Gomphaeshninae. Of these only former has got representative in West Bengal; while latter two are not represented in whole of India. Division Aeshnini has 4 subfamilies Aeshninae, Anactinae, Gynacanthaginae and Ploycanthaginae. Of these all have representative in West Bengal. A key to divisions and their subfamilies are provided, to give comprehensive picture.

Key to the divisions, subfamilies of the family AESHNIDAE

1. R 4+5 and MA running parallel to one another, Ma without bulging after nodus.....BRACHYTRINI 2

 Ma gradually converging towards R 4+5 and shortly after nodus distinctly bulged.....
AESHNINI 4
2. IRiii simple and unforked3
 IRiii symmetrically forked.....BRACHYTRINAE
3. A chain of reddish spots on costal border of all wings, anal loop absent or rudimentary.....
NEOPETALINAE
 No chain of reddish spots on costal border of all wings, anal loop present.....
GOMPHAESHNINAE
4. Hind wing rounded at base in both sexes on side of abd. 2 oreillets absent (except in genus *Anaciaeschna*), Riii bends abruptly towards pterostigma, anal triangle absent.....ANACTINAE
 Hind wing in male angulated and excavated at base, rounded in female, on side of abdomen 2 oreillets present, Riii not bending abruptly towards pterostigma, anal triangle always present...
5

5. Female genitalia with simple rounded dentigerous plate, number of fine spine to the plate.....
AESHNINAE
 Female genitalia with dentigerous plates produced in fewer (two or more) robust spines.....6
6. Two long, robust spines to the dentigerous plateGYNACANTHAGINAE
 Four or more, not so long, robust spines to the dentigerous platePOLYCANTHAGINAE

Subfamily BRACHYTRINI

This subfamily has 5 representative genera in West Bengal.

Key to the genera of the subfamily BRACHYTRINI

1. IRiii forked into two equal branches at or near the inner end of Pterostigma2
 IRii not forked into two equal branches*Jagoria* Karsch
2. Median (basal) space traversed by one or more nervures, an incomplete basal antenodal nervure nearly always present3
 Median (space) not traversed but entire, incomplete basal antenodal nervure absent, 4-6 rows of cells between IRiii and Rspl, pterostigma short with 1 or 2 opaque cells in the space below it*Tetracanthagyana* Selys
3. Abd. segment 10 of female prolonged into a dentigerous plate4
 Abd. segment 10 of female rounded, not prolonged into a dentigerous plate, discoidal cell short and broad, frons raised markedly.....*Cephalaeschna* Selys
4. Dentigerous plate ending in 2 robust apposed spines, discoidal cell short and broad, frons raised markedly*Gynacantheshna* Fraser
 Dentigerous plate ending in long, less robust divaricate spines, discoidal cell long and narrow, frons not raised markedly.....*Periaeshna* Martin

Genus *Jagoria* Karsch

1880. *Jagoria* Karsch, *Ent. Nachr.*, XV : 238.

1936. *Jagoria* : Fraser, *Fauna Brit. India, Odon.*, (3) : 57.

This genus is represented not only in West Bengal but whole of India, by a single species. No key is, therefore provided.

75. *Jagoria martini* Laidlaw

1921. *Jagoria martini* Laidlaw, *Rec. Indian Mus.*, XXXII : 76

1936. *Jagoria martini* : Fraser, *Fauna Brit. India, Odon.*, (3) : 59.

Distribution : India : West Bengal (Darjiling dist.), Assam, Sikkim.

Remarks : This species is included on the basis of the literature review. It is distinguishable from all Indian Aeshnids by its amber tinted wings and bifid inferior appendages.

Genus *Tetracanthagyna* Selys

1883. *Tetracanthagyna* Selys, *Bull. Acad. Belg.*, (3), (v) : 744.
 1936. *Tetracanthagyna* : Fraser, *Fauna Brit. India, Odon.*, (3) : 115.

This genus has a sole representative, in not only West Bengal but rest of India, hence no key is provided.

76. *Tetracanthagyna waterhousei* MacLachlan

1898. *Tetracanthagyna waterhousei* MacLachlan, *Trans. Ent. Soc. London*, 4 : 441.
 1936. *Tetracanthagyna waterhousei* : Fraser, *Fauna Brit. India, Odon.*, (3) : 117.

Distribution : India : West Bengal (Darjiling dist.), Meghalaya. Elsewhere : Vietnam, Malaysia, Indonesia.

Remarks : This species is included on the basis of the literature review. It has characteristic short pterostigma, with 1 or 2 opaque cells in the space below it, dentigerous plate of female ending in 4 short, robust spine and abd. 3 not constricted in contrast with allied genus *Gynacantha* Rambur.

Genus *Cephalaeschna* Selys

1883. *Cephalaeschna* Selys, *Bull. Acad. Belg.* (3) : 739.
 1936. *Cephalaeschna* : Fraser, *Fauna Brit. India, Odon.*, (3) : 65.

Key to the species of the genus *Cephalaeschna*

- 1 (a) Anal triangle only 3 celled legs black, proximal ends of femora reddish-brown, 4-5 cubital nervure : 5 in forewing, 4 or 5 in hindwing*orbifrons* Selys
 1 (b) Anal triangle 5 or more celled, legs bright reddish-brown, distal ends of femora and proximal ends of tibiae black, 7 cubital nervure in all the wings*masoni* (Martin)

77. *Cephalaeschna orbifrons* Selys

1883. *Cephalaeschna orbifrons* Selys, *Bull. Acad. Belg.*, (3) V : 739.
 1936. *Cephalaeschna orbifrons* : Fraser, *Fauna Brit. India, Odon.*, (3) : 67.

Distribution : India : West Bengal (Darjiling dist.), Himachal Pradesh.

Remarks : This species is included on the basis of the literature review. It has 3 cells only to anal triangle. This character is shared by *C. acutifrons* (Martin) from which it can be differentiated in having face rounded instead of oval.

78. *Cephalaeschna masoni* (Martin)

1909. *Cephalaeschna masoni* Martin, *Cat. Coll. Selys (Aeschnines)*, XIX : 111.
 1922. *Cephalaeschna masoni* Fraser, *J. Bombay Nat. Hist. Soc.*, XXVIII, 110, 615.
 1936. *Cephalaeschna masoni* (Martin) : Fraser, *Fauna Brit. India, Odon.*, (3) : 72.

Distribution : India : West Bengal (Darjiling dist.), Assam.

Remarks : This species is included on the basis of the literature review. This species is easily distinguishable from other species of the genus in having high numbers of cells in anal triangle in male (5 to 8:3), curved antchumeral stripes with expanded upper end.

Genus *Gynacanthaeschna* Fraser

1922. *Gynacanthaeschna* Fraser, *J. Bombay Nat. Hist. Soc.*, XXVIII, 110, 618.

1936. *Gynacanthaeschna* : Fraser, *Fauna Brit. India, Odon.*, (3) : 76.

This genus has a sole representative, in not only West Bengal but for whole of India, hence no key is provided.

79. *Gynacanthaeschna sikkima* (Karsch)

1891. *Gynacanthaeschna sikkima* Karsch, *Ent. Nachr.*, XVII : 6-7.

1922. *Gynacanthaeschna sikkima* Fraser, *J. Bombay Nat. Hist. Soc.*, XXVIII, 110, 618-620.

1936. *Gynacanthaeschna sikkima* : Fraser, *Fauna Brit. India, Odon.*, (3) : 77.

Distribution : India : West Bengal, Sikkim.

Remarks : This species is included on the basis of the literature review. This species is characterised by very short pterostigma covering only $1\frac{1}{2}$ cells.

Genus *Periaeschna* Martin

1909. *Periaeschna* Martin, *Cat. Coll. Selys (Aeschnines)*, XX : 7, 157.

1936. *Periaeschna* : Fraser, *Fauna Brit. India, Odon.*, (3) : 81.

Key to the species of the genus *Periaeschna*

- 1 (a) Thorax with only a single lateral coloured stripe on each side, larger species (Abdomen 57-58 mm., Hind wing 50-51 mm.), 6 median nervure in fore and 5 in hindwing, anal-triangle 3 or 4 celled *unifasciata* Fraser
 Thorax with two coloured stripes on each side, small species (Abd. 49-52 mm., hindwing 44-45 mm.), 4 median nervures in all wings, anal-triangle 5 celled *magdalena* Martin

Periaeschna unifasciata Fraser

1935. *Periaeschna unifasciata* Fraser, *J. Darjiling Nat. Hist. Soc.*, X : 25.

1936. *Periaeschna unifasciata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 84.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This species is easily distinguishable by its large size - (largest known *Periaeschna* abd. 57 : 48-53 mm.) and single stripe on side of thorax, instead of two in all other members.

80. *Periaeschna magdalena* Martin

1909. *Periaeschna magdalena* Martin, *Cat. Coll. Selys (Aeschnines)*, XX : 157.

1936. *Periaeschna magdalena* : Fraser, *Fauna Brit. India, Odon.*, (3) : 82.

Distribution : India : West Bengal, Assam, Sikkim.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from *P. nocturnalis* in having black stripe on upper surface of frons (instead being unmarked) and blackish brown marks at base of female wings. Yellow markings on thorax distinguishes it from *P. unifasciata*.

Key to the genera of the subfamily ANACTINAE

1. Base of hind-wing more or less deeply notched, tornus of hind-wing angulated in male, anal-triangle always present, IRiii forked into 2 equal branches*Anaciaeschna* Selys
Base of hind-wing without a notch, tornus of hind-wing rounded in both sexes; anal-triangle absen2
2. Abdomen segment 4 to 8 with longitudinal supplementary ridges on the two sides, superior anal appendages of male obtuse at apex, only 2 rows of cells between the origins of Cuii and IA of hind wing*Anax* Leach
Abdomen segment 4 to 8 without longitudinal supplementary ridges on two sides, superior anal appendage acuminate at apex, 3 rows of cells between the origins of Cuii and IA of hind-wing*Hemianax* Selys

Genus *Anaciaeschna* Selys

1878. *Anaciaeschna* Selys, *Mitth. Mus. Dresden*, III : 317.

1936. *Anaciaeschna* : Fraser, *Fauna Brit. India, Odon.*, (3) : 150.

This genus has a sole representative, in West Bengal, hence no key is provided.

81. *Anaciaschna jaspidea* (Burmeister)

1839. *Anaciaschna jaspidea* Burmeister, *Handb. Ent.*, II : 840.

1890. *Anaciaschna jaspidea* Kirby, *Cat. Odon.*, 86.

1936. *Anaciaschna jaspidea* : Fraser, *Fauna Brit. India, Odon.*, (3) : 152.

Distribution : India : West Bengal (Jalpaiguri dist.), Karnataka. Elsewhere : Samoa.

Remarks : This species is included on the basis of the literature review. This species is closely related to *A. martini* (Selys), but is easily distinguishable by having wings in both partly tinted with pale amber-yellow and male without a black spot at base of hind-wing.

Genus *Anax* Leach

1815. *Anax* Leach, *Edinb. Encycl.*, IX : 137.

1936. *Anax* : Fraser, *Fauna, Brit. India, Odon.*, (3) : 134.

Key to the species of the genus *Leach*

- 1 (a) Abdomen with orange coloured markings, wings membrane black*guttatus* (Burmeister)
- 1 (b) Abdomen with blue coloured markings, membrane black.....*imperator* Leach

82. *Anax guttatus* (Burmeister)

1839. *Aeschna guttatus* Burmeister, *Handb. Ent.*, II : 840.

1967. *Anax guttatus* Hagen, *Verh. Zool. Bot. Ges. Wien.*, XIV : 39.

1936. *Anax guttatus* (Burmeister) : Fraser, *Fauna, Brit. India, Odon.*, (3) : 140.

Distribution : India : West Bengal (Calcutta dist.), Assam, Kerala, Tamil Nadu. Elsewhere : Burma, Siam, Java, Sumatra.

Remarks : This species is included on the basis of the literature review. This inhabits small weedy ponds, lakes and mostly remains in its vicinity flying majestically. It is larger (abd. 56-62 : 54-56) than *A. imperator*., only other species known from West Bengal.

83. *Anax imperator* Leach

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

1936. *Anax imperator* : Fraser, *Fauna, Brit. India, Odon.*, (3) : 136.

Distribution : India : West Bengal (Calcutta dist.), Uttar Pradesh, Maharashtra, Tamil Nadu. Elsewhere : British Isles to Europe to Central Asia, South-Wards to Central and North Africa, North Morocco.

Remarks : This species is included on the basis of the literature review. It is one of the common species of genus and by its general pale blue colour and 'strongly contrasted jagged mid-dorsal black stripe', of abdomen distinguishes it from other Indian species of the genus.

Genus *Hemianax* Selys

1871. *Cyrtosoma* Selys, (nom. preoc.), *Trans, Ent. Soc. Lond.*, : 412.

1833. *Hemianax* : Selys, *Bull. Acad. Belg.* (3), V : 723.

1936. *Hemianax* : Fraser, *Fauna Brit. India, Odon.*, (3) : 146.

This genus is represented not only in West Bengal but whole of India by a single species, hence no key is provided.

84. *Hemianax ephippiger* (Burmeister)

1839. *Aeschna ephippigera* Burmeister, *Handb. Ent. Band.*, II : 840.

1890. *Hemianax ephippiger* : Kerby, *Cat. Odon.* : 85.

1936. *Hemianax ephippiger* : Fraser, *Fauna Brit. India, Odon.*, (3) : 147.

1974. *Hemianax ephippiger* : Mitra & Lahiri, *Entomologist's Rec. J. Var.* 86 : 74.

1982. *Hemianax ephippiger* : Raja Ram et al, *Rec. zool. Surv. India*, 80 : 180.

Material : 1 Male, Medinipur dist., 8. viii. 85, B. C. Das and Party coll.

Diagnosis : Labrum, Labium and face bright golden or citron yellow, black transverse stripe across frons. Prothorax and thorax olivaceous/brown. Hind-wing with a patch of amber yellow between MA, IA and hinder margin of wing. Abdomen bright ochreous marked with azure blue and reddish/blackish brown.

Distribution : India : West Bengal (Medinipur, Haora, Calcutta and 24 Parganas dists.), Maharashtra, Rajasthan, Uttar Pradesh, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. Elsewhere : South Europe.

Remarks : This species inhabits stagnant water confined in shallow weedy ponds/tanks and marshes. This species is easily distinguishable from members of *Anax* in absence of longitudinal supplementary ridge on the sides of abd. 4 to 8.

Subfamily AESHNINAE

This subfamily has got a single genus *Aeshna* Fabricius and two species under it, represented in West Bengal.

Genus *Aeshna* Fabricius

1775. *Aeshna* Fabricius, *Syst. Ent.*, 424.

1936. *Aeshna* : Fraser, *Fauna Brit. India, Odon.*, (3) : 123.

Key to the species of the genus *Aeshna*

- 1 (a) Discoidal cell of fore-wing 3 celled, IRiii forks at the level of proximal end of pterostigma, anal appendage in female not much broad, 'lanceolate' in shape*orinθοcephala* MacLachlan
 1 (b) Discoidal cell of forewing 5 celled, IRiii forks at the level of proximal to the level of proximal end of pterostigma, anal-appendage of female much broad, 'racquet' shaped*petalura* Martin

85. *Aeshna orinθοcephala* MacLachlan

1896. *Aeshna orinθοcephala* MacLachlan, *Ann. Mag. Nat. Hist.*, (6), XVII : 368.

1936. *Aeshna orinθοcephala* : Fraser, *Fauna Brit. India, Odon.*, (3) : 125.

Distribution : India : West Bengal (Darjiling dist.), Himachal Pradesh, Sikkim. Elsewhere : Moupin, Tibet.

Remarks : This species is included on the basis of the literature review. Anal appendages of male is most characteristic, beside very open reticulation, discoidal cell 2 celled and 2 - celled discoidal field differentiates it from other species of the genus.

86. *Aeshna petalura* Martin

1909. *Aeshna petalura* Martin, *Cat. Coll. Selys. (Aeschnines)*, XVIII : 78, 79, 84.

1936. *Aeshna petalura* : Fraser, *Fauna Brit. India, Odon.*, (3) : 128.

Distribution : India : West Bengal (Darjiling dist.), Assam. Meghalaya, Sikkim. Elsewhere : Tibet.

Remarks : This species is included on the basis of the literature review. Singular character of large, markedly broad anal appendage (giving it paddle or Oar shape) distinguishes it from all other Indian Aeschnines.

Subfamily GYNACANTHAGINAE

This subfamily is represented by a single genus *Gynacantha* Rambur, hence no key is provided.

Genus *Gynacantha* Rambur

1842. *Gynacantha* Rambur, *Ins. Nevrop.*, 209.

1936. *Gynacantha* Rambur : Fraser, *Fauna Brit. India, Odon.*, (3) : 94.

Key to the species of the genus *Gynacantha*

1. Small species (abdomen 40mm., hind-wing not more than 35 mm.), upper surface of frons unmarked*o'doneli* Fraser
 Larger species (abdomen 45 mm. or more, hind-wing about 40 mm. or more)2

2. Upper surface of frons marked with a thick black 'T'3
 Upper surface of frons unmarked with black 'T' or with only a blackish bordering5
3. Inferior anal appendage more than half the length of superiors, thorax bright grass green with 2 sharply defined blackish brown stripes on each side*khasiaca* MacLachlan
 Inferior anal appendage much less than half the length of superiors, thorax without well defined stripes4
4. A blackish-brown mark at base of all wings in suncostal and adjacent space ...*basiguttata* Selys
 Wings unmarked at base, abd 3 to 8 with a dark black brown oblique fascia-extending from apical border to jugum*hyalina* Selys
5. Abdomen conspicuously tumid or dilated at base, abd. 3 markedly constricted, anal loop with less than 12 cells6
 Abdomen not conspicuously dilated at base, abd. 3 slightly or not constricted, anal loop with 13 cells.....*rammohani* Mitra & Lahiri
6. Discoidal cell of fore-wings have 6 cells hind-wings 5, anal appendage bright ochreous, changing to reddish-brown at extreme base and towards apices*bayadera* Selys
 Discoidal cell of fore-wings have 5 cells hind-wings 4, anal appendage-superior black, inferior creamy white tipped with black or dark brown*albistyla* Fraser

87. *Gynacantha o'doneli* Fraser

1922. *Gynacantha O'doneli* Fraser, *J. Bombay Nat. Hist. Soc.*, (28) : 700.

1936. *Gynacantha O'doneli* : Fraser, *Fauna Brit. India, Odon.*, (3) : 106.

Distribution : India : West Bengal (Jalpaiguri dist.).

Remarks : This species is included on the basis of the literature review. This is smallest member of the genus (abd. 41 : 45-54), Abd. 3 is markedly constricted differentiating it from *G. millardi*.

88. *Gynacantha khasiaca* MacLachlan

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

1936. *Gynacantha khasiaca* : Fraser, *Fauna Brit. India, Odon.*, (3) : 113.

Distribution : India : West Bengal (Jalpaiguri dist.), Assam. Elsewhere : Burma.

Remarks : This species is included on the basis of the literature review. The inferior anal appendage of exceptional length (2/3 of length superiors) distinguishes it from other species.

89. *Gynacantha basiguttata* Selys

1882. *Gynacantha basiguttata* Selys, *An. Soc. Espan.*, (11) : 20.

1936. *Gynacantha basiguttata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 107.

Distribution : India : West Bengal, Assam. Elsewhere : Burma, Malaysia, Indochina and The Sundaic Archipelago.

Remarks : This species is included on the basis of the literature review. This species is easily distinguishable from other Indian species by having proportionately very long superior anal appendage with abd. 10 (1:3) and club-shape (Broad at base, then markedly slim followed by marked dilation at the apical third).

90. *Gynacantha hyalina* Selys

1882. *Gynacantha hyalina* Selys, *An. Soc. Espan. Hist. Nat.*, (11) : 19.

1936. *Gynacantha hyalina* : Fraser, *Fauna Brit. India, Odon.*, (3) : 97.

Distribution : India : West Bengal (Darjiling dist.), Assam, Bihar, Kerala. Elsewhere : Burma, China, Japan.

Remarks : This species is included on the basis of the literature review. This is a montane species known to occur upto an altitude of 2500 meters. This species is distinguishable from its nearest species *G. bainbriggsi* Fraser and *G. subinterrupta* Fraser. From the former in having abd. 3 to 8 with a dark brown oblique fascia and from latter by inferior anal appendages more than 1/3 length of superiors.

91. *Gynacantha rammohni* Mitra & Lahiri

1975. *Gynacantha rammohni* Mitra & Lahiri, *Entomologist's Rec. J. var.*, (87) : 148.

Distribution : India : West Bengal (Calcutta dist.).

Remarks : This species is included on the basis of the literature review. This species can be distinguishable from other of the genus by the nervures traversing the discoidal cells and hypertrigoncs.

92. *Gynacantha bayadera* Selys

1891. *Gynacantha bayadera* Selys, *Ann. Mus. Civ. Genova*, (30) : 47.

1936. *Gynacantha bayadera* : Fraser, *Fauna Brit. India, Odon.*, (3) : 103.

Distribution : India : West Bengal (Darjiling dist.), Sikkim, Meghalaya. Elsewhere : Burma, Thailand, Indonesia, Malaysia, Indochina, Java, Celebes, New Guina Philippines.

Remarks : This species is included on the basis of the literature review. This species differs from *G. millardi* by having abd. 3 constricted. Black 'T' shaped mark on frons further distinguishes it from other Indian species of the genus.

93. *Gynacantha albistyla* Fraser

1927. *Gynacantha albistyla* Fraser, *Rec. Ind. Mus.*, (19) : 75.

1936. *Gynacantha albistyla* : Fraser, *Fauna Brit. India, Odon.*, (3) : 112.

Distribution : India : West Bengal (Jalpaiguri dist.), Bihar.

Remarks : This species is included on the basis of the literature review. This species is diurnal instead of crepuscular habit of most of the species of the genus. It has unique feature of having width of space similar between the forking of IRiii and between IRiii and R spl.

Subfamily POLYCANTHAGINAE

This subfamily has got a single genus *Polycanthagyna* Fraser and a single species *P. erythromelas* (MacLachlan), not only in West Bengal but for rest of India, hence no key is provided.

Genus *Polycanthagyna* Fraser

1933. *Polycanthagyna* Fraser, *J. Bombay Nat. Hist. Soc.*, XXXVI : 463.

1936. *Polycanthagyna* : Fraser, *Fauna Brit. India, Odon.*, (3) : 119.

This genus has a single representative species not only in West Bengal but for whole of India, hence no key is provided.

94. *Polycanthagyna erythromelas* (MacLachlan)

1986. *Aeschna erythromelas* MacLachlan, *Ann. Mag. Nat. Hist.*, (6), XVII : 368.

1936. *Polycanthagyna erythromelas* : Fraser, *Fauna Brit. India, Odon.*, (3) : 120.

Distribution : India : West Bengal (Darjiling dist.), Simla, Sikkim.

Remarks : This species is included on the basis of the literature review. This species has certain resemblance with *Tetracanthagyna* Sclys but differs in having membrane large, extending to the base of wing in contrast with obsolete membrane not extending upto base of wing.

Family GOMPHIDAE

This family is represented, in West Bengal, by three subfamilies namely Gomphinae, Epigomphinae and Ictinogomphinae

Key to the subfamilies of GOMPHIDAE

1. Discoidal, hyper- and subtrigone all traversed by cross veins, several cross veins in addition to AC, in the cubital space ICTINOGOMPHINAE
 Discoidal, hyper- and subtrigone not traversed by cross veins or only discoidal trigone traversed by a single vein 2
2. Cross veins connecting MA to Rs in hind-wing only 3 to 4, branching of Rs unsymmetrical...
 EPIGOMPHINAE
 Cross veins connecting MA to RS in hind-wing only 2 branching of RS symmetrical.....
 GOMPHINAE

Key to the genera of the subfamily ICTINOGOMPHINAE

- 1 (a) Abd. 8 widely dilated with wing like lateral expansion, superior anal appendages acute at apex
 *Ictinogomphus* Cowley
- 1 (b) Abd. 8 not dilated, nor with wing like lateral expansion, superior anal appendages obtuse at apex
 *Gomphidia* Sclys

Genus *Ictinogomphus* Cowley

1842. *Ictinus* Rambur, *Ins. Nevrop.*, : 171.

1934. *Ictinus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 370.

1934. *Ictinogomphus* : Cowley, *Entomologist*, 67 : 200.

Key to the species of the genus *Ictinogomphus*

1. Face and femora largely black, posterior border of thorax margined with black2
Face and femora largely yellow, posterior border of thorax not margined with black, labrum bordered with black, lateral expansion of segment 8 unmarked with yellow ...*angulosus* Selys
2. Segment 8 of abdomen with a broad basal yellow ring*rapax* (Rambur)
Segment 8 of abdomen without a broad basal yellow ring*pertinax* Selys

95. *Ictinogomphus angulosus* Selys

1854. *Ictinogomphus angulosus* Selys, *Bull. Acad. Belg.*, XXI (2) : 92.

1934. *Ictinogomphus angulosus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 378.

Distribution : India : West Bengal (Calcutta dist.).

Remarks : This species is included on the basis of the literature review. This species has in male moderately large leaf-like expansion on abd. 8, margin not markedly denticulate.

96. *Ictinogomphus rapax* (Rambur)

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

1922. *Ictinus rapax* : Laidlaw, *Rec. Indian Mus.*, (24) : 370.

1934. *Ictinus rapax* : Fraser, *Fauna Brit. India, Odon.*, (2) : 373.

Material : 1 Male, Bhalbungri Hills, Puruliya dist., 19. ix. 87, M. Prasad and Party coll.

Diagnosis : Face largely yellow, postclypeus and vertex black. Thorax and abdomen marked variably by yellow-abd. 8 with broad yellow ring. Leaf like expansion of abd. 8 black Hind femora with two rows of spines. Cubital cells 3 in fore-wing 2 in hind and 5 cells in anal triangle.

Distribution : India : West Bengal (Puruliya, Calcutta and Haora dists.), widely distributed throughout India except in desert areas. Elsewhere : Burma, Sri Lanka, Malaysia.

Remarks : This species is included on the basis of the literature review. This species is known to inhabit both lotic and lentic water bodies, but mainly latter.

97. *Ictinogomphus pertinax* Selys

1854. *Ictinus pertinax* Selys, *Bull. Acad. Belg.*, (21), (2) : 88.

1934. *Ictinus pertinax* : Fraser, *Fauna Brit. India, Odon.*, (2) : 377.

Distribution : India : West Bengal (Haora dist.). Elsewhere : Burma, China, Indochina.

Remarks : This species is included on the basis of the literature review. This species differs from closely allied species *I. rapax* in having black anteclypeus (instead of yellow), abd. 8 with lateral spots instead of broad yellow basal ring and abd. 10 entirely black lackings spots.

Genus *Gomphidia* Selys

1854. *Gomphidia* Selys, *Bull. Acad. Belg.*, XXI (2) : 86.

1934. *Gomphidia* : Fraser, *Fauna Brit. India, Odon.*, (2) : 381.

This genus is represented by a single species, in West Bengal hence no key is provided.

98. *Gomphidia williamsoni* Brauer1923. *Gomphidia williamsoni* Fraser, *J. Bombay Nat. Hist. Soc.*, XXIX, 670, 671.1934. *Gomphidia williamsoni* : Fraser, *Fauna Brit. India, Odon.*, (2) : 387.*Distribution* : India : West Bengal (Darjiling dist.)*Remarks* : This species is included on the basis of the literature review. Lack of yellow spot on the medial lateral stripe of thorax and frons being entirely yellow above, separates this species from *G. abbotti* Williamson known to occur in Burma.

Subfamily EPIGOMPHINAE

This subfamily is represented, in West Bengal, by 2 genera *Macrogomphus* Selys and *Perissogomphus* Laidlaw.

Key to the genera of EPIGOMPHINAE

An incomplete basal antenodal nervure present, 3 or more rows of cells between IA and posterior margin of wings.*Macrogomphus* SelysIncomplete basal antenodal nervures always absent, 1-2 rows of cells between IA and posterior margin of wings*Perissogomphus* LaidlawGenus *Perissogomphus* Laidlaw1922. *Perissogomphus* Laidlaw, *Rec. Indian Mus.*, XXIV : 383.1934. *Perissogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 319.

This genus is represented in West Bengal, by a single species, hence no key is provided.

99. *Perissogomphus stevensi* Laidlaw1922. *Perissogomphus stevensi* Laidlaw, *Rec. Indian Mus.*, XXIV : 371.1934. *Perissogomphus stevensi* : Fraser, *Fauna Brit. India, Odon.*, (2) : 321.*Distribution* : India : West Bengal (Darjiling dist.), Assam, Meghalaya.*Remarks* : This species is included on the basis of the literature review. Wing venation of this species is markedly close vis-a-vis its size. This is in contrast to other Gomphines.Genus *Macrogomphus* Selys1859. *Heterogomphus* Selys (pars), *Bull. Acad. Belg.*, XXI (2) : 27.1857. *Macrogomphus* Selys, *Mon. Gomph.*, 87 : 428.1934. *Macrogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 339.Key to the species of the genus *Macrogomphus*1 (a) Two narrow black stripe on sides of thorax, occiput brown, its border raised into a small coincl tubercle in the middle*montanus* (Selys)1 (b) Only a single broad black stripe on side of thorax, occiput black, neither tuberculated nor spined*seductus* Fraser

100. *Macrogomphus montanus* Selys1869. *Macrogomphus montanus* Selys, *Bull. Acad. Belg.*, XXVIII (2) : 171.1934. *Macrogomphus montanus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 345.

Distribution : India : West Bengal (Calcutta & 24 Parganas dists.), Assam. Elsewhere : Bangladesh.

Remarks : This species is included on the basis of the literature review. This species differs from all other Indian species of the genus in having humeral stripes and on side of thorax with two fine narrow black stripe instead of one thick medial.

101. *Macrogomphus seductus* Fraser1922. *Macrogomphus seductus* Liadlaw, *Rec. Indian Mus.*, XXIV : 375.1934. *Macrogomphus seductus* : Fraser, *Fauna, Brit. India, Odon.*, (2) : 347.

Distribution : India : West Bengal (Darjiling & Jalpaiguri dists.).

Remarks : This species is included on the basis of the literature review. This species lacks humeral stripe in contrast to *M. montanus*. Also, simple character of occiput-without tubercle or spine separates it from *montanus*.

Subfamily GOMPHINAE

This subfamily has largest number of genera and species; among whole family Gomphidae.

Key to the genera of the subfamily GOMPHINAE

1. Discoidal cell of hind-wing traversed by a nervure running from costal to distal side, IA and Cuii in hindwing widely divergent at the posterior border of wing. *Davidus* Selys
Discoidal cell in hind-wing never traversed, IA and Cuii rarely or but slightly divergent at posterior margin of hind-wing. 2
2. Hind-wing not excavated at base, with tornus rounded in the male ... *Anormogomphus* Selys
Hind- wing more or less excavated at base, with tornus more or less angulate 3
3. Anal loop present 4
Anal loop absent 10
4. Superior anal appendages and branches of inferior of equal length and equally divaricate 5
Superior anal appendage variable, usually much longer than the branches of inferior, or if not, posses ventral process or spine underneath 7
5. Discoidal field with two rows of cells to beyond level of node, only two rows of cells between IA and border of forewing *Burmagomphus* Will
Discoidal field with three rows of cells at level of node, 3 or more cells cells between IA and margin of fore wing 6
6. Anal triangle well formed, Abd. segment 8,9 not markedly dilated laterally ... *Gomphus* Leach
Anal triangle poorly formed, Abd. segment 8,9 greatly dilated laterally
..... *Platygomphus* Selys

7. Superior anal appendage as long as branches of inferior, a black robust spine/process underneath *Anisogomphus* Selys
 Superior anal appendage longer than branches of inferior, simple without spine/process underneath 8
8. Superior anal appendages very closely apposed, Abd. 8 and 9 with lateral leaf like expansion...
 *Mesogomphus* Forster
 Superior anal appendages widely separated, Abd. 8 and 9 without lateral leaf like expansion ... 9
9. Hind - femora with two rows of about five pairs of very long, widely separated spines, segment 9 markedly elongate *Merogomphus* Martin
 Hind femora with two rows of very short, closely set, distally lengthening spines, segment 9 not markedly elongate *Stylogomphus* Fraser
10. Branches of inferior anal appendage with two fine terminal branches.....
 *Megalogomphus* Campion
 Branches of inferior anal appendage ending in an acute/obtuse point 11
11. Anal triangle three celled, only two rows of cells between IA and margin of fore-wing, penes lobe swollen and distinctly vesiculated *Nepogomphus* Fraser
 Anal triangle four celled, three or more rows of cells between IA and margin of fore-wing, lobe of penes not swollen and nor vesiculate..... 12
12. Ground colour conspicuously black, superior anal appendages enormously curled, hook shaped enclosed broad cordate/oval space by meeting corresponding curled branches of inferior.....
 *Lamelligomphus* Fraser
 Ground colour conspicuously yellow, superior anal appendage relatively much straight, curling at apices, no enclosed space, inferior slightly shorter than superiors.....
 *Onychogomphus* Selys

Genus *Davidus* Selys

1878. *Davidus* Selys, *Bull. Acad. Belg.*, (2), XLVI : 667.

1934. *Davidus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 160.

Key to the species of the genus *Davidus*

1. Superior anal appendages branched..... 2
 Superior anal appendages unbranched, simple, labrum and face black.....
 *aberrans senchalensis* Fraser
2. Both humeral and antchumeral yellow markings present on the dorsum of thorax, superior branch of superior anal appendage equal in length to abd. segment 10.....
 *zalorensis delineatus* Fraser
 Humeral and antchumeral yellow markings absent no upper cuneiform spot present.....
 *dauidi assamensis* Laidlaw

102. *Davidus aberrans senchalensis* Fraser

1926. *Davidus aberrans senchalensis* Fraser, *J. Bombay Nat. Hist. Soc.*, (31) : 170.

1934. *Davidus aberrans senchalensis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 167.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This has only montane habitat. Known to occur at an altitude of about 2500 meters. Humeral stripe are absent, antehumeral stripes almost confluent with the yellow of mid-dorsal carina.

103. *Davidus zallorensis delineatus* Fraser

1926. *Davidus Zallorensis delineatus* Fraser, *J. Bombay Nat. Hist. Soc.*, (31) : 166.

1934. *Davidus Zallorensis delineatus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 164.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. Prothorax black, with broad anterior collar a lateral posterior triangular citron-yellow spot. This is in contrast with prothorax black, a large quadrate spot on each side and bright - yellow posterior lobe of *D. aberrans aberrans*.

104. *Davidus dividi assamensis* Laidlaw

1916. *Davidus dividi assamensis* Laidlaw, *Rec. Indian Mus.*, (12) : 135.

1934. *Davidus dividi assamensis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 168.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. In anal appendage it is similar to *D. jallorensis jallorensis*, but differs from same in absence/reduction of hemeral and antehumeral stripes.

Genus *Anormogomphus* Selys

1854. *Anormogomphus* Selys, *Bull. Acad. Belg.*, XXI (2) : 60.

1934. *Anormogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 172.

This genus is represented only by a single species, in West Bengal, hence no key is provided.

105. *Anormogomohus heteropterus* Selys

1854. *Anormogomohus heteropterus* Selys, *Bull. Acad. Belg.*, XXI (2) : 61.

1934. *Anormogomohus heteropterus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 174.

Material : 3 Females, Manik Chack, Malda dist., M. S. Shishodia coll., (1 Female, Manik chack, 24. vii. 86; 1 Female, Haldibari, 25. vii. 86, 1 Female, Ratua, 16. vii. 86).

Diagnosis : Head and thorax with pale brown markings. Legs moderately long, hind femora with a group of short closely-packed robust spines and a long single spine at distal end. Abd. slightly tumid at base, terminal segments in male slightly dilated. Superior anal appendage conical, widely divaricate, with robust basal ventral spine.

Distribution : India : West Bengal (Malda dist.), Bihar, Punjab. Elsewhere : Pakistan.

Remarks : It differs from *A. kiritschenkoi* Bartenev in having pale brown marking on head and thorax, being smaller (abd. 25-27 : 29-31 mm.).

Genus *Burmagomphus* Williamson

1907. *Burmagomphus* Williamson, *Proc. U. S. Nat. Mus.*, XXXIII : 275.

1934. *Burmagomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 221.

Key to the species of the genus *Burmagomphus*

- 1 (a) Only upper and lower half of antchumeral and humeral thoracic stripes respectively present, two halves joined obliquely to form a sinuous stripe on each side of dorsum of thorax.....
.....*hasimanicus* Fraser
- 1 (b) Antchumeral and humeral stripes separated, three lateral black stripes on each side of thorax...
.....*sivalikensis* Laidlaw

106. *Burmagomphus hasimanicus* Fraser

1926. *Burmagomphus hasimanicus* Fraser, *J. Bombay Nat. Hist. Soc.*, XXXI : 411.

1934. *Burmagomphus hasimanicus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 216.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.).

Remarks : This species is included on the basis of the literature review. This species differs from closely allied *B. pyramidalis* Laidlaw in having vertex entirely black without yellow spot on it, mesothoracic collar finely interrupted, abd. 8 entirely black.

107. *Burmagomphus sivalikensis* Laidlaw

1922. *Burmagomphus sivalikensis* Laidlaw, *Rec. Indian Mus.*, XXIV : 401.

1934. *Burmagomphus sivalikensis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 217.

Distribution : :India : West Bengal (Darjiling and Jalpaiguri dists.), Uttar Pradesh.

Remarks : This species is included on the basis of the literature review. This species has characteristic complete humeral stripe, three lateral black on each side of thorax and has a stout stunted spine near the apex on outer side of superior anal appendage; in last point it agrees with *B. pyramidalis*. In lamina of male being slightly raised, hood like deeply cleft it differs from later species.

Genus *Gomphus* Leach

1775. *Aeshna* Fabricius, *Sust. Ent.*, 424.

1815. *Gomphus* Leach, *Edinb. Encycl.*, IX : 137.

1934. *Gomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 197.

This genus has a single representative, in West Bengal, hence no key is provided.

108. *Gomphus o'doneli* Fraser

1922. *Gomphus o'doneli* Fraser, *Rec. Indian Mus.*, XXIV : 420.

1934. *Gomphus o'doneli* : Fraser, *Fauna Brit. India, Odon.*, (2) : 205.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.)

Remarks : This species is included on the basis of the literature review. In occiput being black instead of yellow, abd. 9 with large yellow spot on each side instead of broad apical yellow triangle and a broad black stripe on each side of thorax instead of two narrow stripes it differs from closely allied species *G. personatus* Selys.

Genus *Platygomphus* Selys

1854. *Platygomphus* Selys, *Bull. Acad. Beng.*, XXI (2) : 44.

1934. *Platygomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 207.

This genus has a single species, represented in West Bengal, hence no key is provided.

109. *Platygomphus dolobratus* Selys

1854. *Platygomphus dolobratus* Selys, *Bull. Acad. Belg.*, (2), XXI : 44.

1934. *Platygomphus dolobratus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 208.

Distribution : India : West Bengal, Bihar.

Remarks : This species is included on the basis of the literature review. In having leg marked with yellow and abd. 5,6,7 with mid-dorsal yellow spots confluent with basal yellow ring it differs from *P. feae* Selys.

Genus *Anisogomphus* Selys

1857. *Anisogomphus* Selys, *Mon. Gomph.*, 102.

1934. *Anisogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 187.

Key to the species of the genus *Anisogomphus*

1. An incomplete basal antenodal nervure always present, rarely more than one cubital nervure in the fore wing2
 An incomplete basal antenodal nervure rarely present, nearly always two cubital nervure in the fore-wing, only an upper humeral spot present, antehumeral stripe confluent with meso-thoracic collar to form inverted 'T' shaped figure*occipitalis* (Selys)
2. A sinuous humeral stripe present, not confluent above with antehumeral stripe, postclypeus at its lower part and the occiput yellow*bivittatus* (Selys)
 Antehumeral and humeral stripes connected above by an oblique transverse spot, postclypeus and occiput black*orites* Laidlaw

110. *Anisogomphus occipitalis* (Selys)

1854. *Gomphus occipitalis* Selys, *Bull. Acad. Belg.*, XXI (2) : 45.

1890. *Anisogomphus occipitalis* Kirby, *Cat. Odon.*, 69.

1934. *Anisogomphus occipitalis* : Fraser, *Fauna Brit. India, Odon.*, (2) : 190.

Distribution : India : West Bengal (Darjiling, Jalpaiguri dists.), Assam.

Remarks : This species is included on the basis of the literature review. It has characteristic 'T' shaped figure formed by confluence of antehumeral stripe and meso-thoracic collar instead of 'L' shaped figure of *A. caudalis* Fraser.

111. *Anisogomphus bivittatus* (Selys)1854. *Gomphus bivittatus* Selys, *Bull. Acad. Belg.*, XXI (2) : 461890. *Anisogomphus bivittatus* Kirby, *Cat. Odon.*, 69.1934. *Anisogomphus bivittatus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 192.*Distribution* : India : West Bengal (Darjiling dist.), Uttar Pradesh.*Remarks* : This species is included on the basis of the literature review. This species is distinguishable from other members of genus by having incomplete antenodal in all wings and three black and three yellow alternating bands on face.112. *Anisogomphus orites* Laidlaw1922. *Anisogomphus orites* Laidlaw, *Rec. Indian Mus.*, XXIV : 371.1934. *Anisogomphus orites* : Fraser, *Fauna Brit. India, Odon.*, (2) : 194.*Distribution* : India : West Bengal (Darjiling dist.), Assam, Sikkim, Meghalaya.*Remarks* : This species is included on the basis of the literature review. This is a sub-montane species known to occur upto an altitude of 2000 meters. It differs from *A. bivittatus* (Selys) in having post clypeus and occiput black instead of yellow.Genus *Mesogomphus* Forster1906. *Mesogomphus* Forster, *Wiesbadon Jahr. ver. Natk.*, LIX : 323.1934. *Mesogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 228.Key to the species of the genus *Mesogomphus*

- 1 (a) Anal appendage yellow a dorsal line bordering mesothoracic collar closely*lineatus* (Selys)
 1 (b) Anal appendage black, mesothoracic collar confluent with antehumeral stripe.....
*lindegreni* Fraser

113. *Mesogomphus lineatus* (Selys)1850. *Gomphus lineatus* Selys, *Rev. Odon.*, : 386.1924. *Mesogomphus lineatus* Fraser, *Rec. Indian Mus.*, XXVI : 427.1934. *Mesogomphus lineatus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 230.*Distribution* : India : West Bengal, Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Kerala. Elsewhere : Burma.*Remarks* : This species is included on the basis of the literature review. This species is known to inhabit both lotic and lentic water bodies. It differs from *M. henryi* Laidlaw, anal appendage being dull sandy yellow instead of blackish or bark reddish brown, inferior 1/3 or less of superior instead of 1/2.114. *Mesogomphus lindgreni* (Fraser)1923. *Onychogomphus lindgreni* Fraser, *J. Bombay Nat. Hist. Soc.*, XXIX : 65.1924. *Mesogomphus lindgreni* Fraser, *J. Bombay Nat. Hist. Soc.*, XXIX : 995.1934. *Mesogomphus lindgreni* : Fraser, *Fauna Brit. India, Odon.*, (2) : 235.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. It is distinguishable from closely related *M. lineatus* by absence of spine to occiput and black costa and pterostigma instead of yellow and pale reddish brown respectively.

Genus *Merogomphus* Martin

1904. *Merogomphus* Martin, *Misson Pavie, Neuropt.*, III :214.

1934. *Merogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 309.

This genus has a single species, as sole representative in West Bengal, hence no key is provided.

115. *Megogomphus martini* (Fraser)

1922. *Platygomphus martini* Fraser, *Mem. Dept. Agric. India (Ent.)*, VII (7) : 68.

1930. *Merogomphus martini* Laiclaw, *Trans. Ent. Soc. London*, LXXXIV : 185.

1934. *Merogomphus martini* : Fraser, *Fauna Brit. India, Odon.*, (2) : 313.

Distribution : India : West Bengal (Darjiling dist.), Assam, Meghalaya. Elsewhere : Maymyo, Burma.

Remarks : This species is included on the basis of the literature review. In having superior anal appendage simple, short, tapered, strongly divaricate instead of strongly curled it differs from *M longistigma* (Fraser).

Genus *Stylogomphus* Fraser

1922. *Stylogomphus* Fraser, *Mem. Dept. Agric. India (Ent.)*, VII (7) : 69.

1934. *Stylogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 288.

This genus has a single species, as sole representative not only in West Bengal but whole of India, hence no key is provided.

116. *Stylogomphus inglisi* Fraser

1922. *Stylogomphus inglisi* Fraser, *Mem. Dept. Agric. India (Ent.)*, VII (7) : 70.

1934. *Stylogomphus inglisi* : Fraser, *Fauna Brit. India, Odon.*, (2) : 290.

Distribution : India : West Bengal (Darjiling dist.), Meghalaya.

Remarks : This species is included on the basis of the literature review. In having parallel, closely apposed branches of inferior anal appendage instead of widely divaricate it differs from members of closely allied genus *Merogomphus* Martin.

Genus *Megalogomphus* Champion

1854. *Heterogomphus* Selys, *Bull. Acad. Belg.*, XXI (2): 27.

1923. *Megalogomphus* Champion, *Ann. Meg. Nat. Hist.* (9), XII : 668.

1934. *Megalogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 291.

Key to the species of the genus *Megalogomphus*

- 1 (a) Head entirely yellow except at the back of eyes, broad medial black rings on abd. segment 2 to 7 and apical rings on 8 to 10, Larger species (abdomen, without appendage, 60 mm., Hindwing 50-52 mm.*flavicolor* (Fraser)
- 1 (b) Head black marked with yellow or green, abdomen black, marked with broad dorsal yellow markings, dorsal and basal yellow spot, smaller species (abd., with appendages, 52-55 mm.; Hind-wing 42-45 mm.).....*smithi* (Selys)

117. *Megalogomphus flavicolor* (Fraser)

1923. *Heterogomphus flavicolor* Fraser, *J. Bombay Nat. Hist. Soc.*, XXIX : 678.

1930. *Megalogomphus flavicolor* Laidlaw, *Trans. Ent. Soc. Lond.*, LXXVIII : 197.

1930. *Megalogomphus flavicolor* : Fraser, *Fauna Brit. India, Odon.*, (2) : 303.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This species is distinguishable from other species of the genus by massive, robust body, length (51 : 40-48 mm.) and width of wing.

118. *Megalogomphus smithi* (Selys)

1854. *Heterogomphus smithi* Selys, *Bull. Acad. Belg.*, XXI (2) : 29.

1924. *Megalogomphus smithi* Fraser, *J. Bombay Nat. Hist. Soc.*, XXX : 50.

1934. *Megalogomphus smithi* : Fraser, *Fauna Brit. India, Odon.*, (2) : 294.

Distribution : India : West Bengal (Darjiling dist.), Assam, Sikkim. Bangladesh.

Remarks : This species is included on the basis of the literature review. In colour and markings it is most related to *M. superbus* Fraser, but is distinguishable by uninterrupted mesothoracic collar and in being broadly confluent with ante-humeral stripes.

Genus *Nepogomphus* Fraser

1854. *Onychogomphus* (pars) Selys, *Bull. Acad. Belg.*, XXI (2) : 30.

1934. *Nepogomphus* Fraser, *Fauna Brit. India, Odon.*, (2) : 282.

This genus is represented by a single species in West Bengal, hence no key is provided.

119. *Nepogomphus modestus* (Selys)

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

1934. *Nepogomphus modestus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 285.

Distribution : India : West Bengal (Jalpaiguri and Darjiling dists.), Assam. Elsewhere : Burma, Sumatra, Malaysia

Remarks : This species is included on the basis of the literature review. In possessing a robust, superior, subapical spine to branches of inferior anal appendage it differs from *N. walli* (Fraser).

Genus *Lamelligomphus* Fraser1922. *Lamelligomphus* Fraser, *Rec. Indian Mus.*, XXIV : 426.1934. *Lamelligomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 269.Key to the species of the genus *Lamelligomphus*

Humeral stripe present and complete, abd. 2 with two large spots (including oreillets) on sides and a bilobate stripe on dorsum.....*biforceps* (Selys)

Humeral stripe absent or represented only by a tiny upper spot, abd. 2 broadly yellow on the sides (including the robust oreillets) and a linear and mid-dorsal stripe.....*risi* (Fraser)

120. *Lamelligomphus biforceps* (Selys)1878. *Onychogomphus biforceps* Selys, *Bull. Acad. Belg.*, (2) : XLVI : 420.1930. *Lamelligomphus biforceps* Laidlaw, *Trans. Ent. Soc. London*, 193.1934. *Lamelligomphus biforceps* : Fraser, *Fauna Brit. India, Odon.*, (2) : 271.*Distribution* : India : West Bengal (Darjiling dist.). Elsewhere : Tonkin.

Remarks : This species is included on the basis of the literature review. This species differs from *L. risi* in having no tumid basal and., abd a small rounded spot near the base on both sides of abd. 8, instead of its absence. There are certain other differences mentioned under remarks of *risi*.

121. *Lamelligomphus risi* (Fraser)1922. *Gomphus risi* Fraser, *Mem. Dept. Agric. India*, VII (7) : 73.1934. *Lamelligomphus risi* : *Fauna Brit. India, Odon.*, (2) : 273.*Distribution* : India : West Bengal (Jalpaiguri and Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This species differs from *L. biforceps* (Selys) in reduction of humeral stripe to superior humeral spot and in abdomen 3 to 6 with basal rings instead of yellow mid-dorsal spots.

Genus *Onychogomphus* Selys1826. *Lindenia* (pars) De Hann, *Bijd. Nat. Wetensch.* 1 (2) : 47.1854. *Onychogomphus* Selys, *Bull. Acad. Belg.*, XXI (2) : 30.1934. *Onychogomphus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 239.Key to the species of the genus *Onychogomphus*

1. Yellow humeral stripe present but vestigeal or interrupted2
The humeral stripe present and complete3
2. Antero-lateral black stripes on thorax nearly obsolete-represented by a mere upper vestige.....
.....*aureus* Laidlaw
Anterolateral black stripe on thorax not obsolete, represented by a fully continuous, not interrupted, inferior anal appendage without an upper basal spine*duaricus* Fraser
3. Antehumeral stripes confluent with mesothoracic collar, superior anal appendage yellow...
.....*M. flavum* Selys

122. *Onychogomphus aureus* Laidlaw1922. *Onychogomphus aureus* Laidlaw, *Rec. Indian Mus.*, XXIV : 4051934. *Onychogomphus aureus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 254.*Distribution* : India : West Bengal (Calcutta dist.), Assam, Meghalaya.*Remarks* : This species is included on the basis of the literature review. The extent of yellow-ground colour is so marked that it distinguishes from other species of the genus.123. *Onychogomphus M-flavum* Selys1854. *Onychogomphus bistrigatus* Selys, *Mon. Gomph.*, 22.1894. *Onychogomphus M-flavum* Selys, *Ann. Soc. Ent. Belg.*, XXXVIII : 169.1934. *Onychogomphus M-flavum* : Fraser, *Fauna Brit. India, Odon.*, (2) : 250.*Distribution* : India : West Bengal (Darjiling dist.).*Remarks* : This species is included on the basis of the literature review. This species is distinguishable from closely related species *O. duaricus* in having unicolourous superior anal appendages (instead of bright yellow, apical 1/3 or more abruptly black) and presence of two teeth on the inferior appendages (instead of only one).124. *Onychogomphus duaricus* Fraser1924. *Onychogomphus duaricus* Fraser, *J. Bombay Nat. Hist. Soc.*, XXIX : 1001.1934. *Onychogomphus duaricus* : Fraser, *Fauna Brit. India, Odon.*, (2) : 245.*Distribution* : India : West Bengal (Darjiling and Jalpaiguri dists.).*Remarks* : This species is included on the basis of the literature review. This species differs from *O. aureus*, as discussed earlier under that species. It also is well distinguishable from all other species of the genus., by the unusual distribution of black on the labrum, the black occiput and much wider space between wing nervures RII and IRII.

Superfamily LIBELLULOIDEA

Family CORDULIIDAE

This family has, though, 6 subfamilies under it but in West Bengal only following 2 subfamilies are represented, whose key are provided.

Key to the subfamilies of the CORDULIIDAE

Cross-veins in the cubital space more than 3 in number, anal loop in hind-wing quadrate or broader than long and without a midrib.....EOPHTHALMIINAE

Cross-veins in the cubital space less than 3 in number, anal loop in hind-wing elongate, obtuse at apex, midrib present and slightly zigzaggedIDIONYCHINAE

Subfamily EOPHTHALMIINAE

This subfamily has got two genera viz., *Marcormia* Rambur and *Epophtalmia* Burmeister, having representative in West Bengal.

Key to the genera of the subfamily EPOPHALMIINAE

- Discoidal cell of forewing always and that of hindwing nearly always traversed, RIV+V and MA markedly undulated in both wings*Epopthalmia* Burm.
 Discoidal cell of both forewing and hind-wing always entire, RIV+V markedly sinuous in hindwing*Macromia* Rambur

Genus *Epopthalmia* Burmeister

1839. *Epopthalmia* Burmeister, *Handb. Ent.*, II : 844.
 1936. *Epopthalmia* : Fraser, *Fauna Brit. India, Odon.*, (3) : 192.

This genus is represented in West Bengal by a single species hence on key is provided.

Epopthalmia vittata vittata Burmeister

1839. *Epopthalmia vittata* Burmeister, *Handb. Ent.*, II : 845.
 1936. *Epopthalmia vittata vittata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 194.

Material : 1 Male, Haldibari and Environs, Malda dist., 16. vii. 86, M. S. Shishodia and Party coll.

Diagnosis : Frons and vesicle dark metallic blue, rounded spot on each side and crown-shaped spot in the middle. Bluish green metallic reflex on sides of thorax. Dark costal brown rays on bases of wings of female only. Tonal angle of hind wing with bright amber patch. Abdomen dark reddish brown, with bright yellow annules- more broad on abd. 3-6. Superior anal appendage very little angulated on its outer middle spot.

Distribution : India : West Bengal (Calcutta dist.), Andhra Pradesh, Maharashtra, Kerala, Karnataka, Uttar Pradesh, Tamil Nadu.

Remarks : Abdominal broad yellow annules distinguishes it from other Indian species of the genus. It differs from *E. vittigera* (Rambur), from Burma, in having dark costal rays in wings of female only, instead of in the wings of both sexes.

Genus *Macromia* Rambur

1842. *Macromia* Rambur, *Ins. Nevrop.*, : 137.
 1936. *Macromia* : Fraser, *Fauna Brit. India, Odon.*, (3) : 161.

Key to the species of the genus *Macromia*

1. Humeral or antehumeral stripe absent on thorax or present only as a vestige but not extending halfway upto dorsum*moorei* Sclys
 Humeral or antehumeral present on thorax, well defined and extends beyond halfway up to dorsum.2
2. Face except crest of frons entirely pale creamy-yellow, sides of thorax pale creamy-yellow traversed by a dark green metallic stripe.....*pallida* Fraser
 Face black or dark brown marked with citron-yellow, sides of thorax dark with metallic green reflex and traversed by a narrow citron-yellow stripe3

3. Superior anal appendages with a robust spine on outer side and with apex acuminate, Abd., 10 with robust mid-dorsal spine.....*flavicincta* Selys
 Superior anal appendages with only a minute spine on outer side, Abd., 10 without a mid-dorsal spine.....*flavovittata* Fraser

125. *Macromia moorei* Selys

1874. *Macromia moorei* Selys, *Bull. Belg.*, (2), XXXVII : 28.

1936. *Macromia moorei* : Fraser, *Fauna Brit. India, Odon.*, (3) : 164.

Distribution : India : West Bengal (Darjiling dist.), Assam, Himachal Pradesh, Uttar Pradesh, Meghalaya.

Remarks : This species is included on the basis of the literature review. This species is distinguishable by absence of dark brown rays at the base of wings and abd. 10 with mid-dorsal keel and a small tubercle on each side on dorsum.

126. *Macromia pallida* Fraser

1924. *Macromia pallida* Fraser, *Rec. Indian Mus.*, XXVI : 456.

1936. *Macromia pallida* : Fraser, *Fauna Brit. India, Odon.*, (3) : 176.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.).

Remarks : This species is included on the basis of the literature review. The predominant yellow marking differentiates it from other species of the genus.

127. *Macromia flavicincta* Selys

1874. *Macromia flavicincta* Selys, *Bull. Acad. Belg.*, (2), XXXVII : 25.

1936. *Macromia flavicincta* : Fraser, *Fauna Brit. India, Odon.*, (3) : 171.

Distribution : India : West Bengal, Maharashtra.

Remarks : This species is included on the basis of the literature review. This species is distinguishable by very broad yellow abd. annules, 'T' shaped marking on crest of frons.

128. *Macromia flavovittata* Fraser

1935. *Macromia flavovittata* Fraser, *Rec. Indian Mus.*, XXXVII : 326.

1936. *Macromia flavovittata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 177.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This species differs from closely allied species *M. flavicincta*, from which it differs (besides points mentioned under said species) by single row of cells at the beginning of discoidal field, abd. 3 to 6 with paired dorsal spots instead of annules.

Subfamily IDONYCHINÆ

This subfamily has only one representative genus and one species under it in West Bengal, hence no key is provided.

Genus *Idionyx* Hagen

1867. *Idionyx* Hagen, *Verh. zool. bot. Ges., Wien*, XVII : 58.

1936. *Idionyx* : Fraser, *Fauna Brit. India, Odon.*, (3) : 218.

129. *Idionyx stevensi* Fraser

1924. *Idionyx stevensi* Fraser, *Rec. Indian Mus.*, XXVI : 462.

1936. *Idionyx stevensi* : Fraser, *Fauna Brit. India, Odon.*, (3) : 237.

Distribution : India : West Bengal (Darjiling dist.).

Remarks : This species is included on the basis of the literature review. This species differs from closely related *I. optata* Selys in having a very robust, simple, lateral spine to the inferior anal appendage instead of small spine surmounted on a quadrate projection.

Family LIBELLULIDAE

This family has been, though, divided into 12 subfamilies by Fraser (1957) they appear to be untenable due to overlapping characters. This is found more likely, as compared to Tillyard Fraser (1938-1940) and in accordance with Lihiri (1987). It is, therefore, considered best to treat all representative genera known from West Bengal under the family Libellulidae.

Key to the genera of the family LIBELLULIDAE

1. Claws with hooks2
Claws without hooks, thorax metallic*Onychothemis* Brauer
2. Claw-hooks equal in length to claws - giving claws a bifid appearance, thorax invariably metallic*Zygonyx* Selys
Claw - hooks shorter than claws, arises from about middle of claw, not giving a bifid appearance to claws, thorax generally non-metallic (only rarely metallic).....3
3. Borders of anal-loop running upto the posterior borders of hind wings, apex of loop open4
Borders of anal-loop not running upto the posterior borders of hind-wing but converges and meets before posterior border, apex of loop closed.....5
4. Abdomen broad at base, tapers gradually, an opalescent white spot in centre of hind-wing.....
.....*Tholymis* Hagen
Abdomen very tumid at base and then abruptly narrowed and very slim and cylindrical to the end, no opalescent white spot, wings broadly tipped with dark brown*Zygonyx* Rambur
5. Distal antenodal nervure in fore-wing complete.....6
Distal antenodal nervure in fore-wing incomplete17
6. Lobe of prothorax large and fringed with long hairs7
Lobe of prothorax small, inconspicuous and usually naked-without fringe of long hairs.....9
7. Frons metallic above*Brachydiplax* Brauer
Frons non-metallic above..... 8

8. Only 6 antenodal nervures in fore-wing, abd. segments 1 to 6 conspicuously dilated, 7-10 slim and cylindrical *Acisoma* Rambur
Always 12 or more antenodal nervure in fore-wing, abdomen of variable shape, not conspicuously dilated abd. 1 to 6 *Orthetrum* Newman
9. Sectors of arc in fore-wing arising from a common and rather long stalk, frons metallic above 10
Sectors of arc in fore-wing separated at their origin, frons non-metallic above 14
10. Base of discoidal cell in hind-wing distinctly distal to the level of arc 11
Base of discoidal cell in hind-wing at the level of arc 12
11. Supplementary nervure present in bridge, anal-loop small comprised of not more than 6 cells, abd, 8 of female with lateral borders undilated *Nesoxenia* Kirby
Supplementary nervure absent in bridge, anal-loop larger and longer, comprises of more than 8 cells, abd. 8 of female with lateral borders dilated *Agrioptera* Brauer
12. Only 1 cubital nervure in all Wings, anal-loop very long and overlapping distal end of discoidal cell *Cratilla* Kirby
More than 1 cubital nervure in hindwing, anal loop variable-long or short 13
13. Anal-loop very short, of not more than 6 cells, discoidal cell in fore-wing entire.....
..... *Amphithemis* Selys
Anal-loop longer, of nervure less than 9 cells and usually many more, discoidal cell in fore-wing traversed *Lyriothemis* Brauer
14. Three rows of cells between IRiii and Pspl *Camacinia* Kirby
Only 1 or 2 rows of cells between IRiii and Rspl 15
15. Sub trigone in fore-wing single celled, hind-wing with a conspicuous black and golden yellow basal markings *Aethriamanta* Kirby
Subtrigone on fore-wing three celled, hind-wing with no such conspicuous pigment markings 16
16. Hamules of male genitalia long and conspicuous, only abd. 8 and 9 with black dorsal markings *Urothemis* Brauer
Hamules of male genitalia small, triangular and inconspicuous, abd. 1 to 10 with black dorsal markings *Macrodiplax* Brauer
17. Lobe of prothorax large and fringed with long hairs 18
Lobe of prothorax small, usually naked 20
18. Borders of discoidal field bounded by MA and Cuii converging strongly at wing border.....
..... *Sympetrum* Newman
Borders of discoidal field in fore-wing diverging widely at wing border 19
19. Eyes contiguous for a short space, discoidal cell in hind-wing entire, costal border of fore-wing straight, frons non-metallic above, discoidal field in fore-wing beginning with two row of cells *Diplacodes* Kirby
Eyes more broadly contiguous, discoidal cell in fore-wing traversed, costal border of fore-wing sinuous near base, frons metallic above, discoidal field beginning with at least 3 rows of cells...
..... *Palpopleura* Rambur

20. Sectors of arc in fore-wing separated and diverging at origin, body very dark metallic.....
*Rhyothemis* Hagen
 Sectors of arc in fore-wing not separated at its origin, arises from a common and rather long stalk, body not so very dark metallic21
21. Discoidal field with borders converging strongly at wing-margin22
 Discoidal field with borders parallel or widely divergent at wing - margin23
22. Discoidal cell in fore-wing very narrow, its costal side only about 1/4 to 1/3 the length of basal, a conspicuous supplementary nervure (Irii) present between Rii and Riii.....
*Pantala* Hagen
 Discoidal cell in fore-wing broader, its costal side about 1/2 the length of basal, no supplementary nervure (IRii) present between Rii and Riii*Trithemis* Brauer
23. Discoidal field in fore-wing adjacent to discoidal cell only 2 cells wide*Indothemis* Ris.
 Discoidal field in fore-wing adjacent to discoidal cell 3 or more cell wide24
24. Genital hamules very long, hindwing broad at base, pterostigma very short and usually unequal in fore and hind-wings25
 Genital hamules very small, hind-wing not markedly broad at base, pterostigma variable and usually of equal size in fore and hind-wings.....27
25. Three rows of cells between IRiii and Rspl*Pseudotranea* Fraser
 Only one row of cells between IRiii and Rspl*Tranea* Hagen
26. Pterostigma bicolours-black with white end, 2 rows cells between IRiii and Rspl.....
*Bradinopyga* Kirby
 Pterostigma unicolorous, 1 or rarely 2 rows of cells between IRiii and Rspl.....27
27. More than one cubital nervure in all wings, close secondary reticulation proximal to node, wings coloured amber-yellow at base or more broadly dark reddish-brown.....
*Neurothemis* Brauer
 Only one cubital nervure in all wings, no secondary reticulation in the wings, wings usually uncoloured or only restricted to small basal yellow markings in the hind-wing (except in *Brachythemis* with a broad medial fascia).....28
28. Red or ochreous species with basal or medial yellow markings to wings29
 Variable coloured, darker species (rarely only partly red or ochreous)30
29. Antenodals in fore-wings $9\frac{1}{2}$ to $10\frac{1}{2}$ eyes shortly contiguous, wings with basal yellow markings, face and frons red*Crocothemis* Brauer
 Antenodals in fore-wings $6\frac{1}{2}$ to $7\frac{1}{2}$, eyes shortly contiguous, face, frons and also abdomen never red, wings with broad reddish-yellow medial fascia*Brachythemis* Brauer
30. Arc situated between the second and third antenodal nervures, only one row of cells between IRiii and Rspl*Lathrecista* Kirby
 Arc between the first and second antenodal nervures, two rows of cells between IRiii and Rspl*Potamarcha* Karsch

Genus *Onychothemis* Brauer

1868. *Onychothemis* Brauer, *Verh. zool. bot. Ges. Wien*, XVIII : 170.

1936. *Onychothemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 402.

This genus has a single species represented in West Bengal, hence no key is provided.

Onychothemis testacea ceylanica Ris

1912. *Onychothemis testacea ceylanica* Ris, *Cat. coll. Schys. Fase.*, (14) : 832.

1924. *Onychothemis testacea ceylanica* : Laidlaw, *Spolia Zeylanica*, (12) : 349.

1936. *Onychothemis testacea ceylanica* : Fraser, *Fauna Brit. India, Odon.*, (3) : 404.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.), Andhra Pradesh, Kerala, Karnataka, Tamil Nadu. Elsewhere : Sri Lanka.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from only other species *O. culminicola culminicola* Forster in having thorax dark metallic green instead of coppery-brown and abdomen black marked with bright yellow spots instead of entirely reddish-brown.

Genus *Zygonyx* Selys

1867. *Zygonyx* Selys-Hagen, *Verh. zool. bot. Ges. Wien*, XVII : 62.

1936. *Zygonyx* : Fraser, *Fauna Brit. India, Odon.*, (3) : 391.

Key to the species of the genus *Zygonyx*

- 1 (a) Base of hind-wing broadly amber yellow, prothorax black with a median geminate spot on middle lobe, a narrow anterior collar and whole of posterior lobe citron yellow.....
*iris davina* Fraser
 Base of hind-wing uncoloured, prothorax blackish-brown anterior border of anterior lobe finely, middle of dorsum of mid-lobe and whole of posterior lobe dull yellow*iris iris* Selys

Zygonyx iris davina Fraser

1926. *Zygonyx iris davina* Fraser, *J. Bombay Nat. Hist. Soc.*, (31) : 768.

1936. *Zygonyx iris davina* : Fraser, *Fauna Brit. India, Odon.*, (3) : 397.

Distribution : India : West Bengal (Darjiling dist.), Assam, Meghalaya.

Remarks : This sub-species is included on the basis of the literature review. This subspecies is distinguishable from not only the other known species within West Bengal *Z. iris iris* but all other Indian species under the genus by possessing broad yellow markings of body and by basal yellow area at base of wings in the female.

Zygonyx iris iris Selys

1869. *Zygonyx iris* Selys, *Ann. Soc. Ent. Belg.*, XII : 97.

1926. *Zygonyx iris iris* Fraser, *J. Bombay Nat. Hist. Soc.*, XXXI : 763, 764.

1936. *Zygonyx iris iris* : Fraser, *Fauna Brit. India, Odon.*, (3) : 394.

Distribution : India : West Bengal, Assam, Meghalaya.

Remarks : This sub-species is included on the basis of the literature review. This sub-species is related to *Z. iris davina*, and could be separated as remarked under said sub-species.

Genus *Tholymis* Hagen

1867. *Tholymis* Hagen, *Stett. Ent. Zeit.*, XXVIII : 221.

1936. *Tholymis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 410.

This genus has a single species, represented not only in West Bengal but whole of India hence no key is provided.

130. *Tholymis tillarga* (Fabricius)

1798. *Libellula tillarga* Fabricius, *Ent. Syst. Suppl.*, : 285

1936. *Tholymis tillarga* : Fraser, *Fauna Brit. India, Odon.*, (3) : 411.

Material : 1 Female, Ilambazar, Birbhum dist., 2. x. 87, M. Prasad coll.; 1 Female, Puruliya Sainik School Campus, Puruliya dist. 1. xi. 85, S. Sen and party coll.; 1 Female, Bagdogra, Darjiling dist., 13. v. 87, Raja Ram and party coll.; 1 Female, In and around Joypur, R. R. H., Bankura dist., 22. xii. 85, D. K. Mondal and party coll.; 1 Male W. Dinajpur, 30. xi. 87, T. R. Mitra and party coll.

Diagnosis : Abdomen broad at base than tapering gradually to the end; borders of anal-loop running on the posterior border of hind-wing apex of loop open and an opalescent white spot.

Distribution : India : West Bengal (Bankura, Birbhum, W. Dinajpur, Puruliya, Hughli, Darjiling, Calcutta and 24 Parganas), Assam, Himachal Pradesh, Madhya Pradesh, Punjab, Uttar Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Orissa, Tamil Nadu. Elsewhere : Australia, Burma, Sri Lanka, Madagascar and Tropical Africa.

Remarks : This species has a characteristic opalescent white spot on hind-wing, which is markedly visible against green back ground of vegetation over which they fly. This species is crepuscular in habit.

Genus *Zygomma* Rambur

1842. *Zygomma* Rambur, *Ins. Nevrop.*, : 26, 30

1936. *Zygomma* : Fraser, *Fauna Brit. India, Odon.*, (3) : 407.

This genus is represented by a single species, in not only West Bengal but whole of India, hence no key is provided.

131. *Zygomma petiolatum* Rambur

1842. *Zygomma petiolatum* Rambur, *Ins. Nevrop.*, : 30.

1936. *Zygomma petiolatum* : Fraser, *Fauna Brit. India, Odon.*, (3) : 409.

Distribution : India : West Bengal (Calcutta dist.), Karnataka, Kerala, Maharashtra, Tamil Nadu. Elsewhere : Burma, Sri Lanka.

Remarks : This species is included on the basis of the literature review. This species has wide distribution, except in desert areas and are known to occur in plains to 1000 meters. This species is distinguished from *Tholymis* by abd. very tumid at base, wings are broadly tipped with dark brown and opalescent white spot being absent.

Genus *Brachydiplax* Brauer

1868. *Brachydiplax* Brauer, *Verh. zool. -bot. Ges. Wien.*, XVIII : 172.

1936. *Brachydiplax* : Fraser, *Fauna Brit. India, Odon.*, (3) : 323.

Key to the species of the genus *Brachydiplax*

1. Bases of all wings burnt-brown or golden brown, dorsum of thorax densely pruinose, sides of thorax and basal segments of abdomen ferruginous *chalybea* Brauer
 Bases of all wings uncoloured or but very pale so, dorsum of thorax dark metallic or yellow marked with black 2
2. Fore-wing with 8 to 9 antenodal nervure, male sexual organs barely visible in profile.....
 *farinosa* Kruger
 Fore-wing with only 7 antenodal nervure, male sexual organs conspicuously projecting and visible in profile *sobrina* (Rambur)

Brachydiplax chalybea chalybea Brauer

1868. *Brachydiplax chalybea* Brauer, *Verh. zool. -bot. Ges. Wien.*, (18) : 173.

1936. *Brachydiplax chalybea* : Fraser, *Fauna Brit. India, Odon.*, (3) : 328.

1976. *Brachydiplax chalybea chalybea*, Mitra et al., *Third all India Cong. Zool.*, : 64.

Material : 1 Male, around Jhargram, Medinipur dist., 15. ix. 85, S. Biswas and party coll.; 2 Males, Gobindapur, S. 24 Parganas dist., 27. iv. 86, B. N. Das and Party coll.

Diagnosis : Wings hyaline, base have burnt-brown patch extending from the level of second antenodal to tornus in hind-wing. Thorax pruinose white on dorsum, laterally ochraceous with vestiges of lines on upper part of humeral and postero-lateral sutures metallic black.

Distribution : India : West Bengal (Midnapur, Calcutta and 24 Parganas dists.), Assam. Elsewhere : Burma, Java, Malaysia, Siam, Sumatra, Borneo, Celebes, Bangkok.

Remarks : This species is distinguishable by its large size (abd. 21-25 : 18-19 B. *farinosa*; 20-24 Male and 16-22 Female of *B. sobrina*), base of all wings burnt-brown or golden brown in contrast with uncoloured in *sobrina* and with pale yellow in *farinosa*.

132. *Brachydiplax farinosa* Kruger

1891. *Brachydiplax Sobrina* Selys, *Ann. Mus. Civ. Genova.*, (30) : 449.

1902. *Brachydiplax farinosa* : Kruger, *Stett. Ent. Zeit.*, (63) : 135.

1936. *Brachydiplax farinosa* : Fraser, *Fauna Brit. India, Odon.*, (3) : 327.

Material : 1 Male, Dattpukur, 24 Parganas dist., 18. ix. 74, Raja Ram and S. Das coll.

Diagnosis : Anterior surface of frons margined with black. Prothorax, thorax dark metallic green, dorsum in old adults almost white with pruinescence. Nodal index high, specially antenodal 8-9. Lamina of male genitalia depressed, concave not visible in profile.

Distribution : India : West Bengal (Jalpaiguri, Haora, 24 Parganas dist.), Assam. Elsewhere : Burma, Malaysia and Sumatra

Remarks : This species is related to *B. sobrina* but is distinguishable by higher antenodal nervure (8-9 : 6-7), thorax dark metallic green and its male genitalia not visible in profile.

133. *Brachdiplax sobrina* (Rambur)

1842. *Libellula sobrina* Rambur, *Ins. Nevrop.*, : 114.

1936. *Brachdiplax sobrina* : Fraser, *Fauna Brit. India, Odon.*, (3) : 325.

1976. *Brachdiplax sobrina* : Mitra et al., *Third all India Congr. Zool.*, 64.

1987. *Brachdiplax sobrina* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 191.

Material : 1 Female, Arabari Reserve forest, Medinipur dist., 3. iv. 85, B. Nandi & A. R. Lahiri coll.; 1 Female, Kamalpur, Bankura dist., 10. ix. 86, R. S. Barman and Party coll.; 2 Males, Kusumdanga, Bankura dist., 12. x. 85, K. K. Ray and Party coll.; 1 Male, Katwa, Bardhaman dist., 4. ix. 86, K. K. Ray and Party coll.; 1 Female, Nimbari, Malda dist., 24. vi. 87, K. P. Mukherjee and Party coll.; 1 Male, Haldibari and Environs, Malda dist.; 16. ix. 86, M. S. Shishodia and Party coll.

Diagnosis : Frons above metallic blue, so are vesicle. Occiput dark brown with yellow geminate spot. Prothorax dark brown, thorax olivaceous-brown with black metallic markings. Abdomen black. Lamina of great size, prominently seen projecting in profile.

Distribution : India : West Bengal (Bankura, Burdhaman, Calcutta, 24 Parganas, Malda, Medinipur, Haora, Hughli), Assam, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Punjab, Uttar Pradesh. Elsewhere : Bangladesh, Burma, Thailand, Vietnam, Sri Lanka.

Remarks : This species is moderate in size (abd. 20-24 in Male, 16-22 mm in female) as compared larger *Chalybea* (21-25 in Male, 21-23 mm. in Female) or smaller *farinosa* (18-19 in Male and 17-18 mm. in female). Genitalic lamina prominent, projecting (ill developed in *farinosa*). Thorax only with black or metallic markings (instead of whole of thorax metallic green as in *farinosa*).

Genus *Acisoma* Rambur

1842. *Acisoma* Rambur, *Ins. Nevrop.*, 26, 28.

1936. *Acisoma* : Fraser, *Fauna Brit. India, Odon.*, (3) : 329.

This genus has a single species represented not only in West Bengal but whole of India, hence no key is provided.

Acisoma panorpoides panorpoides Rambur

1842. *Acisoma panorpoides* Rambur, *Ins. Nevrop.*, 28.

1936. *Acisoma panorpoides panorpoides* : Fraser, *Fauna Brit. India, Odon.*, (3) : 330.

Material : 1 Male, Golabganj, Malda dist., 21. vi. 87, K. P. Mukherjee and Party coll.; 1 Female, Tulshihata, Malda dist., 25. vi. 87, K. P. Mukherjee and Party coll.; 1 Female, Ratua, Malda, 22. vii. 86, M. S. Shishodia and Party coll.; 1 Male, Gobindapur, S. 24 Parganas, 27. iv. 86, B. N. Das and Party coll.

Diagnosis : Small sized dragon fly (abd. 15-18 mm.). Thorax azure-blue marbled with black. Abd. azure - blue. Abd. 1 to 6 swollen, 7 to 10 slim, cylindrical. Wings hyaline, low number of antenodals in fore-wing (6-7).

Distribution : India : West Bengal (Malda, Haora, Calcutta and 24 Parganas dist.), Arunachal Pradesh, Assam, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Punjab, Tamil Nadu, Uttar Pradesh. Elsewhere : Sri Lanka, Celebes, China, Japan, Java, Thailand, Malaysia, Indonesia, Taiwan, Philippines, Sumatra, Moluccan Islands.

Remarks : In size it is somewhat like *Diplacodes* but is more robust. The characteristic swelling of abd. 1-6 easily separates it from all other Indian Libellulids.

Genus *Orthetrum* Newman

1833. *Orthetrum* Newman, *Ent. Mag.*, I : 511.

1936. *Orthetrum* : Fraser, *Fauna Brit. India, Odon.*, (3) : 291.

Key to the species of the genus *Orthetrum*

1. Males coloured violaceous-red due to thin covering of pruinescence, frons blue anteriorly.....
.....*Pruinosum neglectum* (Rambur)
Males coloured brown or black with yellow markings of variable pattern, often very conspicuously pruinose in males, rarely without pruinescence2
2. Abdomen enormously swollen at base and then abruptly slimmed and compressed laterally to the end, black marked with greenish yellow not pruinose*sabina* Drury
Abdomen variable but not swollen conspicuously at base, never slim nor compressed laterally, mostly with dense pruinescence on thorax and abdomen3
3. Base of hind-wing with a large black triangular marking*triangulare triangulare* (Sclys)
Base of hind-wing without a black triangular marking4
4. Cui in hind-wing arises from distal side of discoidal cell, far away from its posterior angle...
.....*chrysostigma chrysostigma* (Brauer)
Cui in hind-wing arises from the posterior angle of discoidal cell5
5. Abdomen short and broad, almost appears white with thick pruinescence, thorax with 2 broad greenish or bluish stripes more or less obscured with pruinescence.....
.....*japonicum internum* MacLachlan
Abdomen long and narrow, often blue with pruinescence, thorax with very narrow whitish creamy stripes, membrane black*glaucum* (Brauer)

Orthetrum pruinatum neglectum (Rambur)

1842. *Libellula neglecta* Rambur, *Hist. nat. Ins. Nevrop.*, : 86.
 1909. *Orthetrum pruinatum neglectum* : Ris, *Cat. Coll. Schys.*, (9) : 219.
 1936. *Orthetrum pruinatum neglectum* : Fraser, *Fauna Brit. India, Odon.*, (3) : 311.

Material : 2 Males, Keranitula, Medinipur dist., 31. iii. 85, B. Nandy and Party coll.; 1 Male, Khatra Srv., Bankura dist., 6. x. 85, K. K. Ray and Party coll.; 1 Female, Apalchand 1, Kathanbari, Jalpaiguri dist., 11. x. 87, S. K. Tandon and Party coll.

Diagnosis : Frons dark-brown to blue-black anteriorly. Prothorax thorax reddish-brown, abd. purplish-red to bright vermilion red even anal appendage red. Genital hamule with median cleft, 2 rows of cells between IRiii and Rspl.

Distribution : India : West Bengal (Medinipur, Bankura and Jalpaiguri dists.). Elsewhere : Nepal, Tibet, China, Sri Lanka, Burma, Malaysia, Indochina, Taiwan.

Remarks : This species is known to inhabit small ponds tanks etc., quite common Libellulid from plains upto an altitude of 2000 metres. Abdomen being violet-coloured differentiates it from *O. chrysis* and *O. testaceum*.

Orthetrum sabina sabina (Drury)

1770. *Libellula sabina* Drury, *Ill. Evot. Ins.* (1), 114.
 1936. *Orthetrum sabina* : Fraser, *Fauna Brit. India, Odon.*, (3) : 300.
 1987. *Orthetrum salina sabina* : Lahiri, *Rec. Zool. Surv. India., Occ. paper No. 99* : 183.

Material : 1 Female, Gaur and Environs, Malda dist., 18. vii. 86, M. S. Shishodia and Party coll.; 1 Female, Achipur, 15 km. from Budge Budge, S. 24 Parganas dist., 21. iv. 86, B. N. Das and Party coll.; 1 Female, Maureswar, Birbhum dist., 31. iii. 86, M. S. Shishodia and Party coll.; 1 Male, Katwa, Bardhaman dist., 4. ix. 86, K. K. Ray and Party coll.; 2 Males, Mechbast, Kathambari, Jalpaiguri dist., 10. x. 87, S. K. Tandon and Party coll.; 1 Female, Jayanti, Jalpaiguri dist., 17. xii. 86, R. S. Barman and Party coll.; 1 Female, Raiganj College Para, W. Dinajpur, 15. xii. 86, B. C. Das and Party coll.; 1 Male, Jammuna, Bishnupur, Bankura dist., 8. ii. 85, S. Sen and Party coll.; 1 Male, 1 Female, Sushunia Hills, North Bankura, Bankura dist., 9. x. 85, K. K. Ray and Party coll.; 1 Male, Jhargram, Medinipur dist., 17. ix. 85, S. Biswas and Party coll.; 1 Male, Medinipur Rly. Station, Medinipur dist., 6. iv. 85, B. N. Nandy and A. R. Lahari coll.; 1 Male, Rampur, W. Dinajpur dist. 25. xi. 87, T. R. Mitra and Party coll.; 1 Male, Amarpur, Murshidabad dist., 8. ii. 86, I. J. Gupta and Party coll.

Diagnosis : Frons very deeply notched forming two triangular facets in front. Prothorax bright yellow its anterior and middle lobe black, posterior brown. Thorax and abdomen greenish yellow; sutures of thorax finely black. Abdomen enormously swollen at base and then abruptly slimmed and compressed laterally to the end.

Distribution : India : West Bengal (Bankura, Bardhaman, Haora, Hughli, Calcutta, 24 Parganas (North and South), Malda, West Dinajpur, Murshidabad, Jalpaiguri dists.), Assam, Bihar, Himachal Pradesh, Punjab, Uttar Pradesh, Manipur. Elsewhere : Sri Lanka, Burma, Siam and Samoa.

Remarks : This is one of the most commonly occurring *Orthetrum* species. This species is easily distinguishable from all the Indian species of *Orthetrum* by its enormously swollen basal abdomen segments. Marking of abdomen is greenish-yellow not pruinose, instead of pruinose abd. and thorax of other species of the genus.

Orthetrum triangulare triangulare (Selys)

1878. *Libellula triangularis* Selys, *Mith Mus. Dsesden.*, : 314.
 1909. *Orthetrum triangulare triangulare* : Ris, *Cat. Col. Selys.*, (9) : 244.
 1936. *Orthetrum triangulare triangulare* : Fraser, *Fauna Brit. India, Odon.*, (3) : 305.
 1987. *Orthetrum triangulare triangulare* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 184.

Distribution : India : West Bengal (Darjiling and Calcutta dists.), Arunachal Pradesh, Assam, Himachal Pradesh, Karnataka, Kashmir, Kerala, Maharashtra, Meghalaya, Mizoram, Sikkim, Tamil Nadu, Uttar Pradesh. Elsewhere : Nepal, Sri Lanka, Burma, Vietnam.

Remarks : This species is included on the basis of the literature review. This species is known to occur upto an altitude of 2500 meters. Robust build and broad black triangular mark at base of hind-wings easily distinguishes it from other species of the genus.

Orthitrum chryso stigma luzonicum (Brauer)

1868. *Libellula luzonica* Brauer, *Verh. zool. bot. Ges. Wien.*, (18) : 169.
 1909. *Orthitrum chryso stigma luzonicum* : Ris, *Cat. Col. Selys Fase.*, (9) : 203.
 1936. *Orthitrum chryso stigma luzonicum* : Fraser, *Fauna Brit. India, Odon.*, (3) : 298.
 1987. *Orthetrum chryso stigma luzonicum* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 181.

Distribution : India : West Bengal, Assam, Karnataka, Kerala. Elsewhere : Nepal, Sri Lanka, Burma, Vietnam, Malaysia, Indonesia, Philippines.

Remarks : This species is included on the basis of the literature review. This is generally a sunmontane/montane inhabitant, associated with stagnant water bodies full of aquatic vegetation or in marshy zones. In the Cuii in hind-wing arising from the distal side of discoidal cell well away from its posterior angle it differs from *anceps* (Schneider), *cancellatum* (Linnaeus), *Japonicum internum* (MacLachlan), *glaucum* (Brauer), *brunneum* (Fonscolombe) and *teniolum* (Schneider).

Orthetrum japonicum internum MacLachlan

1894. *Orthetrum japonicum internum* MacLachlan, *Ann. Mag. Nat. Hist.*, (6), 13 : 431.
 1936. *Orthetrum japonicum internum* : Fraser, *Fauna Brit. India, Odon.*, (3) : 304.
 1987. *Orthetrum japonicum internum* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 181.

Distribution : India : West Bengal (Darjiling dist.), Himachal Pradesh, Kashmir, Meghalaya, Assam, Nagaland, Uttar Pradesh. Elsewhere : Nepal, Tibet, China, Vietnam.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from its allied species of the genus by having thorax with two broad greenish or bluish stripe almost obscured by pruinescence instead of very narrow whitish or creamy stripes.

144. *Orthetrum glaucum* (Brauer)

1865. *Libellula glauca* Brauer, *Verh. zool. -bot. Ges. Wien.*, (15) : 1012.
 1890. *Orthetrum glaucum* : Kirby, *Cat. Odon.*, 39.
 1936. *Orthetrum glaucum* : Fraser, *Fauna Brit. India, Odon.*, 307.
 1987. *Orthetrum glaucum* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 179.

Material : 1 Male, Andharikhola stream, Rangpo, Darjiling dist., 13. v. 87, Raja Ram and Party coll.

Diagnosis : Moderately large species (Abd. 28-35, hind-wing 33-40 mm.), face and frons olivaceous or blackish-brown. Abd. ventro dorsally dilated at segment 1-3, then very thin-of even width to the end, triquentral in cross-section. Pruinosed pale dirty blue abd. 1 to 8, 9 and 10 black; anal appendage black.

Distribution : India : West Bengal (Darjiling dist.), Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Tamil Nadu, Sikkim, Uttar Pradesh. Elsewhere : Nepal, China, Sri Lanka, Burma, Thailand, Malaysia, Indonesia, Newguina, Philippines.

Remarks : This species is strictly montane, known to occur upto an altitude of 1500 meters. In moderately large size it is similar to *bruneum*, but differs from it in having membrane black instead of pure white.

Genus *Nesoxenia* Kirby

1889. *Nesoxenia* Kirby, *Trans. Zool. Soc. London*, XII : 260, 291.

1936. *Nesoxenia* : Fraser, *Fauna Brit. India, Odon.*, (3) 277.

This genus has only a single species represented not only in West Bengal but whole of India, hence no key is provided.

145. *Nesoxenia lineata* (Selys)

1868. *Agrionoptera lineata* Selys, ex Brauer, nom. nud., *Verh. zool. bot. Ges. Wien.*, XVIII : 729.

1936. *Nesoxenia lineata* : Fraser, *Fauna Brit. India, Odon.*, (3) 279.

Distribution : India : West Bengal (Darjiling dist.), Elsewhere : Malaysia, Sumatra, Borneo and Philippines.

Remarks : This species is included on the basis of the literature review. This species is differentiated from nearest species *Agrionoptera insignis insignis* (Rambur) and *A. i. dorothea* Fraser by possessing supplementary nervure present in the bridge, anal-loop small with lesser cells (less than 6 : more than 8) and abd. 8 of female without dilation of lateral borders.

Genus *Agrionoptera* Brauer

1864. *Agrionoptera* Brauer, *Verh. zool-bot. Ges. Wien*, XIV : 163.

1936. *Agrionoptera* : Fraser, *Fauna Brit. India, Odon.*, (3) : 273.

This genus has a single representative in West Bengal, hence no key is provided.

Agrionoptera insignis dorothea Fraser

1927. *Agrionoptera insignis dorothea* Fraser, *Rec. Indian Mus.*, XXIX : 65, 66.

1936. *Agrionoptera insignis dorothea* Fraser, *Fauna Brit. India, Odon.*, (3) 276.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.).

Remarks : This species is included on the basis of the literature review. This subspecies is easily distinguishable from *A. i. insignis* (Rambur) by lower nodal index (antenodal nervures upto 10 : never less than 15) and restricted thoracic markings.

Genus *Cratilla* Kirby

1900. *Cratilla* Kirby, *Ann. Mag. Nat. Hist.* (7), V : 542.

1936. *Cratilla* : Fraser, *Fauna Brit. India, Odon.*, (3) 284.

Key to the species of the genus *Cratilla*

- 1 (a) Wings tipped broadly with deep black, thorax dark metallic green.....*metallica* (Brauer)
 1 (b) Wings not tipped with black, thorax non-metallic green but steely or bronzed black.....
*lineata* (Brauer)

147. *Cratilla metallica* (Brauer)

1878. *Orthemis metallica* Brauer, *Sitzungsber. Akad. Wien.*, (77) : 7.

1900. *Cratilla metallica*, Kirby, *Ann. Mag. Nat. Hist.* (7), 5 : 542.

1936. *Cratilla metallica* : Fraser, *Fauna Brit. India, Odon.*, (3) 285.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.). Elsewhere : Burma, Malacca, Borneo, Sumatra, New Guinea.

Remarks : This species is included on the basis of the literature review. This species is easily distinguishable from only other known Indian species *C. lineata* (Brauer) by its thorax being dark metallic green and blue instead of steely or bronzed black and wings tipped with balckish-brown to as far as middle of pterostigma.

148. *Cartilla lineata* (Brauer)

1878. *Orthemis lineata* Brauer, *Sitzungsber. Akad. Wien.*, (77) : 9.

1903. *Cartilla lineata* : Forster, *Ann. Mus. Hungar.*, : 537.

1936. *Cartilla lineata* : Fraser, *Fauna Brit. India, Odon.*, (3) 286.

Distribution : India : West Bengal (Darjiling dist.), Kerala, Maharashtra. Elsewhere : Burma, Ceylon, Malaysia, Sundaic Archipelago to Borneo, New Guinea, Philippines.

Remarks : This species is included on the basis of the literature review. This is one of the two species under the genus *Cratilla* and its distinguishing points have been mentioned under *C. metallica*, dealt earlier.

Genus *Amphithemis* Selys

1891. *Amphithemis* Selys, *Ann. Mus. Civ. Genova*, XXX : 454.

1936. *Amphithemis* : Fraser, *Fauna Brit. India, Odon.*, (3) 254.

This species has only a single species represented in West Bengal, hence no key is provided.

149. *Amphithemis vacillans* Selys

1891. *Amphithemis vacillans* Selys, *Ann. Mus. Civ. Genova*, (30) : 457.

1936. *Amphithemis vacillans* : Fraser, *Fauna Brit. India, Odon.*, (3) : 257.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.), Assam. Elsewhere : Burma.

Remarks : This species is included on the basis of the literature review. This species is known to inhabit marshy lands and small tanks with plenty of weeds. Abd. 2 and 3 are snow-white due to heavy pruinescence in contrast to ruby-red of other species of the genus.

Genus *Lyriothemis* Brauer

1868. *Lyriothemis* Brauer, *Verh. zool. -bot. Ges. Wien.*, XVIII : 180, 365, 728.
 1936. *Lyriothemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 263.

Key to the species of the genus *Lyriothemis*

1. Discoidal field beginning with 3 rows of cells, all wing bases with a blackish-brown streak...
*bivittata* (Rambur)
 Discoidal field beginning with 2 rows of cells, base of all wings with no black streak2
2. Large species (abd. 30-34 mm., hind-wing 36-39 mm.) thorax with 2 short yellow oval spots, on dorsum its sides broadly yellow*tricolor* Ris.
 Smaller species (abd. 19-21 mm., hind-wings 25-26 mm.), dorsum of thorax with two converging ante-humeral stripes, its sides yellow but largely obscured*acigastra* (Selys)

150. *Lyriothemis bivittata* (Rambur)

1842. *Libellula bivittata* Rambur, *Ins. Nevrop.* : 75.
 1909. *Lyriothemis bivittata* : Ris, *Cat. Coll. Selys., fasc.*, (9) : 103.
 1936. *Lyriothemis bivittata* : Fraser, *Fauna Brit. India, Odon.*, (3) 269.
 1987. *Lyriothemis bivittata* : Lahiri, *Rec. Zool. Surv. India., Occ. Paper No. 99* : 176.

Distribution : India : West Bengal (Darjiling dist.), Assam, Meghalaya. Elsewhere : Burma, Thailand, Vietnam, Malaysia.

Remarks : This species is included on the basis of the literature review. This species is distinguishable, from other Indian species of the genus, by character of blackish-brown streaks at the base of all wings.

150a. *Lyriothemis tricolour* Ris

1916. *Lyriothemis tricolour* Ris, *Cat. Coll. Selys., fase.*, (16) : 1063.
 1936. *Lyriothemis tricolour* : Fraser, *Fauna Brit. India, Odon.*, (3) : 270.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.), Assam. Elsewhere : Formosa, Tamyoo, Burma.

Remarks : This species is included on the basis of the literature review. This species is distinguishable, from *L. bivittata*, by discoidal field begening with two row of cells, instead of three and lack of streak at base of wings; from *L. acigastra* (Selys) by its large size (30 : 20 mm.) and two short yellow spots on the dorsum of thorax instead of two converging antehumeral stripes.

150b. *Lyriothemis acigastra* Selys

1878. *Calothemis acigastra* Selys, *Mith. Mus. Dresden.*, : 309.
 1883. *Lyriothemis acigastra* : Selys *Ann. Soc. Ent. Belg.*, (27) : 97.
 1936. *Lyriothemis acigastra* : Fraser, *Fauna Brit. India, Odon.*, (3) : 265.

Distribution : India: West Bengal (Darjiling dist.), Assam. Elsewhere : Tibet, Burma.

Remarks : This species is included on the basis of the literature review. This differs from *tricolor* and *vittata*, as pointed under concerned species.

Genus *Camacinia* Kirby

1889. *Camacinia* Kirby, *Trans. Zool. Soc. London*, XII : 260, 266.

1936. *Camacinia* : Fraser, *Fauna Brit. India, Odon.*, (3) : 416.

This genus is represented, not only in West Bengal by whole of India, by a single species, hence no key is provided.

151. *Camacinia gigantea* (Brauer)

1867. *Neurothemis gigantea* Brauer, *Verh. Zool. bot. Ges. Wien.*, (17) : 8.

1889. *Camacinia gigantea* : Kirby, *Trans. Zool. Soc. Lond.* (12) : 267.

1936. *Camacinia gigantea* : Fraser, *Fauna Brit. India, Odon.*, (3) : 417.

Distribution : India : West Bengal, Assam. Elsewhere : Burma, Malaysia, Indo-China, Java, Sumatra, Borneo, New Guinea and Philippines.

Remarks : This species is included on the basis of the literature review. This species is distinguishable by possessing three rows of cells between IRiii and Rspl, instead of 1 or 2 rows.

Genus *Aethriamanta* Kirby

1889. *Aethriamanta* Kirby, *Trans. Zool. Soc. Lond.* XII : 262, 283.

1936. *Aethriamanta* : Fraser, *Fauna Brit. India, Odon.*, (3) : 445.

This genus is represented not only in West Bengal but whole of India, hence no key is provided.

Aethriamanta brevipennis brevipennis (Rambur)

1842. *Libellula brevipennis* Rambur, *Ins. Nevrop.*, : 114.

1913. *Aethriamanta brevipennis brevipennis*, Ris., *Cat. Coll. Selys. fase.* (16) : 1029.

1936. *Aethriamanta brevipennis brevipennis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 445.

Material : 1 Male, 3 Females, Gangajal ghati, Puruliya dist., 11. ix. 86, R. S. Barman and Party coll.; 1 Female, Dhulian, Malda dist., 17. vi. 87, K. P. Mukherjee and Party coll.; 1 Male, Kamalpur, Bankura dist., 10. ix. 86, R. S. Barman and Party coll.

Diagnosis : Face, frons, vesicle and labrum heavily coated with short, stiff black hairs, wings tinted with golden yellow at base. Dark black opaque rays in costal, sub-costal and cubital space and a large spot in the anal-area. Hind-femora and extensor surface with a spot of sharply defined bright blood-red.

Distribution : India : West Bengal (Malda, Bankura, Puruliya, Haora, Calcutta and 24 Parganas dists.), Assam, Kerala. Elsewhere : Upper Burma, Sri Lanka.

Remarks : This species is easily distinguishable, from any other Indian Libellulids, due to presence of bright-red spot at distal end of femora and abd. brilliant vermilion red, which is also dilated and depressed.

Genus *Urothemis* Brauer

1868. *Urothemis* Brauer, *Verh. zool. -bot. Ges. Wien*, XVIII : 175, 366, 737.

1936. *Urothemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 441.

This genus is represented by a single species not only on West Bengal but for whole of India, hence no key is provided.

Urothemis signata signata (Rambur)

1839. *Libellula sanguinea* Burmeister, *Handb. Ent.*, (2) : 858.
 1913. *Urothemis signata signata*, Ris., *Cat. Coll. Selys. fase.* (16) : 1023.
 1936. *Urothemis signata signata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 442.
 1987. *Urothemis signata signata* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 228.

Material : 1 Female, Demtom, Chaulia, Medinipur dist., 13. viii. 85, B. C. Das and Party coll.; 1 Female, Kamalpur, Bankura dist., 10. ix. 86, R. S. Barman and Party coll.; 2 Males, Parbatidanga, Malda dist., 27. vi. 87, K. P. Mukherjee and Party coll.

Diagnosis : Frons, eyes, thorax, abd. blood-red except some marking on segments 8 and 9. Nodal-index low and not much variable (7-7/7-7/7-5/5-7). Wings reticulation crimson, extreme base of wing golden-amber, a broader dark amber spot at base of hindwing enclosing in it is blackish-brown spot. Hamules of male genitalia long and conspicuous.

Distribution : India : West Bengal (Medinipur, Bankura, Malda, Hughli, Calcutta and 24 Parganas dist.), Assam, Bihar, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh. Elsewhere : Tibet, China, Bangladesh, Sri Lanka, Burma, Vietnam.

Remarks : This species is easily distinguishable, from rest of Indian Libellulids, by its basal markings of hind-wing, open venation, low-constant nodal index.

Genus *Macrodiplax* Brauer

1868. *Macrodiplax* Brauer, *Verh. zool. -bot. Ges. Wien*, XVIII : 366, 737.
 1936. *Macrodiplax* : Fraser, *Fauna Brit. India, Odon.*, (3) : 447.

This genus is represented by a single species not only in West Bengal but for whole of India, hence no key is provided.

154. *Macrodiplax cora* (Brauer)

1867. *Diplax cora* Brauer, *Verh. zool. -bot. Ges. Wien*, XVIII : (17) : 20.
 1868. *Macrodiplax cora* : Brauer, *Verh. zool. -bot. Ges. Wien*, XVIII : (18) : 737.
 1936. *Macrodiplax cora* : Fraser, *Fauna Brit. India, Odon.*, (3) : 448.
 1982. *Macrodiplax cora* : Raja Ram et al, *Rec. zool. Surv. India.*, (80) : 181.

Distribution : India : West Bengal (Haora, Calcutta and 24 Parganas dists.), Karnataka, Maharashtra. Widely distributed from the east coast of Africa, Oceania and Australia, throughout Southern Asia.

Remarks : This species is included on the basis of the literature review. In superficial appearances it looks similar to *Pantala flavescens* Fabr., but is similar in size (abd. 15 -17 : 21-35) and has a conspicuous festooned, black mid - dorsal pattern to the abdomen.

Genus *Sympetrum* Newman

1833. *Sympetrum* Newman, *Ent. Mag.*, I : 511.
 1936. *Sympetrum* : Fraser, *Fauna Brit. India, Odon.*, (3) : 370.

This genus is represented in West Bengal by a single species, hence no key is provided.

155. *Sympetrum hypomelas* Selys

1884. *Diplax hypomelas* Selys, *Ann. Soc. Ent. Belg.*, (28) : 37.
 1890. *Sympetrum hypomelas* : Kirby, *Cat. Odon.*, 16.
 1936. *Sympetrum hypomelas* : Fraser, *Fauna Brit. India, Odon.*, (3) : 373.
 1987. *Sympetrum hypomelas* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 210.
 1982. *Sympetrum hypomelas* : Raja Ram et al., *Rec. zool. Surv. India*, (80) : 184.

Distribution : India : West Bengal (Darjiling and Calcutta dists.) Assam, Sikkim, Arunachal Pradesh, Himachal Pradesh, Uttar Pradesh. Elsewhere : Nepal, Tibet, China and Burma.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from *S. orientale* (Selys) by broad black marking on thorax and femora of fore-leg yellow on inner side yellow instead of black.

Genus *Diplacodes* Kirby

1889. *Diplacodes* Kirby, *Trans. zool. Soc. London*, XII : 263, 307.
 1936. *Diplacodes* : Fraser, *Fauna Brit. India, Odon.*, (3) : 331.

Key to the species of the genus *Diplacodes*

1. Apices of the wings tipped with black.....*nebulosa* (Fabricius)
 Apices of wings hyaline.....2
2. Adults entirely black, without markings wings palcy enfumed with brown towards apices, anal - appendages black*lefebvrei* (Rambur)
 Adults not entirely black, marked with yellow or pruinosed dark blue throughout, wings uncoloured at base, anal appendages yellow*trivialis* (Rambur)

156. *Diplacodes nebulosa* (Fabricius)

1793. *Libellula nebulosa* Fabricius, *Ent. Syst.*, (2) : 379.
 1889. *Diplacodes nebulosa* : Kirby, *Trans. zool. Soc. London*, 12: 308.
 1936. *Diplacodes nebulosa* : Fraser, *Fauna Brit. India, Odon.*, (3) : 335.

Material : 1 Male, Bishnupur, Bankura dist., 25. x. 85, M Datta and party coll., 1 Male, Belpahari, Midanapore dist., 11. xi. 85, S Biswas and party coll.; 1 Male Keranitola, Midanapore dist., 30. iii. 85, B. Nandi and party coll.

Diagnosis : Frons, vesicle dark violet with metallic lustre. Prothorax, thorax, abdomen and legs black. Wing apices blackish brown. Pterostigma dark reddish - brown between thick black nervures. Subtrigone in fore-wing 1 or 2 celled.

Distribution : West Bengal (Bankura, Midanapore, Calcutta and 24 Parganas dists.). Assam, Himachal Pradesh, Madhya Pradesh, Madras, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Tamil Nadu, Uttar Pradesh. Elsewhere : Sri Lanka, Australia, Java, China, Burma, Vietnam, Malaysia, Indonesia, New Guinea.

Remarks : This species has similarity with *D. lefebvrei* but are easily distinguishable by very distinct features of dark, sharply demarcated markings at the wing - apices.

157. *Diplacodes lefebvrei* (Ramb.)

1842. *Libellula lefebvrei* Rambur, *Ins. Nevrop.*, : 112.

1890. *Diplacodes lefebvrei* : Kirby, *Cat. Odon.*, 42.

1936. *Diplacodes lefebvrei* : Fraser, *Fauna Brit. India., Odon.*, (3) : 333.

Material : 1 Female, Katwa, Barddhaman dist., 4.ix.86. K. K. Ray and Party coll.

Diagnosis : Adults are entirely black without markings. Prothorax, thorax, abdomen and leg entirely black. Abdomen 1 and 2 on sides with paired, sub-dorsal elongate spots, as also on 4 to 8. Pterostigma brown above, white beneath, between thick black nervures.

Distribution : India : West Bengal (Barddhaman dist.), Karnataka. Elsewhere : Mesopotomia.

Remarks : This species is closely related with *D. nebulosa*, but is distinguishable from it as remarked under that species.

158. *Diplacodes trivialis* Rambur

1842. *Libellula trivialis* Rambur, *Ins. Nevrop.*, : 115.

1891. *Diplacodes trivialis* : Karsch, *Ent. Nachr.*, (17) : 246.

1936. *Diplacodes trivialis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 336.

1987. *Diplacodes trivialis* : Lahiri, *Rec. zool. Surv. India, Occ. Paper No. 99* : 202.

Material : 2 Females, Sushunia, Bankura dist., 13. ix. 86, R. S. Barman and Party Coll. : 1 Male, Belpahari, Midanapore dist., 9. ix. 85, S. Biswas and party Coll.; 1 Male, South West of Digha, Midanapore dist., 26. xii. 85, A. K. hazra and party Coll., 1 Male, Patapur colony Raghunath ganj, Murshidabad dist., 7 ii. 86, I. J. gupta and Party Coll.; 1 Male, Bhatal, W. Dinajpur dist., 28. xi. 87, T. R. Mitra and Party Coll.; 1 Male, Alal Malda dist., 19.vi. 87, K.P. Mukherjee and Party Coll.; 1 Male, Abhirampur, Haora dist., 23. 1. 86, B. Datta and Party Coll.; 1 Male, Katwa, Barddhaman dist., 9. ix. 86, K.K. ray and party Coll.; 1 Female, Gobindapur, S. 24 Parganas, 27. iv. 86, B. N. Das and Party Coll.; 1 Male, 2 Females, Birchandrapur, Birbhum dist., 1 iv. 86, M.S. Shishodia and Party Coll.; 1 Male, 1 Female, bania Forest, Chilapata, Jalpaiguri dist., 14. X. 87, S. K. Tandon and Party Coll.

Diagnosis : Labium, labrum and bases of mandible creamish yellow; face, frons and vesicle palest azure blue. Prothorax pale brown to black, a mid dorsal stripe on dorsum. Thorax greenish yellow / olivacedous, sutures finely black; whole thorax may be pruinosed in old adults. Wings hyaline, apices clear. Abd. 1 to 3 greenish yellow sutures finely black, prominent mid - dorsal and subdorsal stripes. Abd. 4 to 7 with sub - dorsal yellow stripes. abd. 8 to 10 black, marking may be obscured due to pruinescence. Anal - appendages bright yellow; vulvar scale broad but short 'scoop' shaped.

Distribution : India : West Bengal (Bankura, Midanapore, Murshidabad, W. Dinajpore, Malda, Birbhum, Barddhaman, Haora, 24 Parganas and Jalpaiguri dist.). Andaman Islands, Andhra Pradesh, Himachal Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Kerala, Madras, Manipur, Meghalaya, Orissa, Tamil nadu, Tripura, Punjab, Uttar Pradesh. Elsewhere : Australia, Burma, Sri Lanka, Nepal, Seychelles, China, Thailand, Vietnam, Malaysia, Indonesia, Newguinea, Japan Ryudyus Philippines, Pacific Islands, Iraq.

Remarks : This species is by far the single libelluid species with maximum occurrence round the year and practically of very wide distribution in plains as well as upto an altitude of 2500 meters. Apices of all wings are absolutely clear, no basal markings, creamy white anal appendages (instead of black or yellow) separates it from other species of the genus.

Genus *Palpopleura* Rambur

1842. *Palpopleura* Rambur : *Ins. Nevrop.*, 26, 129.

1936. *Palpopleura* Rambur : Fraser, *Fauna Brit. India, Odon.*, (3) : 316.

This genus is represented by a single species in West Bengal, hence no key is provided.

Palpopleura sexmaculata sexmaculata (Fabricius)

1787. *Libellula sexmaculata* fabricius, *Mant. Ins.*, (1) : 338.

1868. *Palpopleura sexmaculata* : Brauer, *Verh. Zool. bot. Ges, Wien.*, (18) : 716.

1936. *Palpopleura sexmaculata sexmaculata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 318.

Material : 1 Male, Sevak Forest, Darjiling dist., 12. v. 87, Raja Ram and party Coll.; 1 Female Rathkhola Vill., Naxalbari, Darjiling dist., 11. v. 87, Raja Ram and Party Coll.

Diagnosis : Small species (abd. 14 - 17 mm.). A geninate spot on dorsum of the middle lobe of prothorax. Frons and vesicle brilliant metallic blue. A black spot at node in fore wing 1/2 to 1 1/2 cells proximal to node. 3 black streaks in the basal half of the wing. These are located in the sub costal, between sector of arc and in cubital space.

Distribution : India : West Bengal, (Darjiling dist.). Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh. Elsewhere : Tibet, China, Sri Lanka, Burma, Vietnam, Malaysia.

Remarks : This species possesses characteristically black spot at node in fore - wing, covering 1/2 to 1, 1/2 cells proximal to node; a black streak in sub - costal space from base to 2/3 its length to node; streak between sectors of arc and a streak in cubital space upto discoidal cell. In these and in frons being metallic above it could be differentiated from *Diplacodes trivialis*, with which it has superficial resemblance.

Genus *Rhyothemis* Hagen

1867. *Rhyothemis* Hagen, *Stett. Ent.*, XXVIII: 232.

1936. *Rhyothemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 419.

This genus is represented by a single species in West Bengal, hence no key is provided.

Rhyothemis variegata variegata (Linnaeus)

1763. *Libellula variegata* Linnacus, *Amoenitates Acad.*, (6) : 412.

1913. *Rhyothemis variegata variegata* : Ris. *Cat. Call. Selys.*, (15) : 935.

1936. *Rhyothemis variegata variegata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 423.

1982. *Rhyothemis variegata variegata* : Raja Ram et al, *Rec. zool. Surv. India.*, (80) : 187.

1987. *Rhyothemis variegata variegata* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 220.

Material : 2 Males, 1 Female, Ballaypur, Birbhum dist., 15. iii. 86, K. P. Mukherjee and Party Coll.; 1 Female, Parbatidanga, Malda dist., 27. vii. 87, K. P. Mukherjee and Party Coll.; 1 Female, Puruliya 7. ix. 86, R. S. Barman and Party Coll.

Diagnosis : Body dark metallic, frons metallic above. Prothorax black, thorax dark metallic green, abdomen black. Wings generally broadly coloured black or black and golden amber. Apical spot less but nodal spot more extensive in fore-wing; hind wings basal fasciae more extensive with additional dark spots at middle of IRiii, MA, markings are variably variegated.

Distribution : India : West Bengal (Birbhum, Malda, Puruliya, Hughli, Haora, Calcutta and 24 Parganas), Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Tamil Nadu. Elsewhere : Nepal, Tibet, Bangladesh, Burma, Sri Lanka, Malaysia, Philippines.

Remarks : This species can be easily distinguishable by variegated pattern of colour on the wings. This can be distinguished from *R. phyllis phyllis* (Sulzer) from Burma by having apices hyaline only in female, instead of apices opaque in male and black in female.

Genus *Pantala* Hagen

1861. *Pantala* Hagen, *Syn. Neur. Amer.*, : 141.

1936. *Pantala* : Fraser, *Fauna Brit. India, Odon.*, (3) : 413.

This genus is represented not only in West Bengal but for whole of India by a single species, hence no key is provided.

161. *Pantala flavescens* (Fabricius)

1798. *Libellula flavescens* Fabricius, *Ent. Syst. Suppl.*, : 285.

1861. *Pantala flavescens* : Hagen, *Syn. Neur. N. Amer.* : 142.

1936. *Pantala flavescens* : Fraser, *Fauna Brit. India, Odon.*, (3) : 415.

Material : 1 Male, Keranitala, Medinipur, 31. iii. 85, B. Nanady and Party Coll.; 1 Female, Moregram, Phul Bari, Murshidabad dist., 9. ii. 86, I. J. Gupta and Party Coll. : 1 Female, Birbhum dist., 1. iv. 86, M. S. Shishodia and Party Coll.; 1 Female, Nantia, Haora dist., 30. i. 86, B. Datta and Party Coll.; 1 Male, Mendabari Forest, Chilapata, Jalpaiguri dist., 16. x. 87, S. K. Tandon and Party Coll.

Diagnosis : Large species (abd. 30-35 mm.), transverse belt of dark reddish-brown between anterior and posterior lobe of prothorax. Base of hind-wing pale golden-yellow upto anal loop. Iriii and Riii wavy in their length. Membrane white.

Distribution : India : West Bengal (Medinipur, Murshidabad, Birbhum, Jalpaiguri, Hughli, Haora, Calcutta and 24 Parganas dist.), Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh. Elsewhere : Tibet, Burma, Sri Lanka and Malaysia.

Remarks : This species is one of the most commonly occurring Libellulid, among plains and submontane habitats. Anal-area of the hind-wing broad and can be distinguished from nearest *Trithemis* by presence of a conspicuous supplementary nervure (Irii) situated between Rii and Riii.

Genus *Trithemis* Brauer

1868. *Trithemis* Brauer, *Verh. Zool. -bot. Ges. Wien.*, XVIII : 176.

1936. *Trithemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 381.

Key to the species of the genera *Trithemis*

1. Legs very long and spidery, pterostigma bicolorous, body yellow marked with black.....
.....*pallidinervis* Kirby
Leg not very long nor spidery, pterostigma unicolorous, body colour variable2
2. Wing neuration black, thorax violaceous black, abdomen violaceous black...*festiva* (Rambur)
Wing neuration not black but yellow/crimson, thorax crimson/red3
3. Base of hind-wing with small reddish brown spot*aurora* (Burmeister)
Base of hind-wing without spot, but whole base is bright orange*Kirby kirby* Selys.

162. *Trithemis pallidinervis* (Kirby)

1889. *Sympetrum pallidinervis* Kirby, *Trans. Zool. Soc. London.*, (12) : 327.

1907. *Trithemis pallidinervis* : Morton, *Trans. ent. Soc. London.*, : 304.

1936. *Trithemis pallidinervis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 389.

1982. *Trithemis pallidinervis* : Raja Ram et al, *Rec. zool. Surv. India.*, (80) : 187.

1987. *Trithemis pallidinervis* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 214.

Material : 1 Male, Fatchpur, W. Dinajpur, 27. ii. 87, T. R. Mitra and Party Coll.; 1 Female, Parbatidanga, Malda dist., 27. vi. 87, K. P. Mukherjee and Party Coll.; 1 Male, Maureswar, Birbhum dist., 31. iii. 86, M. S. Shishodia and Party Coll.; 1 Female, Jhalda, Puruliya dist., 7. ix. 86, R. S. Barman and Party Coll.; 1 Female, Natabari, Cooch Bihar, 30. iv. 87, Raja Ram and Party Coll.

Diagnosis : Labrum black with 2 large basal citron-yellow spots; frons, vesicle metallic purple. Prothorax dull brown or black; thorax olivaceous brown, dorsum with thick coating of greyish hair; Abd. black marked with yellow. Legs very long and spidery, pterostigma bicolorous black with creamy white ends.

Distribution : India : West Bengal (Malda, W. Dinajpur, Birbhum, Puruliya, Cooch Bihar, Calcutta, Haora and 24 Parganas dists.), Andhra Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Orissa, Punjab, Uttar Pradesh. Elsewhere : Burma, Sri Lanka, Formosa, Philippines, Malaysia, Indonesia, Taiwan.

Remarks : This species is known to inhabit stagnant water bodies. This species is distinguishable from other species of the genus in having bicolorous pterostigma black with creamy white ends and being largest in size. (abdomen 28-32 : 20-26 mm.).

163. *Trithemis festiva* (Rambur)

1842. *Libellula festiva* Rambur, *Ins. Nevrop.*, : 92.

1868. *Trithemis festiva* : Brauer, *Verh. Zool. -bot. Ges. Wien.*, (18) : 736.

1936. *Trithemis festiva* : Fraser, *Fauna Brit. India, Odon.*, (3) : 387.

1987. *Trithemis festiva* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 213.

Material : 1 Female, Sevak Forest, Darjiling dist., 12. v. 87, Raja Ram and Party Coll.; 1 Male, Jayanti, Jalpaiguri dist., 17. xii. 88, R. S. Barman and Party Coll.

Diagnosis : Frons and vesicle dark brown in front, metallic violet above. Prothorax dark blue; thorax black coated with a thin pruinescence. Dark brown opaque mark at base of hind-wing, dark rays in sub-costal and cubital spaces. Neuration and pterostigma black.

Distribution : India : West Bengal (Darjiling and Jalpaiguri dists.), Arunachal Pradesh, Assam, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Punjab, Tamil Nadu, Uttar Pradesh. Elsewhere : Nepal, Pakistan, Sri Lanka, Burma, Malaysia, Indonesia, Taiwan, Loo Vhòo Islands, Philippines, New Guinea, Turkey.

Remarks : This species is distinguishable from *T. aurora*, in having crimson neuration instead of black.

164. *Trithemis aurora* (Burmeister)

1839. *Libellula aurora* Burmeister, *Handb. Ent.*, (2) : 859.

1868. *Trithemis aurora* : Brauer, *Verh. Zool. -bot. Ges. Wien.*, (18) : 177.

1936. *Trithemis aurora* : Fraser, *Fauna Brit. India, Odon.*, (3) : 383.

1982. *Trithemis aurora* : Raja Ram et al, *Rec. Zool. Surv. India*, (80) : 187.

1987. *Trithemis aurora* : Lahiri, *Rec. zool. Surv. India., Occ. Paper No. 99* : 212.

Material : 1 Male, Around a radius of 4 km of Simlapal, Bankura dist., 1985, D. K. Mandal and Party Coll.; 1 Male, Raja Bhatkhawa, Jalpaiguri dist., 27. iv. 86, B. C. Das and Party Coll.; 1 Male, Bhachapur, Birbhum dist., 30. iii. 86, M. S. Shishodia and Party Coll.; 1 Male, Islampur, Chowsia, W. Dinajpur dist., 10. xii. 86, B. C. Das and Party Coll.

Diagnosis : Face and front of frons ochreous, changing to reddish above, Vesicle and dorsum of frons metallic violaceous. Prothorax reddish-brown, thorax dull purple due to pruinescence. Crimson neuration, broad amber-yellow at base of wing, dark brown rays in sub-costal and cubital space.

Distribution : India : West Bengal (Bankura, Birbhum, West Dinajpur, Jalpaiguri, Calcutta, Haora and 24 Parganas dists.). Elsewhere : Nepal, Tibet, Pakistan, Sri Lanka, Bruma, Vietnam, Malaysia, Indonesia, Java, Philippines, Taiwan.

Remarks : This species is known to inhabit upto an altitude of *Ca* 1500 meters, General vilaceous colouration will be able to distinguish it from the rest of the Indian species of the genus.

Trithemis kirby kirby Selys

1886. *Trithemis aurora* Kirby (Pars.), *Proc. zool. Soc., London* : 327.

1912. *Trithemis kirby kirby* : Ris, *Cat. Coll. Selys*, (14) : 760.

1936. *Trithemis kirby kirby* : Fraser, *Fauna Brit. India, Odon.*, (3) : 385.

Distribution : India : West Bengal, Maharashtra, Karnataka.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from other Indian species of the genus in having bright vermilion red thorax and abdomen of violaceous-black/crimson and neuration yellow instead of black or crimson.

Genus *Indothemis* Ris

1909. *Indothemis* Ris, *Cat. Coll. Selys*. IX : 29.

1936. *Indothemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 338.

Key to the species of the genus *Indothemis*

- 1 (a) Fore-wing with obly $8\frac{1}{2}$ antenodal nervure, apices of wing hyaline, base of hind-wing unmarked *caesia* (Rambur)
- 1 (b) Fore-wing with $11\frac{1}{2}$ to $12\frac{1}{2}$ antenodal nervure, apices of wing finely bordered with blackish brown, base of hind-wing with broad blackish brown opaque triangular markings..... *limbata limbata* (Selys)

167. *Indothemis caesia* (Rambur)

1842. *Libellula caesia* Rambur, *Ins. Nevrop.*, : 95.

1911. *Indothemis caesia* : Ris., *Cat. Coll. Selys. fase.*, (13) : 529.

1936. *Indothemis caesia* : Fraser, *Fauna Brit. India, Odon.*, (3) : 340.

Distribution : India : West Bengal (Jalpaiguri dist.), Madhya Pradesh, Maharashtra, Kerala. Elsewhere : Bangkok, Burma.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from *I. limbata limbata* (Selys) by lower number of antenodal nervure in fore-wing ($8\frac{1}{2}$: $11\frac{1}{2}$ to $12\frac{1}{2}$), apices of wing clear and in its bigger size (abd. 24-26 : 20-22 mm., hind-wing 28-31 : 25-27 mm).

Indothemis limbata limbata (Selys)

1891. *Trithemis limbata* Selys, *Ann. Mus. Civ. Genova*, (30) : 463.

1911. *Indothemis limbata* : Ris., *Cat. Coll. Selys, Fase.*, (13) : 530.

1936. *Indothemis limbata limbata* : Fraser, *Fauna Brit. India., Odon.*, (3) : 341.

Material : 2 Females, Sevak Forest, Darjiling dist., 12. v. 87 Raja Ram and Party Coll.

Diagnosis : Labrum, labium, face frons, vesicle and occiput black, sides of frons and vesicle metallic purple. Prothorax, thorax, legs and abdomen uniformly black. Apices of wings blackish-brown, not more than one cell deep; base of wings dark brown, nodal index ($9-12\frac{1}{2} / 12\frac{1}{2} - 9/8-8/8-8$).

Distribution : India : West Bengal (Darjiling dist.). Elsewhere : Burma, Siam, Malacca.

Remarks : The characteristic narrow brown markings on apices of wings distinguishes it from other Indian species of the genus.

Genus *Pseudotrimea* Fraser

1920. *Pseudotrimea* Fraser, *J. Bombay Nat. Hist. Soc.*, XXVII : 149.

1936. *Pseudotrimea* : Fraser, *Fauna Brit. India., Odon.*, (3) : 438.

This genus is represented by a single species not only in West Bengal but whole of India, hence no key is provided.

168. *Pseudotranea prateri* Fraser

1920. *Pseudotranea prateri* Fraser, *J. Bombay Nat. Hist. Soc.*, (27) : 149.

1936. *Pseudotranea prateri* : Fraser, *Fauna Brit. India., Odon.*, (3) : 439.

Distribution : India : West Bengal (Darjiling dist.), Sikkim.

Remarks : This species is included on the basis of the literature review. This species is distinguishable from Indian species of the allied genus *Tranea*, by absence of basal marking.

Genus *Tranea* Hagen

1861. *Tranea* Hagen, *Syn. Neur. Amer.*, 114.

1936. *Tranea* : Fraser, *Fauna Brit. India., Odon.*, (3) : 431.

This genus is represented by a single species in West Bengal, hence no key is provided.

Tranea basilaris burmeisteri Kirby

1839. *Libellula chinensis* Burmeister, *Handb. Ent.*, (2) : 852.

1889. *Tranea burmeisteri* Kirby, *Trans. Zool. Soc. Lond.*, (12) : 316.

1936. *Tranea basilaris burmeisteri* : Fraser, *Fauna Brit. India., Odon.*, (3) : 432.

Material : 1 Male, Jampur (Panthasevya), Bankura dist., 26. xi. 86, T. R. Mitra and Party Coll.

Diagnosis : Postclypeus and frons vermilion-red, fine basal black line on frons. Prothorax yellowish, thorax with olivaceous-reddish tinge on dorsum, bluish laterally. Abd. bright reddish-brown-with black markings, anal-appendages thrice the length of abd. 8 to 10. Two large black spots within golden yellow area at baso-anal area of hind-wing; these two spots are at cubital space and anal-area narrowly confluent.

Distribution : India : West Bengal (Bankura, Hughli and Calcutta dists.), Himachal Pradesh, Kerala, Punjab, Rajasthan, Uttar Pradesh. Elsewhere : Burma, Sri Lanka, Malaysia.

Remarks : This inhabits plains, sub-montane and montane habitats upto an altitude of 2500 meters. Species is distinguishable from *T. limata* (Desjardins) and *T. virginia* (Rambur), in having double spot on hind-wing instead of only one.

Genus *Crocothemis* Brauer

1868. *Crocothemis* Brauer, *Verh. Zool.-bot. Ges. Wien.*, XVIII : 367, 736

1936. *Crocothemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 343.

This genus is represented by a single species not only in West Bengal but whole of India, hence no key is provided.

Crocothemis servilla servilla (Drury)

1770. *Libellula servilla* Drury, III, *Ex. Ins.*, (1) : 112.

1911. *Crocothemis servilla servilla* : Ris., *Cat. Coll. Selys*, (13) : 533.

1936. *Crocothemis servilla servilla* : Fraser, *Fauna Brit. India, Odon.*, (3) : 345.

Material : 1 Male, Gangajal ghati, Bankura dist., 11. ix. 86, R. S. Barman and Party Coll.; 1 Male, Haldia, Medinipur dist., 4. viii. 85, B. C. Das and Party Coll.; 2 Females, Cossimbazar, Dayanagar, Murshidabad dist., 26. ii. 86, S. K. Mitra and Party Coll.; 1 Male, Fatchpur, W. Dinajpur dist., 27. xi. 87, T. R. Mitra and Party Coll.; 1 Male, Manikchak, Malda dist., 9. xii. 87, T. R. Mitra and Party Coll.; 1 o, Katwa, Barddhaman dist., 4. ix. 86, K. K. Ray and Party Coll.; 1 Female, Sarberia, S. 24 Parganas dist., 24. iv. 86, B. N. Das and Party Coll.; 1 Male, Ilambazar, Birbhum dist., 14. iii. 86, K. P. Mukherjee and Party Coll.; 1 Male, Rampurhat, Birbhum dist., 5. iv. 86, M. S. Shishodia and Party Coll.; 1 Male, Bagzacot, Jalpaiguri dist., 11. x. 87, S. K. Tandon and Party Coll.

Diagnosis : Most parts of head, often dorsum of thorax abdomen and anal-appendages of male blood - red but female on whole are yellow, ochreous to olivaceous brown. Middle lobe of prothorax ridged transversely, beset with stiff red hairs. Bases of all wings marked with rich amber-yellow, apices of wings narrowly pale-brown.

Distribution : India : West Bengal (Bankura, Medinipur, Murshidabad, W. Dinajpur, Malda, Birbhum, Barddhaman, S. 24 Parganas, Calcutta and Jalpaiguri dists.), Bihar, Himachal Pradesh, Madhya Pradesh, Manipur, Punjab, Rajasthan, Uttar Pradesh. Elsewhere : Australia, Burma, Nepal, Philippines, Sri Lanka, Thailand, Malaysia, Indonesia, Japan, Taiwan, Iraq, Iran.

Remarks : This species is one of the very common Indian Libellulid. This species can be distinguished from only other Indian sub-species of the genus *C. servillia erythraea* (Brulle), in having black mid-dorsal carina on abd. 8 and 9 instead of red, without black markings.

Genus *Bradinopyga* Kirby

1893. *Bradinopyga* Kirby, *J. Linn. Soc. Zool.*, XXIV : 553.

1936. *Bradinopyga* Kirby : Fraser, *Fauna Brit. India, Odon.*, (3) : 348.

This genus is represented by a single species not only in West Bengal but whole of India, hence no key is provided.

171. *Bradinopyga geminata* (Rambur)

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

1911. *Bradinopyga geminata* : Ris., *Cat. Coll. Selys. fase.*, (13) : 545

1936. *Bradinopyga geminata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 349.

Material : 1 Male, Pakuahat, Malda dist., 16. vi. 87, K. P. Mukherjee and Party Coll.

Diagnosis : Most parts of head yellowish brown. Prothorax and thorax and abdomen dirty pale yellow, topped with irregular black markings. Anal-appendage pale creamy white. Wings hyaline, pterostigma black at centre, pure white at its proximal and distal ends.

Distribution : India : West Bengal (Malda, Haora, Calcutta and 24 Parganas dists.), Madhya Pradesh, Uttar Pradesh, Peninsular India.

Remarks : This species mostly inhabits plains and in fringe distribution upto an altitude of 500 meters. This mingles well with rocky background in nature or wells, small cemented channels for irrigation, cemented tanks. This species has characteristic bicolourous pterostigma, quite different from other Indian Libellulids.

Genus *Neurothemis* Brauer

1842. *Polyneura* Rambur, *Ins. Nevop.*, 26.
 1867. *Neurothemis* Brauer, *Verh. Zool. -bot. Ges. Wien*, XVII : 6, 289.
 1936. *Neurothemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 350.

Key to the species of the genus *Neurothemis*

1. Bases of wings of male broadly black or dark reddish brown2
 Bases of wings pale or golden lyellow at base3
2. Black basal arcad of wings edged outwardly with an opalescent white band ...*tullia tullia* (Drury)
 Basal half upto middle of pterostigma dark reddish brown, no opalescent band, a clear window
 at apex of all wings formed by basal brown and narrow opaque brown.....*fulvia* (Drury)
3. Wings pale golden-yellow from base to within two cells proximal of pterostigma, humeral
 stripe absent on thorax*intermedia degner* Selys
 Base of wings golden-yellow to as far distal as outer border of discoidal cell or a few cells
 beyond, a pale brown humeral stripe on thorax.....*intermedia intermedia* (Rambur)

Neurothemis tullia tullia (Drury)

1773. *Libellula tullia* Drury, *Ill. Exot. Ins.*, (2) : 85.
 1911. *Neurothemis tullia tullia* : Ris, *Cat. Coll. Selys*, (13) : 551.
 1936. *Neurothemis tullia tullia* : Fraser, *Fauna Brit. India, Odon.*, (3) : 360.
 1982. *Neurothemis tullia tullia* : Raja Ram et at. *Rec. zool. Surv. India*, 80 : 186.
 1987. *Neurothemis tullia tullia* : Lahiri, *Rec, zool. Surv. India, Occ. Paper No. 99* : 207.

Material : 1 Male, Keranitala, Medinipur dist., 30. iii. 83, B. Nandy and Party Coll.; 1 Male, Gangarampur, Malda dist., 15. vi. 87, K. P. Mukherjee and Party Coll.; 1 Female, Pakuahat, Malda dist., 16. vi. 87, K. P. Mukherjee and Party Coll.; 1 Male, Dinjata, Cooch Bihar dist., 3. v. 87, Raja Ram and Party Coll.

Diagnosis : Most of the head blackish-brown to black, Prothorax thorax and abdomen black-mid dorsal carina of thorax narrowly yellow Abd. 1 to 8 with a broad mid-dorsal interrupted creamy white stripe. Broad blue-black marking on basal half, a broad opalescent white band bordering it apically. In female wings reddish-brown, apices of all wings broadly opaque blackish-brown to as far as middle or inner end of pterostigma.

Distribution : India : West Bengal (Medinipur, Malda, Cooch Bihar, Hughli, Haora, Calcutta and 24 Parganas dists.), Bihar, Assam, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Punjab, Tamil Nadu, Tripura, Sikkim, Uttar Pradesh. Elsewhere : Nepal, Tibet, China, Sri Lanka, Burma, Thailand, Vietnam, Malaysia, Hongkong, Indo-China, Malacca.

Remarks : This species inhabits swamps or heavily weeded ponds, puddles. This species is easily distinguishable from other Indian species of the genus by having a white opalescent band bordering basal black in the wings of male and in female by broad-black apices of wings.

173. *Neurothemis fulvia* (Drury)

1773. *Libellula fluvia* Drury, Ill, *Exot. Ins.*, (2), XLVI : 84.
 1889. *Neurothemis fulvia* : Kirby, *Trans. Zool. Soc. Lond.*, (12) : 271.
 1936. *Neurothemis fulvia* : Fraser, *Fauna Brit. India, Odon.*, (3) : 353.
 1987. *Neurothemis fulvia* : Lahiri, *Rec, zool. Surv. India, Occ. Paper No. 99* : 205.

Material : 1 Male, Mendabori forest, Chilapata, Jalpaiguri dist., 16. x. 87, S. K. Tandon and Party Coll.

Diagnosis : Prothorax, thorax, abdomen reddish-brown, sutures and borders of latter finely black. Legs and anal-appendages dark ferruginous. Wings dark reddish-brown from base to about middle of pterostigma, apex of wings also opaque-brown enclosing a clear window in each wing at apex in male. In female wings are clear amber yellow, a dark ray in subcostal, expanding at node into large quadrate nodal spot.

Distribution : India : West Bengal (Jalpaiguri dist.), Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Tamil Nadu, Uttar Pradesh. Elsewhere : Nepal, China, Bangladesh, Burma, Thailand, Vietnam, Malaysia, Indonesia, Malacca, Siam, Indo-China.

Remarks : This species inhabits weedy ponds or marshes and known to occur in plains and upto an altitude of 1000 meters. It is easily distinguishable by clear, hyaline window enclosed in dark reddish-brown wings of male and uniform golden-amber tinted wings with or without clear, hyaline window.

Neurothemis intermedia degener Selys

1879. *Neurothemis degener* Selys, *Ann. Mus. Civ. Genova*, (14) : 290.
 1911. *Neurothemis intermedia degener* : Ris, *Cat. Coll. Selys, fase.*, (13) : 552.
 1936. *Neurothemis intermedia degener* : Fraser, *Fauna Brit. India, Odon.*, (3) : 359.

Distribution : India : West Bengal (Jalpaiguri dist.), Assam, Sikkim. Elsewhere : Burma.

Remarks : This sub-species is included on the basis of the literature review. This sub-species is distinguishable from *N. intermedia intermedia* by lack of humeral-stripe on thorax and with the ventro-lateral interrupted stripe poorly developed or absent.

Neurothemis intermedia intermedia (Rambur)

1842. *Neurothemis intermedia* Rambur, *Ins. Nevrop.*, : 91.
 1911. *Neurothemis intermedia intermedia* : Ris, *Cat. Coll. Selys, fase.*, (13) : 551.
 1936. *Neurothemis intermedia intermedia* : Fraser, *Fauna Brit. India, Odon.*, (3) : 357.

Material : 1 Male, Palasbari, Jalpaiguri dist., 24. xii. 86, R. S. Barman and Party Coll.

Diagnosis : Prothorax, thorax pale greenish-yellow, dorsum tinted with ferruginous and with a distinct humeral reddish-brown stripe. Wings pale tinted yellow. Abdomen bright reddish-brown/ochraceous with sutures on segments 2 and 3 finely darker, some small dark points at base of abd. 10. Anal-appendages reddish.

Distribution : India : West Bengal (Jalpaiguri, 24 Parganas dists.), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh. Elsewhere : Nepal, Sri Lanka, Burma, Indo-China and Malacca.

Remarks : Wings marking are very much restricted in which it differs from all Indian subspecies and species of the genus.

Genus *Brachythemis* Brauer

1868. *Brachythemis* Brauer, *Verh. Zool. -bot. Ges. Wien*, XXIII : 367, 736.

1936. *Brachythemis* : Fraser, *Fauna Brit. India, Odon.*, (3) : 363.

This genus has single representative species not only in West Bengal but whole of India, hence no key is provided.

176. *Brachythemis contaminata* (Fabricius)

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

1868. *Brachythemis contaminata* : Brauer, *Verh. Zool. -bot. Ges. Wien*, 18: 736.

1936. *Brachythemis contaminata* : Fraser, *Fauna Brit. India, Odon.*, (3) : 365.

1982. *Brachythemis contaminata* : Raja Ram et al., *Rec. zool. Surv. India*, (80) : 184.

Material : 2 Males, Kaliaganj, W. Dinajpur dist., 1. xii. 87, T. R. Mitra and Party Coll.; 1 Male, Katagar, Malda dist., 7. xii. 87, T. R. Mitra and Party Coll.; 1 Male, Lalbag, Katra colony, Murshidabad dist., 3. ii. 86, I. J. Gupta and Party Coll., 1 Female, Jangipur, Dhanpat Nagar, Murshidabad dist. 12. ii. 86, I. J. Gupta and Party Coll. 1 Female, Aliporeduar, Haikhola, Jalpaiguri dist., 28. iv. 86, B. C. Das and Party Coll. 2 Males, Keranitala, Medinipur dist., 30. iii. 84, B. Nandy and Party Coll. 1 Male, 1 Female, Katwa, Barddhaman dist., 4. 9. 86, K. K. Ray and Party Coll.

Diagnosis : Small sized Libellulid (Abd. 18-22 mm and hind wing 20-25 mm.). General body colour ochraceous, olivaceous-brown to reddish-brown on its abdomen. Prothorax with dark reddish brown transverse stripes, an obscure reddish-brown humeral stripes on dorsum and two on sides of thorax. Wings with bright orange fascia from base to within 2/3 cells to pterostigma; fascia absent in female.

Distribution : India : West Bengal (Medinipur, Murshidabad, Malda, W. Dinajpur, Jalpaiguri, Barddhaman, Calcutta and 24 Parganas dists), Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Punjab, Rajasthan, Uttar Pradesh. Elsewhere : Nepal, China, Bangladesh, Sri Lanka, Burma, Thailand, Malaysia, Indonesia, Japan, Taiwan, Philippines, Formosa and Sumatra.

Remarks : This is one of the very commonly occurring Libellulid, in habiting borders of both lentic (weedy ponds, lakes, puddles) and lotic (slowly moving streams, rivulets). This species is distinguishable from allied genus *Crocothemis*, in having broad reddish-yellow medial fascia instead of small yellow basal markings and lesser numbers of antenodal nervures ($6\frac{1}{2}$ to $7\frac{1}{2}$: $9\frac{1}{2}$ to $10\frac{1}{2}$).

Genus *Lathrecista* Kirby

1889. *Lathrecista* Kirby, *Trans. Zool. Soc. London*, XII : 264, 291.

1936. *Lathrecista* : Fraser, *Fauna Brit. India, Odon.*, (3) : 280.

This genus has sole representative not only in West Bengal, but whole of India, hence no key is provided.

Lathrecista asiatica asiatica (Fabricius)

1798. *Libellula asiatica* Fabricius, *Ent. Syst. Suppl.*, : 283.

1909. *Lathrecista asiatica asiatica* : Ris, *Cat. Coll. Selys, fase.*, (9) : 129.

1936. *Lathrecista asiatica asiatica* : Fraser, *Fauna Brit. India, Odon.*, (3) : 281.

1982. *Lathrecista asiatica asiatica* : Raja Ram et al., *Rec. zool. Surv. India*, (80) : 183.

Material : 1 Male, Bankura dist., 22. ix. 87, M. Prasad Coll.; 1 o, Jhalda Para, Puruliya dist., 7. ix. 86, S. Barman and Party Coll., 1 Female, Ajadhya Hills, Puruliya dist., 4. xi. 85, S. Sen and Party Coll.

Diagnosis : Prothorax blackish-brown, thorax dark coppery brown on dorsum, bright yellow laterally. Abd. 1 and 2 with broad lateral stripe and also a mid-dorsal, sutures finely black; abd. 3-8 bright crimson red-sutures black, 9 and 10 black; wings apices enfumed or may be reddish-brown to proximal and of pterostigma.

Distribution : India : West Bengal (Bankura, Puruliya and Calcutta dists.). Elsewhere : Samoa, Sondaic, Archipelago, Bornco, Newguinea, Philippines, Malabar.

Remarks : This species inhabits small stagnant water body. In having only one row of cell between IRiii and Rspl, instead of two, it is distinguishable from allied species of genus *Potamarcha* Karsch.

Genus *Potamarcha* Karsch

1890. *Potamarcha* Karsch, *Berlin Ent. Zeit.*, XXXIII : 370.

1936. *Potamarcha* : Fraser, *Fauna Brit. India, Odon.*, (3) : 288.

This genus has a single species represented not only in West Bengal but whole of India, hence no key is provided.

178. *Potamarcha obscura* (Rambur)

1842. *Libellula obscura* Rambur, *Ins. Nevrop.*, : 64.

1890. *Potamarcha obscura* : Karsch, *Berlin Ent. Zeit.*, (33) : 371.

1936 *Potamarcha obscura* : Fraser, *Fauna Brit. India, Odon.*, (3) : 289.

Material : 1 Male, Jangipur, Dhanpat Nagar, Murshidabad Dist., 12. ii. 86, Coll.; I. J. Gupta and Party; 1 Female, Ramkrishna Asram, Bishnupur, Bankura dist., 6. xi. 85, S. Sen and Party Coll.; 1 Male, Bishnupur, Bankura dist., 6. xi. 85, S. Sen and Party Coll.; 1 Male, Bishnupur, Bankura dist., 25. x. 85, M. Datta and Party Coll.; 1 Male, 1 Female, Abhirampur, Haora dist., 23. i. 86, B. Dutta and Party Coll.; 1 Male, Keranitala, Medinipur dist., 30.iii.85, B. Nandy and Party Coll.; 1 Male Belpahari. F. R. H. Midanapore dist. 8. ix. 85, S. Biswas and Party Coll.; 1 Female, Eglegram

Forest, Gopalpur, Birbhum dist., 24. i. 86, S. B. Ray and Party Coll.; 1 Female, Chancal, Malda dist., 14. vi. 87, K. P. Mukherjee and Party Coll.; 1 Female, Jaintia Hills, forest of river Hill side, Jalpaiguri dist.; 20.iii. 86, A. K. Hazra and Party Coll.

Diagnosis : Prothorax dark brown thorax black. Wing apices tipped with brown 2 row of cells between IRiii and R. spl. Anal appendages black. Arc situated between first and second antenodal nervures, no secondary reticulation, only one cubital nervure in all wings.

Distribution : India : West Bengal (Bankura, Birbhum, Murshidabad, Malda, Midnapore, Haora, Jalpaiguri, Hughli, Calcutta and 24 Parganas dists.), Himachal Pradesh, Madhya Pradesh, Uttar Pradesh. Elsewhere : Sri Lanka to Tibet and from West Coast of India to Philippines, Formosa.

Remarks : It inhabits small weedy, stagnant water body. Anal appendage is similar to *cratilla lineata* (Brauer) but is distinguishable by absence of supplementary nervures to bridge and incomplete antenodal nervure in the fore -wings.

CLASSIFIED LIST OF ODONATES

A comprehensive list of Odonates known from West Bengal is provided, same is arranged systematically under Suborders, Superfamilies, Families, subfamilies, genera, species. This includes all known species so far known, including those which are studied on basis of material present in the National Zoological Collection of Zoological Survey of India, recent material collected by Z. S. I. survey parties from this area [these are marked with an astrix (*); such of those species which are recorded for the first time are marked with double astrix (**)] and species without astrix marks are based on literature review].

Order ODONATA
Suborder - A. ZYGOPTERA
Super family I. COENAGRIONOIDEA
Family I, COENGRIONOIDAE
Subfamily i, ISCHNURINAE

Genus *Aciagrion* Selys

- **1. *A. Pallidum* Selys
- **2. *A. Occidentale* Laidlaw
- 3. *A. Olympicum* Laidlaw

Genus *Ischnura* Charpentier

- *4. *I. rufostigma rufostigma* Selys
- *5. *I. aurora aurora* (Brauer)
- *6. *I. senegalensis* (Rambur)
- 7. *I. forcipata* Morton

Genus *Enallagma* Charpentier

- *8. *E. parvum* Selys
- **9. *E. Cyathigerum* Charpentier
- **10. *E. malayanum* Selys

Genus *Rhodischnura* Laidlaw

11. *R. nursei* (Morton)

Genus *Ceriagrion* Selys

12. *C. fallax* Ris
 *13. *C. olivaceum* Laidlaw
 *14. *C. coramandelianum* Fabricius
 15. *C. azureum* (Selys)
 *16. *C. cerinorubellum* Brauer

Genus *Pseudagrion* Selys

- *17. *P. hypermelas* Selys
 *18. *P. rubriceps* Selys
 *19. *P. decorum* (Rambur)
 *20. *P. australasiae* Selys
 *21. *P. malabaricum* Fraser
 *22. *P. microcephalum* (Rambur)
 23. *P. specei* Fraser

Genus *Onychargia*

- *24. *O. atrocyana* Selys

Genus *Argiocnemis* Selys

25. *A. rubescens* Selys

Genus *Agriocnemis* Selys

- *26. *A. pymaea* (Rambur)
 27. *A. femina* (Brauer)
 *28. *A. lacteola* Selys
 *29. *A. splendidissima* Laidlaw
 30. *A. aborensis* (Laidlaw)
 31. *A. clauseni* Fraser

Subfamily ii, COENAGRIINAE

Genus *Himalagrion* Fraser

32. *H. exclamationis* Fraser

Genus *Coenagrion* Kirby

- *33. *C. dyeri* Fraser

Family 2, PLATYSTICTIDAE
 Subfamily iii, PLATYSTICTINAE
 Genus *Protosticta* Selys

34. *P. himalica* Laidlaw

Genus *Drepanosticta* Selys

*35. *D. polychromatica* Fraser

Family 3, PROTONURIDAE
 Subfamily iv, CACONEURINAE
 Genus *Caconeura* Kirby

36. *C. Odoneli* Fraser

Family 4, PLATYCNEMIDIDAE
 Subfamily v, PLATYCNEMININAE
 Genus *Copera* Kirby

- *37. *C. annulata* Selys
 *38. *C. marginipes* Rambur
 39. *C. superplatypes* Fraser
 *40. *C. vittata* (Selys)

Subfamily vi CALICNEMSNAE
 Genus *Coeliccia* Kirby

41. *C. renifera* selys

Genus *Calicnemia* Selys

- *42. *C. exima* Selys
 43. *C. pulverulens* Selys
 44. *C. miniata* Selys

Super Family II, LESTIDOIDEA
 Family 5. CHLOROLESTIDAE
 Subfamily vii, MEGALESTINAE
 Genus *Megalestes* selys

45. *M. irma* Selys
 46. *M. major* Selys

Family 6, LESTIDAE
 Subfamily viii, LESTINAE
 Genus *Platylestes* Selys

47. *P. platystyla* (Rambur)

Genus *Orolestes* McLachlan48. *O. selysi* McLachlanGenus *Ceylonolestes* Kenneddy49. *C. cyanea* (Selys)Genus *Lestes* Leach50. *L. thoracia* Laidlaw

Superfamily - III, CALOPTERYGOIDEA

Family 7, AMPHIPTERYGIDAE

Subfamily ix, PHILOGANGINAE

Genus *Philoganga* Selys51. *P. montana* (Selys)Genus *Rhinocypha*52. *R. immculata* Selys53. *R. bifasciata* Selys54. *R. trifasciata* Selys55. *R. bifenestrata* Fraser56. *R. cuneata* Selys**57. *R. fenestrella* Rambur*58. *R. quadrimaculata* Selys*59. *R. unimaculata* Selys**60. *R. ignipennis* Selys

Family 8, EUPHAEIDAE

Genus *Bayadera* Selys61. *B. indica* (Selys)62. *B. longicauda* FraserGenus *Anisoplenra* Selys63. *A. lestoides* Selys64. *A. comes* Selys

Family - 9, CALOPTERYGIDAE

Subfamily x, Caliphacinae

Genus *Caliphaea* Selys65. *C. confusa* selys

Subfamily x Calopteryginae
Genus *Vestalis*

66. *V. smaragdina* selys
*67. *V. gracilis gracilis* (Rambur)

Genus *Neurobasis* Selys

- *68. *N. chinensis chinensis* (Linnaeus)

Suborder - B ANISOZYGOPTERA
Superfamily iv, HETROPHLEBIOIDEA
Family 10, EPIOPHLEBIIIDAE
Genus *Epiophlebia* Calvert

69. *E. ladiidlawi* Tillyard

Suborder - B, ANISOPTERA
Super family v, CORDULEGASTEROIDEA
Family 11, CORDULEGASTEROIDAE
Subfamily - xi, CORDULEGASTEROINAE
Genus *Allogaster* Selys

70. *A. latifrons* Selys
71. *A. hermionae* Fraser

Genus *Anatogaster* Selys

72. *A. nepalensis* Selys

Subfamily xii, CHLOROGOMPHINAE
Genus *Chlorogomphus* Selys

73. *C. atkinsoni* (Selys)
74. *C. fraseri* St. Quentin
75. *C. selysi* Fraser
76. *C. preciosus* Fraser

Superfamily - VI, AESHNOIDEA
Family 12, AESHNIDAE
DIVISION BRACHYTRINI
Subfamily xiii, BRACHYTRINAE
Genus *Jagoria* Karsch

77. *J. martini* Laidlaw

Genus *Tetracanthagyna* Selys

78. *T. waterhousei* MacLachlan

Genus *Cephalaeschna* Selys

79. *C. orbifrons* Selys
80. *C. masoni* (Martin)

Genus *Gynacanthaeschna* Fraser

81. *G. sikkima* (Karsch)

Genus *Periaeschna* Martin

82. *P. unifasciata* Fraser
83. *P. magdelana* Martin

Division AESHNINI
Subfamily xiv, ANACTINAE
Genus *Anaciaeschna* Selys

84. *A. jaspidea* (Burmeister)

Genus *Anax* Leach

85. *A. guttatus* (Burmeister)
86. *A. imperator* Leach

Genus *Hemianax* Selys

- *87. *H. ephippiger* Burmeister

Subfamily xv, AESHNINAE
Genus *Aeshna* Fabricius

88. *A. orinθοcephala* MacLachlan
89. *A. petalura* Martin

Subfamily xvi, Gynacanthaginae
Genus *Gynacantha* Rambur

90. *G. o'doneli* Fraser
91. *G. khasiaca* MacLachlan
92. *G. basiguttata* Selys
93. *G. hyalina* Selys
94. *G. rammohni* Mitra and Lahiri
95. *G. baydera* Selys
96. *G. albistyla* Fraser

Subfamily xvii POLYCANTHAGINAE
Genus *Polycanthagyna* Fraser

97. *P. erthromelas* (MacLachlan)

Family -13, GOMPHIDAE
 Subfamily xviii, ICTINOGOMPHINAE
 Genus *Ictinogomphus* Cowley

98. *I. angulosus* Selys
 99. *I. rapex* (Rambur)
 100. *I. pertinax* selys

Genus *Gomphidia* Selys

101. *G. williamsoni* Brauer

Subfamily xix, EPIOGOMPHINAE
 Genus *Perissogomphus* Laidlaw

102. *P. stevensi* Laidlaw

Genus *Macrogomphus* Selys

103. *M. montanus* Selys
 104. *M. seductus* Fraser

Subfamily xx, GOMPHINAE
 Genus *Davidius* Selys

105. *D. zalorensis delineatus* Fraser
 106. *D. davidi assamensis* laidlaw
 107. *D. aberrans senchalnsis* Fraser

Genus *Anormogomphus* Selys

- **108. *A. heteropterus* Selys

Genus *Burmagomphus* Williamson

109. *B. hasimaricus* Fraser
 110. *B. sivalikensis* laidlaw

Genus *Gomphus* Leach

111. *G. o'doneli* Fraser

Genus *Platygomphus* Selys

112. *P. dolobratus* Selys

Genus *Anisogomphus* Selys

113. *A. occipitalis* (Selys)
 114. *A. bivittatus* (selys)
 115. *A. orites* Laidlaw

Genus *Mesogomphus* Forster

116. *M. lineatus* (Selys)
117. *M. lindergreni* (Fraser)

Genus *Merogomphus* Forster

118. *M. martini* (Fraser)

Genus *Stylogomphus* Fraser

119. *S. inglisi* Fraser

Genus *Megalogomphus* Champion

120. *M. flavicolor* (Fraser)
121. *M. smithi* (Selys)

Genus *Nepogomphus* Fraser

122. *N. modestus* (selys)

Genus *Lamelligomphus* Fraser

123. *L. biforceps* (Selys)
124. *L. risi* (Fraser)

Genus *Onychogomphus* Selys

125. *O. aureus* laidlaw
126. *O. duaricus* Fraser
127. *O. M- flavum* Selys

Super family VIII, LIBELLULOIDEA
Family 14, CORDULIIDAE
Subfamily xxi, EPOPTHALMIINAE
Genus *Epopthalmia* Burmeister

128. *E. vittata vittata* Burmeister

Genus *Macromia* Rambur

129. *M. moorei* Selys
130. *M. pallida* Fraser
131. *M. flavicincta* Selys
132. *M. flavovittata* fraser
133. *M. flavocolorata* Fraser

Subfamily- xxii, Idionychinae
Genus *Idionyx* Hagen

134. *I. stevensi*

Family -15, LIBELLULIDAE
Genus *Onychothemis* Brauer

135. *O. testacea ceylanica* Ris

Genus *Zygonyx* Selys

136. *Z. iris davina* Fraser

137. *Z. iris iris* Fraser

Genus *Tholymis* hagen

138. *T. uillarga* fabricius

Genus *Zyxomma* Rambur

139. *Z. petiolatum* Rambur

Genus *Brachydiplax* Brauer

*140. *B. chalybea chalybea* brauer

*141. *B. farinosa* Kruger

*142. *B. sobrina* (Rambur)

Genus *Acisoma* Rambur

*143. *A. panorpoides panorpoides* Rambur

Genus *Orthetrum* Newman

*144. *O. pruinatum neglectum* Rambur

*145. *O. sabina sabina* (Drury)

146. *O. triangulare triangulare* (Selys)

147. *O. chrystostigma luzonicum* (Brauer)

148. *O. japonicum internum* MacLachlan

*149. *O. glaucum* (Brauer)

Genus *Nesoxenia* Kirby

150. *N. lineata* (selys)

Genus *Agrionoptera* Brauer

151. *A. insignis dorothea* Fraser

Genus *Cratilla* Kirby

152. *C. metallica* (Brauer)

153. *C. lineata* (Brauer)

Genus *Amphithemis* Selys154. *A. vacillans* SelysGenus *Lyriothemis* Brauer155. *L. bivittata bivittata* (Rambur)156. *L. tricolor* Ris157. *L. acigastra* SelysGenus *Camacinia* Kirby158. *C. gigantea* (Brauer)Genus *Aethriamanta* Kirby*159. *A. brevipennis brevipennis* RamburGenus *Urothemis* Brauer*160. *U. signata signata* (Rambur)Genus *Macrodiplax* Brauer161. *M. cora* (Brauer)Genus *Sympetrum* Newman162. *S. hypomelas* SelysGenus *Diplacodes* Kirby*163. *D. nebulosa* (Fabricius)**164. *D. lefebvrei* Rambur*165. *D. trivialis* RamburGenus *Palpopleura* Rambur166. *P. sexmaculata sexmaculata* (Fabricius)Genus *Rhyothemis* Hagen*167. *R. variegata variegata* (Linnaeus)Genus *Pantala* Hagen*168. *P. flavescens* (Fabricius)Genus *Trithemis* Brauer*169. *T. pallidinervis* (Kirby)*170. *T. festiva* (Rambur)*171. *T. aurora* (Brumeister)172. *T. kirbyi kirbyi* Selys

Genus *Indothemis* Ris

173. *I. caesia* (Rambur)
**174. *I. limbata limbata* (Selys)

Genus *Pseudotranea* Fraser

175. *P. prateri* Fraser

Genus *Tranea* Hagen

- *176. *T. basilaris burmeisteri* Kirby

Genus *Crocothemis* Brauer

- *177. *C. servillia servillia* (Drury)

Genus *Bradinopyga* Kirby

- *178. *B. geminata* Rambur

Genus *Neurothemis* Brauer

- *179. *N. tullia tullia* (Drury)
*180. *N. fulvia* (Drury)
181. *N. intermedia degner* Selys
*182. *N. intermedia intermedia* (Rambur)

Genus *Brachythemis* Brauer

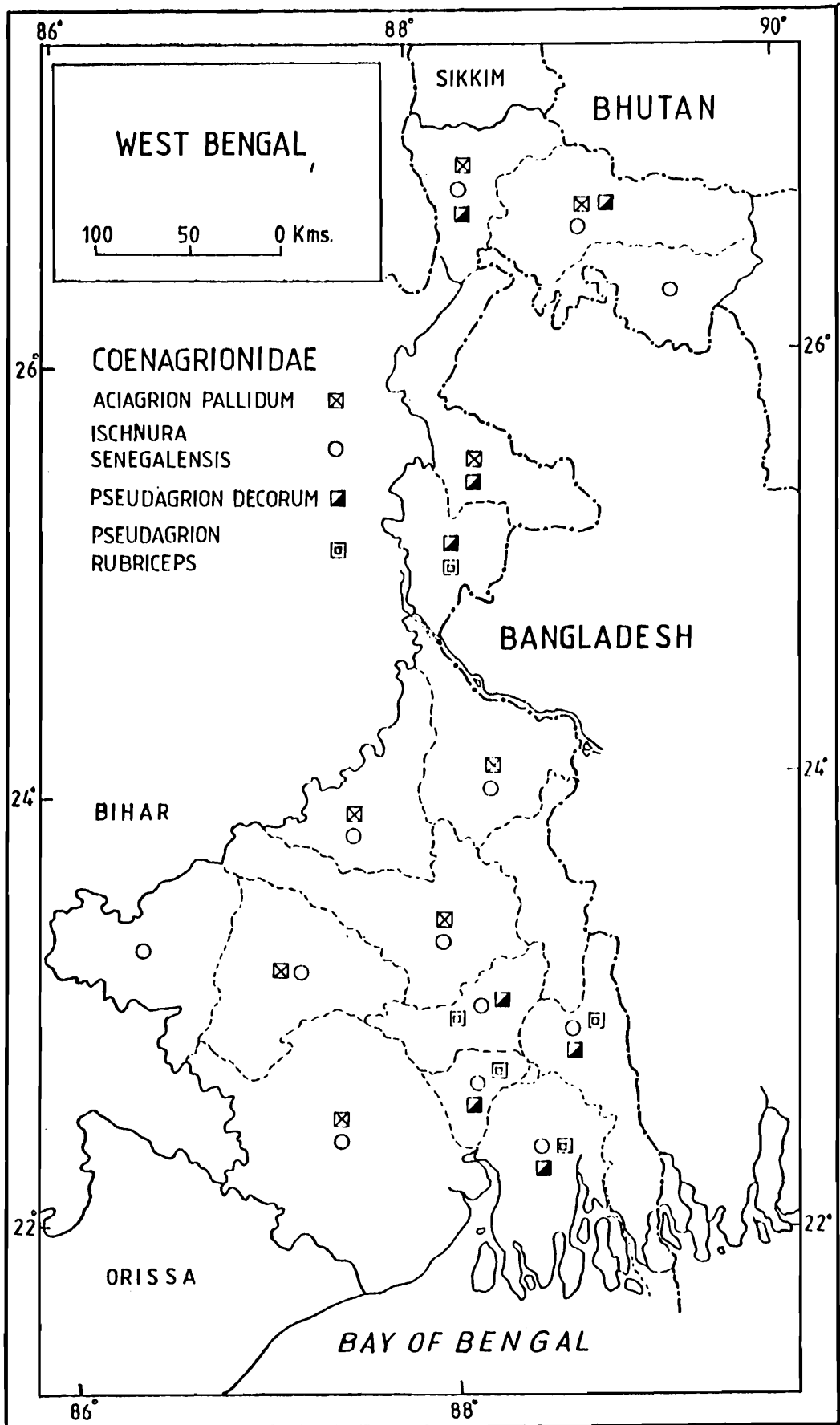
- *183. *B. contaminata* (Fabricius)

Genus *Lathrecista* Kirby

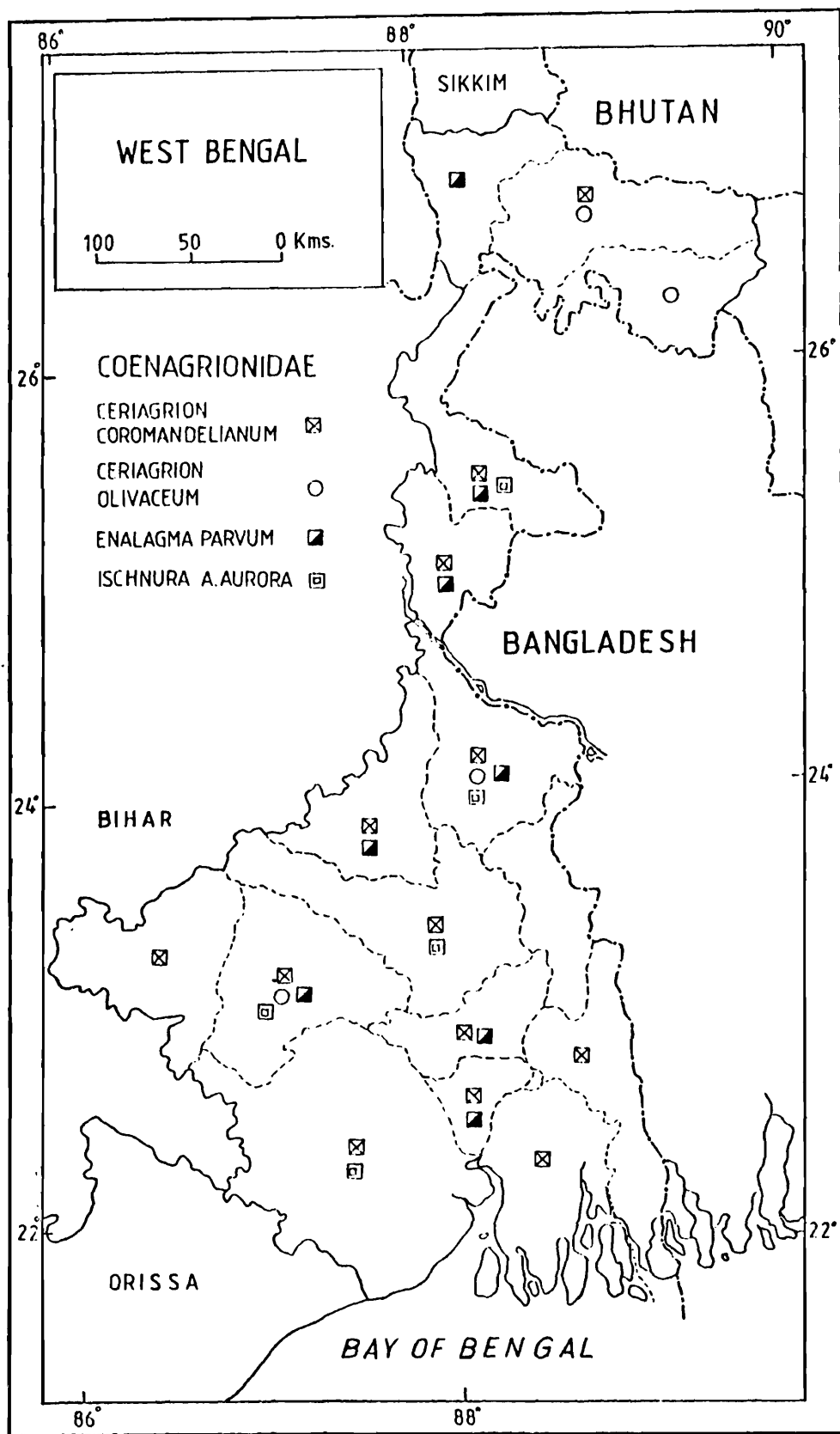
- *184. *L. asiatica asiatica* (Fabricius)

Genus *Potamarcha* Karsch

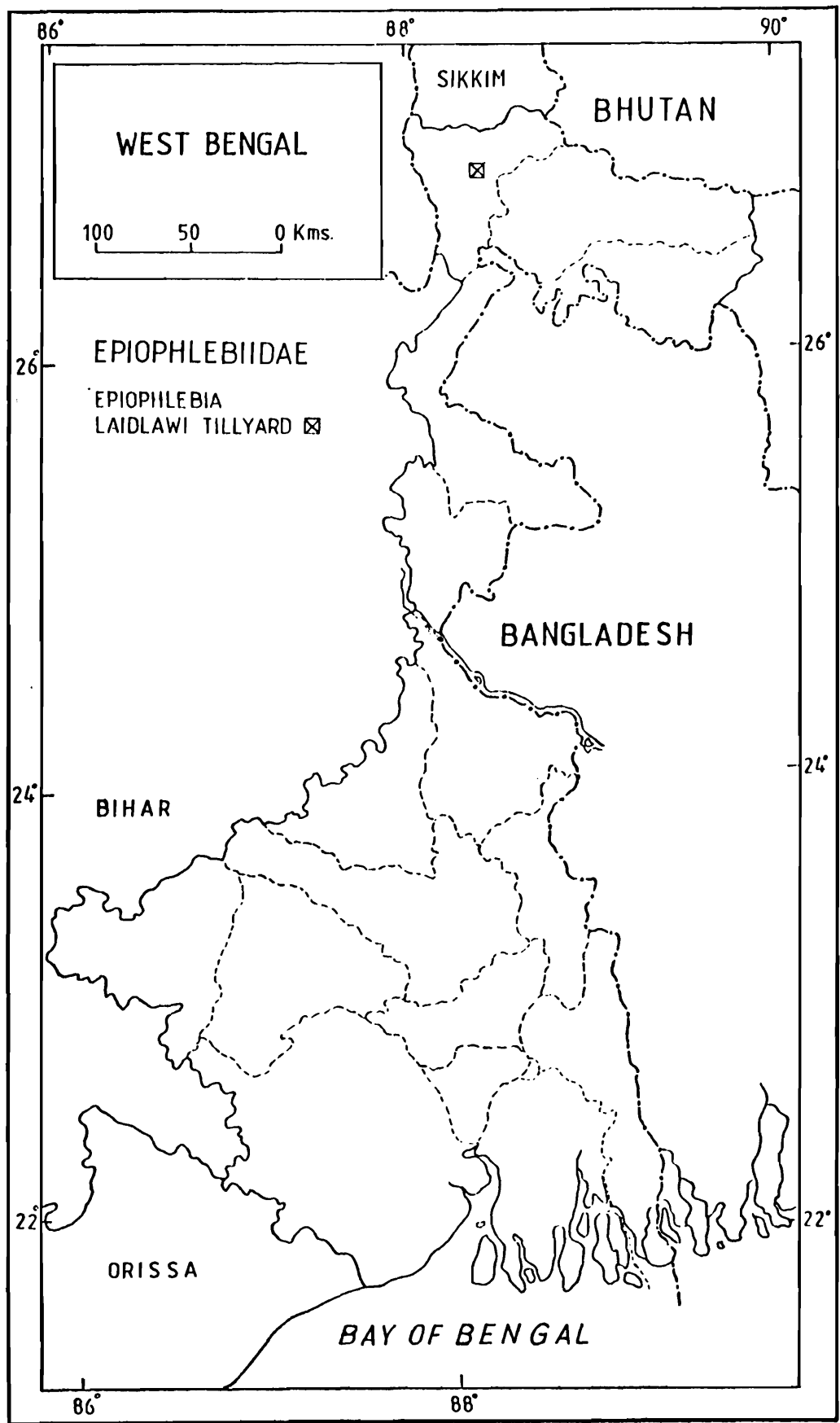
- *185. *P. obscura* (Rambur)



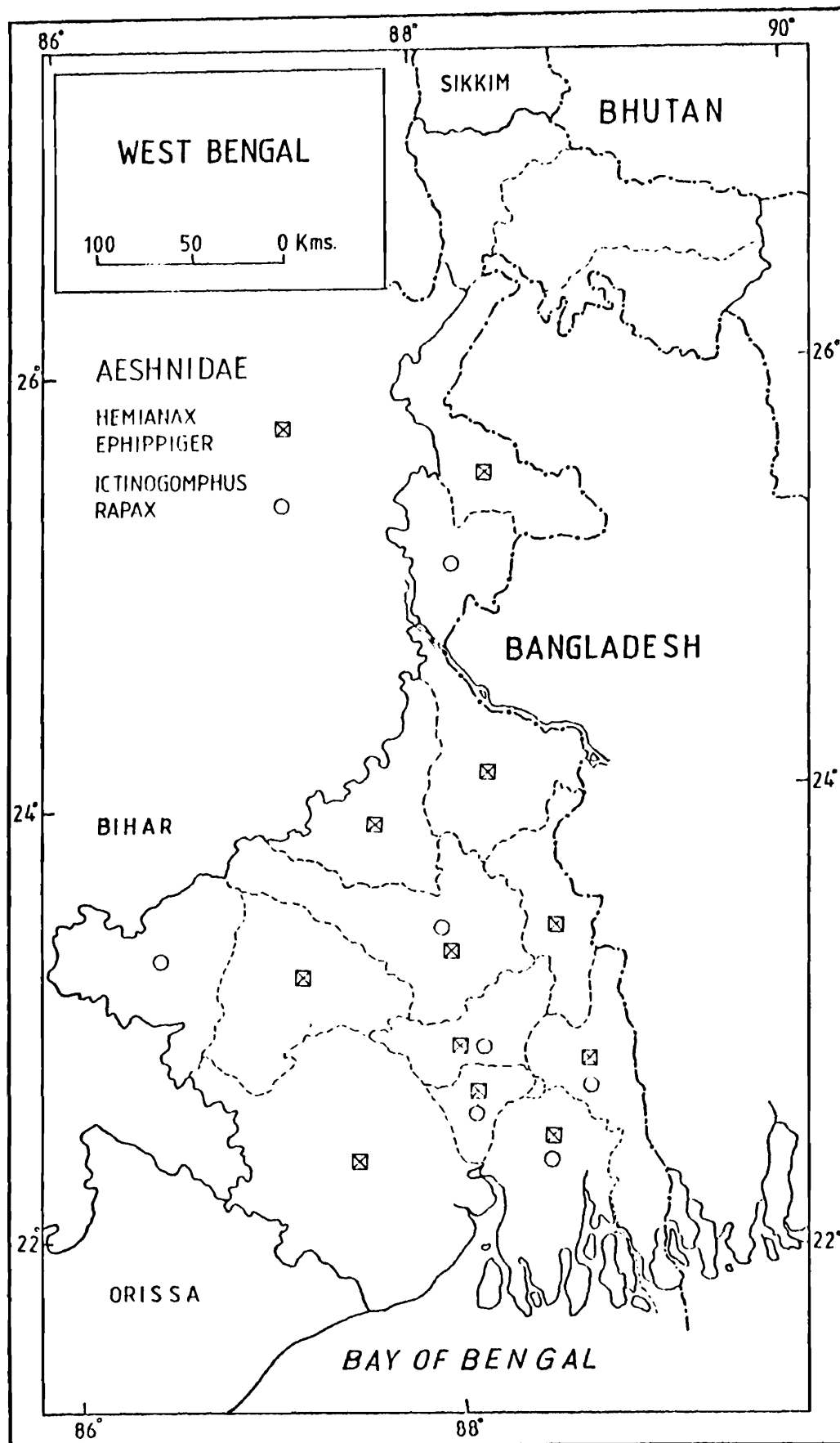
Map 1. Showing distribution of four species of *Coenagrionidae*.



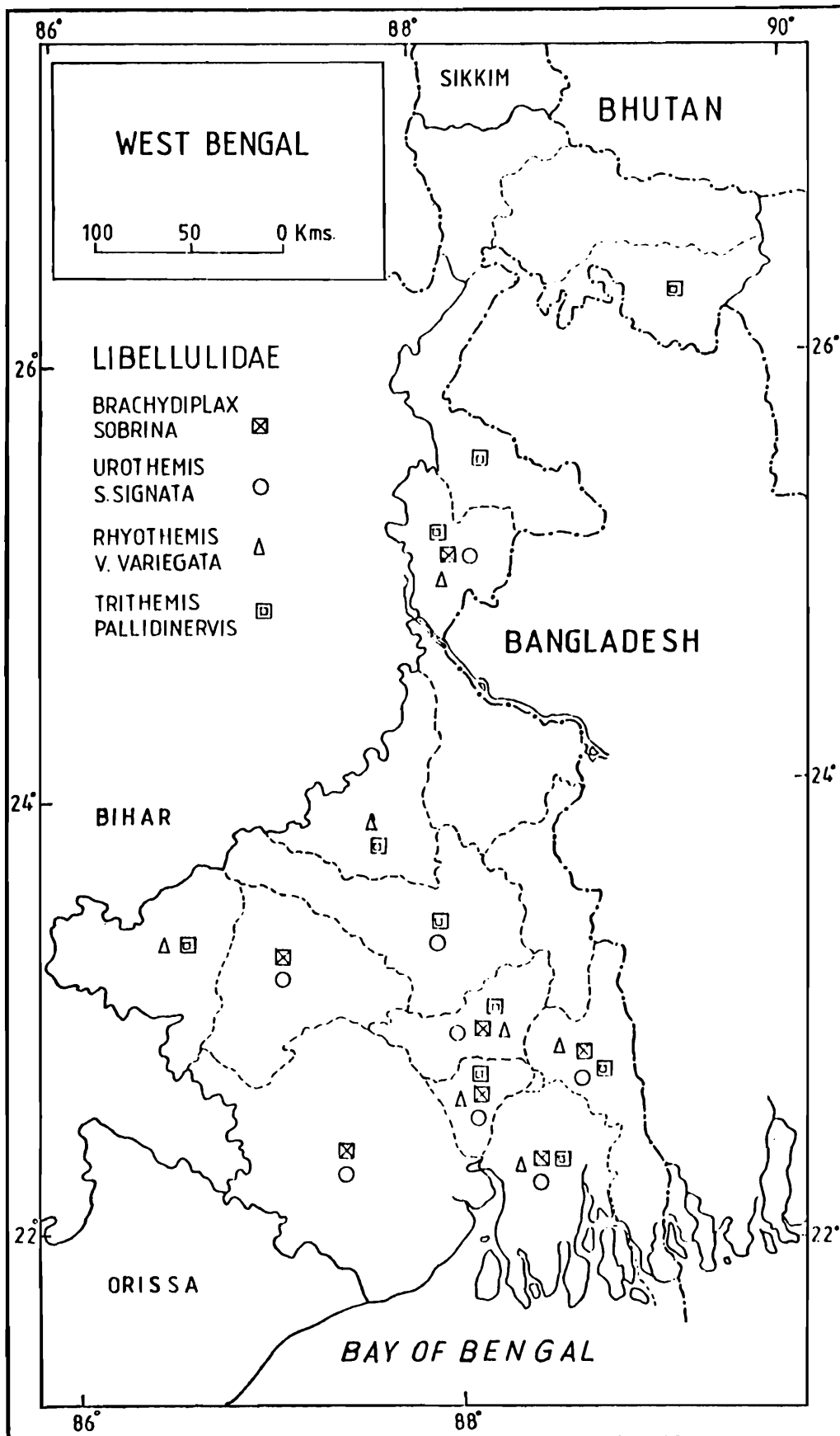
Map 2. Showing distribution of four species of Coenagrionidae



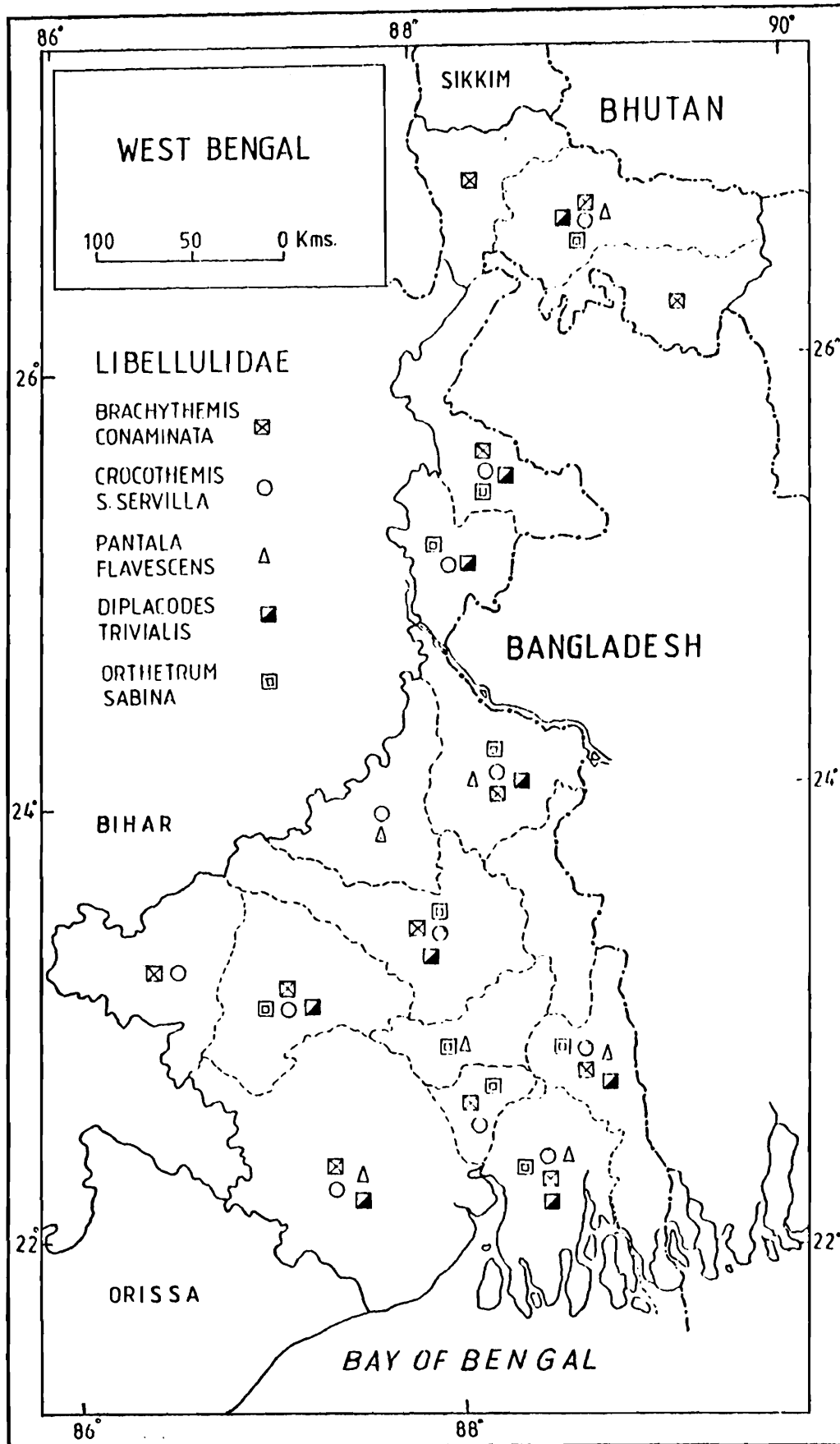
Map 3. Showing distribution of two species of Epiophlebiidae.



Map 4. Showing distribution of two species of Aeshnidae.



Map 5. Showing distribution of four species of Libellulidae.



Map 6. Showing distribution of five species of Libellulidae

TABLE - 1
QUALITATIVE COMPOSITION OF ODONATA FROM WEST BENGAL : INDIA

TAXA			WEST BENGAL		INDIA		
SO	SF	F	SBF	SPECIES	GENERA	SPECIES	GENERA
			AMPHICNEMINAE			1	1
			PSEUDAGRIINAE			22	2
		COENAGRIIDAE	COENAGRIINAE	2	2	3	3
			ISCHNURINAE	31	9	20	4
			AGRIOCNEMINAE			13	2
			AGRIINAE			1	1
	COE	PLATYSTICIDAE	PLATYSTICTINAE	2	2	11	3
			PROTONURINAE			6	2
		PROTONURIDAE	DISPARONEURINAE			7	1
			CACONEURINAE	1	1	10	4
		PLATYCNEMIDIDAE	PLATYCNEMINAE	4	1	6	2
			CALCNEMINAE	4	2	10	3
		CHLOROLESTIDAE	CHLOROLESTINAE				
Z			MEGLESTINAE	2	1	2	1
	LES	LESTIDAE	LESTINAE	4	4	19	3
			SYNPECMATINAE			3	1
		AMPHIPTERYGIDAE	PHILOGANGINAE	1	1	1	1
		CHLOROCYPHIDAE		9	1	29	4
	CAL	EUPHAEIDAE		4	2	9	4
		CALOPTERYGIDAE	CALIPHAEINAE	1	1	1	1
			CALOPTERYGINAE	3	2	3	2
		AGRIIDAE	AGRIINAE			16	6
		EPALLAGIDAE				13	5
AZ	HET	EPIOPHLEBIIDAE		1	1		
	CORD	CORDULEGASTERIDAE	CORDULEGASTERINAE	3	2	6	2
			CHLOROGOMPHINAE	4	1	9	1
			GOMPHINAE	23	13	65	15
		GOMPHIDAE	EPHIOGOMPHINAE	3	2	24	5
			ICTINOGOMPHINAE	4	2	10	2
	AESH		BRACHTRINAE	7	5	14	8
			ANACTINAE	4	3	10	3
A		AESHNIDAE	AESHNINAE	2	1	4	1
			GYNACANTHAGINAE	7	1	15	2
			POLYCANTHAGINAE	1	1	1	1
		CORDULIIDAE	IDIOMACROMIINAE	1	1	15	2
			EPOPTHALMIINAE	6	2	22	3
	LIB						
		LIBELLULIDAE	LIBELLULINAE	52	31	86	30
		MACRODIPLACTIDAE		3	3	4	4
3	7	19	32	185	95	490	134

Λ = Anisoptera, AESH = Aeshnoidea, AZ = Anisozygoptera, CAL = Calopterygoidea, COE = Coenagrionidea, CORD = Cordulegasteridae, F = Family, HET = Heterophlebiodea, LES = Lestoidea, LIB = Libelluloidea, SBF = Subfamily, SF = Superfamily.

SUMMARY

Present paper deals with the diagnostic features, distribution pattern-within West Bengal, rest of India and elsewhere; affinities with allied taxa and distinguishing features of 185 species known so far within the limits of West Bengal. These are represented under 3 suborders, 7 superfamilies, 15 families, 23 subfamilies and 95 genera. Among these, family Libellulidae of the Anisopterous odonates is by far the maximum represented species and genera (52, 31 : 133, 64 respectively). Family Coenagrionidae, among the Zygopterous Odonates are represented by next highest numbers (33, 11:152, 84 respectively). These two families together represents a little less than half of whole component (85 : 100). Key have been formulated for various level of taxa concerned, besides providing material, relevent synonymy, bibliography. A comprehensive clasified list of Known Odonata fauna of West Bengal is also provided. Map indicating distribution pattern of certain most abundant species and rare species, amongst West Bengal component, are also provided; besides general labelled diagram certain essential diagrams of Zygoptera Anisoptera (Plate I & II) and certain anal appendages and male genitalia (Plate III). One table is also provided including species and genera represented in West Bengal vis-a-via India.

ACKNOWLEDGEMENTS

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REFERENCES

- Bhasin, G. D. 1953. Odonata (In Roonwal et al A systematic catalogue of the main identified collection at the Forest Research Institute, Dehradun, Parts 9-21) *Indian Forest Leaflet* 121 (3) : 63 -69.
- Calvert, P. P. 1895. The odonata of Baja california, Mexico, *Proc. Calif. Acad.* (2), 4 : 463 - 558.
- Charpentier, T. 1840. Libellulinae Europaenae descriptal et de Pictae, 180. Lipoiae.
- Fabricius, J. C. 1787. Odonata, 336 340. (in *Mantissa Insectorum*, Hafnics, Proft.).
- Fabricius, J.C. 1793. Libellula, 2 : 373-383. (in *Entomologiae Systematicae. Hafniae Proft.* 8).
- Fabricius, J.C. 1798. Libellula, 283 286. (in *supplementum Entomologiae Systematicae. Hafniae. Proft. and Storch* 8).
- Fraser, F. C. 1922a. Notes on new and rare Indian dragonflies. *J. Bombay nat. Hist. Soc.*, 28 : 698 702.
- Fraser, F. C. 1922b. New and rare Indian Odonata in the Pusa collections. *Mem. Dep. Agric. India*, 7 : 39 -77.
- Fraser, F. C. 1926a. A revision of the genus *Idionyx* Selys. *Rec. Indian Mus.*, 28 : 195 - 207.

- Fraser, F. C. 1926b. Dragonflies. A revision of the genus *Zygonyx* Selys, *J. Bombay nat. Hist. Soc.*, **31** : 763-769.
- Fraser, F. C. 1927. Description of twenty new Indian dragonflies. *Rec. Indian Mus.*, **19** : 63 - 90.
- Fraser, F. C. 1933, 1934 and 1936. Fauna of British India including Ceylon and Burma. Odonata, 1 : XIII + 423, 2 : XXIII + 398, 3 : XI + 461, Taylor and Francis, London.
- Fraser, F. C. 1957. A reclassification of the order Odonata, 1 - 133. Royal Zoological Society of New South Wales, Sydney.
- Karsch, F. 1889a. Beitrage zur Kenntniser der Arten and gattungen der Libellulien. *Berlin Ent. Zeit.*, **33** : 347- 392.
- Karsch, F. 1891b. Uber die Odonata gattung *Idionyx* Selys. *Ent. Nachr.*, **17** : 27 - 31.
- Lahiri, A. R. 1987. Studies on the Odonata fauna of Meghalaya, *Rec. zool. Surv. India Misc. Pub., Occ. Paper No. 99* : 1 - 402.
- Lahiri, A. R. and Mitra, T. R. 1973. A note on *Acanthagyna dravida* Lieftinck. *J. Bombay nat. Hist. Soc.*, **69** : 438 - 439.
- Lahiri, A. R. and Mitra T. R. 1975. A new species of *Gynacantha* Rambur 1842. *Ent. Rec. J. var.*, **87** : 148 -149.
- Laidlaw, F. F. 1916. Notes on Indian Odonata. Subfamily Agrionidae, Genus *Ischnura* Charp., genus *Ceriagrion* Selys; subfamily Gomphinae, genus *Davidius* Selys. *Rec. Indian Mus.*, **17** : 129 - 139.
- Laidlaw, F. F. 1917. A list of dragonflies recorded from the Indian empire with special reference to the collection of the Indian Museum, Part I. Family Calopterygidae.. *Rec. Indian Museum.*, **13** : 23 40.
- Laidlaw, F. F. 1917, 1919. A list of dragonflies recorded from the Indian empire with special reference to the collection of the Indian Museum, Part II. Family Agrionidae. *Rec. Indian Museum.*, **13** : 321 348 and **16** : 169 195.
- Mitra, T. R. 1983. A list of Odonata of Calcutta. *Ent. mon. Mag.*, **119** : 29 31.
- Mitra, T. R. 1974. Note on the distribution of some dragonflies (Odonata : Anisoptera) of Bengal. *Ent. Rec. J. Var.*, **86** : 73 74.
- Mitra, T. R. and Lahiri A. R. 1975. A new species of *Gynacantha* Rambur (1842) (Odonata) from India. *Entomologists. Rec. J. var.*, **85** (5) : 148 149.
- Mitra, T. R. Lahiri A. R. and Raychaudhury, D. N. 1976. Remarks on dragonflies (Odonata : Anisoptera) of Calcutta, *Third All India Congr. Zool.* : 64.
- Needham, J. G. 1932. A key to the dragonflies of India. *Rec. Indian Mus.*, **34** : 195 - 228.
- Raja Ram, Srivastava, V. D. and Prasad, M. 1982. Odonata (Insecta) fauna of Calcutta and surroundings, *Rec. zool. Surv, India*, **80** : 169 196.
- Rambur, M. P. 1842. Histoire Naturelle des Insectes Nevropteres. XVII + 534 pp. *Librairie Encyclopedique de Roret, Paris*.

- Srivastava, V. D. 1986. Aid to the identification of Odonata (in Manual : Collection preservation and identification of insects and mites of economic importance). *Rec. zool. Surv. India*, Calcutta, 227 - 240.
- Srivastava, V. D. and Das, S. 1987. Insecta : Odonata Fauna of Orissa, Pt. 1, State fauna Series. 1, *Zool. Surv. India*, Calcutta, 135 - 159.
- St. Quentin, D. 1936. Libellen aus dem district Darjiling nebst beschreibung neuen *Chlorogomphus* art. *Knowia*, 15 : 102 - 105.
- Selys long Champs, E. De. 1853 - 1854. Synopsis des calopterygines. *Bull. Accd. Belg. Sci.*, 20 : 1 - 73.
- Selys Long Champs, E. De. 1859. Additions aus synopsis des Caopterygines, *Bull. Acad. Belg. Sci.*, (2) 7 : 437 - 443.
- Selys Long Champs, E. De. 1860, Synopsis des Agrionines, Derniere Legion : protneura, *Bull. Acad. Belg. Sci.* (2). 10 : 431 - 462.
- Selys Long Champs, E. De. 1862. Synopsis des Agrionines, Seconde Legion : lestes. *Bull. Acad. Belg. Sci.*, (2), 13 : 288 - 338.
- Selys Long Champs, E. De. 1863. Synopsis des Agrionines. Quetrieme legion *Platycnemis*, *Bull. Acad. Belg. Sci.*, (2), 16 : 150 - 176.
- Selys Long Champs, E. De. and Hagen, 1854. Monographie des Calopterygines, *Mem. Soc. Sc. Liegs*, 9 : 1 - xi + 1- 291.
- Selys Long Champs, E. De. and Hagen 1858. Monographie des Ghmphines. *Mem. Couron. Soc. Roy. Sci.*, Leige, 11 : 257 - 720.
- Tillyard R. J. 1921. Larvae of *Epiophlebia laidlawi* Tillyard. *Rec. Indian Mus.*, XXII : 93 - 107.
- Tillyard, R. J. and Fraser, F. C. 1938 - 1940, A reclassification of the order Odonata. *Aust. Zool.*, 9 : 125 - 169; 195 - 221; 359 - 396.

INSECTA : PLECOPTERA

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INTRODUCTION

Plecoptera or Stone flies are a small group of insects available in the high altitude hill stream of cool temperate region. Due to the preference of this particular niche they have a very restricted distribution. They are not available in the Warm plains like other insects. Very few workers have worked on the Indian Plecoptera. [Needham (1909), Kimmins (1946, 1950), Jewett (1958, 1960, 1975), Aubert (1967), Kawai (1968), Zwick & Sivec (1980)]. Among these only Needham (1909), Zwick & Sivee (1980) have reported Plecoptera from this state.

In India about 102 species of Plecoptera have been reported. Among these 21 species belonging to 10 genera have been reported from a single District Darjiling of West Bengal.

MATERIAL AND METHOD

Except for a lot comprising of about 114 exs. no other material was available for the present study. So literature records largely form the basis of the present paper.

MORPHOLOGY AND TERMINOLOGY

Plecoptera or stone flies are small to medium sized insects. Body is of orthopteran type. Head is hypognathus or prognathus with mandibulate mouth parts. Two lateral compound eyes with two or three ocelli. Antennae long and filamentous with numerous segments. Thorax three segmented. Fore wing slightly narrower than hind wing. Venation primitive type with numerous cross veins. Legs long, tarsi three segmented with two claws. Abdomen cylindrical, ten segmented, cerci many segmented. Nymphal gill remanants often present on thorax and abdomen.

LIST OF TERMS

Caudal cerci - Appendages of the 11th abdominal segment. Epiproct Dorsal plate of the 11th abdominal segment. Glossae Inner lobe of the labium. Ocellus Simple eye of the adult insect. Paraglossae - Outer lobe of the labium. Paraproct Lateral plate of the 11th abdominal segment.

SYSTEMATIC ACCOUNT

The order Plecoptera is divided into 15 families. Out of these 7 families are represented in India. These are Capniidae, Leuctridae, Nemouridae, Perlidae, Perlodidae, Peltoperlidae and Taeniopterygidae. In West Bengal only 4 families viz., Leuctridae, Nemouridae, Perlidae and Peltoperlidae have been recorded so far.

Key to the families

Adults

1. Cerci short, with one segment2
 - Cerci long, always with more than one segments3
2. In both wings the veins Sc₁, Sc₂, and R₄₊₅ and cross vein r-m form a distinct X like figure; wings at rest not rolled around abdomen. Cerci often modified NEMOURIDAE
 - In both wings no such X like formation of vein ; wing at rest rolled around abdomen. Cerci not modifiedLEUCTRIDAE
3. Cerci 5-6 segmented, not longer than greatest width of prothorax; prothorax much wider than head PELTOPERLIDAE
 - Cerci many segmented, longer than greatest width of prothorax. Prothorax about as wide as head. Remnants of nymphal gills on ventral side of thorax PERLIDAE

Nymphs

1. Labium with glossae and paraglossae of equal length2
 - Labium with glossae much shorter than paraglossae4
2. Head with 2 ocelli. Venter of thorax with large overlapping plates PELTOPERLIDAE
 - Venter of thorax without large, shield like plates3
3. Small and robust nymphs, hind wing pads extending outwards from the body. Cerci modified NEMOURIDAE
 - Small and slender, hind wing pads extending parallel to body, cerci not modifiedLEUCTRIDAE
4. Thorax with branched pleural gills..... PERLIDAE

Family NEMOURIDAE

Key to the Genera

1. Cerci of male markedly modified as copulatory organ. Subanal lobe at most pointed, drawn out backwards and somewhat upwards.....*Nemoura* Pictet
 - Cerci of male not modified as copulatory organ.....2
2. Nymphal gill vestiges on the ventral side of prothorax ; cerci of male simple ; eight sternite of female bears a median chitinised plate*Amphinemoura* Ris
 - Nymphal gill vestiges not present on prothorax.....3

3. Epiproct narrow and flat, asymmetrical distally and prolonged by a whip like process; Subanal plate divided into two *Mesonemoura* Baumann
 – Epiproct cylindrical, asymmetrical beyond middle and terminating in a short curved lobe with spinules at base; subanal plate divided into three *Indonemoura* Baumann

1. Genus *Amphinemoura* Ris 1902

1. *Amphinemoura elegans* Zwick

1980. *Amphinemoura elegans* Zwick, *Entomo. Basiliensia*, 5 : 83.

Remarks : No description could be given as literature for this species could not be procured.

Distribution : India : West Bengal (Darjiling dist., Lopchu, Rimbick-Ramam).

2. *Amphinemoura luteipes* Kimmins

1947. *Amphinemoura luteipes* Kimmins, *Ann. Mag. nat. Hist.*, 13(11) : 728-730.

1980. *Amphinemoura luteipes* Kimmins, Zwick & Sivec ; *Entomo. Basiliensia*, 5 : 81.

Diagnosis : Head brown, antennae and palpi pale. Thorax fuscous. Legs Pale. Wings greyish hyaline. Ninth tergite of male elevated. Subgenital plate narrow, vesicle slender about 3/4 as long as subgenital plate. Tenth tergite with a rounded depression at centre of basal margin. Cerci short and stout. Sub anal plate moderately broad at base, apex produced upwards in a pair of approximated branches. Outer branch terminating in an upwardly directed hook, inner branch acutely rounded as its apex with a finger like process dorsally and carrying a number of spines.

Distribution : India : West Bengal (Darjiling dist, Jhepi, Singamari-Bharapatea Bung), Arunachal Pradesh, Assam, Manipur.

3. *Amphinemoura nigrifrons* Zwick

1977. *Amphinemoura nigrifrons* Zwick, *Entomo Bawelensia*, 2 : 95.

1980. *Amphinemoura nigrifrons* Zwick, Zwick & Sivec ; *Entomo. Basiliensia*, 5 : 77.

Remarks : No description could be given as literature for this species could not be procured.

Distribution : India : West Bengal (Darjiling dist., Darjiling, Tiger Hill, Chinkhona-Ghum, Ramam); Elsewhere : Bhutan.

4. *Amphinemoura pulchra* Zwick

1977. *Amphinemoura pulchra* Zwick, *Entomo. Basiliensia*, 2 : 86.

1980. *Amphinemoura pulchra* Zwick, Zwick & Sivec ; *Entomo. Basiliensia*, 5 : 83.

Remarks : No description could be given as literature for this species could not be procured.

Distribution : India : West Bengal (Darjiling dist., Lopchu, Ramam).

5. *Amphinemoura rahungi* Aubert

1967. *Amphinemoura rahungi* Aubert, *Mitt. Schweiz. ent. Ges.*, **39** : 237-238.

1980. *Amphinemoura rahungi* Aubert, Zwick & Sivec; *Entomo. Basiliensia*, **5** : 77.

Diagnosis : Body black brown, prothorax brilliant shiny. Wings clear brown. Legs 1 and 2 black brown. Paraproct-median lamella as long as subanal plate. Subanal plate triangular, prolonged dorsally into a elbowed process. External appendages reduced to a fine elbowed lamella. Cerci short. Epiproct long and slender, membranous at the upper surface, tergite 9 very slightly embedded at the posterior margin which bears a few setae. Genital plate in females formed of two divergent triangular lobes.

Distribution : India : West Bengal (Darjiling dist., Lopchu), Arunachal Pradesh, Assam, Manipur. Elsewhere : Nepal.

2. Genus *Indonemoura* Baumann 1975

6. *Indonemoura adunca* Harper

1974. *Protonemoura adunca* Harper, *Psyche*, **81** : 372.

1980. *Indonemoura adunca* (Harper), Zwick & Sivec; *Entomo. Basiliensia*, **5** : 86.

Diagnosis : Antennae and pronotum black. Wings amber, veins dark. Legs particularly the hind pair banded. Paraproct-median lamella narrow and rounded apically. Subanal plate at base divided distally into three lobes. Cerci long. Tegum 9 emerginate centrally, bearing spinules. Tergum 10 excavated anteriorly and prolonged into two short median lobes covered with spinules. Epiproct cylindrical, asymmetrical beyond middle and terminating in a short curved lobe, a group of spinules at base of epiproct.

Distribution : India : West Bengal (Darjiling dist., Sandakphu). Elsewhere : Nepal.

7. *Indonemoura assami* (Aubert)

1967. *Protonemoura assami* Aubert, *Mitt. schweir. ent. Ges.*, **39** : 213-215.

1975. *Indonemoura assami* (Aubert), Baumann; *Smith. Contr. Zool.* **211** : 13.

Diagnosis : Body dark brown. Wings brown. Legs brown with two deep brown rings in the posterior half of femora. Paraproct-median lamella short, chitinised, subanal plate broad, quadrangular, elongated by a long sclerotised horn. Subanal vesicle long and slender. External appendages slender, reclinear with a few subterminal spines. It is shorter than the sub anal plate. Epiproct elongated and slender, at the interior surface a swelling form by two parallel ridges each with 9-12 spicules. Cerci 2-3 times longer than wide.

Distribution : India : West Bengal (Darjiling dist., Lopchu, Kalimpong), Assam, Uttar Pradesh. Elsewhere : Nepal.

8. *Indonemoura indica* (Kimmins)

1946. *Protonemoura indica* Kimmins, *Ann. Mag. Nat. Hist.*, **13**(11) : 727-733.

1975. *Indonemoura indica* (Kimmins), Baumann; *Smith. Contr. Zool.* **211** : 13.

Diagnosis : Head and antennae piceous. Pronotum quadrate with a dull median patch, femora dull castaneous, tibiae blackish, tarsi piceous. Wings brownish hyaline. Subgenital plate broad, tapering to an upcurved apex. Vesicle truncate, less than half as long as subgenital plate. Tenth tergite with a deep median tough. Supra anal lobe strongly chitinised. Cerci long, nearly as long as subgenital plate. Sub anal plate broad, its apex rounded and produced in blackened upcurved bifid process. Intermediate appendages fused to the upper margin of the subanal plate, forked, the outer branch strongly chitinised and blackened, the inner branch membranous and rather inconspicuous.

Distribution : India : West Bengal (Darjiling dist., near Ghoom).

9. *Indonemoura shergaoni* (Aubert)

1967. *Protonemoura shergaoni* Aubert, *Mitt. Schweiz. ent Ges.* 39 : 220-222.

1975. *Indonemoura shergaoni* (Aubert), Baumann ; *Smith. Contr. Zool.* 211 : 13.

Diagnosis : Body deep brown. Wings greyish brown. Femora 1 & 2 clear brown. Femora 3 with two large deep bands. Paraproct-median lamella small. Subanal plate prolonged into a digitiform appendage which is less chitinised than the genital plate itself. External appendages very small. Subanal vesicle generally invisible. Cerci moderate length.

Epiproct – Superior and inferior pieces generally less distinct. The body of the epiproct may form less differentiated globular or elongated mass. Always with a terminal filament. Sometimes more or less marked asymmetrical. Genital plate of the female small, hardly surpassing 1/2 of the width of the sternite 8.

Distribution : India : West Bengal (Darjiling dist., Darjiling, Singamsari Bharapatea Bung, Ramam).

3. Genus *Mesonemoura* Raumann 1975

10. *Mesonemoura filigera* (Kimmins)

1946. *Amphinemoura filigera* Kimmins, *Ann. Mag. Nat Hist.* 13(11) : 730-731.

1975. *Mesonemoura filigera* (Kimmins), Baumann; *Smith Contr. Zool.* 211 : 15.

Diagnosis : Ninth tergite with anal margin produced in a pair of triangular elevated process, each armed with three small spines. Subgenital plate moderately broad and tapering to a bluntly rounded apex. Vesicle about 2/3 as long as subgenital plate, with rounded apex. Supra anal lobe short, straight having a coiled filament which rests in the base of the tenth tergite. Subanal plate broad at base, its apex produced upwards in a finger and with a small hairy lobe at the base of the finger.

Distribution : India : West Bengal (Darjiling dist., Tiger Hill, Chinkhona - Ghoom). Elsewhere : Nepal.

4. Genus *Nemoura* Pictet 1841

11. *Nemoura magnicauda* Zwick & Sivec

1980. *Nemoura magnicauda* Zwick & Sivec, *Entomo. Basiliensia.* 5 : 97.

Diagnosis : Pronotum brown, abdomen red brown. Antennae dark brown. Tergite 9 simple. Sternite 9 forms an enlarged caudal image. Subgenital plate transversely blunted, short and pointed. The outer side of epiproct is sharp.

In dorsal view the basal third broadened with apex long and slender. Paraproct triangular with sharper apex. The inner lobe is very small and short, hardly visible. External surface is sclerotised and dark.

Distribution : India : West Bengal (Darjiling dist., Chimkhona - Ghoom, Tiger Hill).

2. Family PERLIDAE

Key to the Genera

1. Branches of pleural gills present on the thorax.....*Perla* Goffroy
 - No such pleural gills present2
2. Occiput behind the ocelli modified, usually with an oval depression with raised margins; a transverse vein between the anal veins of the hind wing*Phenoperla* Banks
 - Occiput not modified3
3. Two ocelli placed very close to each other ; hind margin of male 7th tergite trapezoid, 8th tergite with a recurved process at hind margin *Neoperla* Needham
 - Two ocelli nearer to compound eyes to each other ; no such process on 8th tergite of male
..... *Gibosia* Okamoto

5. Genus *Gibosia* Okamoto 1912

12. *Gibosia needhami* Klapalek

1916. *Gibosia needhami* Klapalek, *Casopsis ceske spol. Ent.* 13 : 62.

1980. *Gibosia needhami* Klapalek, Zwick & Sivec; *Entomo. Basiliensia*, 5 : 133.

Diagnosis : The two ocelli wide apart. Antennae and setae yellow. Prothorax is narrower than head. The ninth abdominal segment of male is very peculiar. Its posterior prolongation on the ventral side is short, not upturned around the end of the abdomen. The tenth segment is annular and exposed, one third as long as the ninth. From its hind margin on the dorsal side there grows out posteriorly a short stout downwardly directed spine. To this spine are opposed two claw like upcurved hooks that arise from the inner side of the base of the setae.

Distribution : India : West Bengal (Darjiling dist., Jhepi); Himachal Pradesh.

6. Genus *Neoperla* Needham 1905

13. *Neoperla limosa* Hagen

1858. *Neoperla limosa* Hagen, *Zool. Bot. Gesell. Wien. Verhandan*, 8 : 475.

1940. *Neoperla limosa* Hagen, Classen; *Cornell Univ. Agri. Exp. Stn.* 232 : 162.

Diagnosis : Head dark brown, antennae pale. Each of the ocelli separated from the other by about its own diameter. Prothorax straight margined in front. Slightly narrowed of the convex sides posteriorly in the males but not in the females. With a fine mid dorsal line. Legs yellow. Wings yellowish, veins darker. Abdomen yellow. 9th segment is moderately produced and bears on its dorsal side a pair of roughened prominences.

Material : 1 ex (Damaged). Darjiling dist., Singla, 12.iv.1913, Coll. Carmichel.

Distribution : India : West Bengal (Darjiling dist., Singla); Himachal Pradesh.

14. *Neoperla lushana* Wu

1935. *Neoperla lushana* Wu, *Bull Peking Nat. Hist.* 9 : 233.

1980. *Neoperla lushana* Wu, Zwick & Sivec; *Entomo. Basiliensia*, 5 : 118.

Remarks : No description could be given as literature for this species could not be procured.

Distribution : India : West Bengal (Darjiling dist., Lopchu, Lopchu-Ghum).

15. *Neoperla montivaga* Zwick

1977. *Neoperla montivaga* Zwick, *Entomo. Basiliensia*, 2 : 121.

1980. *Neoperla montivaga* Zwick, Zwick & Sivec; *Entomo. Basiliensia*. 5 : 117.

Remarks : No description could be given as literature for this species could not be procured.

Distribution : India : West Bengal (Darjiling dist., Chimkhona - Ghum).

16. *Neoperla perspicillata* Zwick

1980. *Neoperla perspicillata* Zwick, *Entomo Basiliensia*. 5 : 120.

Remarks : No description could be given as literature for this species could not be procured.

Distribution : India : West Bengal (Darjiling dist., Jhepi) ; Nepal.

7. Genus *Perla* Geoffroy 1764

17. *Perla xenocia* Banks

1914. *Perla xenocia* Banks, *Proc. Acad. Nat. Sci. Philadelphia*. 66 : 609.

1940. *Perla xenocia* Banks, Classen; *Cornell Univ. Agric. Exp. Stn.* 232 : 147.

Diagnosis : Head yellow, a large dark brown spot over the ocelli, antennae and palpi black. Abdomen pale yellow. Legs black, femora pale yellow. Posterior ocelli about 3 diameter apart. Pronotum about one and one fifth broader than long, the corners nearly square. Last tarsal joint twice as long as other together.

Material : 82 exs. (Nymphs), Teesta Survey, 31.1.53-3.2.53 ; 10 exs. (Nymphs), Teesta Survey, Kalimpong, 21.1.53; 16 exs (Nymphs), Teesta Survey, Kalighora, 23.1.53; 5 exs (Nymphs), Teesta Survey, Poskjhora, 8.2.53.

Distribution : India : West Bengal (Darjiling dist., Kalimpong, Kalighora, Pasokjhora).

8. Genus *Phenoperla* Banks 193818. *Phenoperla himalayana* Zwick

1977. *Phenoperla himalayana* Zwick, *Entomo. Basiliensia* 2 : 124.

1980. *Phenoperla himalayana* Zwick & Sivec, *Entomo. Basiliensia*, 5 : 129.

Remarks : No description could be given as no literature for the species could be procured.

Distribution : India : West Bengal (Darjiling dist, Lopchu, Jhepi, Lebong), Assam. Elsewhere : Nepal.

3. Family LEUCTRITIDAE

9. Genus *Rhopalopsole* Klapalek 191219. *Rhopalopsole magnicerea* (Jewett)

1958. *Leuctra (Rhopalopsole) magnicerea* Jewett, *Proc. Nat. Acad. Sci (India)*. 28B (iv) : 321.

1977. *Rhopalopsole magnicerea* (Jewett), Harper, *Orient. Insects*. 11 : 55.

Diagnosis : Ninth sternum of male broadly rounded distally. Subanal lobes fused into a massive median organ. Epiproct a slender hook. Cerci lightly sclerotised and bent upwards in lateral view. Ninth tergum broadened posteriorly with a complete row of spinules. Tenth tergum prolonged laterally into a prominent parallel-sided lobe, the ventral margin of which is terminated into a long point.

Distribution : India : West Bengal (Darjiling dist., Sandakphu, Lopchu, Chimkhona-Ghum, Srikhola, Rimbik), Himachal Pradesh, Meghalaya.

4. Family PELTOPERLIDAE

10. Genus *Cryptoperla* Needham 190920. *Cryptoperla torva* Needham

1909. *Cryptoperla torva* Needham, *Rec. Indian Mus.* 3 : 190.

1980. *Cryptoperla torva* Needham, Zwick & Sivec; *Entomo. Basiliensia*. 5 : 108.

Diagnosis : Body pale yellow brown. Head flat above. Ocelli apparently two but obscure. Antennae forty or more segmented. The wings are subhyaline, darker on the coastal margin. The eighth segment of the female produced on its ventral side in an enormous scoop-shaped concave plate. Its lateral margin spring from the middle of the side of segment 9.

Distribution : India : West Bengal (Darjiling dist., Jhepi), Himachal Pradesh.

21. *Cryptoperla pentagonalis* Zwick & Sivec

1980. *Cryptoperla pentagonalis* Zwick & Sivec, *Entomo. Basiliensia*, 5 : 109.

Remarks : No description could be given as literature for this species could not be procured.

Distribution : India : West Bengal (Darjiling dist. Lopchu, Laopchu-Ghum). Elsewhere : Nepal.

SUMMARY

About 21 species of Plecoptera have been reported from West Bengal, that too from Darjiling dist. only because of its restriction to the high altitude hill stream. It is evident from the above list that 11 species belonged to family Nemouridae, 7 to family Perlidae, 2 to family Peltoperlidae and 1 to family Leuctridae. Nemouridae is the dominant family among the all families of Plecoptera present in this region.

REFERENCES

- Aubert, J. 1967. Les Nemouridae de l'Assam (Plecoptera). *Mitt. Schweiz. ent. Ges.* **39** : 209-253.
- Harper, P.P. 1977. Capniidae, Luctridae and Perlidae (Plecoptera) from Nepal. *Orient. Insects.* **11** : 53-62.
- Kimmins, D.E. 1947. New Species of Himalayan Plecoptera. *Ann. mag. nat. Hist.* **13**(11) : 28-30.
- Needham, J.G. 1909. Perlidae. In notes on the Neuroptera in the collection of the Indian Museum. *Rec. Indian Mus.* **3** : 185 :280.
- Zwick, P. and Sivec, I. 1980. Beitrage zur Kenntnis der Plecoptera des Himalaya. *Entomo. Basiliensia* **5** : 59 - 138.

INSECTA : ORTHOPTERA : TETRIGOIDEA

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INTRODUCTION

The superfamily Tetrigoidea constitutes a group of grasshoppers, commonly known as grouse locustus, which are generally harmless to the agricultural crops, except a few species which are reported as pest on vegetables like cabbage. The knowledge on grouse locustus of West Bengal is limited to the early works of Bolivar (1887, 1909, 1918), Kirby (1914) and Hancock (1912, 1915). The last has studied the tetrigids available in the collection of the Indian Museum (now represented in the Zoological Survey of India) and that too from Darjiling District only, except some materials from Calcutta. Subsequently Gunther (1938 a,b,c, 1939) has published revisionary studies on the family Tetrigidae excluding Tetriginae and Batrachideinae. Later on Steinmann (1970, 1971) has contributed to the Tetrigid fauna of Oriental and Palaearctic Regions. Recently Shishodia (under publication) has studied the tetrigid fauna of North eastern India including West Bengal. As a result of above all studies 50 species, distributed over 19 genera under five subfamilies, have been reported from the State of W. Bengal. There are approx. 1,000 species known from the world and 122 species from India.

No exclusive study on the tetrigid fauna of West Bengal has been made so far. The present study is based on the large collection of tetrigids brought by different parties of the Zoological Survey of India from all the Districts of West Bengal, during 1983-1988, as well as older material in the National Zoological Collection.

The specimens have been collected from various ecological niches as far as possible. They were captured by sweeping with a butterfly net, and on light traps.

The present study deals with 52 species under 20 genera of grouse locustus, distributed over five subfamilies. Species marked with double astrisks are recorded for the first time from West Bengal, while other species marked with single astrisk have been reported in the literature from W. Bengal, but have not been studied by the author.

The classification is followed after Gunther (1938 a,b,c, 1939) and Steinmann (1970).

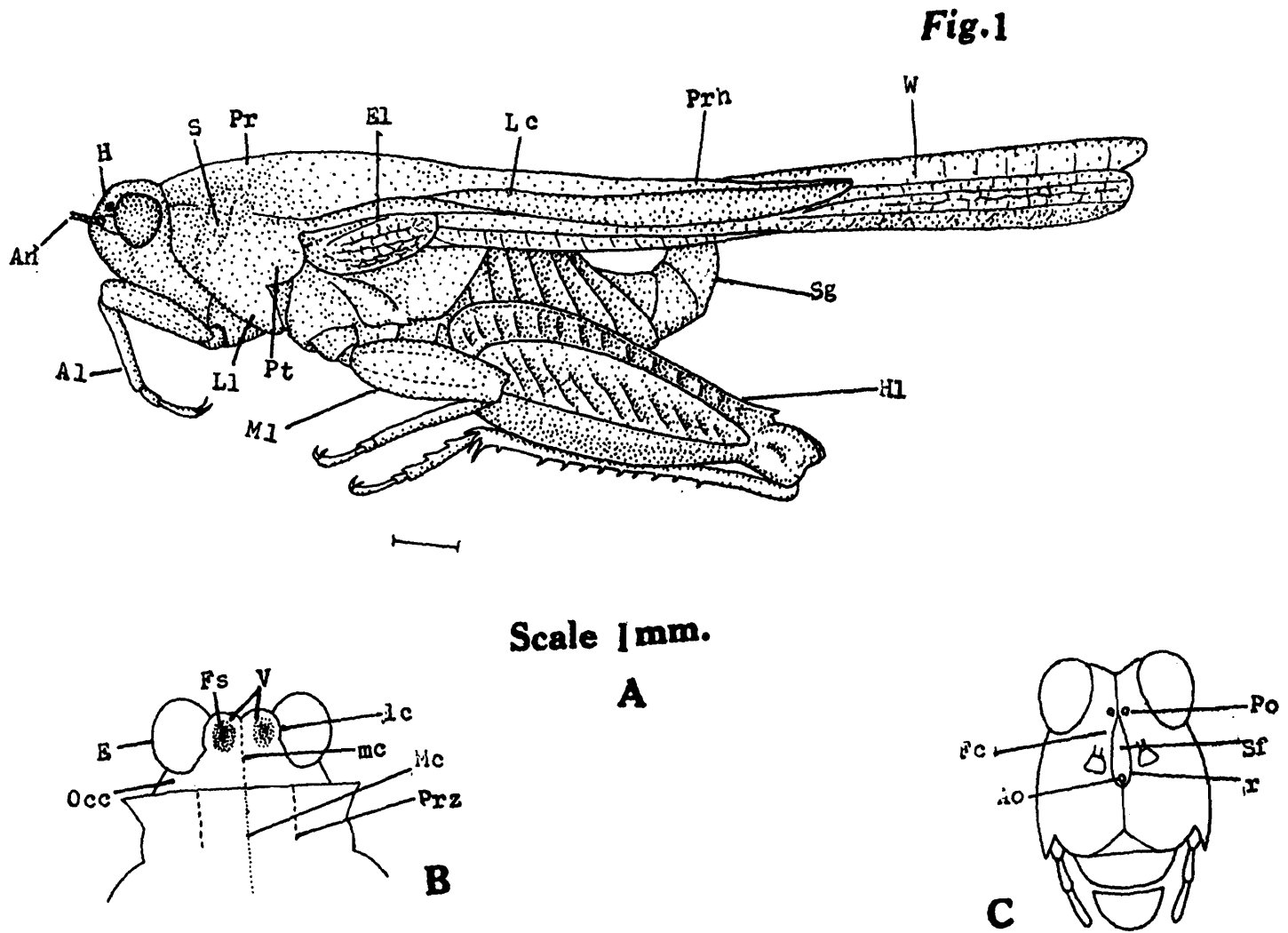


Fig. 1. A. Dorso-lateral view of *Paratettix rotundatus* Hancock (Male). B. Dorsal view of the head of Tetrigid (Magnified). C. Front view of the head of Tetrigid (Magnified).

SYSTEMATIC ACCOUNT

Order ORTHOPTERA

Superfamily TETRIGOIDEA

Family TETRIGIDAE

The family Tetrigidae is characterized by the following characters :

- i. The pronotum much elongated and covers the whole or a greater part of the abdomen.
- ii. The tegmina much shortened, scale like.
- iii. The wings fully developed except in the case of apterous species.
- iv. The anterior and middle tarsi consist of two segments and the posterior tarsi three segments.
- v. Claws of tarsi not provided with an arolium.

Key to the subfamilies of Tetrigidae

- 1. Anterior femora more or less compressed carinate above; pronotum anteriorly not produced over the head in a cornute process2
 Anterior femora above distinctly sulcate; pronotum anteriorly produced over the head in a cornute processBATRACHIDEINAE
- 2. Frontal costa widely forked between the ocelli, the rami strongly divergent CLANDONOTINAE
 CLANDONOTINAE
- Frontal costa forked, but the rami divergent only a little or moderately in front, or parallel, frequently separated only in a slight degree by a sulcus3
- 3. Posterior angle of lateral lobes of pronotum acutely produced outwards and generally spined; first segment of posterior tarsi generally longer than the thirdSCELIMENINAE
 Posterior angle of lateral lobes of pronotum rarely acutely spined; first segment of posterior tarsi generally not longer than the third4
- 4. Posterior angle of the lateral lobes of pronotum little produced outwards, obliquely truncated behind, very rarely acutely spined; first and third posterior tarsal segments nearly equal in length ... METRODORINAE
 Posterior angle of lateral lobes of pronotum turned downwards, more or less rounded; first and third posterior tarsal segments unequal in length, first rather longer than the thirdTETRIGINAE

I. Subfamily CLADONOTINAE

Key to the genera of the subfamily Cladonotinae

1. Pronotum extremely compressed above and wholly foliaceous *Oxyphyllum* Hancock
 - Pronotum neither compressed nor foliaceous *Epitettix* Hancock

Genus *Oxyphyllum* Hancock, 19081. * *Oxyphyllum pennatum* Hancock

1908. *Oxyphyllum pennatum* Hancock, *Trans. R. ent. Soc. Lond.*, 1908 : 393.

1915. *Oxyphyllum pennatum* : Hancock, *Rec. Indian Mus.*, 11 : 61.

Diagnosis : Body shining and granulose; face a little oblique; pronotal crest strongly elevated, the anterior part regularly arcuate, the posterior part sloping backward, extending upto the apices of hind knee; tegmina oblong; wings extended behind beyond the pronotal apex; the first joint of the posterior tarsi little longer than the third.

Distribution : India : West Bengal (Darjiling District).

Remarks : The author could not get this species in the Zoological Survey of India's collection. The type which is from West Bengal is deposited in the Oxford University Museum, Oxford, London. However, it has been studied by the author.

Genus *Epitettix* Hancock, 19072. * *Epitettix elytratus* Gunther

1939. *Epitettix elytratus* Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 (A) Zool. (NF) BD : 306 - 7.

Diagnosis : Head not exserted above the pronotum; vertex wider than one of the eyes, depressed on either side of median carinula anteriorly, extended forward about less than half the length of eyes, medially angulate; frontal costa widely bifurcate in front of paired ocelli; paired ocelli located below the middle of eyes; antennae situated on the inferior margin of eyes; eyes not elevated above the vertex; pronotum extended upto the apex of abdomen, obtusely rounded at apex; posterior angle of lateral lobes of pronotum turned downward, obliquely truncate at apex; tegmina narrowly rounded at apex; wings reduced; posterior femora stout at base, elongated, margins finely serrulated.

Distributed : India : West Bengal (Darjiling District - Kalimpong).

Remarks : The author could not find the species in the present collection. However, Gunther (1939) has recorded it from Kalimpong, and deposited in the Zoological Survey of India, Calcutta.

II. Subfamily SCELIMENINAE

Key to the genera of the subfamily Scelimeninae

1. Posterior tibiae and first tarsal segment expanded *Indoscelimena* Gunther
- Posterior tibiae and first tarsal segment not expanded2
2. Lateral margin of pronotum, behind the shoulders, from the side view, distinctly angulated upwards, wider between shoulders; generally brachypterous with strong sculpture
..... *Thoradonta* Hancock
- Lateral margin of pronotum, behind the shoulders, produced3
3. Vertex broader than an eye or sometimes in females only just as broad as an eye but never narrower; eyes not raised above the level of pronotum *Criotettix* Bolivar
- Vertex narrower than an eye or sometimes in females as broad as an eye; eyes slightly or well raised above the pronotum4
4. Head slightly raised above the pronotum; vertex only a little narrower than an eye and not strongly attenuate in front.....5
- Head distinctly raised above the pronotum; vertex much narrower than an eye and strongly attenuate in front.....6
5. Generally small or medium sized; posterior angles of lateral lobes of pronotum subspiniform or oblique and obtuse but without forming a lateral spine *Loxilobus* Hancock
- Generally medium or large sized; posterior angles of lateral lobes of pronotum, acute or produced into a spine at the anterior margin which is more or less transverse or obliquely directed forward *Eucriotettix* Hebard
6. Posterior angles of lateral lobes of pronotum rounded at apex; lateral carinae of pronotum runs towards median carina behind the shoulders which is parallel to the median carina at the apex of pronotum *Synalibas* Gunther
- Posterior angles of lateral lobes of pronotum provided with spine at anterior margin or truncate; lateral carinae of pronotum do not run towards median carina behind the shoulders
..... *Hebarditettix* Gunther

Genus *Indoscelimena* Gunther, 1938Key to the genera of *Indoscelimena*

1. Pronotum bearing large tubercles on the disc *flavopicta* (Bolivar)

- Pronotum not bearing elevated tubercles on the disc2
- 2. Dorsum above smooth punctate, a little subreticulate; humeral angles very obtuse; median carina little elevated, percurrent, tuberculate in front at the middle over occiput; lateral and median carinae not at all appreciably tuberculate; margins of first segment of posterior tarsi somewhat dilated; pronotum of female 21.7 mm*angulata* (Hancock)
- Dorsum very little rugose, coarsely granulose; median carina bearing three small tubercles forward before the humeral angles and tuberculate backward in an indistinct series to the base of process; lateral carinae indistinctly bituberculate on each side of shoulders and barely subtuberculate backward to the base of process; margins of first segment of hind tarsi not at all expanded; pronotum of male 19 mm*saussurei* (Hancock)

3. * *Indoscelimena angulata* (Hancock)

1915. *Eugavialidium angulatum* Hancock, *Rec. Indian Mus.*, 11 : 73.
 1938. *Indoscelimena angulata* : Gunther, *Mitt. zool. Mus. Berl.*, 23 : 372.

Diagnosis : Vertex subequal in width to one of the eyes, on either side dentate but not elevated above the eyes; dorsum of pronotum plain, punctate; humeral angles very obtuse-convex; the lateral and median carinae unarmed; median carina terminating in front over the occiput in a tubercle; prozonal carinae compressed, parallel behind the front margin; the front lateral margin on either side armed with a tubercle; posterior angle of lateral lobes of pronotum not spined, but a little triangulate; posterior femoral margin entire below; the first joints of posterior tarsi with the margin little expanded; the three pulvilli equal in length.

Distribution : India : West Bengal (Calcutta).

Remarks : The author has not studied the species in the present collection. However, Hancock (1915) has described it from West Bengal.

4. * *Indoscelimena flavopicta* (Bolivar)

1909. *Eugavialidium flavopictum* Bolivar, *Boln. Soc. ent. Esp.*, 9 : 394.
 1938. *Indoscelimena flavopicta* : Gunther, *Mitt. zool. Mus. Berl.*, 23 : 375.

Diagnosis : Pronotum bearing large tubercles on the disc; humeral angles obtuse, provided with abbreviated external carinulae; dorsum with two tubercles behind the humeral angles, and four at the middle of the process; posterior angles of the lateral lobes of pronotum produced, but not at all spinose, margin behind with a profound sub-rectangular sinus; pronotum length 19 mm; Shoulder width 4.6 mm; ratio of width of an eye over width of vertex = 22 : 32.

Distribution : India : West Bengal (Calcutta).

Remarks : The author could not studied this species. However, Bolivar (1909) has described this species from Calcutta (West Bengal).

5. * *Indoscelimena saussurei* (Hancock)

1915. *Eugavialidium saussurei* Hancock, *Rec. Indian Mus.*, 11 : 74.

1938. *Indoscelimena saussurei* : Gunther, *Mitt. zool. Mus. Berl.*, 23 : 372.

Diagnosis : Head not exserted; vertex subequal in width to an eye, lateral carinulae elevated in the middle of eyes, dentate on either side, not elevated above the eyes; paired ocelli placed below the middle of eyes; antennae located below the eyes; pronotum bears small tubercles on either side of front margin, extending beyond the apices of posterior femora; median carina bears small tubercles upto the base of hind process of pronotum; tegmina narrow at base; wings extending upto the apex of pronotum; first segment of posterior tarsi not expanded.

Distribution : India : West Bengal (Calcutta).

Remarks : The author has not studied this species in the present collection. However, Hancock, (1915) has described it from West Bengal.

Genus *Criotettix* Bolivar, 1887

6. *Criotettix bispinosus* (Dalman)

1818. *Acrydium bispinosum* Dalman, *Kongl. Vet. Akad. Handl.*, 77.

1887. *Criotettix bispinosus* : Bolivar, *Annls. Soc. ent. Belg.*, 31 : 185, 223, 226.

1938. *Criotettix bispinosus* : Gunther, *Stettin. ent. Ztg.*, 99 : 134.

Material examined : 1 (M), 1 (F), Calcutta, 26.x.1949, A.P. Kapur.

Diagnosis : Head not exserted; vertex distinctly broader than an eye, slightly narrower in front; paired ocelli situated in between the middle of eyes; antennae located on the inferior margin of the eyes; pronotum extending beyond the apices of posterior femora; dorsum granulate; posterior angle of lateral lobes of pronotum dilated and laminated, apex of anterior margin provided with a sharp pointed spine, directed backwards; wings extending upto the apex of pronotum; first segment of posterior tarsi longer than the third; all the pulvilli of first segment of posterior tarsi more or less equal.

Distribution : India : West Bengal (Calcutta), Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Manipur, Tripura. Elsewhere : Borneo, Burma, China, Hainan, Hongkong, Java, Luzon, Malaya, Sulawesi, Sumatra, Taiwan, Thailand, W. Malaysia.

Remarks : This species is clearly separable from all the remaining Indian species under the genus by the sharply pointed spines of the posterior angle of the lateral lobes of pronotum which is distinctly directed backwards. It is recorded by Shishodia (Mss in press) from Calcutta.

Genus *Eucriotettix* Hebard, 1929Key to the species of *Eucriotettix*

1. Stature moderately small; pronotum of female not exceeding 11 mm. in length
.....*pallidus* (Hancock)
- Stature medium to large; pronotum of female exceeding 11-20.5 mm2
2. Stature medium; posterior angles of lateral lobes of pronotum subquadrate, obliquely truncate behind, the angle little prominent, not at all spined; pronotum of male and female 13-15.5 mm
.....*dohertyi* (Hancock)
- Stature larger; pronotum of female more than 15.00 mm3
3. Lateral lobes of pronotum with the posterior angles barely produced*aequalis* (Hancock)
- Lateral lobes at the posterior angles produced, acute with spines directed transversely
.....*grandis* (Hancock)

7. * *Eucriotettix aequalis* (Hancock)

1912. *Criotettix aequalis* Hancock, *Mem. Dep. Agric. India. ent. Ser. 4* : 135-136.

1929. *Eucriotettix aequalis* : Hebard, *Revue suisse Zool.*, **36** : 573.

Diagnosis : Vertex narrower than one of the eyes; frontal costa narrowly divided above the paired ocelli; paired ocelli placed between the middle of the eyes; antennae inserted between the lower fourth of the eyes; pronotum extend beyond the apex of abdomen; dorsum smooth; anterior prozonal carinae nearly obliterated; median carina indistinct forward, little elevated between the thoracic sulci; lateral lobes of pronotum moderately deflexed, slightly triangulately produced but not strictly spined. Body length with pronotum 18.5 mm.

Distribution : India : West Bengal (Darjiling).

Remarks : The author has not found this species in the present collection. The Type specimen of this species, which is from West Bengal, and deposited in the Academy of Natural Sciences of Philadelphia, U.S.A., has been studied by the author.

8. *Eucriotettix dohertyi* (Hancock)

1915. *Criotettix dohertyi* Hancock, *Rec. Indian Mus.*, **11** : 86.

1938. *Eucriotettix dohertyi* : Gunther, *Stettin. ent. Ztg.*, **99** : 170.

Material examined : 1 (F), 2 (M), 1/2 km south of Goke Forest Rest House, Darjiling District, 20.iv.1973, H.S. Sharma.

Diagnosis : Head exserted; vertex narrower than an eye, more narrower in front; frontal costa bifurcated behind the paired ocelli, arcuate in front; paired ocelli situated between the middle of eyes; antennae inserted between the lower angles of eyes and filiform; pronotum extend beyond the apex of posterior femora; dorsum granulose and rugulose; posterior angle at lateral lobes of pronotum expanded, truncated or slightly rounded at apex, slightly notched in the middle; elytra rounded at apex; wings caudate.

Distribution : India : West Bengal (Darjiling District), Assam.

Remarks : It is similar to *E. pallidus* (Hancock), but differs from it in the posterior angles of lateral lobes of pronotum which are truncate or slightly rounded.

9. *Eucriotettix grandis* (Hancock)

1912. *Criotettix grandis* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 : 134.

1938. *Eucriotettix grandis* : Gunther, *Stettin. ent. Ztg.*, 99 : 182.

Material examined : Darjiling Dist. : 1 (F), Kalimpong, 9.i.1971, J.M. Julka; 3 (F), Chunabati 120 m, Churanti Forest, 28.xii.1973, G.K. Srivastava & P.K. Maiti; 1 (M), 1 (F), Rangpo, 600 m, 29.v. & 1.vi.1974, J.K. Jonathan; 10 (M), 9 (F), Teesta Bajar, 214 m, 24.v.1979, M.S. Shishodia.

Jalpaiguri Dist. : 1(M), Joyanti River Bed, 17.xii.1986, R.S. Barman.

Diagnosis : Head slightly exserted; vertex narrower than an eye; frontal costa distinctly bifurcate behind the paired ocelli; paired ocelli situated more or less in between the eyes; antennae located on the inferior margin of eyes; eyes elevated above the vertex; pronotum wider between the shoulders, extend beyond the apices of posterior femora; posterior angles of lateral lobes of pronotum laminate, deflexed, anterior margin bears distinct triangular sharp spines directed posteriorly or subobliquely directed; elytra roundly truncate at apex; wings extending upto the apex of pronotum. Body length with pronotum 17-22 mm.

Distribution : India : West Bengal (Darjiling District, Arunachal Pradesh, Assam, Meghalaya, Sikkim. Elsewhere : Burma.

Remarks : It is similar to *E. annandalei* (Hancock), but differs from it by the larger size of the body, elevation of head, direction of the posterior angles of lateral lobes of pronotum and texture of the dorsum.

10. *Eucriotettix pallidus* (Hancock)

1915. *Criotettix pallidus* hancock, *Rec. Indian Mus.*, 11 : 85.

1938. *Eucriotettix pallidus* : Gunther, *Stettin. ent. Ztg.*, 99 : 170.

Material examined : 1 (F), Panighata, near suspension bridge, Darjiling District, 14.i. 1971, J.M. Julka.

Diagnosis : Head a little exserted; vertex narrower than an eye, still narrower in front; frontal costa

bifurcate between the paired ocelli; paired ocelli situated on the middle of eyes; antennae located on the inferior margin of eyes; eyes elevated above the vertex; pronotum extending beyond the apices of posterior femora; dorsum bears nodules on the pronotal process; posterior angles of lateral lobes of pronotum expanded, a little triangular, with the posterior margin slightly concave; tegmina rounded at apex; wings extending upto the apex of pronotum.

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

Remarks : Shishodia (Mss in press) has reported this species from West Bengal for the first time.

Genus *Hebarditettix* Gunther, 1938

Key to the species of *Hebarditettix*

1. Pronotum shorter (10-13.5 mm).....*lobatus* (Hancock)
- Pronotum longer (13.5-14 mm)*quadratus* (Hancock)

11. *Hebarditettix lobatus* (Hancock)

1912. *Systolederus lobatus* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 : 143.

1915. *Bolotettix lobatus* : Hancock, *Rec. Indian Mus.*, 11 : 78

1938. *Hebarditettix lobatus* : Gunther, *Stettin, ent. Ztg.*, 99 : 202.

Material examined : Darjiling District : 1 (M), 1 (F), Kurseong, 1520 m, 5.viii. 1908, N. Annandale (Reg. no. 107/17); 1 (F), Kurseong, 1428-1520 m, 26.vi. 1910, N. Annandale (Reg. No. 1583/20); 1 (F), Ghumti, 1216 m, -- vii. 1911, F.H. Gravely; 1 (F), Kalimpong, 182-1378 m, 24.iv. - 10.v. 1915, F.H. Gravely.

Diagnosis : Head exserted; vertex narrower than an eye and more narrowed in front; frontal costa bifurcated behind the paired ocelli, compressed arcuate between the antennae; paired ocelli placed below the middle of eyes; antennae located below the inferior margin of eyes; pronotum extending beyond the apices of posterior femora; posterior angles of lateral lobes of pronotum a little obliquely truncate; tegmina widely rounded at apex; wings extending upto the apex of pronotum; first and third segments of posterior tarsi equal in length.

Distribution : India : West Bengal (Darjiling District).

Remarks : Shishodia (Mss in press) has reported that *H. lobatus* and *H. quadratus* are similar to each other except their pronotal length. As the type specimen of *H. lobatus* is not available, the matter could not be decided.

12. *Hebarditettix quadratus* (Hancock)

1915. *Bolotettix quadratus* hancock, *Rec. Indian Mus.*, 11 : 70.

1938. *Hebarditettix quadratus* : Gunther, *Stettin, ent. Ztg.*, 99 : 202.

Material examined : Darjiling District : 1 (F), Type, Singla, 456 m, - vi. 1913, Lord Carmichael's collection (Reg. No. cc/864); 1 (M), Ghumti, 456-1520 m, - vi. 1914, Carmichael's collection 1 (M), 1 (F), Pashok, 608 m, 26.v. - 14.vi. 1916, F.H. Gravely; 1 (F), Teesta Bajar, 214 m, 24.v. 1979, M.S. Shishodia.

Diagnosis : Head exserted; vertex narrower than an eye; frontal costa bifurcate before the paired ocelli, paired ocelli situated on the inferior margin of eyes; antennae located below the eyes; pronotum extending beyond the apices of posterior femora; posterior angles of lateral lobes subquadrate; wings extend upto the pronotal apex or beyond; first and third segments of posterior tarsi more or less equal in length.

Distribution : India : West Bengal (Darjiling District), Sikkim.

Remarks : This species is very close to *II. lobatus* except in the length of pronotum. Since the Type of *lobatus* has not been examined, this synonymy has not been decided.

Genus *Loxilobus* Hancock, 1904

Key to the species of *Loxilobus*

1. Pronotum extend upto the apex of posterior femora; vertex narrower than an eye
.....*assamus* Hancock
- Pronotum extend much beyond the apex of posterior femora; vertex slightly wider than an eye
.....*striatus* Hancock

13. *Loxilobus assamus* Hancock

1907. *Loxilobus assamus* Hancock, *Trans. R. ent. Soc. Lond.*, 223.

1914. *Loxilobus assamus* : Kirby, *Fauna of British India, Orthoptera (Acridiidae)* : 43.

Material examined : Darjiling District : 4 (M), 1 (F), Karmaktar, 450 m, Singla, 3.i.1976, G.K. Srivastava; 2 (M), 1 (F), Kurscong, 1475 m, 15.v.1979, M.S. Shishodia.

Diagnosis : Head exserted; vertex subequal in width to one of the eyes, narrowed in front; pronotum extending backward as far as the hind femoral knees; median carina of pronotum sinuated, interrupted in profile; lateral lobes of pronotum little laminated outwards and subtriangular; obliquely truncate; third article of the posterior tarsi, with the third pulvilli longest, the apex of first and second acute; tegmina elongate with rounded apex; wings abbreviated.

Distribution : India : West Bengal (Darjiling), Assam, Arunachal Pradesh, Nagaland, Sikkim and Tripura.

Remarks : Shishodia (Mss in press) has recorded this species from West Bengal for the first time.

Fig.2

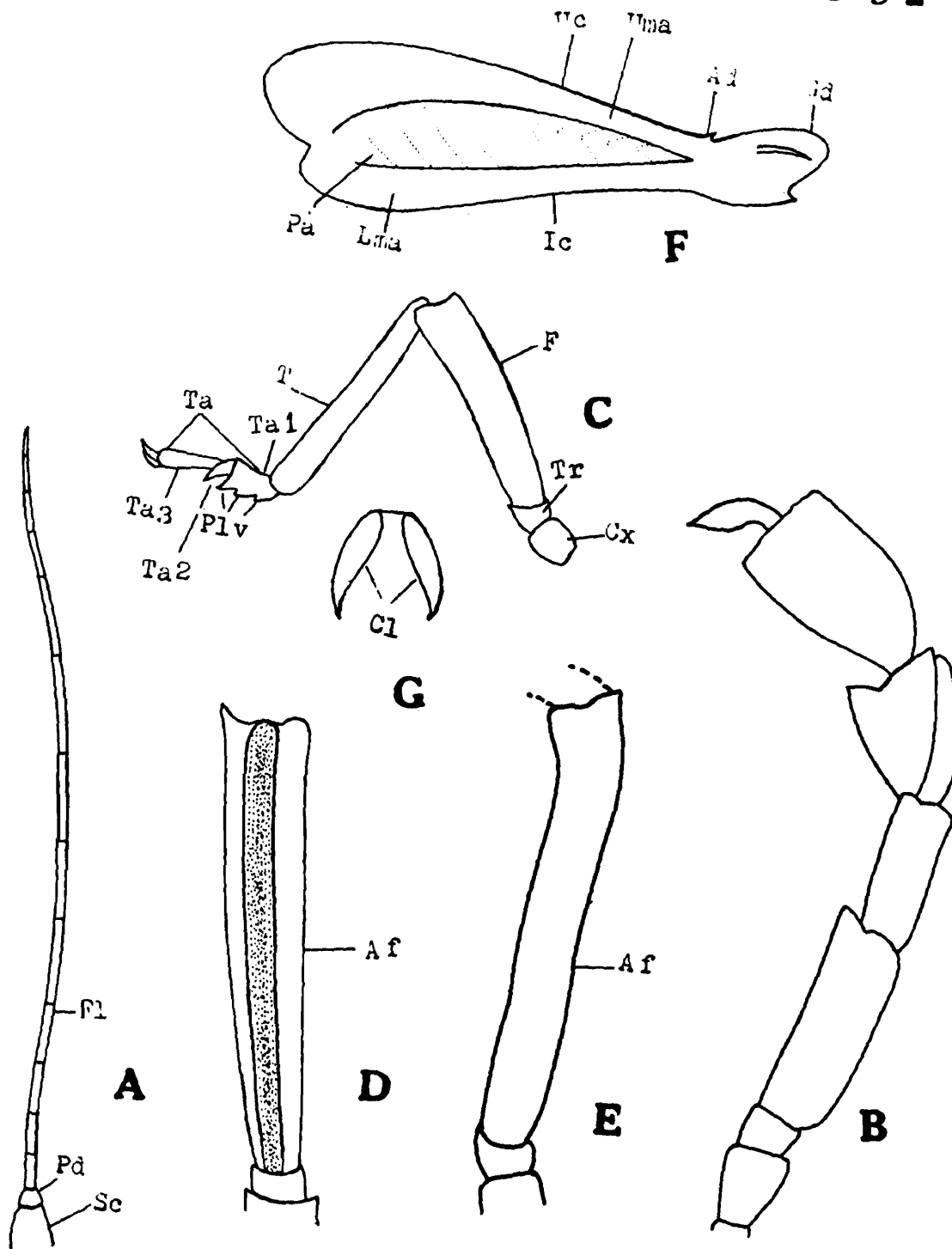


Fig. 2. A. Antenna of *Scelimena diiscalis* (Hancock) (Magnified). B. Antenna of *Tripetalocera ferruginea* Westwood (Magnified). C. Posterior leg of Tetrigid (Magnified). D. Dorsal view of anterior femur of *Saussurella indica* Hancock (Magnified). E. Dorsal view of anterior femur of *Loxilobus assamus* Hancock (Magnified). F. Posterior femur, external face (Magnified). G. Claw of posterior leg.

14. * *Loxilobus striatus* Hancock

1915. *Loxilobus striatus* hancock, *Rec. Indian Mus.*, 11 : 91.
 1938. *Loxilobus striatus* : Gunther, *Stettin. ent. Ztg.* 99 : 208.

Diagnosis: Vertex wider than one of the eyes, slightly narrowed in front; antennae inserted between the lower fourth of the eyes; pronotum interspersed with very small tubercles, surpassing the hind femoral apices; median carina of pronotum low, irregularly interrupted and compressed; posterior angles of lateral lobes of the pronotum laminate, obliquely truncate behind, the apices subacute; tegmina elongate and the apices rounded; wings extended beyond the pronotal apex; antegenicular spine of posterior femora acute.

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

Remarks: The author has not found this species in the present collection. However, Hancock (1915) has reported it from Calcutta.

Genus *Synalibas* Gunther, 1939Key to the species of *Synalibas*

1. Head a little exserted; vertex not so narrow as in the preceding species; frontal costa bifurcate between the paired ocelli, not widely sulcate between the antennae; posterior angles of lateral lobes of pronotum subroundly truncate; wings wanting or undeveloped*perplexus* (Hancock)
- Head distinctly exserted; vertex narrow, more narrowed in front; frontal costa bifurcate behind the paired ocelli, more widely sulcate between the antennae; posterior angles of lateral lobes of pronotum rounded at apex; wings double the length of elytra*vagans* Gunther

15. *Synalibas perplexus* (Hancock)

1915. *Mazarredia perplexa* Hancock, *Rec. Indian Mus.*, 11 : 101.
 1939. *Synalibas perplexus* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 : 325.

Material examined : Darjiling District : 2 (M), 2 (F), Rangiroom, 2000 m, 23 & 25.v. 1974, J.K. Jonathan; 3 (F), Lava, 2150 m, 5.vi. 1974, J.K. Jonathan; 4 (M), 1 (F), Manibhanjang, 1944 m, 18.v. 1975, G.K. Srivastava and P.K. Maiti; 1 (F), 1 (M), Ghoombhanjang, 27.v. 1975, J.K. Jonathan; 4 (M), Lepchajaghat, 1.vi. 1975, J.K. Jonathan; 27 (F), 18 (M), Tiger Hill, 2660 m, 19.v.1979, M.S. Shishodia.

Diagnosis : Head exserted; vertex narrower than an eye, more narrowed in front, not produced in front of the eyes; frontal costa bifurcate slightly behind the paired ocelli, paired ocelli placed below the middle of eyes; antennae inserted below the inferior margin of eyes; pronotum extending behind upto three-fourth the distance of hind femora or a little more but never upto the last abdominal segment; lateral carine of pronotum bicarinate; lateral lobes of pronotum turned downwards, subtruncately rounded at apex; tegmina small, rounded at apex; wings abbreviated.

Distribution : India : West Bengal (Darjiling District), Sikkim.

Remarks : It is found at high altitudes in Darjiling District (W. Bengal) and Sikkim only.

16. * *Synalibs vagans* Gunther

1939. *Synalibas vagans* Gunther, *Abh. Ber. Mus. Tierk. Volkerk, Dresden*, 20 : 324.

Diagnosis : Head distinctly exserted above the pronotum; vertex narrower than an eye, still narrower in front; frontal costa bifurcate behind the paired ocelli; paired ocelli placed below the middle of eyes; antennae located below the inferior margin of eyes; pronotum extending upto the apex of abdomen; dorsum laterally bicarinate; posterior angles of lateral lobes of pronotum turned downwards, rounded at apex; wings double the length of tegmina.

Distribution : India : West Bengal (Darjiling district).

Remarks : The author has not found this species in the present collection. However, Gunther (1939) has described it from Darjiling.

Genus *Thoradonta* Hancock, 1908.

Key to the species of *Thoradonta*

1. Vertex narrower (.64-.75 mm).....2
- Vertex wider (.75-.86 mm) (spine of upper lobe of posterior angles of lateral lobes of pronotum not constricted or sinuated margin in front, directed posteriorly*apiculata* Hancock
2. Upper lobes of posterior angles of lateral lobes of pronotum with small or medium sized spines, directed posteriorly, front margin not constricted; upper marginal and median areas of posterior femora with a series of nodules*nodulosa* (Stal)
- Upper lobes of posterior angles of lateral lobes of pronotum with medium sized spines, directed posteriorly, front margin constricted; upper marginal and median areas of posterior femora without nodules*pruthii* Gunther

17. *Thoradonta apiculata* Hancock

1915. *Thoradonta apiculata* Hancock, *Rec. Indian Mus.*, 11 : 81.

Material examined : 24-Parganas District : 1 (M), Narendrapur, 30.viii. 1979, M.S. Shishodia. Jalpaiguri Dist. : 1 (M), 1 (F), Chilapata, 14 & 16.x. 1987, S.K. Tandon. West Dinajpur Dist. : 1 (F), Tunidighi, 26.xi. 1987, S.K. Mitra.,

Diagnosis : Head not exserted; vertex wider than one of the eyes, slightly narrowed in front,

fossulate on either side; frontal costa bifurcate behind the paired ocelli, depressed in front and behind the antennae, narrowly sulcate between the paired ocelli; paired ocelli placed below the middle of eyes; antennae inserted on the inferior margin of eyes.

Pronotum extended beyond the apex of hind femora; dorsum rugose-granulose, a little depressed on either side in front and behind the shoulders, medially convex between shoulders; posterior angles of lateral lobes of pronotum slightly dilated and laminated, upper lobe produced into a sharp spine with a wide base, slightly directed posteriorly, lower lobe blunt with serrated margins; wings extended upto the apex of pronotum.

Distribution : India : West Bengal (Darjiling, 24-Parganas Districts), Arunachal Pradesh, Assam, Manipur, Meghalaya, Orissa, Tamil Nadu. Elsewhere : Burma.

Remarks : This species is very common and widely distributed in India.

18. *Thoradonta nodulosa* (Stal)

1860. *Tetrix nodulos* Stal, *Eugenies Resa Orth.* : 346.
 1887. *Criotettix nodulosus* : Bolivar. *Annls. Soc. ent. Belg.*, 31 : 230.
 1912. *Thoradonta spiculoba* hancock, *mem. Dep. Agric. India ent. Ser.*, 4 : 138.
 1915. *Thoradonta nodulosa* : Hancock, *Rec. Indian Mus.*, 11 : 82.
 1970. *Thoradonta nodulosa* : Steinmann, *Acta zool. hung.*, 16 : 225.

Material examined : Birbhum District : 1 (M), 1 (F), Ilambazar, 14.iii. 1986, K.P. Mukherjee. Calcutta Dist. : 1 (M), Maidan Tank, 27.ii. 1914, C. Paiva (Reg. No. 2031/H5). Darjiling Dist. : 1 (F), Rangpo, 7.iv. 1973, H.S. Sharma, 4 (M), 3 (F), Karmaktar, 450 m, Singhla, 3 i. 1976, G.K. Srivastava. Haora Dist. : 2 (M), Botanical garden, 27.x. 1965, K. R. Rao. Jalpaiguri dist. : 1 (M), Rajabhatkhalam 27.iv. 1986, B.C. Das; 3 (M), 2 (F), Chilapata, 16.x. 1987, S.K. Tandon. Koch Bihar dist. : 1 (M), Adapara, 28.iii.1984, M. Prasad, 1 (M), Dhulian, 17.vi. 1987, K.P. Mukherjee.

Diagnosis : Head not exserted; vertex generally wider than an eye (.64-.75 mm); frontal costa bifurcate behind the paired ocelli; paired ocelli placed slightly below the middle of eyes; antennae situated on the inferior margin of eyes; frontum wider between the shoulders, extending beyond the apices of posterior femora; posterior angles of lateral lobes of pronotum dilated and laminate at base, the upper lobe produced into a spine which is directed posteriorly, lower lobe obliquely produced with a pointed apex; wings extending upto the apex of pronotum posterior femora stouter, crassate and with a series of nodules on the upper marginal and medial areas.

Distribution : India : West Bengal (Birbhum, Calcutta, Darjiling, Haora, Jalpaiguri, Koch Bihar, Maldah, Districts), Arunachal Pradesh, Bihar, Himachal Pradesh, Maharashtra, Manipur, Meghalaya, Sikkim, Tamilnadu, Tripura. Elsewhere : Borneo; Burma; Hainan; Java; Malaya; Pahang; Perak; Singapore; Sri Lanka; Sumatra; West Flores; Wutoshi.

Remarks : This species resembles *T. apiculata* hancock, but can be separated by the characters mentioned above.

19. *Thoradonta pruthii* Gunther1938. *Thoradonta pruthii* Gunther, *Stettin, ent. Ztg.*, 99 : 129*Material examined* : 1 (M), Narendrapur, 24-Parganas District, 30.viii.1979, M.S. Shishodia.

Diagnosis : Head not exserted; vertex not wider than an eye; frontal costa bifurcate behind the paired ocelli, compresso-elevated and arched between the antennae; paired ocelli placed between the middle of eyes; antennae inserted slightly above the inferior margin of eyes; pronotum wider between the shoulders, extended beyond the apices of posterior femora; upper lobes of posterior angles of lateral lobes of pronotum with medium sized spines, directed posteriorly, front margin constricted; upper marginal and medial areas of posterior femora without nodules.

Distribution : India : West Bengal (24-Parganas District), Madhya Pradesh.*Remarks* : Shishodia (Mss in press) reported this species from West Bengal for the first time.

II. Subfamily METRODORINAE

Key to the genera of Metrodorinae

1. Vertex, in top view, not broader than one of the basal segments of antennae at the anterior margin, its basal width not more than two-fifths the width of an eye; head not extended2
- Vertex, in top view, broader than one of the basal segment of antennae at front and especially at its base, rarely half wide as an eye or usually wider; head strongly extended3
2. Head exserted above the pronotal surface; eyes big, globular, approximate and raised above the pronotum*Systolederus* Bolivar
- Head not exserted above the pronotal surface; eyes bigger and approximate, especially at the anterior and thus making the vertex triangular; pronotum not ascending or rarely in females weakly developed*Teredorus* Hancock
3. Eyes strongly exserted above the pronotal surface; head often extended and thus making the posterior margin of eyes more or less wide*Xistrella* Bolivar
- Eyes slightly exserted or not above the pronotal surface; head not extended in front4
4. Head not exserted above the pronotal surface; pronotum extending beyond the apex of hind femora; posterior angle of lateral lobes turned downward, wide, subtruncate or truncate at apex; tegmina elongate, reticulate, broadly or narrowly rounded at apex; wings extending upto the pronotal apex, rarely entirely absent*Bolivaritettix* Gunther

- Head a little or not exserted above the pronotal surface; pronotum not extending beyond the apices of hind femora; posterior angles of lateral lobes turned outward, dilated, laminate, subtruncate at apex; tegmina and wings absent or when present, tegmina elongate, narrowly rounded at apex, wings abbreviated or produced beyond the pronotal apex*Hyboella* Hancock

Genus *Bolivaritettix* Gunther, 1939

Key to the species of *Bolivaritettix*

1. Dorsum of pronotum, behind the shoulders, with a deep-seated fossulae2
- Dorsum of pronotum, behind the shoulders, with less deep-seated fossulae4
2. Dorsum of pronotum, between the shoulders, unequal, rather a little elevated*singlaensis* (Hancock)
- Dorsum of pronotum, between the shoulders, either low or depressed but never elevated3
3. Lateral carinulae of vertex raised above the level of eyes, roundly reflexed laterally, median carinulae a little extended beyond the front margin; median carina of pronotum not depressed in front*sculptus* (Bolivar)
- Lateral carinulae of vertex not raised above the level of eyes; median carina of pronotum depressed in front.....*sikkimensis* (Bolivar)
4. Vertex nearly twice the width of an eye6
- Vertex more than twice the width of an eye5
5. Vertex distinctly narrowed in front; eyes distinctly exserted; very short and sharp isolated tubercles present on the pronotal surface*laticeps* (Bolivar)
- Vertex not distinctly narrowed in front; eyes moderately exserted; without scattered isolated tubercles on the pronotal process*dubius* (Hancock)
6. Frontal process not reaching upto the apex of posterior femora*ghumtianus* (Hancock)
- Pronotal process subulate and surpass the apex of posterior femora*lativertex* (Brunner)

20. *Bolivaritettix dubius* (Hancock)

1912. *Mazarredia dubia* Hancock, *Mem. Dep. Agric. India. ent. Ser.*, 4 : 141.

1970. *Bolivaritettix dubius* : Steinmann, *Acta zool. hung.*, 16 : 227.

Material examined : Darjiling District : 1 (M), type, Lebong, 1520 m, - .ix.1908, H.M.L. (Type No.

H 699); 1 (M), Allotype, Lebong, Phoobscring, - .iv. 1908, H.M.L. (Hebard Cln.).

Diagnosis : Head not or a little exserted; vertex equal or a little wider than one of the eyes; frontal costa distinctly arcuate, protuberant between the antennae and moderately sulcate; paired ocelli placed between the middle of eyes; antennae inserted below the middle of eyes; pronotum extend beyond the hind femoral apices; dorsum transversely convex between the shoulders; wings extended upto the pronotal apex.

Distribution : India : West Bengal (Darjiling District), Karnataka, Tamilnadu.

Remarks : Both Type specimens were burrowed from The Natural Science, Philadelphia, U.S.A. for study. Besides the Type specimens, the author could not found any specimen for study.

21. *Bolivaritettix ghumtianus* (Hancock)

1915. *Mazarredia ghumtiana* Hancock, *Rec. Indian Mus.*, **11** : 100.

1939. *Bolivaritettix ghumtianus* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, **20** : 78.

Material examined : Darjiling Dist. : 1 (F), Type, Ghumti 760 m, 27.iii. 1910, F.H. Gravely (Reg. No. 130/17); 1 (M), 2/1/2 km. North of Takda, 21.iii. 1973, H.S. Sharma; 1 (F), 1 km. S.W. of Goke Forest Rest House , 16.iv. 1973, H.S. Sharma; 1 (F), Lebong, 18.v. 1979, M.S. Shishodia.

Diagnosis : Head not exserted above the pronotal surface; vertex equal or a little broader than of the eyes; frontal costa bifurcate a little behind the paired ocelli; antennae inserted on or slightly below the inferior margin of eyes; pronotum not extended upto the apex of abdomen; dorsum smoothly granulose, without gibbosity in front of shoulders, fossulae less deep behind the shoulders; median carina low throughout its length; prozonal carinae indistinct; abbreviated carinae absent; wings not extended upto the pronotal apex.

Distribution : India : West Bengal (Darjiling District).

Remarks : The distribution of this species is limited.

22. *Bolivaritettix laticeps* (Bolivar)

1909. *Mazarredia laticeps* Bolivar, *Boln Real Soc. Espan.*, **9** : 399.

1939. *Bolivaritettix laticeps* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, **20** : 76.

Material examined : 1 (M), 2 (F), Soom 1218-1524 m, Darjiling District, 16.vi. 1914., F.H. Gravely.

Diagnosis : Head not exserted above the pronotal surface; vertex broader than one of the eyes, a little narrowed in front, depressed on either side of median carinula; frontal costa bifurcate a little behind the paired ocelli; antennae situated slightly below the eyes; pronotum extending beyiond the apex of hind femora' dorsum granulose, tubercles sharo andscattered especially on the hind process of prototum; posterior angles of lateral lobes of pronotum turned down wards, apex truncated; wings extending upto the pronotal process; third pulvili a little longer than the first two pulvili.

Distribution : India : West Bengal (Darjiling District), Assam.

Remarks : This species resembles somewhat to *Eucriotettix* Hebard, and *Eucriotettix dohertyi* Hancock, but the head in case of *E. dohertyi* is not exserted and both the anterior pulvilli of hind tarsi are sharply spinose. Gunther (1939) has reported this species from West Bengal.

23. * *Bolivaritettix lativertex* (Brunner)

1893. *Mazarredia lativertex* Brunner, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 106, 108.

1912. *Mazarredia latifrons* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 : 139.

1939. *Bolivaritettix lativertex* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 : 62.

Diagnosis : Head not exserted above the pronotal surface; vertex nearly twice the width of an eye; paired ocelli placed between the middle of eyes; antennae placed on or below the inferior margin of eyes; frontal costa moderately sulcate; pronotum extending beyond the posterior femoral apices; dorsum granulose, hind process rugulose; median carina compreso-elevated on sulci; lateral carinae interrupted on lateral sulci in front; wings extending upto the pronotal apex; all the sulvilli equal in length.

Distribution : India : West Bengal (Darjiling District). Elsewhere : Burma; China; Java; Malaya; Perak; Sumatra; Tonkin.

Remarks : The author could not get any specimen for the present study from West Bengal. However, Hancock (1912) has reported this species from Darjiling District of West Bengal.

24. *Bolivaritettix sculptus* (Bolivar)

1887. *Mazarredia sculpta* Bolivar, *Annl. soc. ent. Belg.*, 31 : 238.

1939. *Bolivaritettix sculptus* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 : 59.

Material examined : 1 (F), Sukna 304 m, Darjiling, District, - .v. 1913. Lord Carmichael's collection (Reg. No. 7807/20).

Diagnosis : Head exserted above the pronotal surface; vertex equal or a little broader than one of the eyes, somewhat narrowed in front; frontal costa bifurcate behind the paired ocelli, moderately sulcate between the paired ocelli, gradually widen in front; antennae inserted on the inferior margin of eyes; pronotum extending beyond the apex of hind femora; dorsum granulose, tubercles linear, fossae present behind the shoulders; posterior angles of lateral lobes of pronotum turned downwards, apex truncated; wings extending upto the apex of pronotal process; posterior femora with longitudinal ridges on the medial area, with short pointed antegenicular and genicular denticles.

Distribution : India : West Bengal (Darjiling District), Assam. Elsewhere : Burma.

Remarks : The distribution of the species is limited.

25. *Bolivaritettix sikkimensis* (Bolivar)

1909. *Mazarredia sikkimensis* Bolivar, *Bol. Real. Soc. Espan.*, 9 : 398.

1939. *Bolivaritettix sikkimensis* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 : 65.

Material examined : 1 (F), Darjiling to Soom , 1520-2128 m, 14.vi. 1914, F.H. Gravely.

Diagnosis : Head not exserted above the pronotal surface ; vertex broader than one of the eyes; frontal costa bifurcated behind the paired celli; antennae placed below the inferior margin of eyes; pronotum extending beyond the apex of posterior femora; dorsum granulose, tubercles linear and irregular, moderately fossulate behind shoulders; median carina depressed in front but it is visible; wings extending upto the apex of pronotum.

Distribution : India : West Bengal (Darjiling District), Meghalaya, Sikkim.

Remarks : *Bolivaritettix sikkimensis* (Bolivar) is near to *B. singlaensis* (Hancock) and *B. sculptus* (Bolivar) especially with the latter.

26. *Bolivaritettix singlaensis* (Hancock)

1915. *Mazarredia singlaensis* Hancock, *Rec. Indian Mus.*, 11 : 99

1939. *Bolivaritettix singlaensis* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk dresden*, 20 : 58, 59.

Material examined : 1 (F), Holotype, Singla 1500 ft., Darjiling District, -. vi. 1913, Lord Carmichael's collection (Badly damaged).

Diagnosis : Vertex very little wider than an eye; frontal costa bifurcate behind the paired ocelli, widely sulcate, sinuate between the eyes; antennae inserted a little below the eyes; pronotum extending beyond the apex of posterior femora; dorsum fossulate behind the shoulders, coarsely granulose; median carina compresso-elevated in a rough gibbosity between the sulci; wings extending upto the apex of pronotum; third pulvilli of first segment of posterior tarsi longer than he second.

Distribution : India : West Bengal (Darjiling District).

Remarks : No specimen, other than Type, was available for the present study. The Type specimen is from West Bengal, and badly damaged.

Genus *Hyboella* Hancock, 1915

Key to the species of *Hyboella*

1. Size smaller, less broader between the shoulders; dorsum behind the shoulders deplanate
.....*conioptica* Hancock
- Size larger, more broader between the shoulders ; dorsum behind the shoulders depressed2

2. Vertex slightly produced in front of eyes, twice the width of an eye, superficially depressed on either side*obesa* Hancock
- Vertex not produced in front of eyes, less than twice the width of an eye, depressed on either side*tentata* Hancock

27. *Hyboella conioptica* Hancock

1915. *Hyboella conioptica* Hancock, *Rec. Indian Mus.*, **11** : 109.

1939. *Hyboella (?) conioptica* : Gunther, *Abh. Ber. Mus. Tirk. Volkerk. Dresden*, **20** : 220-221.

Material examined : 1 (M), Holotype, Singla 456 m, Darjiling District, - .iii. 1913, Lord Carmichel's collection (Reg. No. 7809/20).

Diagnosis : Head not exserted; vertex wider than an eye, narrowed forward; frontal costa bifurcate behind the paired ocelli, gently sulcate; paired ocelli placed between the middle of eyes; antennae situated below the middle of eyes; eyes not elevated; pronotum extending beyond or not the apices of posterior femora; dorsum convex between the shoulders; median carina depressed on the shoulders; posterior angles of lateral lobes of pronotum subtransversely truncate behind; wings extending upto the apex of pronotum; first segment of posterior tarsi longer than the third.

Distribution : India : West Bengal (Darjiling District), Assam.

Remarks : No specimen, other than Type was available for the present study. The type specimen is from West Bengal, and it is damaged.

28. *Hyboella obesa* Hancock

1915. *Hyboella obesa* Hancock, *Rec. Indian Mus.*, **11** : 107-8.

Material examined : Darjiling District : 1 (F), Tindharia 850 m, - vii. 1911, F.H. Gravely (Reg. no. 1552/20); 1 (F), Pashok 1064 m, 26.v. 14.vi. 1916, F.H. Gravely (Reg. No. 2017/H5); 1 (F), Mangpa, Sureil 1520 m, - iv. - v. 1917, S.W. Kemp (Reg. No. 2018/H5); 1 (M), Teesta Bazar 214 m, 24.v. 1979, M.S. Shishodia.

Jalpaiguri Dist. : 2 (F) (nymphs), Chilapata, 16.x. 1987, S.K. Tandon.

Diagnosis : Head not exserted, a little retracted under the pronotum; vertex wider than one of the eyes, extended a little beyond the anterior margin of eyes; frontal costa bifurcate behind the paired ocelli, a little compresso-elevated and arched between the antennae; paired ocelli placed between the middle of eyes; antennae inserted on the inferior margin of eyes; pronotum obtusely angulate in front, wide between shoulders, connate behind, extending upto the apex of hind femora or surpass a little beyond; dorsum tectiform in front; median carina compresso-elevated and arched in front of shoulders; posterior angles of lateral lobes of pronotum turned downward, widely dilated, truncate at apex; wings extending upto the apex of pronotum.

Distribution : India : West Bengal (Darjiling and Jalpaiguri District), Arunachal Pradesh, Sikkim.

Remarks : This species has similarity with *Hyboella dilatata* (De Haan), in regard to the posterior angle of lateral lobes of pronotum.

29. ** *Hyboella tentata* Hancock

1915. *Hyboella tentata* Hancock, *Rec. Indian Mus.*, 11 : 106-7.

Material examined : 2 (M), Chilapata, Jalpaiguri District. 14 & 16.x. 1987, S.K. Tandon.

Diagnosis : Body stouter; head not exerted above the pronotal surface; vertex a little broader than one of the eyes, slightly narrowed forward; frontal costa narrow between the paired ocelli, widely sulcate between antennae; paired ocelli placed between the middle of eyes; eyes not raised above the vertex surface; pronotum not extending upto the apex of posterior femora, apex narrowly truncate; dorsum tectiform anteriorly, tumidus between shoulders; median carina obtusely produced over the occiput in front, undulate behind the shoulders; posterior angle of lateral lobes of pronotum obliquely truncate; wings not extending upto the pronotal apex.

Distribution : India : West Bengal (Jalpaiguri District), Assam.

Remarks : Hancock (1915) reported this species from Assam. It is found at a place where *H. obesa* Hancock is also available.

Genus *Systolederus* Bolivar, 1887

30. * *Systolederus gravelyi* Gunther

1939. *Systolederus gravelyi* Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 : 164.

Diagnosis : Head exerted above the pronotal surface; vertex narrow between the eyes, triangular, longitudinally fossulate, not produced upto the level of eyes in front; frontal costa bifurcate behind the paired ocelli; paired ocelli placed below the middle of eyes; antennae located below of the inferior margin of eyes; pronotum extending beyond the apex of posterior femora; dorsum smoothly granulose; posterior angle of lateral lobes of pronotum turned downward, widely rounded at apex; tegmina small; wings extending beyond the pronotal apex; third pulvilli longer than first two pulvilli.

Distribution : India : West Bengal (Darjiling District).

Remarks : The author has not found this species in the present collection. However, Gunther (1939) has described it from Darjiling district of West Bengal.

Genus *Teredorus* Hancock, 1906

Key to the species of *Teredorus*

1. Head not exerted above the pronotal surface; vertex strongly contracted forward; tegmina large; pronotum extending much behind the hind femoral apices*carmichaeli* Hancock

- Head a little exserted above the pronotal surface or not; vertex not strongly contracted forward; tegmina smaller; pronotum less extending behind the hind femoral apices*frontalis* Hancock

31. *Teredorus carmichaeli* Hancock

1915. *Teredorus carmichaeli* Hancock, *Rec. Indian Mus.*, 11 : 110.

Material examined : 1 (M), Rombi 364 m, Darjiling District, 6.i. 1974, G.K. Srivastava & P.K. Maiti. Jalpaiguri Dist. 1 (F), Chilapata, 16.x. 1987, S.K. Tandon.

Diagnosis: Head not exserted above the level of pronotum; vertex small, strongly narrowed in front; frontal costa bifurcate behind the paired ocelli; paired ocelli placed below the middle of eyes; antennae inserted below the eyes; eyes pear to globular in shape, drawing antero-medially to form a triangular vertex; pronotum extending beyond the hind femoral apices; posterior angles of lateral lobes of pronotum turned downward, apices rounded to subtruncate; wings extending upto or beyond the pronotal apices.

Distribution : India : West Bengal (Darjiling and Jalpaiguri Districts).

Remarks : This species is near to *Teredorus stenofrons* Hancock which is found in South America.

32. *Teredorus frontalis* Hancock

1915. *Teredorus frontalis* Hancock, *Rec. Indian Mus.*, 11 : 110.

Material examined : Darjiling District: 1 (M), 1 (F), Kurseong 1475 m, 15.v. 1979, M.S. Shishodia; 2 (M), 1 (F), Teesta Bajar, 214 m, 24.v. 1979, M.S. Shishodia.

Diagnosis: Head a little exserted above the surface of pronotum : vertex strongly narrowed in front; frontal costa bifurcate behind the paired ocelli; antennae inserted below the eyes; pronotum extending beyond the hind femoral apices; posterior angle of lateral lobes of pronotum turned downwards; wings extending upto the pronotal apex.

Distribution : India : West Bengal (Darjiling District), Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya and Sikkim.

Remarks : Shishodia (Mss in press) has reported this species from West Bengal.

Genus *Xistrella* Bolivar, 1909

Key to the species of *Xistrella*

1. Median carina of pronotum compresso-elevated and arched between the shoulders like a hump; dorsum of pronotum smooth*dromadaria* Bolivar
- Median carina of pronotum depressed on the shoulders; dorsum of pronotum smooth or granulose or granulose and rugulose*inermis* (Hancock)

33. *Xistrella dromadaria* Bolivar

1909. *Xistrella dromadaria* Bolivar, *Boln Real. Soc. Espan.*, 9 : 401.
 1939. *Xistrella dromadaria* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 : 148.

Material examined : Darjiling District : 1 (F), Soom 1218-1524 m, F.H. Gravelly (Reg. no. 2026/H5). Jalpaiguri Dist. : 1 (F), Bagarcot, 11.x. 1987, S.K. Tandon.

Diagnosis : Head exserted above the pronotal surface; vertex equal to the width of an eye, narrowed in front; vertex horn not distinct; frontal costa bifurcate behind the paired ocelli; paired ocelli placed on the lower margin and antennae inserted below the lower margin of eyes; pronotum extending beyond the apex of posterior femora; dorsum convex medially between the shoulders; median carina compresso-elevated between the shoulder in the form of a hump; posterior angles of lateral lobes of pronotum turned downwards, roundly truncate at apex; wings extending upto the apex of pronotum.

Distribution : India : West Bengal (Darjiling and Jalpaiguri Districts), Sikkim.

Remarks : The distribution of this species is limited.

34. *Xistrella inermis* (Hancock)

1915. *Bolotettix inermis* Hancock, *Rec. Indian Mus.*, 11 : 77-78.
 1939. *Xistrella inermis* : Gunther, *Abh. Ber. Mus. Tierk. Volkerk. Dresden*, 20 : 151.

Material examined : Darjiling District: 1 (F), Type, Ghumti 1216 m, -.vii.1911, F.H. Gravelly (Reg. No. 1530120); 1 (F), Mahanuddy 1255 m, 18.vi.1914, F.H. Gravelly (Reg. No. 2027/H5); 1 (M), Pashok 1064 m, 26.v.-14.vi.1916, F.H. Gravelly; 2 (M), 2 (F), Rangiroom, 9-10.vi.1975, G.K. Srivastava and P.K. Maiti.

Diagnosis : Head a little exserted; vertex as wide as an eye or a little narrow, distinctly narrowed towards the front; frontal costa bifurcate behind the paired ocelli, widely sulcated between antennae; antennae inserted below the inferior margin of eyes; pronotum extending beyond the apices of posterior femora; dorsum swollen on shoulders posteriorly; median carina slightly depressed in the middle between shoulders, a little raised behind the shoulders; posterior angles of lateral lobes of pronotum turned downward, apex rounded; wing extending a little beyond the apex of pronotal process.

Distribution : India : West Bengal (Darjiling District), Arunachal Pradesh, Assam and Sikkim.

Remarks : The distribution of this species is within North eastern India.

IV. Subfamily TETRIGINAE

Key to the genera of Tetriginae

1. Vertex and eyes obviously raised above the level of pronotum; antennae inserted between the lower border of eyes 2

- Vertex and eyes very little or not at all raised above the level of the pronotum; antennae placed below the middle of eyes3
- 2. Interocular distance almost half the width of an eye; paired ocelli situated on median line of vertex; antennae inserted below the middle of eyes; median carina of pronotum not undulate; middle femora only slightly narrower than the visible portion of elytra; posterior femora with less conspicuous nodosities on the external medial area*Euparatettix* Hancock
- Interocular distance distinctly much shorter than half width of an eye; paired ocelli situated between the lower third of eyes; antennae inserted distinctly below the inferior margin of eyes; median carina of pronotum a little or very well undulated; middle femora not narrower than visible portion of elytra; posterior femora with distinct nodosities on external medial area*Ergatettix* Kirby
- 3. Body generally smooth or a little granulose; interocular distance equal to or a little narrower than an eye, generally expanded in front; abbreviated carinae on either side of median carina of pronotum distinctly present between shoulders*Hedotettix* Bolivar
- Body generally granulose or tuberculose; interocular distance narrower or equal or rarely wide than an eye, not expanded in front; abbreviated carinae may or may not be present4
- 4. Vertex narrower between eyes and more narrowed in front; the frontal carinulae recurved internally; dorsum of pronotum a little rugose, often bearing round or abbreviated linear tubercles; median carina of pronotum very fine, may or may not be wavy; abbreviated carinae indistinctly present*Coptotettix* Bolivar
- Vertex narrower or equal or rarely wider than an eye, not narrowed in front, with a concavity on either side; median carina of pronotum a little raised, not wavy; dorsum of pronotum finely granulose or slightly rugose; abbreviated carinae absent*Paratettix* Bolivar

Genus *Coptotettix* Bolivar, 1887Key to the species of *Coptotettix*

- 1. Size medium; pronotum reaching upto the last abdominal segment or a little more, but never beyond the hind femoral apices; wings extended or not upto the pronotal apex; posterior angles of lateral lobes of pronotum wide, roundly truncate at apex*annandalei* Hancock
- Size large; pronotum extended behind beyond the hind femoral apices; wings extended upto the pronotal apices or a little more; posterior angles of lateral lobes of pronotum narrow, roundly subtruncate*conspersus* Hancock

35. *Coptotettix annandalei* Hancock1915. *Coptotettix annandalei* Hancock, *Rec. Indian Mus.*, 11 : 119.

Material examined : Darjiling District : 1 (M), Singla, 18.v.1973, H.S. Sharma; 1 (M), Kurseong, 15.v.1979, M.S. Shishodia. 24-Parganas Dist. : 1 (M), Nilgunj, 13.xi.1957, A.P. Kapur.

Diagnosis : Size medium; head not at all exserted above the pronotum; vertex a little narrower than one of the eyes, more narrowed forward; paired ocelli placed between the middle of the eyes; antennae located at the base of eyes; pronotum extending upto the last abdominal segment or slightly more, rarely beyond the apices of hind femora; dorsum flattened, finely granular or with scattered small tubercles or well developed rugosity on pronotal process; abbreviated lateral carinae on dorsum in the form of dots; posterior angles of lateral lobes of pronotum wide, roundly truncate at apex; wings may or may not be extending upto the pronotal apex.

Distribution : India : West Bengal (Calcutta, Darjiling and 24-Parganas Districts), Karnataka. Elsewhere : Burma and Taiwan.

Remarks : Shishodia (Mss in press) has reported this species from West Bengal for the first time.

36. *Coptotettix conspersus* Hancock

1915. *Coptotettix conspersus* Hancock, *Rec. Indian Mus.*, 11 : 119.

1987. *Coptotettix conspersus* : Shishodia, *Fauna of Orissa : State Fauna Series No. I, Pt. I* : 96.

Material examined : 1 (M), Chunabati, Darjiling District, 9.iii.1974, H.K. Bhowmik

Diagnosis : Body elongate; head not exserted above the pronotum; vertex narrower than one of the eyes, and more narrowed forward; antennae placed below the middle of eyes; pronotum extending behind beyond the hind femoral apices; dorsum convex, with abbreviated curved carinae on either side, which is broken and indistinct, finely granulose and tuberculose backwards; posterior angles of lateral lobes of pronotum roundly subtruncate at apex; tegmina longer than broad; wings extended upto or beyond the pronotal apices.

Distribution : India : West Bengal (Darjiling District), Assam, Orissa and Uttar Pradesh. Elsewhere : Sri Lanka.

Remarks : Shishodia (Mss in press) has synonymised *C. artolobus* with *C. conspersus* Hancock, because the differences exhibited by *C. artolobus* are only of intraspecific nature.

Genus *Ergatettix* Kirby, 1914

Key to the species of *Ergatettix*

1. Median carina of pronotum distinctly undulate, lateral carinae with small dilated lobes on the hind process of pronotum; middle femora sufficiently flattened, margins lobate; hind femora strongly tuberculate on external medial area*guntheri* Steinmann

- Median carina of pronotum indistinctly or distinctly undulate, but not like as mentioned above; lateral carinae without dilated lobes on the hind process of pronotum; middle femora less flattened, margins indistinctly lobate; hind femora with less protuberant tubercles on external medial area 2
- 2. Vertex less elevated above the pronotal surface; shoulders more wider than mentioned above; third pulvilli more or less equal to the second pulvilli *callosus* Hancock
- Vertex sufficiently elevated above the pronotal surface; shoulders less wider; third pulvilli a little longer than the second. *dorsifera* (Walker)

37. *Ergatettix callosus* Hancock

1915. *Indatettix callosus* Hancock, *Rec. Indian Mus.*, 11 : 130 .
 1970. *Ergatettix callosus* : Steinmann, *Acta zool. hung.*, 16 (1-2) : 234.

Diagnosis : Size medium; dorsum with two dark brown spots behind the soulders; hind process of prontum brown with black maculations; hind tibiae dirty yellow with smoky shades.

Head distinctly exserted; vertex more narrower than an eye; paired ocelli placed below the middle of eyes; antennae inserted below the eyes; pronotum extending beyond the apex of hind femora; dorsum a little callose, widened between shoulders; median carina undulate on shoulders and hind process; lateral carinae wavy and a little crenulate posteriorly.

Distribution : India : West Bengal (Darjiling District)

Remarks : The author could not get this species in the present collection. However, Hancock (1915) described it from Darjiling District of West Bengal. This species is very close to *E. dorsifera* (Walker).

38. *Ergatettix dorsifera* (Walker)

1817. *Tettix dorsifera* Walker, *Cat. Derm. Salt. Br. Mus.*, 5 : 825.
 1914. *Ergatettix tarsalis kirby*, *Fauna Brit. India*, Orthop. : 70.
 1929. *Ergatettix dorsifera* : Hebard, *Revue suisse Zool.*, 36 : 588.

Material examined : Bankura District : 2 (M), 2 (F), Bankura, 11.x. 1985, K. K. Roy; 27 (M), 3 (F), Jhilimili, 23. ix. 1987, M. Prasad; 1 (M), Joypur, 28. ix. 1987, M. Prasad. Barddhaman Dist. : 1 (M), 1 (F), Durgapur, 15. x. 1985, S. K. Ghosh; 1 (M), Andal, 17. x. 1985, S. K. Ghosh; 3 (M), Asansol, 18. x. 1985, S.K. Ghosh. Birbhum Dist. : 1 (M), 1 (F), Ballavpur, 15. iii. 1986, K. P. Mukherjee; 8 (M), 3 (F), Ilambazar, 2.x. 1987, M. Prasad; 2 (F), 3 (M), Bolpur, 4. x. 1987, M. Prasad; 6(M), 4 (F), Suri, 6. x. 1987, M. Prasad. Calcutta Dist. : 12 (M), 10 (F), Calcutta, 26.x. 1949, A. P. Kapur. Darjiling Dist. : 1 (M), Tiger Hill 2573 m, 19.v. 1979, M.S. Shishodia; 1 (M), Panitanki, 5. xii. 1986, R.S. Barman; 1 (F), Fansidewa, 6. xii. 1986, R.S. Barman. Haora Dist. : 1 (M), 1 (F), Bauria, 21.xii. 1985, B.N. Das. Jalpaiguri Dist. : 1 (M), Kathambari, 10.x. 1987, S. K. Tandon; 2 (M), Chilapata, 13 & 14.x. 1987, S.K. Tandon. Maldah Dist.: 1(F), Bhaluk Station, 26.vi. 1987, K.P. Mukherjee. Medinipur Dist. : 1 (M), 1 (F), Chilkigarh, 20. xii.

1985, A. K. Hazra; 1 (M), 1 (F), Digha, 22. xii. 1985, A. K. Hazra; 1 (F), Sankarpur, 25. xii. 1985, A. K. Hazra. Murshidabad Dist. : 1 (M), 1 (F), Berhampur, C.S.R.S. Campus, 3 & 4.xi. 1974, A.K. Hazra. Nadia Dist. : 1 (M), Karimpur, 30. i. 1986, A.R. Lahiri. 24-Parganas Dist. : 5 (M), 5 (F), Khardah, 9.xi. 1966, S.B. Roy; 1 (M), Narendrapur, 16..v. 1979, M.S. Shishodia. Puruliya Dist. : 1 (M), Bongabari, 14.ix. 1987, M. Prasad; 9 (M), 6 (F), Bhaldugri Hill, Arsha, 19.ix. 1987, M. Prasad; 3 (M), 1 (F), Jhalda, 20.ix. 1987, M. Prasad. West Dinajpur Dist. : 6 (M), 1(F), Gangarampur, 15.,vi. 1987, K.P. Mukherjee; 1(F), Tunidighi, 26.xi. 1987, T.R. Mitra.

Diagnosis: Size medium to large; colour variable, but two black spots present behind the shoulders which may or may not unite to form a complete band; hind femora with one or two small dark brown spots behind the middle of superior margin; hind tibiae with or without two dark brown spots; head a little or distinctly exserted above the pronotal surface; vertex narrower than an eye; pronotum extending beyond the apex of hind femora; median carina of pronotum with or without undulations behind the shoulders.

Distribution: India : West Bengal (Calcutta), Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamilnadu, Uttar Pradesh. Elsewhere : Bangladesh; Burma; Central Asia; Greater Sunda Island and Sumba; South China; Sri Lanka; Sumatra; Taiwan.

Remarks: Widely distributed species in West Bengal. It resembles very much to *E. guntheri* Steinmann.

39. *Ergatettix guntheri* Steinmann

1912. *Euparatettix nodulosus* Hancock, *Mem. Dep. Agric. India etn. Ser.*, 4 : 155.
 1915. *Indatettix nodulosus* : Hancock, *Rec. Indian Mus.* 11 : 129.
 1970. *Ergatettix guntheri* Steinmann, *Acta zool. Hung.*, 16 (1-2) : 234.

Material examined: Bankura District : 2 (M), 4 (F), Sonamukhi forest, 8. iii. 1986, K. P. Mukherjee. Bardhaman Distt. : 1 (M), 1 (F), Ambika Kalna, 11. ii. 1966, S.B. Roy; 1 (M), Ambika-Kalna, 14. xii. 1985, B.N. Das. Birbhum Distt. : 1 (F), Bolpur, 1. x. 1987, M. Prasad; 5 (M), 2 (F), Bakreshwar, 9. x. 1987, M. Prasad. Darjiling Dist. : 1 (M), 1 (F), Teesta Bazar, 214 m, 24.v. 1979, M. S. Shishodia. Hugli Distt.: 1 (M), Bhadreswar, 24. ii. 1966, P. Parui; 2 (F), Baidyabati, 20. i. 1978, M. S. Shishodia. Jalpaiguri Distt.: 3 (F), Rajabhatkhawa, 27. xi. 1986, B.C. Das; 1 (M), 1 (F), Kathambari, 10 & 14. x. 1987, S. K. Tandon. Koch Bihar Distt. : 15 (M), 8 (F), Koch Bihar, 26. i. 1984, M. Prasad; 4 (M), 2 (F), Chaudhury hat, 27. ii. 1984, M. Prasad; 1 (F), Kaligunj, 28. iii. 1984, M. Prasad. Maldah Distt. : 2 (M), 2 (F), Sahapur, 18. xi. 1986, B.C. Das. Medinipur Distt. : 1 (F), Kankrajhar forest, 19. xii. 1985, A. K. Hazra. Nadia Distt. : 3 (M), 5 (F), Bahadurpur, 18. xii. 1985, B. N. Das. 24-Parganas Distt. : 1 (M), Barasat, 5. i. 1966, J. R. Singh; 1 (F), Budge Budge, 24. i. 1967, K. R. Rao. Puruliya Distt. : 2 (F), Pancha, 29. xi. 1986, T. R. Mitra; 1 (M), 2 (F), Bhaldugri Hill, Arsha, 19. ix. 1987, M. Prasad.

Diagnosis: Size medium to large; two brown spots present behind the shoulders which sometimes unite to form a band; superior carina of hind femora behind the middle with one or two small dark brown spots; hind tibiae brownish with two dark brown bands or dirty brown with indistinct and irregular dark brown shade.

Head distinctly exserted above the pronotum; vertex narrower than an eye, carinated in the middle; antennae situated below the inferior margin of eyes; pronotum and wings extending beyond the apex of hind femora : dorsum convex, rugulose, minutely nodulose; median carina also wavy with nodules especially on pronotal process with several pairs of projecting tubercles or crenulations or dilated lobes; posterior femoronea crassate, external medial area with distinct projecting tubercles.

Distribution : India : West Bengal (Calcutta District), Bihar, Madhya Pradesh, Maharashtra, Orissa. Uttar Pradesh. Elsewhere : Bangladesh; Sri Lanka.

Remarks : It is closely related with *E. dorsifera* (Walker).

Genus *Euparatettix* Hancock, 1904

Key to the species of *Euparatettix*

1. Hind tibiae dense black with white annulation just behind the knees; frontal costa generally narrowly sulcate *personatus* (Bolivar)
- Hind tibiae subunicoloured or obscurely marked but never dense black; frontal costa generally moderately sulcate 2
2. Stature very robust and large; head a little exserted; pronotum moderately dilated between shoulders; median carina of pronotum arcuate forward, often little undulate in front of shoulders, low on shoulders and straight behind *histricus* (Stal)
- Stature very slender; pronotum narrow between shoulders; median carina of pronotum substraight percurrent *tenuis* Hancock

40. *Euparatettix histricus* (Stal)

1860. *Tetrix histrica* Stal, *Freg. Eugenes Resa Orth.*, : 347.
 1887. *Paratettix histricus* : Bolivar, *Annls Soc. ent. Belg.*, 31 : 279.
 1937. *Eupratettix histricus* : Gunther, *Revue suisse Zool.*, 44 : 133.

Material examined : Bankura Dist. : 1 (M), Bishnupur, 6.iii.1986, K.P. Mukherjee; 2 (M), 5 (F), Sonamukhi forest, 8.iii.1986, K.P. Mukherjee; 4 (M), 2 (F), Parthasayar, 26.xi.1986, T.R. Mitra; 4 (M), 4 (F), Bankura, 22.ix.1987, M. Prasad; 1 (M), Jhilimili, 23.ix.1987, M. Prasad; 2 (M), 2 (F), Joyrambati, Roypukar, 27.ix.1987, M. Prasad. Bardhaman Dist. : 1 (F), Ambika-Kalna, 11.ii.1966, S.B. Roy and party; 1 (M), 1 (F), Golsi, 14.x.1985, S.K. Ghosh; 1 (M), Bolgona, 9.xii.1985, B.N. Das. Birbhum Dist.: 1 (M), 3 (F), Bolpur, 4.x.1987, M. Prasad; 3 (M), 1 (F), Suri, 6 & 8.x.1987, M. Prasad; 2 (M), Tarapeeth, M. Prasad. Calcutta Dist. : 1 (M), B.I. Steamer in Hooghly river (at light), 23.vi.1914, F.H. Gravely; 18 (M), Calcutta, 26.x.1949, A. P. Kapur; 1 (M), Eden Garden, 25.xii.1956, A.P. Kapur; 1 (F), Kalighat, 8.i.1968, M.S. Shishodia. Darjiling Dist. : 1 (M), 1 (F), Singla, 400 m, 2.i.1976, G.K. Srivastava; 1 (M), Teesta Bazar, 24.v.1979, M.S. Shishodia. Haora Dist. : 5 (M), 6 (F), Botanical Garden, 27.x.1965, K.R. Rao and party; 2 (M), 3 (F), Santragachi, 10.vi.1970, R.K. Singh; 1 (M), 4 (F), Bauria, 21.xii.1985, B.

Dutta. Hugli Dist.: 4 (M), 3 (F), Baidyabati, 20.i.1978, M.S. Shishodia. Jalpaiguri Dist. : 1 (M), 2 (F), Rajabhatkhawa, 27.xi.1986, B.C. Das. Koch Bihar Dist. : 6 (M), 1 (F), Koch Bihar, 26.i.1984, M. Prasad; 2 (M), 1 (F), Chaudhury Hat, 27.iii.1984, M. Prasad; 1 (M), Mathabhanga, 11.xii.1986, R.S. Barman; 1 (M), Baxirhat, 13.xii.1986, R.S. Barman. Maldah Dist. : 1 (M), Agriculture Farm, Maldah, 19.xii.1986, B.C. Das; 1 (M), Gaur, 20.xii.1986, B.C. Das; 2 (M), Nalakhokson, 20.vi.1987, K.P. Mukherjee; 1(M), 1(F), Gopalganj, 21.vi.1987, K.P. Mukherjee. Medinipur Dist. : 1 (F), Belpahari, 8.viii.1985, B.C. Das; 1 (M), Jhargram, 6.ix.1985, S. Biswas; 1 (M), Kankrajhar forest, 19.xii.1985, A.K. Hazra; 2 (M), 2 (F), Digha, 22.xii.1985, A.K. Hazra; 1 (M), Keyagaria, 27.xii.1985, A.K. Hazra. Murshidabad Dist. : 1 (M), 2 (F), Behrampur, C.S.R.S. Campus, 3-4.xi.1974, A.K. Hazra; 1 (M), 2 (F), Berhampur, 11.ii.1986, I.J. Gupta. Nadia Dist.: 2 (F), Krishnanagar, 13.xii.1965, S.P. Chakraborty and K.D. Chatterjee; 1 (M), 2 (F), Bahadurpur, 15.xii.1985, B.N. Das; 2 (M), Karimpur, 30.i.1986, A.R. Lahiri. 24-Parganas Dist. : 1 (F), Sonarpur, 28.xi.1961, R.K. Varshney; 1 (F), Santoshpur, 21.xi.1962, K.R. Rao & party; 7 (M), 3 (F), Hastings, 4.ii.1965, M.S. Shishodia; 1 (M), Barasat, 20.v.1965, M.S. Shishodia & B.K. Bhattacharya; 1 (M), Fatchpur, 27.vi.1965, B.K. Mudi; 1 (M), Kankinara, 18.viii.1965, K. Rai; 1 (F), Behala, 25.xi.1965, G.S. Arora; 4 (M), 2 (F), Diamond Harbour, 31.xii.1965, S.K. Tandon; 1 (M), 1 (F), Narendrapur, 16.x.1979, M.S. Shishodia. Puruliya Dist. : 1 (M), Puncha, 29.xi.1986, T.R. Mitra; 2 (M), 3 (F), Chutakidih, 16.ix.1987, M. Prasad; 1 (M), 4 (F), Bhalduhari Hill, Arsha, 19.ix.1987, M. Prasad; 1 (F), Jhalda, 20.ix.1987, M. Prasad.

Diagnosis : Size medium to large; colour variable; head little exserted; vertex narrower than an eye, more narrowed in front; frontal costa bifurcate behind the paired ocelli; paired ocelli situated between the middle of eyes; antennae located on the lower border of eyes; pronotum extending beyond the middle of hind tibiae; dorsum convex and wide between the shoulders; posterior angles of lateral lobes of pronotum turned downwards, rounded at apex; wings extending beyond the pronotal apex.

Distribution : India : West Bengal (Bardhaman, Murshidabad Districts), Andhra Pradesh, Bihar, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Tamil Nadu. Elsewhere : Borneo, Burma, Celebes, Holland; Java, Malaya Islands; Mindanao; Nepal; N. Australia; N. Caledonia; Pakistan : Queensland; Philippines; South China; Sri Lanka; Sumatra; Taiwan.

Remarks : Widely distributed species in India.

41. *Euparatettix personatus* (Bolivar)

1887. *Paratettix personatus* Bolivar, *Annals Soc. ent. Belg.*, **31** : 278.

1904. *Euparatettix personatus* : Hancock, *Spolia zeylan.*, **2** : 145.

Material examined : Bankura District : 1 (F), Sonamukhi forest, 8.iii. 1986. K.P. Mukherjee. Birbhum Dist. : 3 (M), Illambazar, 14.iii. 1986, K.P. Mukherjee; 1 (M), Bolpur, 4.x. 1987, M. Prasad. Calcutta Dist. : 15 (M), 13 (F), Calcutta, 26.x. 1949, A.P. Kapur; 1 (F), Hastings, 4.ii.1965, M.S. Shishodia. Darjiling Dist. : 1 (M), Himul, Matigarah, 4.xii. 1986, R.S. Barman. Haora Dist. : 1 (M), Botanical Garden, 27.x. 1965, S.K. Tandon. Hugli Dist. : 1 (M), Baidyabati, 8.xii. 1977, M.S. Shishodia. Jalpaiguri Dist. : 1 (F), Bagracot, 11.x. 1987, S.K. Tandon; 1 (M), Chilapata, 13.x. 1987, S.K. Tandon. Koch Bihar Dist. : 2 (M), Koch Bihar, 26.i. 1984, M. Prasad. Maldah Dist. : 1 (M), 4 (F), Gopalganj, 21.vi. 1987, K.P. Mukherjee; 3 (M), 3 (F), Harishchandrapur, 22.vi.1987, K.P. Mukherjee; 5 (M), 4 (F), Tulshihata,

25.vi.1987, K.P. Mukherjee; 12 (M), 7 (F), Bhaluk Station, 26.vi.1987, K.P. Mukherjee. Medinipur Dist.: 2 (F), Keyagaria, Digha, 27.xii.1985, A.K. Hazra. 24-Parganas Dist. : 1 (F), Diamond Harbour, 31.xii.1965, S.K. Tandon; 2 (M), Budge Budge, 25.i.1967, K.R. Rao; 1 (F), Narendrapur, 13.xi.1979, M.S. Shishodia.

Diagnosis : Medium in size; colour variable, hind tibiae dense black with one or two white or light yellow annulations just behind the knees and another one at the apical third of hind tibiae.

Head a little exserted above the surface of pronotum; vertex sub-equal than an eye, a little narrowed forward; frontal costa narrowly sulcate; antennae located on the lower border of eyes; pronotum extending beyond the apices of posterior femora and wings beyond the pronotal apex; median carina depressed in front, straight on shoulders; posterior angles of lateral lobes of pronotum turned downwards, rounded at apex.

Distribution : India : West Bengal (Calcutta, Haora, 24-Parganas and Hugli Districts), Arunachal Pradesh, Assam, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Tripura. Elsewhere : Bangladesh, Burma; Bhutan; Java; Pakistan; Philippines; Sri Lanka and Taiwan.

Remarks : Widely distributed species in India. Shishodia (Mss in press) reported this species from Arunachal Pradesh, Manipur, Meghalaya, Tripura and West Bengal.

42. *Euparatettix tenuis* Hancock

1912. *Euparatettix tenuis* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 : 153.

Material examined : Bankura District : 1 (F), Sonamukhi forest, 8.iii.1986, K.P. Mukherjee; 1 (M), Bishnupur, 29.ix.1987, M. Prasad. Bardhaman Dist. : 1 (F), Ambika-Kalna, 11.ii.1966, S.B. Roy & Party. Birbhum Dist. : 4 (M), 1 (F), Illambazar, 14.iii.1986, K.P. Mukherjee. Calcutta Dist. : 1 (M), 1 (F), Hastings, 4.ii.1965, M.S. Shishodia. Haora Dist. : 1 (M), Botanical Garden, 27.x.1965, K.R. Rao. Maldah Dist. : 3 (M), Gopalganj, 21.vi.1987, K.P. Mukherjee; 10 (M), 5 (F), Bhaluk Station, 26.vi.1987, K.P. Mukherjee. 24-Parganas Dist. : 1 (M), Datta Pukar, 8.ii.1967, K.R. Rao & Party. Puruliya Dist. : 1 (M), Puruliya, 3.xi.1985, S.Sen.

Diagnosis : Slender and large sized species; body colour variable, hind tibiae dirty light brown or light yellow coloured; head and eyes exserted; vertex narrower than an eye, front margin low and truncated; frontal costa moderately sulcate; antennae placed on the lower border of eyes; pronotum extending beyond the middle of posterior tibiae; dorsum finely granulose, narrowly slender between shoulders; median carina nearly straight; wings extending beyond the apex of pronotal process.

Remarks : It is a very slender species and closely related to *E. histricus* (Stal).

Genus *Hedotettix* Bolivar, 1887

Key to the species of *Hedotettix*

1. Vertex angulate in front; fontal costa strongly produced before the yes; front of head oblique; median carina of pronotum very low, compressed or not*costatus* Hancock

- Vertex not angulate in front; frontal costa not produced as mentioned above; median carina of pronotum not very low2
- 2. Frontal costa widely sulcate, the rami more or less abruptly widened between the antennae; median carina of pronotum more or less compressed-arcuate forward before the shoulders, highest at the sulci; dorsum convex*gracilis* (De Haan)
- Frontal costa not widely sulcate, the rami not widened between the antennae; median carina of pronotum a little compressed, less arcuate forward; dorsum not so convex3
- 3. Moderate in size; frontal costa less strongly arcuate; second and third pulvilli of the first joint of hind tarsi not equal in length*attenuatus* Hancock
- Moderately large; frontal costa strongly arcuate; second and third pulvilli of the first joint of hind tarsi more or less equal in length (blades of ovipositor generally long)*grossus* Hancock

43. ** *Hedotettix attenuatus* Hancock

1904. *Hedotettix attenuatus* Hancock, *Spolia Zeylan.*, 2 : 108, 149, 151.

1987. *Hedotettix attenuatus* : Shishodia, *Fauna of Orissa : State Fauna Series* No. 1, pt. 1 : 98.

Material examined : Bardhaman Dist. : 2 (M), Bolgona, 9.xii.1985, B.N. Das. Darjiling Dist. : 2(M), 1 (F), Himul, Matigarah, 4.xii.1986, R.S. Barman; 2 (M), 1 (F), Fansidewa, 6.xii.1986, R.S. Barman. Jalpaiguri Dist. : 2 (M), 1 (F), Teesta river bed, 4.xi.1986, R.S. Barman; 3 (M), 1 (F), Joygaon, 13.x.1987, S.K. Tandon; 3 (M), 1 (F), Chilapata, 14, 16.x.1987, S.K. Tandon. Koch Bihar Dist. : 4 (M), 3 (F), Manthabhanga, 11.xii.1986, R.S. Barman; 1 (M), Baxirhat, 13.xii.1986, R.S. Barman. Maldah Dist. : 1 (F), Gopalganj, 21.vi.1987, K.P. Mukherjee; 1 (F), Tulshihata, 25.vi.1987, K.P. Mukherjee. Medinipur Dist.: 21 (M), 15 (F), Sankarpur, 25.xii.1985, A.K. Hazra; 1 (M), Keyagaria, 27.xii.1985, A.K. Hazra.

Diagnosis : Body slender; head not exserted above the pronotum; vertex narrower than an eye; frontal costa narrowly sulcate; paired ocelli placed above the middle of eyes; antennae located below the middle of eyes; pronotum extended upto or beyond the apex of hind femora; dorsum smooth or finely granulose; abbreviated carinae distinct between the shoulders; wings extended upto or beyond the pronotal apex.

Distribution : West Bengal (Bardhaman, Darjiling, Jalpaiguri, Koch Bihar, Maldah and Medinipur Districts), Assam, Orissa. Elsewhere : Sri Lanka.

Remarks : This species is very close to *Hedotettix gracilis* (De Haan).

44. *Hedotettix costatus* Hancock

1912. *Hedotettix costatus* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 : 147-148.

Material examined : Bankura Dist. : 1 (M), Bankura, 11.x.1985, K.K. Roy. Birbhum Dist. : 1 (F),

Rampurhat, 5.iv.1986, M.S. Shishodia. Calcutta Dist. : 1 (F), Calcutta, Garia, 15.iv.1979, P. Haldar. Darjiling Dist. : 1 (M), Amban, Darjiling, 9.iv.1984, M. Prasad. Koch Bihar Dist. : 1 (M), Koch Bihar, 26.i.1984, M. Prasad; 3 (M), 1 (F), Manthabhanga, 11.xii.1985, R.S. Barman; 3 (M), Baxirhat, 13.xii.1986, R.S. Barman. Maldah Dist. : 2 (M), Agriculture Farm, Maldah, 19.xii.1986, B.C. Das; 1 (F), Parbatidanga, 27.vi.1987, K.P. Mukherjee. Murshidabad Dist. : 1 (M), Berhampur, C.S.R.S. Campur, 4.xi. 1974, A. K. Hazra. W. Dinajpur Dist. : 1 (M), Islampur, 11. xii, 1986, B.C. Das; 1 (M), 1(F), Gangarampur, 15. vi. 1987, K.P. Mukherjee.

Diagnosis : Medium sized; head not exserted above the pronotum; vertex equal to or a little narrower than an eye, expanded, angularly produced in front; frontal costa narrowly sulcate; paired ocelli placed above the middle of eyes antennae located between the middle of eyes; pronotum obtusely angulate anteriorly, extended beyond the hind femoral apices; dorsum finely granulose, a little convex; median carina low; abbreviated carinae on the shoulders indistinct; wings extended beyond the pronotal apex; first pulvilli of hind tarsi short. acute, second more acute and a little longer, third pulvilli not acute, longer than the previous two.

Distribution : India : West Bengal (Calcutta, Murshidabad), Assam, Bihar, Uttar Pradesh. Elsewhere: Bangladesh; Nepal.

Remarks : This species is somewhat similar to *Tetrix subulata* (Linnaeus), not discussed here, but the interocular distance is either equal or less than an eye. The interocular distance in *T. subulata* is either one and half or two times as wide as an eye.

45. *Hedotettix gracillis* (De Haan)

1842. *Acridium (Tetrix) gracile* De Haan, *Temminck., Verhandl., Orthopt.*, : 167, 169.

1887. *Hedotettix gracilis* : Bolivar, *Annls Soc. ent. Belg.*, 31 : 284.

1914. *Hedotettix gracillis* : Kirby, *Fauna British India, Orthot.* : 72.

Material examined : Bankura District : 2 (M), 1 (F), Bankura, 11.x. 1985, K.K. Roy; 1 (M), 1 (F), Jhilimili, 23.ix. 1987, M. Prasad; 2 (M), Bishnupur, 29.ix. 1987, M. Prasad. Bardhaman Dist : 1 (M), Galsi, 14.x. 1985, S.K. Ghosh; 2 (M), 1 (F), Durgapur, 15.x. 1985, S.K. Ghosh; 3 (M), 1 (F), Ukhra, 17.x. 1985, S.K. Ghosh; 3 (M), 5 (F) Mandal, 17.x. 1985, S.K. Ghosh; 3 (M), 2 (F), Asansol, 18.x. 1985, S.K. Ghosh; 2 (M), 1 (F), Bolgona, 9.xii. 1985, B. N. Das. Birbhum Dist. : 4 (M), 4 (F), Illambazar, 2.x. 1987, M. Prasad; 12 (M), 11 (F), Bolpur, 4.x. 1987, M. Prasad; 3 (M), 1 (F), Suri, 6 & 8.x.1987, M. Prasad; 2 (M), 1 (F), Bakreshwar, 9.x. 1987, M. Prasad; 2 (M), 2 (F), Palitpur, 30.x. 1987, M. Prasad. Calcutta Dist.: 2 (M), 1 (F), Eden Garden, 31.x. and 13.xi. 1959, A.P. Kapur; 1 (F), Hastings, 31.v. 1965, M.S. Shishodia. Darjiling Dist. : 2(F), Panitanki, Darjiling, 5.xii. 1986, R.S. Barman. Haora Dist : 5 (M), 4 (F), Botanical Garden, 26.x. 1949, A.P. Kapur. Hugli Dist.: 2 (M), 6 (F), Baidyabati, 8.xii. 1977, M.S. Shishodia. Jalpaiguri Dist. : 1(F), Teesta river bed, 4.xii. 1986, R.S. Barman; 1 (M), 1 (F), (Nymph), Alipurduar, 4.i. 1987, D.V. Srivastava; 1 (M), Kathambari, 10.x. 1987, S.K. Tandon, 1 (M), Bagracot, 11.x. 1987, S.K. Tandon; 1 (M), 1 (F), Chilapata, 14.x. 1987, S.K. Tandon. Koch Bihar Dist. : 1 (M), Koch Bihar, 26.i.1984, M. Prasad; 1 (M), 1 (F), Manthabhanga, 11.xii. 1986, R.S. Barman; 2 (M), 4 (F), Baxirhat, 13.xii. 1986, R.S. Barman. Maldah Dist. : 2 (M), Agriculture Farm, Maldah, 19 & 21.xii. 1986, B.C. Das; 3 (M), 6 (F), Gopalganj, 21.vi. 1987, K.P. Mukherjee; 1 (F), Harish Chandrapur, 22.vi. 1987, K.P. Mukherjee.

Medinipur Dist. : 1 (M), Belpahari, 8.viii. 1985, B.C. Das; 6 (M), 2 (F), Jhargram, 6.ix. 1985, S. Biswas; 3 (M), Chiligarh forest, 20.xii. 1985, A.K. Hazra; 4 (M), 4 (F), Chittimati village, Digha, 26.xii. 1985, A.K. Hazra. Murshidabad Dist. : 1 (M), Amarpur, 8.ii. 1986, I.J. Gupta. Nadia Dist. : 1 (M), 1 (F), Krishnanagar, 13.viii.1965, S. P. Chakraborty & K. D. Chatterjee. 24-Parganas Dist. : 2 (M), 3 (F), Shyamnagar, 11.vi.1965, T. K. Chakraborty & B. K. Bhattacharya; 5 (M), 6 (F), diamond Harbour, 31.xii.1965, S. K. Tandon, 1 (F), Baruipur, 8.xii.1966, K. R. Rao; 3 (F), Narendrapur, 16.x.1978, M. S. Shishodia. Puruliya Dist. : 1 (F), Ayodhya, 2.xi.1985, M. Dutta, 1 (M), 1 (F), Balarampur, 3.ix.1986, R. S. Barman; 1 (M), Pancha, 29.xi.1986, T. R. Mitra; 1 (M), 1 (F) Nandwara, 15.ix.1987, M. Prasad; 3 (M), 3 (F), Velladih Village, 18.ix.1987, M. Prasad; 5 (M), 5 (F), Jhalda, 20.ix.1987, M. Prasad. West Dinajpur Dist. : 4 (F), Tunidighi, 26.xi.1987, T. R. Mitra.

Diagnosis : Body small to large in size; head not exserted above the pronotum; vertex equal to or subnarrower than an eye, front margin rounded; frontal costa widely sulcate, the rami widened between the antennae; pronotum angulate anteriorly, extended behind upto the apex of hind femora or beyond it; dorsum finely granulate, tectiform between shoulders; abbreviated carinae may or may not be distinct; tegmina large in female; wings extending upto the pronotum or surpass a little.

Distribution : India : West Bengal (Bankura, Bardhaman, Birbhum, Calcutta, Darjiling, Haora, Hugli, Jalpaiguri, Koch Bihar, Maldah, Medinipur), Maharashtra, Orissa. Elsewhere : Bangladesh; Burma; Celebes; Java; Pakistan; Sri Lanka; Taiwan; Thailand and Vietnam. Shishodia (Mss in Press) has recorded it previously from West Bengal.

Remarks : Both sexes of this species show dimorphism in the length of pronotum and wings. The micropterous specimens generally have the raised median carina of pronotum.

46. *Hedotettix grossus* Hancock

1915. *Hedotettix grossus* Hancock, *Rec. Indian Mus.*, **11** : 124.

Material examined : 1 (F), Holotype, Singla 450 m, Darjiling District. -v. 1913, Lord Carmichael's collection (Reg. no. 7810/20); 1 (F), Nalakhokson, Maldah Dist., 18.vi. 1987, K.P. Mukherjee.

Diagnosis : Stature moderately large; head not exserted above the pronotum; frontal costa not widened between the antennae; pronotum extended behind beyond the hind femoral apices; dorsum tectiform, granulate; tegmina large (2.1 mm); wings surpass pronotal apices (1.5-2.1 mm); ovipositor valves generally large.

Distribution : India : West Bengal (Darjiling and Maldah Districts).

Remarks : It is similar to the macropterous form of *Hedotettix gracillis* (De Haan), but differs from the latter in the frontal costa which is not widened between the antennae.

Genus *Paratettix* Bolivar, 1887Key to the species of *Paratettix*

1. Tegmina minute; wings abbreviated; pronotum extended upto the middle of hind femora, apex widely rounded *hancockus* (Shishodia & Varshney)
- Tegmina moderate; wings extending beyond the apices of posterior femora; pronotum extending beyond the middle of hind femora, apex narrowly rounded 2
2. Pronotum not extending beyond the apex of posterior femoral apices (frontal costa widely sulcate; dorsum of pronotum declinate, shoulders wide) *curtipennis* Hancock
- Pronotum extending beyond the apex of posterior femoral apices 3
3. Vertex broader than one of the eyes; dorsum wide between the shoulders
..... *rotundatus* Hancock
- Vertex equal or slightly narrower than one of the eyes; dorsum not wide between the shoulders 4
4. Vertex not narrowed forward; frontal costa widely sulcate; dorsum of pronotum declinate; shoulders wide; posterior angles of lateral lobes of pronotum wide, apex rounded; superior carina of posterior femora at the apical third serrulate-lobate, antegenicular lobe acute, spinate
..... *alatus* Hancock
- Vertex narrowed forward; frontal costa not widely sulcate; dorsum of pronotum not declinate; posterior angles of lateral lobes of pronotum narrow, rounded at apex; superior carina of posterior femora normal *tricarinatus* Bolivar

47. *Paratettix alatus* Hancock

1915. *Paratettix alatus* Hancock, *Rec. Indian Mus.*, 11 : 113.

Material examined : 1 o, Darjiling, 2128 m, 18.vi. 1914, F.H. Gravely (Reg. No. 1998/H5).

Diagnosis : Body moderately stout and hirsute below; head exserted; vertex equal to an eye; frontal costa moderately sulcate behind and widely sulcate in front the antennae; paired ocelli situated below the middle of eyes; antennae located below the inferior margin of eyes; pronotum extending beyond the apex of posterior femora, and wings beyond the apex of pronotum.

Distribution : India : West Bengal (Darjiling District).

Remarks : This species is caudate and can be distinguished from *P. curtipennis* (Hancock), by the long subulate hind process of pronotum.

48. *Paratettix curtipennis* (Hancock)

1912. *Coptotettix curtipennis* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 : 146.

1915. *Paratettix curtipennis* : Hancock, *Rec. Indian Mus.*, 11 : 113.

Material examined : Darjiling District : 1 (M), Singla, 1 km. S. West of Goke forest Rest House, 16.iv. 1973, H.S. Sharma; 1 (M), N. Sevok, 24. ii. 1974, H.K. Bhowmik; 1 (M), Mirik, 21.ix.1974, P. Halder; 1 (M), Darjiling, 2123 m, 17.v. 1979, M.S. Shishodia. Koch Bihar Dist. : 1 (M), 2 (F), Manthabhangha, 11.xii. 1986, R.S. Barman; 1 (M). Baxirhat, 13.xii. 1986, R.S. Barman.

Diagnosis : Size medium but robust with a dark spot on either side behind the shoulders; head slightly exserted above the pronotal surface; vertex narrower than an eye; pronotum extending upto the apex of abdomen or a little shorter; dorsum convex, wide and deplanate between shoulders; median carina depressed on shoulders; lateral lobes of pronotum wide, rounded at apex; wings extending upto or a little surpass the apex of pronotum.

Distribution : India : West Bengal (Darjiling and Koch Bihar Districts), Meghalaya. Elsewhere : Burma; Laos; South China; Taiwan; Vietnam.

Remarks : This species is short winged form.

49. *Paratettix hancockus* (Shishodia & Varshney)

1912. *Coptotettix parvulus* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 : 145 (preoccupied).

1987. *Coptotettix hancockus* Shishodia & Varshney, *J. Bombay nat. Hist. Soc.*, 84 (1) : 167.

1987. *Paratettix hancockus* (Shishodia & Varshney), Shishodia, *Bull, zool. Surv. India*, 8(1-3) : 132.

Material examined : Darjiling District : 2 (M), Rangpo, 7.iv. 1973, H.S. Sharma; 1 (F), Kurseong, 1475 m, 15.v. 1979, M.S. Shishodia; 2 (F), Lebung, 1759 m, 18.v. 1979, M.S. Shishodia. Haora Dist. : 1 (M), Botanical Garden, 31.viii. 1965, K.S. Pradhan; 1 (M), Uluberia, 19.iii. 1966, M.S. Shishodia & B.K. Bhattacharya. Hugli Dist. 1 (M), Baidyabati, 8.xii. 1977, M.S. Shishodia. Jalpaiguri Dist. : 1 (M), Oodlabari, 9.x. 1987, S.K. Tandon; 1 (M), Jogaon, 13.x. 1987, S.K. Tandon; 3 (M), 1 (F), Chilapata, 16.x. 1987, S.K. Tandon. 24-Parganas Dist. : 1 (F), Garia, 4.viii. 1974, P. Halder; 1 (F), Narendrapur, 30.viii. 1979, M.S. Shishodia.

Diagnosis : Size very small ; a large brown spot present on either side behind the shoulders; head not exserted above the pronotum; vertex as broad as an eye, fossulated on either side of the median crinula; paired ocelli located a little below the middle of eyes; pronotum extending beyond the middle of posterior femora, but never upto the apices of abdomen, apex widely rounded; dorsum transversely tectiform between shoulders; tegmina very small; wings not visible; posterior femora stout, superior margin minutely serrulated and bear an angulated lobe before the apex.

Distribution : India : West Bengal (Calcutta, Darjiling Districts), Arunachal Pradesh, Assam, Bihar, Sikkim. Elsewhere : Bangladesh.

Remarks : This species is nearer to *Coptotettix fossulatus* Bolivar, not discussed here, but differs from it in the pronotum, which is widely rounded at apex, median carina not largely elevated in front and with a dark patch or band behind the shoulders.

50. *Paratettix rotundatus* Hancock

1915. *Paratettix rotundatus* Hancock, *Rec. Indian Mus.*, 11 : 112.

Material examined : 1 (M), Manthabhanga, Koch Bihar district, 11.xii. 1986, R.S. Barman.

Diagnosis : Body moderate and hirsute below; head not exserted; vertex wider than an eye; frontal costa gently sulcate; paired ocelli placed between the middle of eyes; antennae situated nearly on the inferior margin of eyes; pronotum and wings extending beyond the apices of posterior femora; dorsum tumid between the shoulders, granulose; anterior and middle femora hirsute on margins.

Distribution : India : West Bengal (Koch Bihar District), Arunachal Pradesh and Assam.

Remarks : *Paratettix rotundatus* differs from *P. alatus* by the narrow frontal sulcus, narrower posterior angles of lateral lobes of pronotum and two white and two black annulations on posterior tibiae.

51. *Paratettix tricarinatus* Bolivar

1887. *Paratettix tricarinatus* Bolivar, *Anns Soc. ent. Belg.*, 31 : 282.

1987. *Paratettix tricarinatus* : Shishodia, *Fauna of Orissa : State Fauna Series* no. 1, pt. I, : 95.

Material examined : 1 (F), Calcutta, 23.i.1965, M.S. Shishodia; 2 (M), 1 (F), Baidyabati, 8.iii. 1977, M.S. Shishodia.

Diagnosis : Size medium ; head a little or not at all exserted above the surface of pronotum; vertex narrower than one of the eyes, front margin truncate, middle carinula distinct and extended behind upto the end of fossule; pronotum extended beyond the apices of posterior femora and wings surpass the pronotal apex; apex of tegmina not narrowed.

Distribution : India : West Bengal (Calcutta and Hugli Districts) and Orissa. Elsewhere : Malaya; Mindanao; Papua; Philippines; Sulawesi; Sumatra and Taiwan.

Remarks : Shishodia (Mss in Press) has recorded it from West Bengal for the first time.

Subfamily **BATRACHIDEINAE**

Genus *Saussurella* Bolivar, 1887.

Vertex completely or almost completely covered by anterior pronotal process; pronotum produced over the head as a narrow strong horn or beak like process; humeral angle absent; anterior femora sulcated above.

52. *Saussurella indica* Hancock

1912. *Saussurella indica* Hancock, *Mem. Dep. Agric. India ent. Ser.*, 4 (No.2) : 157.
1970. *Saussurella indica* : Steinmann, *Acta zool. hung.*, 16 : 232.

Diagnosis : Vertex very wide; frontal costa widely sulcate just above the insertion of the antennae; pronotum anteriorly produced in a stout, compressed ascendant process slightly decurved which in profile forms nearly an acute angle with a line drawn forward from the dorsum; posterior process of pronotum slightly turned up at apex; middle femora armed with apical spine; subgenital plate of male emarginate, in the female trilobate, the middle lobe below the ovipositor acutely produced.

Distribution : India : West Bengal (Darjiling district).

Remarks : The author could not get this species in the present collection. However, Hancock (1912) has described it from the West Bengal.

SUMMARY

Fifty two species are recorded here, and two species are being reported for the first time from the State of West Bengal.

ACKNOWLEDGEMENTS

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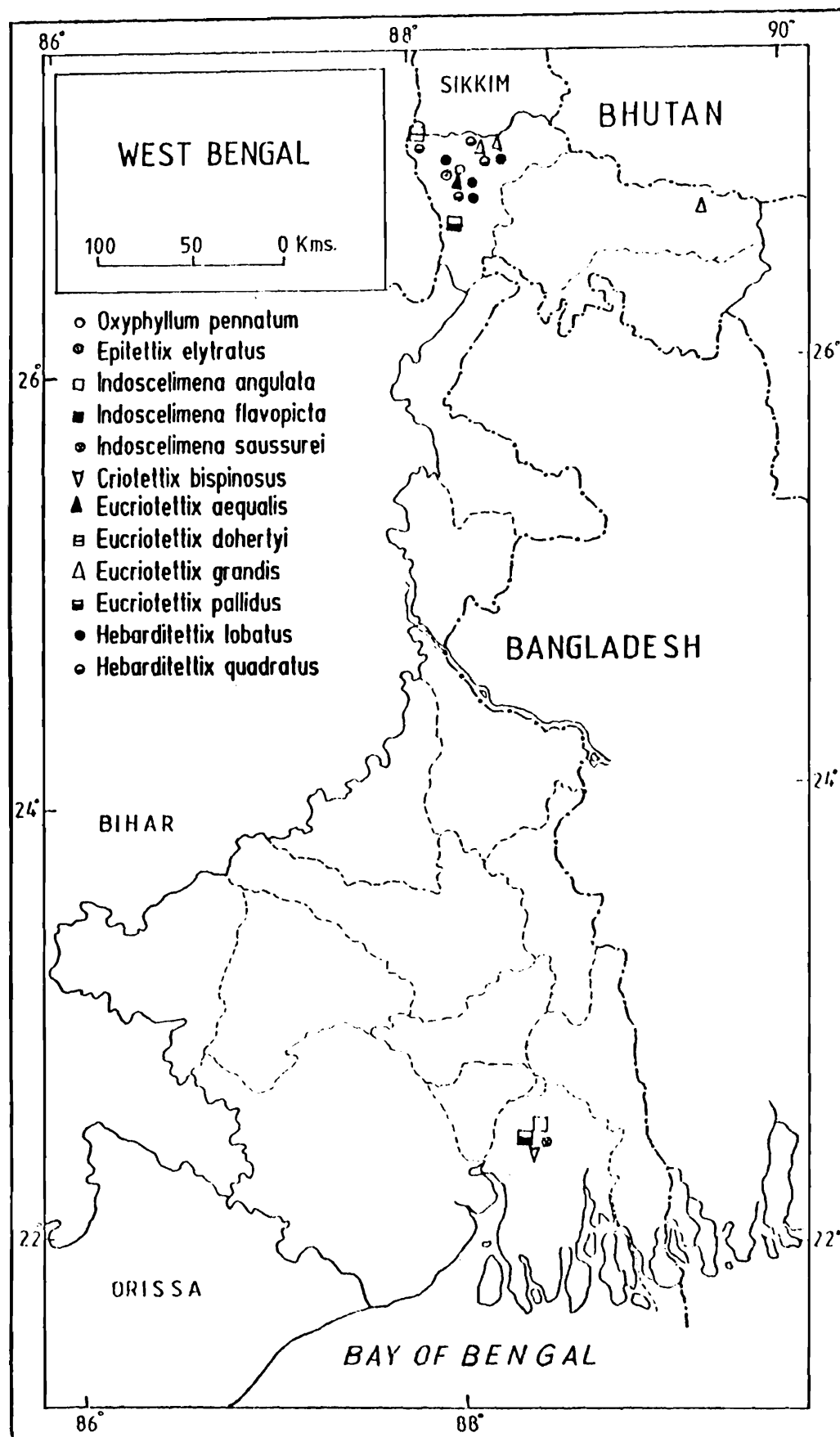
DISTRIBUTION OF THE SPECIES OF TETRIGOIDEA IN WEST BENGAL (DISTRICT WISE)

	Bankura	Bardhaman	Birbhum	Calcutta	Darjiling	Haora	Hugli	Jalpaiguri	Koch Bihar	Maldah	Medinipur	Murshidabad	Nadia	North 24 Parganas	Puruliya	South 24 Parganas	West Dinajpur
Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. <i>Oxyphyllum pennatum</i>				-	+		-	-		-			-			-	-
2. <i>Epitettix elytratus</i>	-			-	+		-				-			-		-	-
3. <i>Indoscelimena angulata</i>				+				-	-				-			-	-
4. <i>Indoscelimena flavopicta</i>				+	-		-		-					-			
5. <i>Indoscelimena saussurei</i>				+						-			-			-	-
6. <i>Criotettix bispinosus</i>				+	-						-		-	-	-	-	-
7. <i>Eucriotettix aequalis</i>					+			-						-			-
8. <i>Eucriotettix dohertyi</i>					+					-	-		-	-			
9. <i>Eucriotettix grandis</i>					+			+		-				-	-	-	
10. <i>Eucriotettix pallidus</i>					+	-			-			-		-			
11. <i>Hebarditettix lobatus</i>					+				-	-						-	-
12. <i>Hebarditettix quadratus</i>					+									-			
13. <i>Loxilobus assamus</i>					+					-	-			-			
14. <i>Loxilobus striatus</i>			-	+			-						-				
15. <i>Synalibas perplexus</i>					+				-		-		-			-	-

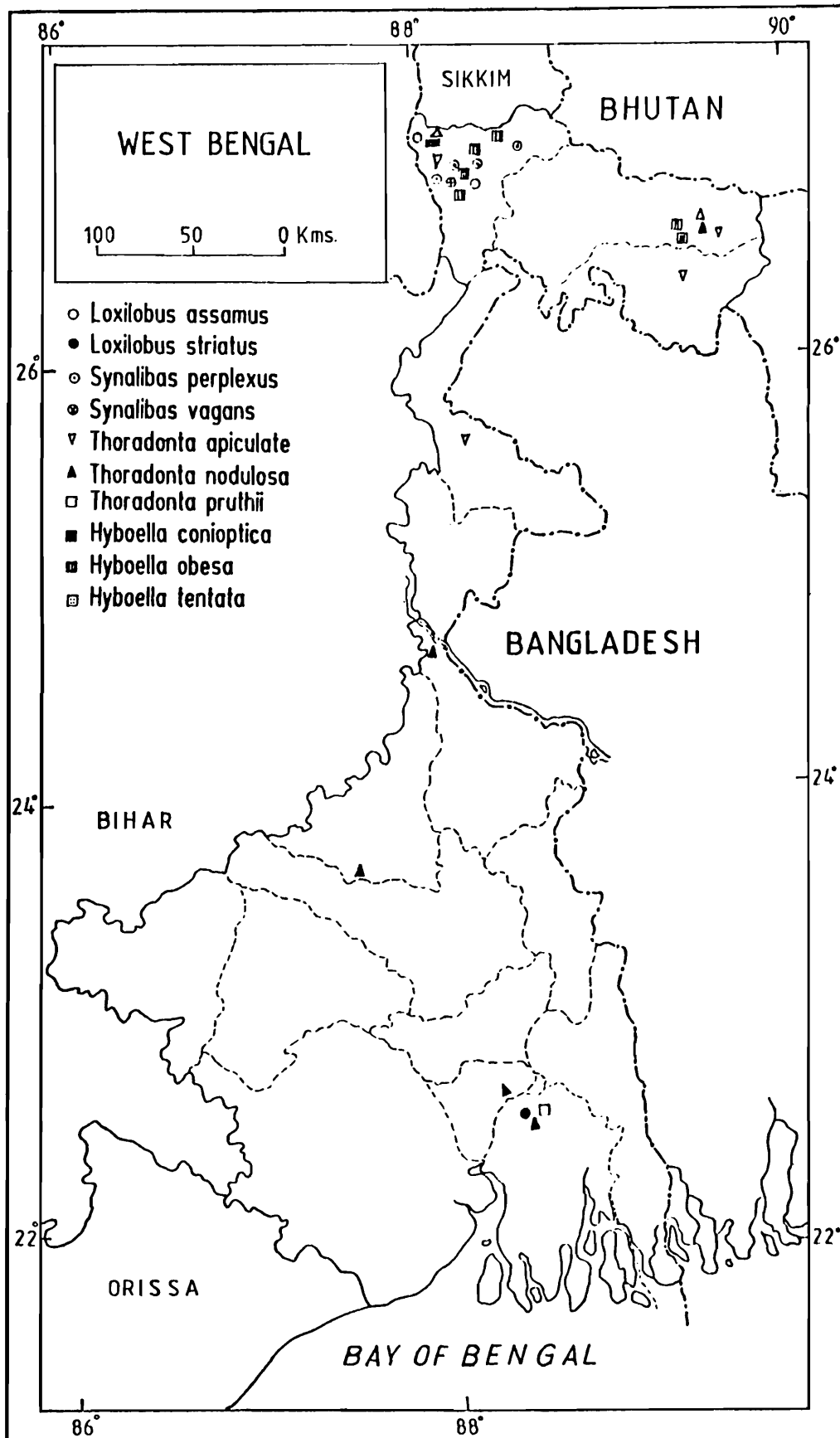
Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
16. <i>Synalibas vagans</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
17. <i>Thoradonta apiculata</i>	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	+
18. <i>Thoradonta nodulosa</i>	-	-	+	+	+	+	-	+	+	+	-	+	-	-	-	-	-
19. <i>Thoradonta pruthii</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
20. <i>Bolivaritettix dubius</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
21. <i>Bolivaritettix ghuntianus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
22. <i>Bolivaritettix laticeps</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
23. <i>Bolivaritettix lativertex</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
24. <i>Bolivaritettix sculptus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
25. <i>Bolivaritettix sikkimensis</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
26. <i>Bolivaritettix singlaensis</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
27. <i>Hyboella Conioptica</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
28. <i>Hyboella obesa</i>	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
29. <i>Hyboella tentata</i>	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
30. <i>Systolederus graveleyi</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
31. <i>Teredorus carmichaeli</i>	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
32. <i>Teredorus frontalis</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
33. <i>Xistrella dromadaria</i>	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
34. <i>Xistrella inermis</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
35. <i>Coptotettix annandalei</i>		:		+	+	-	-	-	-	-	-	-	-	-	+	-	-
36. <i>Coptotettix conspersus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
37. <i>Ergatettix callösus</i>		-			+	-	-	-		-		-	-	-	-	-	-
38. <i>Ergatettix dorsifera</i>	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+
39. <i>Ergatettix guntheri</i>	+	+	+	+	+	-	+	+	+	+	+	-	+	+	+	+	-
40. <i>Euparatettix histricus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
41. <i>Euparatettix personatus</i>	+		+	+	+	+	+	+	+	+	+		-	-	+	-	-
42. <i>Euparatettix tenuis</i>	+	+	+	+	+	+			-	+			-	+	-	+	-
43. <i>Hedotettix attenuatus</i>	-	+		-	+	-		+	+	+	+	-	-	-	-	-	-
44. <i>Hedotettix costatus</i>	+	-	+	+	+			-	+	+		+		-		-	+
45. <i>Hedotettix gracilis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
46. <i>Hedotettix grossus</i>			-		+	-	-	-	-	+		-	-		-		
47. <i>Paratettix alatus</i>		-			+	-	-	-	-	-		-	-	-	-		
48. <i>Paratettix curtipennis</i>		-			+	-	-	-	+	-	-	-	-	-	-	-	-
49. <i>Paratettix hancockus</i>			-	+	+	+	+	+	-	-		-	-	-	+	-	-
50. <i>Paratettix rotundatus</i>		-	-		-	-	-	-	+	-	-	-	-	-	-		
51. <i>Paratettix tricarinatus</i>		-	-	+	-	-	+	-	-					-			-
52. <i>Saussurella indica</i>					+	-		-	-			-					-

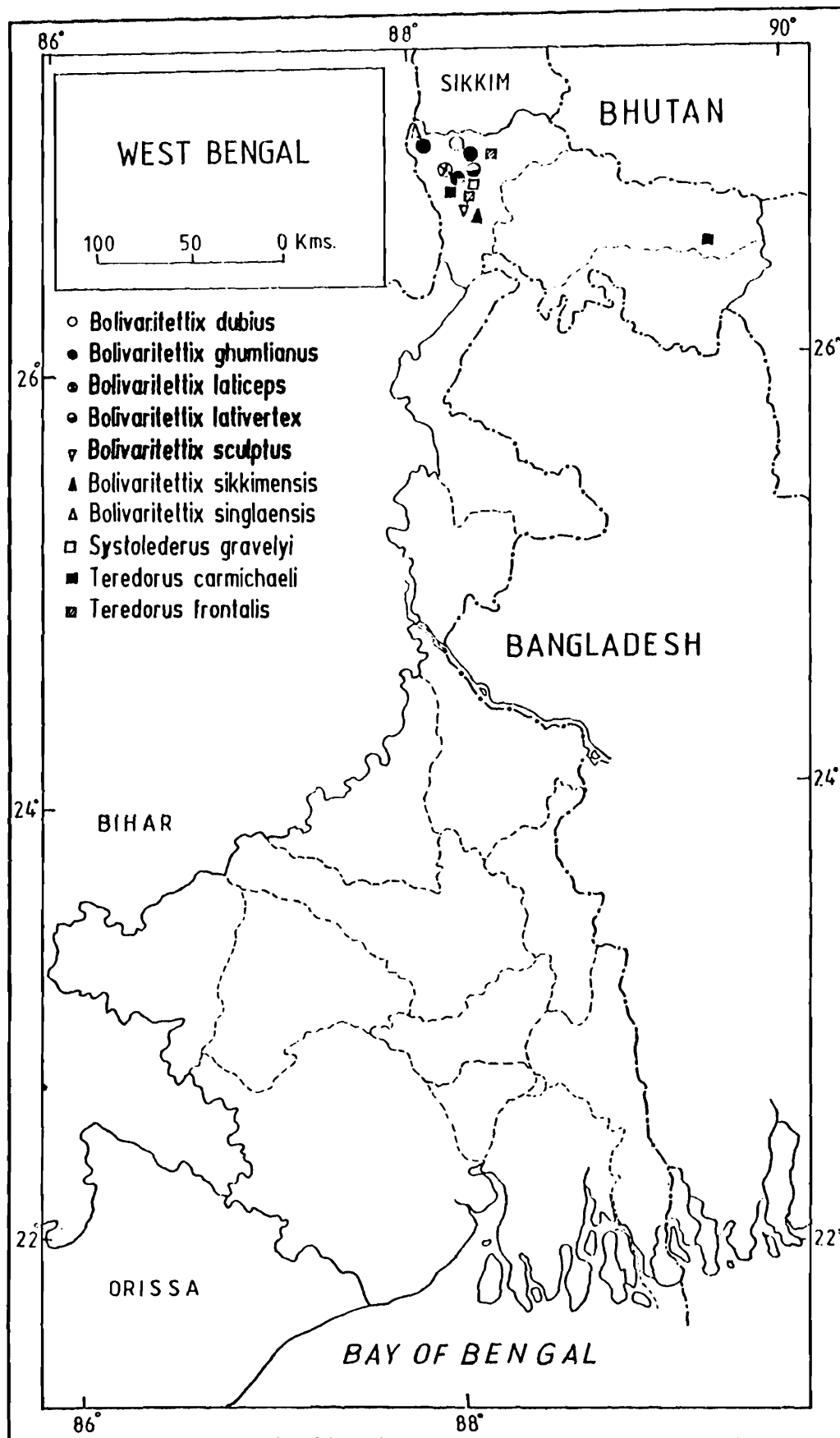
+ indicate present ; - indicate absent



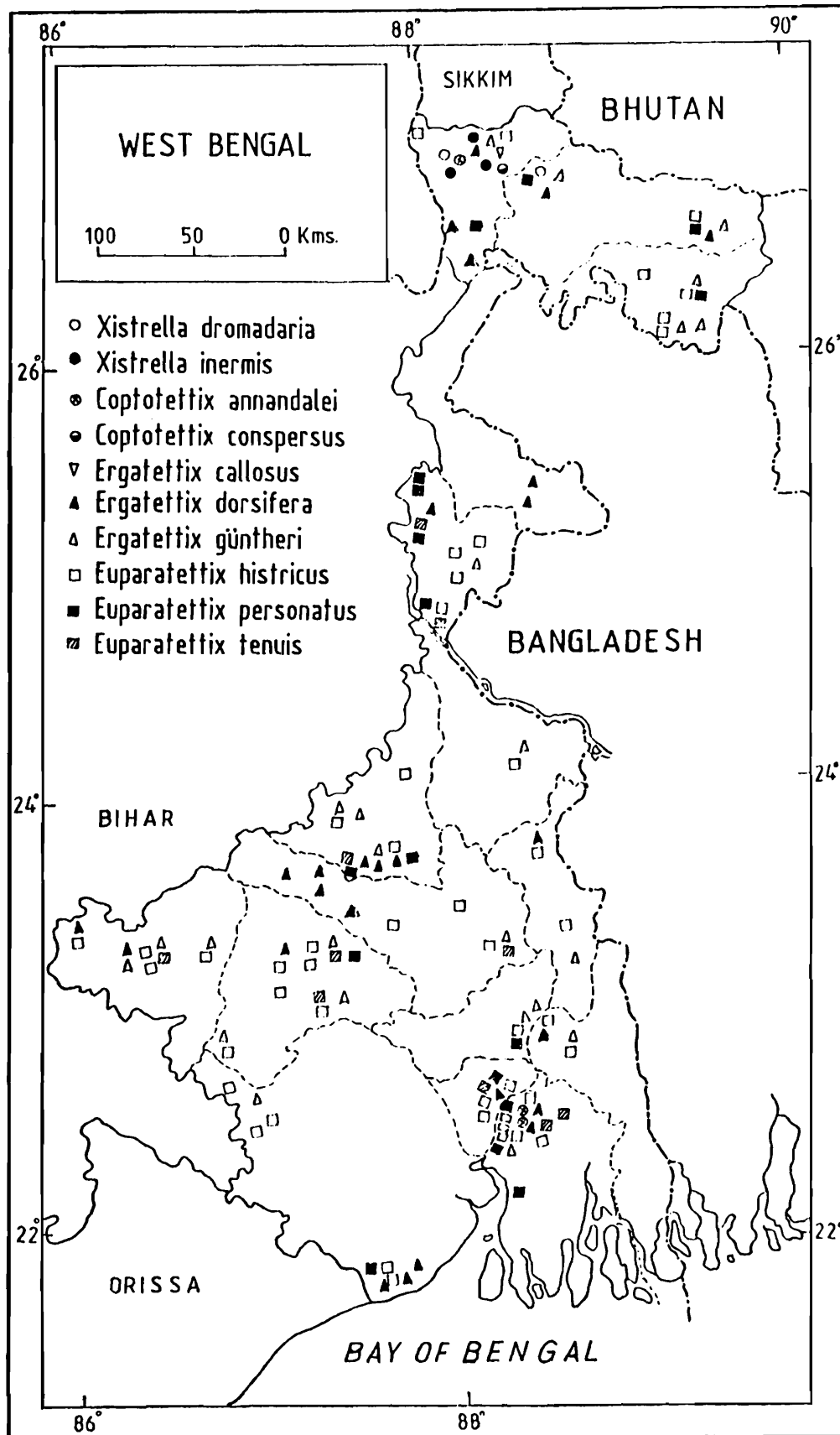
Map 1. Showing distribution of 12 species of Tetrigoidea.



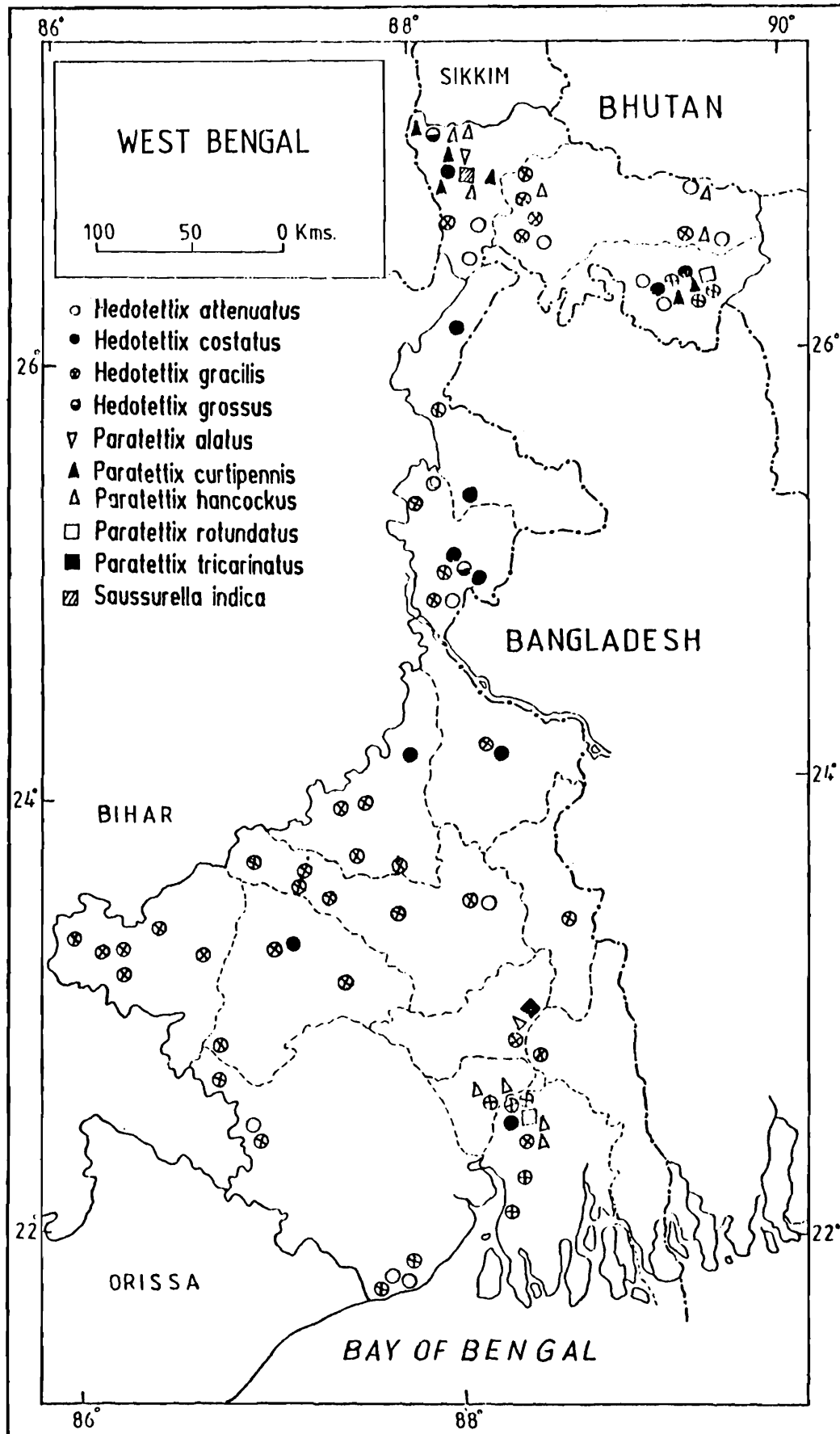
Map 2. Showing distribution of ten species of Tetrigoidea.



Map 3. Showing distribution of ten species of Tetrigoidea.



Map 4. Showing distribution of ten species of Tetrigoidea.



Map 5. Showing distribution of ten species of Tetrigoidea.

REFERENCES

- Bolivar, I. 1887. Essai sur less Acridiens de la tribu des Tettigidae. *Annls Soc. ent. Belg.*, **31** : 175-313.
- Bolivar I, 1898. Contribution a l'etude des Acridiens. Especies de La faune indo-et austro-malaisienne du Museo Civico di Storia Naturale di Genova. *Annali Mus. civ. Stor. nat. Giacomo Doria*, **39** : 66 101.
- Bolivar, I. 1902. Les Orthopteres de St. Joseph's College, a Trichinopoly (Sud de l' Inde). 3e partie. *Annls Soc. ent. Fr.*, **70** : 580 - 634.
- Bolivar, I. 1909. Nouvelles especes d' Acridiens du Musee de Geneve. *Boln. Soc. ent. Esp.*, **9** : 393 - 408.
- Grant, H.J. Jr. 1966. The Pacific genera of the subfamily Batrachideinae (Orthoptera : Tetrigidae). *Pacif. Insects*, **8** : 579-601.
- Gunther, K. 1938a. Zwei neue Dornschrecken (Orth. Acrididae, Acrydiinae) aus Hinterindien. *Ent. Rdch.*, **55** : 465 - 468.
- Gunther, K. 1938b. Revision der Acrydiinae I Sectiones Tripetalocerae, Discotettigiae, Lophotettigiae, Cleostratae, Bufonidae, Cladonotae, Scelimeniae Verae. *Mitt. zool. Mus. Berl.*, **23** : 299 437.
- Gunther, K. 1938c. Revision der Acrydiinae (Orth) II. Scelimenae spuriae. *Stettin. ent. Ztg.*, **99** : 117 - 148 and 161 - 23.
- Gunther, K. 1939. Revision der Acrydiinae (Orthoptera) III. Section Amorphopi (Metrodora Bolivar, 1887. aut.). *Abh. Ber. Mus., Tierk. Volkerk. Dresden*, **20** (A) Zool. (N.F.) BDL : 16 - 355.
- Hancock, J.L. 1904. The Tettigidae of Ceylon. *Spolia zeylan.*, **2** : 97 - 157.
- Hancock, J.L. 1907. Studies of the Tetriginae in the Oxford University Museum. *Trans. R. ent. Soc. Lond.*, 1907, pp. 213-244.
- Hancock, J.L. 1908. Further studies of the Tetriginae in the Oxford University Museum. *Trans. R. ent. Soc. Lond.*, 1908, pp. 387 - 426.
- Hancock, J.L. 1912. Tetriginae (Acridiinae) in the Agricultural Research Institute, Pusa, Bihar, with the description of new species. *Mem. Dep. Agric. India ent. Ser.*, **4** (No.2) : 131-160.
- Hancock, J.L. 1913. Zoological Results of the Abor Expedition, Orthoptera. *Rec. Indian Mus.*, **8** : 311 316.
- Hancock, J.L. 1915. Indian Tetriginae. *Rec. Indian Mus.*, **11** : 55 132.
- Hebard, M. 1929. Acrydiinae (Orthoptera, Acrididae) of Southern India. *Revue suisse Zool.*, **36** : 565 - 592.

- Kirby, W.F. 1914. The fauna of British India, including Ceylon and Burma. Orthoptera (Acridiidae). pp. ix + 276.
- Shishodia, M.S. Taxonomy and Zoogeography of the Tetrigidae (Orthoptera : Tetrigoidea) of North eastern India (Mss in press).
- Shishodia, M.S. 1987. Tetrigidae : Orthoptera : Insecta (Grouse Locusts). Fauna of Orissa : State Fauna Series 1 : 91 - 102 (Publ. Zool. Surv. India).
- Steinmann, H. 1964. Some new Tetrigid species and subspecies from Asia (Orthoptera : Tetrigidae). *Acta zool. hung., Budapest*, **10** : 457 - 468.
- Steinmann, H. 1970. Check-List of the Tetricidae (Orthoptera) of the Oriental Faunal Region. *Acta zool. hung.*, **16** : 215-240.
- Steinmann, H. 1971. The Tetricidae (Orthoptera) of the Palaearctic Fauna. *Folia. ent. hung.*, **24** : 323 - 332.
- Walker, F. 1871. Catalogue of the specimens of Dermaptera and Saltatoria in the collection of the British Museum Part V. Tettigidae and supplements to earlier parts. pp. 4 + 811 - 850 + 43 + 116.

INSECTA : ORTHOPTERA : GRYLLOIDEA

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INTRODUCTION

The knowledge of Indian Grylloidea has increased immensely over the past 20 years or so. In Chopard (1969) "The Fauna of India and the Adjacent Countries, Orthoptera, Grylloidea" all genera and species known at that time are described in a single volume. In the above work Chopard has reported about 48 species from West Bengal mainly from Darjiling District. Recently Bhowmik (1969, 1976, 1977a-b) has also studied Grylloidea from West Bengal, mostly from North Bengal. Besides the above works no serious attempt has been made to study the Grylloid fauna of West Bengal

The present work was initiated to make a systematic study of the cricket fauna of West Bengal, chiefly based on the collections made by various survey parties of the Zoological Survey of India from 1983-88, under the scheme of Department for a District-wise faunistic survey of West Bengal. We have also studied the named and unnamed material present in the National Zoological Collection. Besides this we have also included records published or otherwise from the region under study. This paper deals with 70 species distributed over 39 genera and 8 families. Eight species are new record for the State, and these are marked with asteriks. This is the first comprehensive report on the cricket fauna of West Bengal. We have provided the brief diagnosis of each species, keys for families, subfamilies, genera and species. The detailed distribution of each species is traced within West Bengal and is supported by maps.

A list of species appended here for the convenience. The classification followed is after Chopard (1969) and Randell (1964).

SYSTEMATIC ACCOUNT ORTHOPTERA GRYLLOIDEA

The superfamily Grylloidea of Orthoptera is characterised by the long and slender antennae, tarsi always composed of three joints, auditory organs placed on the anterior tibiae, large part of the male elytron transformed into a stridulatory organ, and a large ovipositor.

Grylloidea has been divided into a large number of families, but the present study deals the following :

Key to the families of grylloidea of West Bengal after Chopard (1969).

1. Anterior legs short, strongly fossorial with tibiae expanded and digitate for digging.....
.....GRYLLOTALPIDAE

- Anterior legs normal, tibiae simple 2
- 2. Second segment of tarsi compressed, minute..... 3
- Second segment of tarsi depressed..... 7
- 3. Posterior tibiae with serrulated margins, without spines on the superior margins..... 4
- Posterior tibiae armed with spines on the superior margins. 5
- 4. Facial shield subquardrate, inserted between the antennal sockets; frontal rostrum wide.....
..... SCLEROPTERIDAE
- Facial shield transverse; frontral rostrum variable but usually not so wide. ...CACOPLISTIDAE
- 5. Posterior tibiae without denticles between the spines.....GRYLLIDAE
- Posterior tibiae serrulated at base and between the spines 6
- 6. Head lengthened, horizontal; slender forms with feebly swollen posterior femora; elytra transparent..... OECANTHIDAE
- Head short, vertical; more robust forms with usually long legs but posterior femora strongly swollen at base; elytra when present coloured. PHALANGOPSIDAE
- 7. Posterior tibiae non-serrulated, armed with three spines on each margin; very small delicate insects.
..... TRIGONIDIIDAE
- Posterior tibiae serrulated between the spines ENEOPTERIDAE

Family GRYLLOTALPIDAE

Genus *Gryllotalpa* Latreille, 1802.

1. *Gryllotalpa africana* Beauvois (Fig 2B)

1805. *Gryllotalpa africana* Beauvois, *Ins. Afr. Amer.*, : 229.
 1869. *Gryllotalpa fossor* Scudder, *Mem. Peabody Ac. Sc.*, 1 : 21.
 1967. *Gryllotalpa africana* : Chopard, *Orthopterorum Catalogus*, Part 12 : 449.

Material examined : Bankura Distt. : 2 (M), 1 (F), Kotulpur, 26. xi. 1986, T. R. Mitra. Barddhaman Distt. : 1 (M), 1(F), Katwa, Irrigation Inspection Bunglow compound, 10. xii. 1985, B.N. Das; ; 1 (M), Dhatrigram, 12. xii. 1985, B.N. Das. Calcutta : 1 (M), Calcutta, 6. viii. 1976, N. Ghosh. Jalpaiguri Distt.: 1 (F), Sewak, 8. xii. 1986, R.S. Barman. Medinipur Distt. : 1 (M), Gorbeta, 19. ix. 1985, S. Biswas.

Murshidabad Distt. : 1 (F), Berhampur, 21. ii. 1986, I. J. Gupta. Nadia Distt. : 1 (M), 1 (F), Kalyani, 3.xi.1981, G. K. Manna; 2 (M), Plassey, 28. i. 1986, A. R. Lahiri.

Diagnosis : Of medium size (25-35mm). Colouration rufous brown. Elytral veins, in case of female, somewhat diverging and simply curved at base, somewhat converging towards apex. Discoidal cell of elytra, in case of male, narrow, twice as long as wide at base, a second cell between the diagonal vein and the first chord almost as large as the discoidal. Anterior tibiae armed with four dactylus. Genitalia of male as figured (Fig. 2B).

Distribution : India : West Bengal (Bankura, Bardhaman, Calcutta, Darjiling, Jalpaiguri, Medinipur, Nadia, 24 Parganas and Puruliya Districts), Andaman Islands, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Meghalaya, Orissa, Pondichery, Tamilnadu, Uttar Pradesh and Tripura. Elsewhere : Bhutan ; Burma; Iran; Madagascar; Malaya; S. Spain; Singapore and Sri Lanka.

Remarks : A very common species and usually occurs on sand at the edge of water. It causes serious damage to potato, paddy and tea.

2. * *Gryllotalpa ornata* Walker (Fig. 2A)

1889. *Gryllotalpa ornata* walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 5.

1969. *Gryllotalpa ornata* : Chopard, *Fauna of India, Grylloid.*, 2 : 10.

Diagnosis : Body of medium size (20-30 mm); with very narrow shape; colouration dark brown ; veins of elytra in female very closely parrallel, not at all divided at base; mirror in male very narrow. Genitalia of male as figured (Fig. 2A).

Distribution : India : West Bengal (Darjiling and Murshidabad Districts), Uttar Pradesh, Sikkim. Elsewhere : Bhutan.

Remarks : We have not found this species in the collections, however Chopard (1969) recorded it from Darjiling and Murshidabad Districts.

Family GRYLLIDAE

Key to subfamilies of Gryllidae

1. Spines of the posterior tibiae immovable, without hairs.Gryllinae
- Spines of the posterior tibiae movable, pubescent.Nemobiinae

Subfamily GRYLLINAE

Key to the genera of Gryllinae

1. Posterior tibiae serrulated at base, proximal to the insertion of spines.....*Landreva* Walker
- Posterior tibiae non-serrulated at base..... 2
2. Posterior femora long, usually as long as tibia and tarsus together; ocelli placed in a straight line; body almost glabrous..... 3
- Posterior femora no longer than tibia and meta- tarsus together; ocelli placed as a triangle; body usually pubescent 4
3. Anterior metatarsi moderately long; anterior and median tibiae ciliated with long hairs; ovipositor, usually longer*Gymnogryllus* Saussure
- Anterior metatarsi very short; very large species, with usually short ovipositor.....*Brachytrypes* Serville
4. Both sexes with convex face 5
- Face more or less flattened in the male..... 11
5. Both sexes apterous; anterior tibiae non- perforated*Cophogryllus* Saussure
- Elytra well developed, in the male sex at least; anterior tibiae perforated with one or two foramina6
6. Head with narrow frontal rostrum.....7
- Head with wide frontal rostrum..... 8
7. Head somewhat flattened above; body pubescent; ovipositor long*Gryllodeds* Saussure
- Head rounded , small; elytra ample in male; ovipositor abortive*Itaropsis* Chopard
8. Elytra of male with well developed mirror..... 9
- Elytra of male with mirror indistinct or small, situated towards the apex.....10
9. Body convex; female with short, lateral elytra*Gryllopsis* Chopard
- Body not so convex; female with more or less well developed elytra, never reduced to small, lateral pads 12

10. Small in size; posterior tibiae armed with feebly movable spines*Nemobiodes* Chopard
 - Medium in size, posterior tibiae armed with immovable spines.....*Callogryllus* Sjostedt
11. Male with flattened or somewhat concave face, but forehead without any prolongation frontal rostrum convex*Velarifictorus* Randell
 - Face of the male strongly flattened and fore head more or less strongly prolonged; frontal rostrum of male projecting but simply angular,*Loxoblemmus* Saussure
12. Epiphallus with styli on the posterior lateral angles.....*Turanogryllus* Tarbinskii
 - Epiphallus without styli 13
13. Median line of the bridge of the epiphallus entire..... *Modicogryllus* Chopard
 - Median line of the bridge of the epiphallus with a small V-shaped emargination..... 14
14. Anterior projection of the ectoparamere approximately equal 15
 - Anterior projection of the ectoparamere much longer than the external anterior projection ...16
15. Endoparamere without a transverse parameral muscle apodeme; the apex of the ectoparamere digitiform.....*Gryllus* Linne
 - Endoparamere with a transverse parameral muscle apodeme; apex of the ectoparamere not digitiform*Melanogryllus* Chopard
16. Virga with transverse parameral muscle insertion crest 17
 - Virga without transverse parameral muscle incertion crest 18
17. Mesal lobes with their apices between the bases of the ectoparameres; endoparameres J-shaped*Plebeiogryllus* Randell
 - Mesal lobes with their apices between the apices of the ectoparameres; endoparameres C-shaped *Teleogryllus* Chopard
18. Endoparameres C-shaped *Platygryllus* Chopard
 - Endoparameres elongate, J-shaped..... *Acheta* Fabricius

Genus *Brachytrypes* Serville, 1839Key to the species of *Brachytrypes*

1. Size very large (35-42 mm).....*portentosus* (Lichtenstein,1796)
 - Size medium (about 25 mm)..... *orientalis* (Burmeister, 1832)

3. *Brachytrypes orientalis* (Burmeister)

1832. *Gryllus orientalis* Burmeister, *Handb. Ent.* 12 : 735.
 1967. *Brachytrypes orientalis* : Chopard, *Orthopterorum Catalogus*, Part 10 : 43.
 1969. *Brachytrypes orientalis* : Chopard, *Fauna of India, Grylloid.*, 2 : 17.

Material examined : Darjiling District : 1 (M), Tadah, -. viii. 1958, H. Khajuria. Jalpaiguri Distt.: 1 (F), Chilapata, 15. x. 1987, S. K. Tandon.

Diagnosis : Elytral venation of male similar to the preceding species; apical part of elytra is divided into short, nearly square areolae; ovipositor short and thicker, with shorter apical valves.

Distribution : India : West Bengal (Calcutta, Darjiling and Jalpaiguri Districts), Assam, Karnataka, Meghalaya, Orissa, Tamilnadu. Elsewhere : Burma; Java; Malacca; Malaya; Philippines; Sri Lanka and Sumatra.

Remarks : Reported to cause damage to paddy, Jute, citrus plants, tobacco, tea and other various garden plants.

4. *Brachytrypes portentosus* (Lichtenstein)

1796. *Acheta portentosa* Lichtenstein, *Cat. Mus. Zool. Hamburg*, 3 : 86.
 1967. *Brachytrypes portentosus* : Chopard, *Orthopterorum Catalogus*, part 10 : 42.

Material examined : Jalpaiguri District : 1 (M), Tecsta river forest belt, 8. xii. 1986, R.S. Barman. Koch Bihar Distt. : 1 (F), Kaligunj, 28. iii. 1984, M. Prasad. Nadia Distt. : 1 (M), Kalyani, 3.x. 1976, S. P. Ghosh.

Diagnosis : General colouration reddish yellow to brown, shining, pronotum strongly punctate, distinctly widening in front, more pronounced in male with two testaceous rufous spots. Ovipositor very short.

Distribution : India : West Bengal (Calcutta, Darjiling, Koch Bihar, Jalpaiguri and nadia Districts), Arunachal Pradesh, Assam, Bihar, Karnataka, Meghalaya, Nagaland, Orissa, Tamilnadu, Uttar Pradesh. Elsewhere : Burma; China; Java; Malaya; Pakistan; Philippines; Singapore; Sumatra; Taiwan.

Remarks : It is known to cause damage to citrus, jute, paddy and tea plantations.

5. *Brychytrypes* sp.

Material examined : 1 (M), Chilapata, Jalpaiguri Dist. 15.x.1987, S.K. Tandon.

Remarks : This species differs from *B. portentosus* and *B. orientalis* in having exceptionally longer mirror with long and square areolae in apical field. In the absence of series of specimens the exact identity can not be fixed.

Measurements (in mm) : Body length 35.0; pronotum length 7.5; pronotum width 12.0; posterior femora 22.0; elytra 23.0.

Genus *Gymnogryllus* Saussure, 1877Key to the species of *Gymnogryllus*

1. Size medium (18-21 mm)..... *erythrocephalus* (Serville)
- Size smaller (11-13 mm)..... *minor* Chopard, 1969

6. ** *Gymnogryllus erythrocephalus* (Serville)

1839. *Gryllus erythrocephalus* Serville, *Ins. Orth.*, : 339

1969. *Gymnogryllus erythrocephalus* : Chopard, *Fauna of India, Grylloid*, 2 : 28.

Material examined : 1 (M), Kalyani, Nadia Dist., 3.x.1979, G.K. Manna.

Diagnosis : Of medium size (18-21 mm); general colouration dark Brown with yellowish legs; antennae without whitish ring; pronotum blackish; posterior femora without any bands.

Distribution : India : West Bengal (Nadia District), Bihar, Karnataka, Tamilnadu. Elsewhere : Pakistan and Sri Lanka.

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

7. ** *Gymnogryllus minor* Chopard

1959. *Gymnogryllus minor* Chopard, *Stuttg. Beitr. z. Naturk.*, : 1.

1967. *Gymnogryllus minor* : Chopard, *Orthopterorum Catalogus*, Part 10 : 19.

Material examined : Puruliya Dist. : 1 (M), Dak-Bungalow compound, Puruliya, 30.v.1971, S. Khera.

Diagnosis : To this species generally resembles *G. erythrocephalus* but mainly differs in having much smaller size.

Distribution : India : West Bengal (Puruliya District), Assam, Bihar, Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Pondicherry, Tamilnadu. Elsewhere : Afghanistan; Burma; Iran; Java; Pakistan; South Vietnam.

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

Genus *Acheta* Fabricius, 1775

8. * *Acheta domesticus* Linne
(Fig. 1-A,B,C; 7 & 8)

1758. *Gryllus acheta domesticus* Linne Syst. Nat. (ed. x), 1 : 428.

1967. *Acheta domesticus* : Chopard, *Orthopterorum Catalogus*, pt. 10 : 62.

Diagnosis : Of medium size (16-20 mm). General colouration reddish yellow or testaceous; body somewhat depressed and pubescent; head with a white transverse band; male genitalia as figured (Fig. 7,8).

Distribution : India : West Bengal (Calcutta); Jammu and Kashmir, Kerala, Maharashtra, Uttar Pradesh. Elsewhere : Pakistan.

Remarks : No specimens of *A. domesticus* was found in the collections. Chopard (1969) reported it from Calcutta on the basis of specimens of Vienna Museum.

Genus *Gryllus* Linne, 1758

9. *Gryllus bimaculatus* De Geer

1773. *Gryllus bimaculatus* De Geer, *Mem. Ins.*, 3 : 521.

1969. *Gryllus bimaculatus* : Chopard, *Fauna of India, Grylloid.*, 2 : 35.

Material examined : Calcutta : 1 (M), 1 (F), Calcutta, 16.viii. 1980, M.S. Shishodia. Darjiling Dist.: 1 (M), Darjiling, 18.vii. 1987, P. Dey. Hugli Dist. : 1 (M), Chinsura, 8. ix. 1982, B.N. Nandi. Nadia Dist.: 1 (F) , Kalyani, 5.vi. 1985, S.P. Ghosh.

Diagnosis : Of large sized. Body completely glabrous; general colouration entirely black with two yellow spots at the base of each elytron.

Distribution : India : West Bengal (Calcutta, Darjiling, Hugli, and Nadia Dist.), Andaman Islands, Bihar, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Tamilnadu, Uttar Pradesh. Elsewhere: Africa, Burma; Malaya; Mediterranean region; Pakistan; Singapore and Sri Lanka.

Remarks : Characteristic yellow spots of elytra faintly marked in female. It is known to damage to potato plants.

Genus *Teleogryllus* Chopard, 1961Key to the species of *Teleogryllus*

1. Head presenting a yellow sport or band along each eye 2
- Head without any marking *testaceus* (Walker)
2. Elytra shorter than the abdomen. *himalayanus* Chopard
- Elytra extending to the apex of abdomen..... *mitratus* (Burmeister)

10. * *Teleogryllus himalayans* (Chopard)
(Fig.5)

1928. *Gryllus himalayanus* Chopard, *Rec. Indian Mus.*, **30** : 44.

1961. *Teleogryllus himlayanus* : Chopard, *Eos. Madr.*, **37** : 277.

Diagnosis : Of medium size (18 mm). Body colour blackish brown. Head with yellow spot around the ocelli; pronotum black with golden-rufous, silky pubescence; mirror small, apical, divided in the middle. Male genitalia large, narrow with rounded apex (Fig. 5).

Distribution : India : West Bengal (Darjiling - Ghumti, Kurseong).

Remarks : During the present study no material of this species was found. Chopard (1928) has described it from West Bengal.

11. *Teleogryllus mitratus* (Burmeister)
(Fig. 4)

1838. *Gryllus mitratus* Burmeister, *Handb. Ent.*, **2** : 734.

1964. *Teleogryllus mitratus* : Randell, *Can. Ent.*, **96**(12) : 1596.

Material examined : Bankura District : 1 (F), Bankura, 8.x. 1985, K.K. Roy. Maldah Dist. : 1 (F), Parbatidanga, Maldah, 27.vi. 1987, K.P. Mukherjee. Nadia Dist. : 1 (F), Plassey, 28.ii. 1986, A.R. Lahiri.

Diagnosis : Of large size (18-26 mm). Body colour dark. head with two very distinct yellow bands along the internal margin of the eyes; Mirror oval as long as broad; male genitalia long, weakly tritobate at apex (Fig. 4).

Distribution : India : West Bengal (Bankura, Calcutta, Darjiling, Jalpaiguri, Maldah and Nadia Dists.), Andaman Islands, Arunachal Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Manipur, Meghalaya; Orissa, Sikkim, Tamilnadu, Uttar Pradesh. Elsewhere : Bhutan; Japan; Johore; Kuala Lumpur; Malaya; Pahang; Philippines; Sri Lanka; Taiwan; Tibet.

Remarks : We have also studied the material of this species from Naihati (24-Parganas), Chinsura (Hugli Dist.) and Kalyani (Nadia Dist.) during the course of other studies.

12. *Teleogryllus testaceus* (Walker)
(Fig. 3)

1869. *Gryllus testaceus* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 38.

1964. *Teleogryllus testaceus* : Chopard, *Can. Ent.*, 96 (12) : 1596.

Material examined : Medinipur District : 1 (M), Jhargram, 6.ix. 1985, S. Biswas; 1 (M), Garbeta, 19.ix. 1985, S. Biswas. Nadia Dist. : 1 (F), kalyani, 3.vii. 1986, J.N. Majumdar.

Diagnosis : Of large size and slightly longer than the preceding species; head without any marking; colouration uniformly light testaceous; mirror broader than long, rounded, divided in the middle by a curved vein; 4 oblique veins and 1 or 2 small ones in the angle of the striulatory vein. Male genitalia weakly acute at apex (Fig. 3).

Distribution : India : West Bengal (Calcutta, Darjiling, Medinipur, Murshidabad and Madia Dist.), Andman Islands, Bihar, Karnataka, Kerala, Orissa, Tamilnadu, Uttar Pradesh. Elsewhere : Borneo; Burma; Indo-China; Japan; Java; Malaya; Pahang; Philippines; Sri Lanka; Sumatra.

Remarks : Widely distributed in Indo-Malayan region.

Genus *Modicogryllus* Chopard, 1961

Key to the species of *Modicogryllus*

1. Head dark brown, shining, without any markings..... *blennus* (Saussure)
- Head adorned with light bands on the occiput, or between the ocelli.....2
2. Head with a transverse yellow band between the ocelli, occiput with short 6 yellow lines; size medium (10.5-15 mm)..... *confirmatus* (Walker)
- Head without transverse yellow band between the ocelli; occiput with 5 yellow lines; size small (8.5 mm)..... *minimus* Chopard

13. *** *Modicogryllus blennus* (Saussure)
(Fig. 11)

1877. *Gryllodes blennus* Saussure, *Mém. Soc. Phys. Hist. nat. Geneve*, 25 : 215.

1964. *Modicogryllus blennus* : Chopard, *Can. Ent.*, 96(12) : 1586.

Material examined : 1 (F), Jhargram, Medinipur District, 28.ix. 1985. S. Biswas.

Diagnosis : Of small size (10-12 mm). General colouration blackish with yellowish-rufous legs; lateral lobes of elytra blackish with inferior margin very slightly ascending backwards; legs light rufous, the posterior femora strongly darkened at apex; mirror of elytra, in male, pentagonal, as long as broad, 2 oblique veins; lateral field with 4 widely separated veins and Sc bearing one branch; genitalia short, deeply notched at apex with a small median process (Fig. 11); elytra, in case of female, rounded at apex, dorsal field with 4 irregular veins; Cu furcate towards the middle; lateral field with veins a little less distant than male.

Distribution : India : West Bengal (Calcutta and Medinipur Districts), Assam, Rajasthan, Tamilnadu, Uttar Pradesh. Elsewhere : Australia; Burma; Malayasia; Solomon Island & Sri Lanka.

14. *Modicogryllus confirmatus* (Walker) (Fig. 10)

1859. *Acheta confirmata* Walker, *Ann. Nat. Hist.*, (3) 4 : 221.

1964. *Modicogryllus confirmatus* : Randell, *Can. Ent.*, 96 (12) : 1584.

Material examined : Bankura Dist. : 1 (F), Sonamukhi forest, 8.iii. 1986, K.P. Mukherjee; 1 (F), Joypur, 23.xi. 1986, T.R. Mitra; Birbhum Dist. : 1 (F), Illambazar, 14.iii. 1986, K.P. Mukherjee; Maldah Dist. : 1 (F), Parbatiganga, 27.vi. 1987, K.P. Mukherjee. Medinipur Dist. : 5 (M), 3 (F), Garbeta, 19 & 22.ix. 1985, S. Biswas. Puruliya Dist. : 1 (M), Jhalda, 20.ix. 1987, M. Prasad. W. Dinajpur Dist. : 1 (F), Raigunj college campus, 15.xii. 1986, B.C. Das.

Diagnosis : Of small size (10-15 mm). General colouration very variable from pale testaceous to dark-brown; pronotum transverse, anterior and posterior margin with a row of strong rufous bristles; elytra in male extended upto the apex of abdomen; mirror wider than long, divided by a curved vein; 2 oblique veins; lateral field with anterior veins strongly curved and separated from the rest; wings caudate; elytra of female, with 3 free and 4 branches of cubital in dorsal field, all are oblique and regularly distant; lateral field with less curved vein. Genitalia of male with superior bridge deeply and widely notched forming 2 erect lobes; inferior pieces with erect tooth (Fig. 10).

Distribution : India : West Bengal (Bankura, Birbhum, Medinipur, Puruliya, Dist.), Andaman Islands, Arunachal Pradesh, Assam, Bihar, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Rajasthan, Tamilnadu, Tripura. Elsewhere : Burma; Israel; Philippines; Malaya; Nepal; Sri Lanka; Thailand.

Remarks : A very common species distributed throughout India.

15. * *Modicogryllus minimus* (Chopard) (Fig. 12)

1928. *Gryllus minimus* Chopard, *Rec. Indian Mus.*, 30 : 12.

1961. *Modicogryllus minimus* : Chopard, *Eos. Modr.* 37 : 274.

Diagnosis : Of very small size (8.5 mm). General colouration mottled with fawn. Head without transverse light band between the ocelli; elytra of male with oblique veins. This species is characterised by its very small size and characteristic male genitalia (Fig.12).

Distribution : India : West Bengal (Darjiling), Assam, Bihar. Elsewhere : Burma.

Remarks : Chopard (1928) described this species from Sureil in Darjiling District. We have not found it in recent collections from same area.

Genus *Plebeiogryllus* Chopard, 1964.

16. *Plebeiogryllus guttiventris* (Walker)
(Fig. 6)

1871. *Gryllus guttiventris* Walker, *Cat. Der, Salt. Brit, Mus.*, 5 (suppl.) : 6.

1964. *Plebeiogryllus guttiventris* : Randell, *Can. Ent.*, (6 912) : 1598.

Material examined : Bankura District : 1 (F), Bankura, 11.x. 1985, K.K. Roy; 2 (M), 4 (F), Bishnupur, 6.iii. 1986, K.P. Mukherjee; 1 (F), Sonamukhi forest, 8.iii. 1986, K.P. Mukherjee; 1 (F), Bankura, 2.ix. 1987, M. Prasad; 1 (F), Unda, 26.ix. 1987, M. Prasad. Birbhum Dist. : 1(F), Narayanpur, 2.iv. 1986, M.S. Shishodia; 1 (F), Palitpur, 3.x. 1987, M. Prasad. Jalpaiguri Dist. : 1 (M), Alipurduar, 14.i. 1987, V.D. Srivastava. Maldah Dist. : 1 (M), Chanchal, 14.iv.1987, K. P. Mukherjee; 1 (F), Gangarampur, 15.vi.1987, K.P. Mukherjee; 6 (F), Nimbari, 24.vi.1987, K.P. Mukherjee; 9 (M), 7 (F), Bhaluk Station, 26.vi.1987, K.P. Mukherjee; 6 (M), 12 (F), Parbatidanga, 27.vi.1987, K.P. Mukherjee. Medinipur Dist. : 4 (M), 4 (F), Jhargram, 6,18.ix.1985, S. Biswas; 1 (F), Belpahari, 8.ix.1985, S. Biswas; 2 (F), Garbeta, 22.ix.1985, S. Biswas. Murshidabad Dist. : 1 (F), Ranaghat, 4.xii.1986, A. R. Lahiri; Nadia Dist. : 1 (M), Plassey, 28.i.1987, A. R. Lahiri. Puruliya Dist. : 1 (F), Jhalda, 20.ix.1987, M. Prasad.

Diagnosis : of medium size (13.5-17.5 mm). General shape short and depressed; colouration dark brown, finely pubescent; head with light lines on occiput; posterior femora short and thick, feebly striated with brown; elytra (in male) extend almost upto the apex of abdomen; mirror as long as broad, divided behind by a curved vein; 4 or 5 oblique veins; lateral field with 6 close veins and 2 branches of Sc; genitalia formed of a large piece with sinuated sides, ending into a blunt point (Fig. 6); elytra (in female) with 4 free veins and 3 branches of Cu, all feebly oblique and regularly distant.

Distribution : India : West Bengal (Bankura, Birbhum,, Darjiling, Haora, Jalpaiguri, Maldah, Medinipur, Murshidabad, Nadia), Madhya Pradesh, Maharashtra, Orisa, Tamilnadu, Uttar Pradesh. Elsewhere : Burma; Sri Lanka.

Remarks : A very common species, We have also studied some specimens of the species from Hugli and Nadia Dist. of West Bengal earlier.

Genus *Melanogryllus* Chopard, 196117. *Melanogryllus carmichaeli* (Chopard)1928. *Gryllus carmichaeli* Chopard, *Rec. Indian Mus.*, 30 : 17.1961. *Melanogryllus carmichaeli* : Chopard, *Eos, Madr.*, 37 : 276.

Diagnosis : Of medium size (16-19 mm). Colouration of head and pronotum blackish, contrasting with the testaceous elytra; abdomen blackish; posterior tibiae armed with 6 spines on each margin; elytra extending upto the apex; mirror not divided; oblique vein 4 in numbers; lateral field blackish, presenting 6 parallel veins; wings abortive; genitalia of male with a large superior piece, rounded at apex.

Distribution : India : West Bengal (Sukna-Darjiling District).

Remarks : No specimen of this species was found in the present collection. Chopard (1969) has described this species in detail.

18. * *Cophogryllus angustus* (Chopard)1926. *Cophogryllus angustus* Chopard, *Rec. Indian Mus.*, 30 : 16.1967. *Cophogryllus angustus* : Chopard, *Orthopterorum Catalogues*, part 10:39.

Diagnosis : Of medium size (13.5mm); general colouration blackish brown with rufous legs. This differs from the preceding species in size, and in general colouration which is much more uniform.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the recent collections from West Bengal.

Genus *Cophogryllus* Saussure, 187719. * *Cophogryllus ornatus* (Chopard)1928. *Cophogryllus ornatus* Chopard, *Rec. Indian Mus.*, 30 : 14.1967. *Cophogryllus ornatus* : Chopard, *Orthopterorum Catalogus*, part 10 : 38.

Diagnosis : Of small size (8.5 mm). General colouration dark-brown with reddish brown spots. Body feebly depressed; head as wide as pronotum in front; pronotum shining, lateral lobes brown. Ovipositor short and straight.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the recent collection from West Bengal.

Genus *Turanogryllus* Tarbinsky, 194020. * *Turanogryllus rufoniger* (Chopard)
(Fig. 13)1925. *Gryllodes rufoniger* Chpard, *Ann. Soc. ent. Fr.*, **94** : 292.1935. *Gryllopsis rufoniger* : Chopard, *Ann. mag. nat. Hist.*, (10) **16** : 288.1967. *Turanogryllus rufoniger* : Chopard, *Orthopterorum Catalogus*, part 10 : 36.

Diagnosis : Of medium size (13-15). Head of female globular; posterior femora blackish at apex; posterior tibiae armed with 5 internal, 7 external spines; elytra of female extending to the apex of 1st abdominal tergite, separated by a narrow space, their internal margin convex; elytra of male, extending to the apex of abdomen; mirror one and a half times as wide as long, divided in the middle by a curved vein; 3 oblique veins; wings short; male genitalia as figured (Fig. 13).

Distribution : India : West Bengal (Darjiling), Assam; Burma; Laos.

Remarks : We have not found this species in the present collections. Chopard (1969) has reported it from Darjiling

Genus *Callogryllus* Sjostedt, 190921. * *Callogryllus pallidus* Chopard1928. *Gryllus pallidus* Chopard, *Rec. Indian Mus.*, **30** : 11.1967. *Callogryllus pallidus* : Chopard, *Orthopterorum Catalogus*, part 10, : 15.

Diagnosis : Of medium size (14.5 mm); head light brown, with 4 longitudinal whitish lines; antennae and palpi whitish; 5th joint of maxillary palpi longer than 3rd; lateral lobes of pronotum whitish; abdomen yellowish and a few brown spots; anterior tibiae with a large external tympanum, armed with 3 apical spurs; posterior tibiae armed on each margin with 5 spines; elytra widely separated on the mid dorsal line, as long as metanotum; dorsal field with 3 veins.

Distribution : India : West Bengal (Darjiling).

Remarks : No specimen of this species was found during the present survey. It is known by Holotype from Darjiling (Chopard, 1969).

Genus *Platygryllus* Chopard22. * *Platygryllus melanocephalus* (Serville)
(Fig. 14)1839. *Gryllus melanocephalus* Serville, *Ins. Orth.*, 342.1964. *Platygryllus melanocephalus* : Randell, *Canad. Ent.*, **96** : 1558.1967. *Platygryllus melanocephalus* : Chopard, *Orthopterorum Catalogus*, Part 10 : 93.

Diagnosis : Of medium size (12-16 mm). General colouration blackish, head black shining. Pronotum blackish above; lateral lobes generally black. Abdomen black dorsally, reddish-black ventrally. Legs black, pubescent. Male genitalia with superior part short and wide, truncated at apex (Fig. 14).

Distribution : India : West Bengal (type lost), Bihar, Gujarat, Himachal Pradesh, Rajasthan, Tamil nadu, Uttar Pradesh. Elsewhere : Nepal; Bangladesh.

Remarks : No specimen of this species was found in the present survey.

Genus *Velarifictorus* Randell, 1964

Key to the species of *Velarifictorus*

1. Size medium (12.5 mm); mirror divided in the middle by a curved vein..... *parvus* (Chopard)
- Size medium to large (13-18 mm); minor divided by curved or straight vein either before or behind the middle.....2
2. Size large (13-19 mm); mirror divided by straight vein behind the the middle; 2 oblique veins*aspersus* (Walker)
- Size medium (13.9 mm); mirror divided by a straight vein much above the middle; 3 oblique veins*sikkimensis* (Bhowmik)

23.* *Velarifictorus aspersus* (Walker) (Fig. 15)

1869. *Gryllus aspersus* Walker, *Cat Derm. Salt. Br. Mus.*, 1 : 39.
 1877. *Scapsipedus mandibularis* Saussure, *Mem. Soc. Geneve*, 25 : 246.
 1984. *Velarifictorus aspersus* : Randell, *Canad. Ent.*, 96 : 1587.

Material examined : Darjiling Dist.: 1 (M), 1 (F), Singla, 1500 ft., Darjiling, 20.v. 1975, N.K. Sarkar.

Diagnosis : Of medium size (13-19); head brown above, adroned with 6 yellow lines on the occiput and a yellow band between the ocelli; mandibles very long, prominent; elytra extending upto the apex of abdomen; mirror lozenge shaped, divided by a straight vein behind the middle; 2 oblique veins; apical field with 4 veins; wings short or caudate; genitalia with superior bridge divided into 3 parts, the median short, truncated, the two lateral a little prolonged, rounded, inferior parts hook-like (Fig. 15).

Distribution : India : West Bengal (Calcutta and Darjiling District.), Andhra Pradesh, Assam, Jammu & Kashmir, Karnataka, Maharashtra, Meghalaya, and Uttar Pradesh. Elsewhere : Annam; Borneo; Burma; China; Java; Hong Kong; Malaya; Philippines; Selangor; Singapore; Sri Lanka and Taiwan.

Remarks : a widely distributed species. Chopard (1969) has described the species in detail.

24. * *Velarifictorus parvus* (Chopard)
(Fig. 9)

1928. *Scapsipedus parvus* Chopard, *Rec. Indian Mus.*, 30 : 18.

1967. *Velarifictorus parvus* : Chopard, *Orthopterorum*, Catalogus part 10 : 123.

Diagnosis : In size smaller than *aspersus* (12.5 mm); head presenting 6 narrow, yellow lines on the occiput, and a yellow band joining the lateral ocelli; face strongly flattened in male, mandibles less lengthened than *aspersus*; elytra extending to the apex of abdomen in male, and middle of abdomen in female; mirror divided about the middle by a curved vein; apical field short, lateral field with regular parallel veins; genitalia of the *aspersus* type but the median part of superior bridge rounded and notched at apex (Fig. 9).

Distribution : India : West Bengal (Darjiling District), Meghalaya. Elsewhere : China.

Remarks : We have not found this species in the present collection. This species is very close to *V. aspersus* but is smaller in size.

25. *** *Velarifictorus sikkimensis* (Bhowmik)
(Fig. 16)

1967. *Scapsipedus sikkimensis* Bhowmik, *Proc. zool. Soc.*, Calcutta, 20 (2) : 126.

1976. *Velarifictorus sikkimensis* : Bhowmik, *Indian Mus. Bull.*, 11 (1) : 44.

Diagnosis : Of medium size (with elytra 13.9 mm); head black, adorned with 6 yellow lines on occiput and vertex, and lateral ocelli connected by a yellow band; elytra in female shorter than abdomen, nearly equal in male; mirror divided by a curved vein much above the middle, 3 oblique veins; genitalia with supero-median part somewhat bilobate, with two prominent denticle like projections from middle, directed laterally (Fig. 16.)

Distribution : India : West Bengal (Darjiling and Jalpaiguri Districts), Arunachal Pradesh and Meghalaya.

Remarks : No specimen of this species was found in the present collection. Bhowmik (1967) described this species from Sikkim, and later on reported it from Darjiling and Jalpaiguri Districts of West Bengal in 1976.

Genus *Gryllodes* Saussure, 1874

26. *Gryllodes sigillatus* (Walker)

1869. *Gryllus sigillatus* Walker, *Cat. Derm. Salt, Brit. Mus.*, 1 : 46.

1969. *Gryllodes sigillatus* : Chopard, *Fauna of India*, Gryllid., 2:85.

Material examined : Bankura District : 1 (F), (nymph), Sonamukhi forest, 8.iii. 1986, K.P.

Mukherjee; 3(F) (nymphs), Kanchanpur forest, 10.iii.1986, K. P. Mukherjee; 1 (F), Bankura, 11.iii. 1986, K.P. Mukherjee. Medinipur Dist. : 1 (F), Bholabheda, 10.viii. 1985, S. Biswas.

Diagnosis : Of medium size (15-16 mm). General shape as in *gryllus*, but head small, a little flattened, frontal rostrum much narrower; colour light brown with a wide transverse yellow band above and a narrower curved one between the ocelli; disk of pronotum almost flat; yellowish with a wide brown band along the posterior margin; abdomen mottled with brown, in the female and nymphs, a wide brown band on the first tergite; legs yellowish with a few brown spots; elytra in male reaching upto the middle of abdomen, truncated at apex; elytra of female very short and widely separated apex; wings absent.

Distribution : Cosmopolitan. In India, it is recorded from West Bengal Bankura, Calcutta, Darjiling and Medinipur, Andaman Islands, Andhra Pradesh, Assam, Bihar, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Punjab, Rajasthan, Tamilnadu, Uttar Pradesh.

Remarks : This species is very common in house or bungalows and produce sound of high velocity during night or when it is dark. Some specimen of this species were studied earlier from 24-Parganas and Puruliya Districts.

Genus *Loxoblemmus* Saussure, 1877

Key to the species of *Loxoblemmus* (male)

1. First joint of the antennae without process (Sometimes a tooth on the external angle).....2.
- First joint of the antennae with external angle produced in a long process... *hamulifer* Chopard
2. Frontal rostrum very broad, almost four times as broad as the first antennal joint.....
.....*microcephalus* Chopard
- Frontal rostrum not so wide.
3. Head shining black above.....*nigriceps* Chopard
- Head brown with yellow lines above..... 4
4. Size small (11-13 mm); 1st joint of the antennae with a short dentiform projection.....
..... *equestris* Saussure
- Size large (14-18 mm). 1st joint of antennae plain.....*detectus* (Serville)

27. * *Loxoblemmus detectus* (Serville)

1839. *Platyblemmus detectus* Serville, *Hist. nat. ins. Orth.* : 356.

1877. *Loxoblemmus haani* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 425.

1969: *Loxoblemmus detectus* : Bhowmik, *Zool. Anz.*, 182 (Part 1/2) : 149.

Diagnosis : Of medium size (15-17 mm); head brown; occiput adorned with 4 yellow lines; first joint of antennae without any process; elytra extending upto the end of abdomen; mirror may or may not be divided, 2 oblique veins; wings short or caudale.

Distribution : India : West Bengal (Darjiling), Andaman Islands, Arunachal Pradesh, Andhra Pradesh, Bihar, Sikkim, Uttar Pradesh. Elsewhere : China; Java; Johore; Kuala Lumpur; Pahang; Singapore, Sri Lanka; Sumatra; Taiwan.

Remarks : No specimen of this species was found during the present survey. Bhowmik (1969) reported this species from Darjiling (West Bengal).

28. *Loxoblemmus equestris* Saussure

1877. *Loxoblemmus equestris* Saussure, *Mem. Soc. Geneve*, 25 : 252.

1969. *Loxoblemmus equestris* : Chopard, *Fauna of India, Grylloid.*, 2 : 122.

Material examined : 1 (F), Eden Garden, Calcutta, 16.x.19110 F.H. Gravely, 1 (F), Kalimpong, Darjiling District, 24.iv.1915, F.H. Gravely.

Diagnosis : Of small size (11-13 mm); head with 6 yellow lines on the occiput and a transverse band at the top of frontal rostrum; face wide, flattened, strongly oblique; antennae without any projection; elytra presenting on the dorsal field a reticulation formed of irregular, lengthened acrolae.

Distribution : India : West Bengal (Calcutta and Darjiling Districts), Assam, Bihar, Jammu & Kashmir, Karnataka, Punjab. Elsewhere : Burma; China; Japan; Indo-Malaya.

Remarks : No specimen of this species was found during the present survey. However, we have examined the named collections of the species from Darjiling, present in the survey. These specimens were determined by Chopard, and all the specimens were without antennal projections.

29. ** *Loxoblemmus hamulifer* Chopard

1969. *Loxoblemmus hamulifer* Chopard, *Fauna of India, Grylloid.*, 2 : 128.

Material examined : 1 (M), Parbatidanga, Maldah District, 27.vi.1987, K.P. Mukherjee.

Diagnosis : Of small size (10.5 mm); head with 5 short yellow lines; first joint of the antennae with a very long, slender hook-shaped process, turned inside; laterl lobes with inferior part whitish, superior part dark brown; legs whitish, mottled with brown; elytra extended upto the apex of abdomen, darkened on the humeral edge; mirror undivided, first chord vein united with mirror by one veinlet only; 2 oblique veins; wings caudate.

Distribution : "Type" specimens were recorded from Pakistan only. In India, it is studied from West Bengal (Maldah District).

Remarks : We have also found some specimens of this species in collections from Hoshiarpur (Punjab) and Dehardun (U.P.).

30. *** *Loxoblemmus macrocephalus* Chopard

1969. *Loxoblemmus macrocephalus* Chopard, *Fauna of India, Grylloid*, 2 : 130.

Diagnosis : Of medium size but a little large for the genus (14.5-15.5 mm); head broader than pronotum, with 6 short lines on the occiput and a narrow yellow band along the apical margin of rostrum; frontal rostrum very wide; antennae without process; 4th joint of maxillary palpi shorter than 3rd and 5th; pronotum strongly widening in front; posterior femora short, thick, a little darker at apex; posterior tibiae armed with 5 spines on each margin; elytra a little shorter than the abdomen; mirror longer than broad, angulate in front, rounded behind; 5 oblique veins; wings short; superior bridge of genitalia trilobate.

Distribution : India : West Bengal (Jalpaiguri Dist.), Arunachal Pradesh and Assam.

Remarks : No specimen of this species was found in the present survey. However, Bhowmik (1976) reported it from West Bengal.

31. *Loxoblemmus nigriceps* Chopard

1933. *Loxoblemmus nigriceps* Chopard, *Stylops*, 2 : 120.

1969. *Loxoblemmus nigriceps* : Chopard, *Fauna of India, Grylloid.*, 2 : 129.

Material examined : 1 (M), Naihati, 24 Parganas, 9.vi.1975, N.K. Sarkar.

Diagnosis : Of very small size (10 mm); head black, shining, without any markings, as broad as pronotum; frontal rostrum broad; face shining, facial shield with small projection on each side of median ocellus; antennae without any process; pronotum strongly widening in front; with yellow silky pubescence and long rufous bristles; abdomen black; elytra shorter than abdomen; mirror apical, longer than wide, divided by a vein on the externo-posterior margin; 2 oblique veins; wings not visible.

Distribution : India : West Bengal (Darjiling, Jalpaiguri and 24-Parganas Districts), Sikkim.

Remarks : This species is endemic to West Bengal.

Genus *Gryllopsis* Chopard, 1928

Key to the species of *Gryllopsis*

1. Body somewhat depressed, and thickly pubescent; occiput adorned with 6 yellow lines.....
.....*pubescens* Chopard

Body almost cylindrical, feebly pubescent; occiput adorned with 4 yellow lines.....
*falconneti* (Saussure)

32. *** *Gryllopsis falconneti* (Saussure)

1877. *Grylloides falconneti* Saussure, *Mem. Soc. Geneve*, 25 : 230.

1969. *Gryllopsis falconneti* : Chopard, *Fauna of India, Grylloid.*, 2 : 70.

Diagnosis : Of medium size (13-16 mm); head big, rounded, shining, adorned with 4 narrow yellow lines; abdomen yellow with a median and two lateral brown bands; posterior femora short and stout; posterior tibiae armed with 5 spines on each margin; elytra as long as the metanotum, separated from each other in the middle; ovipositor long, straight, apical valves close together.

Distribution : India : West Bengal (Darjiling and Jalpaiguri Dists.), Jammu & Kashmir, Madhya Pradesh, Maharashtra, Uttar Pradesh. Elsewhere : Pakistan and Sri Lanka.

33. * *Gryllopsis pubescens* Chopard

1928. *Gryllopsis pubescens* Chopard, *Rec. Indian Mus.*, 30 : 13.

1969. *Gryllopsis pubescens* Chopard, *Fauna of India, Grylloid.*, 2 : 83.

Diagnosis : Of medium size (12 mm); body depressed; colouration testaceous, varied with brown, thickly pubescent; head as wide as pronotum, rounded; vertex slightly flattened; occiput adorned with 6 yellow lines; internal margin of eyes narrowly lined with yellow; abdominal tergites mottled with brown along the posterior margins; posterior tibiae armed with 5 internal and 6 external spines, the 1st internal being short; elytra very short, widely separated on median lines, internal margin obliquely truncated; dorsal field reduced, with 3 small veins; ovipositor long, straight, apical valves acute.

Distribution : India : West Bengal (Darjiling).

Remarks : Chopard (1982) described this species from Ghumti (Darjiling) in West Bengal..

Genus *Nemobiodes* Chopard, 1917

34. *** *Nemobiodes sukhadae* Bhowmik

1976. *Nemobiodes sukhadae* Bhowmik, *Indian Mus. Bull.*, 11 (1) : 43.

Diagnosis : Bhowmik (1976) has described this species in detail. It resembles *N. nigrocephalus* Chopard, but differs from it in the shape of mirror and genitalia; female with smooth ovipositor.

Distribution : India : West Bengal (Darjiling and Jalpaiguri Dists.)

Remarks : We have not found this species in the present collection from West Bengal.

Genus *Itaropsis* Chopard, 192535. * *Itaropsis tenella* (Walker)

1869. *Gryllus tenellus* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 37.

1936. *Itaropsis tenellus* : Chopard, *Ceylon J. Sci. (B)* 20 : 21.

1969. *Itaropsis tenella* : Chopard, *Fauna of India, Grylloid.*, 2 : 107.

Diagnosis : Of medium size (12-16 mm); head small, rounded, shining brown; frontal rostrum a little wider than the first antennal joint; pronotum strongly narrowing in front in male, and not narrowing in female; abdomen light brown; anterior tibiae perforated with a large, oval external tympanum; elytra extending to the apex of abdomen in male, and to the middle in female; mirror divided by a curved vein in the middle; wings caudate or rudimentary; genitalia with superior bridge wide, broadly notched at apex.

Distribution : India : West Bengal (Mace), Goa, Karnataka, Kerala, Maharashtra, Tamilnadu. Elsewhere : Malaya and Sri Lanka.

Remarks : No specimen of this species was found in the present collection. Chopard (1969) has described this species in detail.

Genus *Landreva* Walker, 186936. ** *Landreva* sp.

Material examined : 1 (M) (nymph), Pashok, Darjiling District, 23.iv.-11.v.1915, F.H. Gravely.

Diagnosis : Of medium size (11 mm); body depressed, shining, frontal rostrum sloping, narrow and projecting; face short; posterior tibiae presenting a few denticles before the spines; anterior tibiae perforated on the external face only by a small tympanum; female elytra reduced to lateral pads.

Distribution : India : West Bengal (Darjiling District). Elsewhere : Sri Lanka.

Remarks : In absence of adult male specimen, it could not be identified upto the specific level.

(2) Subfamily NEMOBIINAE

Key to the genera

1. Elytra and wings present in both sexes..... 2
- Both sexes completely apterous.....*Scottiola* Uvarov
2. Apical spurs of the posterior tibiae 3 on each side.....*Pteronemobiu* Jac and Bianchi
- Five apical spurs only, 3 external, 2 internal..... *Speonemobius* Chopard

Genus *Pteronemobius* Jacobson & Bianchi, 1905Key to the species of *Pteronemobius*

1. Elytra presenting false veins between the principal veins..... *strigipennis* (Chopard)
- Elytra with normal venation..... 2
2. Posterior femora adorned with blackish bands.....*fascipes* (Walker)
- Posterior femora unicolorous..... 3
3. Lateral lobes of pronotum and lateral field of elytra blackish, contrasting with the upper part which is testaceous.....*taprobanensis* (Walker)
- Lateral lobes of pronotum and lateral field of elytra of the same colour as the upper part.....4
4. Size larger (7-8 mm); ovipositor long (5 mm) and straight..... *indicus* (Walker)
- Size smaller (4-7 mm); ovipositor shorter (2.5-3 mm), gently curved.....5
5. General shape relatively short and wide; the two last joints of maxillary palpi white.....
.....*pantelchopardorum* Shishodia & Varshney
- General shape more elongated; the two last joints of the maxillary palpi concolorous..... 6
6. Posterior tibiae with 3 external spines.....7
- Posterior tibiae with 4 spines on each margin.....*concolor* (Walker)
7. Posterior tibiae with 3 external and 4 internal spines.....*montanus* Chopard
- Posterior tibiae with 3 spines on each margin in female.....*rufipes* Chopard

37. *Pteronemobius concolor* (Walker)

1871. *Eneoptera concolor* Walker, *Cat. Derm. Salt. Br. Mus.*, 5 (Suppl.) : 10.

1969. *Pteronemobius concolor* : Chopard, *Fauna of India, Grylloid.*, 2 : 159,160.

Material examined : Bankura Dist. : 1 (M), Bankura, 11.iii.1986, K.P. Mukherjee; 1 (M), 1 (F), Joypur, 23.xi.1986, T.R. Mitra. Maldah Dist. : 2 (F), Nalakhokson, 20.iv.1987, K.P. Mukherjee; 2 (F), Nimbari, 24.vi.1987, K.P. Mukherjee. Medinipur Dist. : 2 (M), 1 (F), Jhargram, 6.ix.1985, S. Biswas. Puruliya Dist. : 1 (M), 1 (F), Puruliya, 3.xi.1985, S. Sen.

Diagnosis : Smaller than *indicus* (6-7.5 mm); general shape more elongated; last two joints of

maxillary palpi concolorous; lateral lobes of pronotum and lateral field of elytra of the same colour as the upper part; posterior femora unicolours; posterior tibiae with 4 spines on each margins; elytra usually extending to the apex of abdomen; colour of elytra and pronotum more or less of same colour; ovipositor shorter (2.5-3 mm), gently curved.

Distribution : India : West Bengal (Bankura, Calcutta, Darjiling, Maldah, Medinipur, Nadia, 24 Parganas and Puruliya Districts), Andaman, Assam, Kerala, Maharashtra, Manipur, Orissa, Rajasthan, Tamilnadu, Tripura and Uttar Pradesh. Elsewhere : Afghanistan; Burma; Malaya; Perak; Sri Lanka and Turkistan.

Remarks : We have not found this species in the present collection. Chopard (1969) and Bhowmik (1977) have reported it from West Bengal. All the specimens are macropterous.

38. *Pteronemobius fascipes* (Walker)

1869. *Eneoptera fascipes* Walker, *CA. Derm. Salt. Br. Mus.*, 1 : 67.

1969. *Pteronemobius fascipes* : Chopard, *Fauna of India, Grylloid.*, 2 : 164.

Material examined : Bankura District : 1 (M), 1 (F), Sonamukhi forest, 8.iii.1986, K.P. Mukherjee; 1 (F), Unda, 26.ix.1987, M. Prasad; 1 (F), Joyrambati, Roypukri, 27.ix.1987, M. Prasad; 1 (F), (nymph), Joypur, 28.ix.1987, M. Prasad. Barddhaman Dist. : 1 (M), 2 (F), Asansol, 18.x.1985, S.K. Ghosh. Birbhum Dist. : 1 (M), 2 (F), Suri, 6.x.1987, M. Prasad. Jalpaiguri Dist. : 1 (M), Apalchand Forest (2), 11.x.1987, S.K. Tandon; 3 (F), Bania forest, Chilapata, 14.x.1987, S.K. Tandon. Maldah Dist. : 1 (F), Maldah (Nalakovhson), 26.vi.1987, K.P. Mukherjee. Medinipur Dist. : 1 (M), Garbeta, 22.ix.1985, A.K. Hazra; 2 (F), Chikigarh, 20.xii.1985, A.K. Hazra; 1 (M), Shankarpur, 25.xii.1985, A.K. Hazra. Puruliya Dist. : 1 (M), Puruliya, 3.xi.1985, S. Sen; 1 (F), Velladih, 18.ix.1987, M. Prasad; 1 (M), 1 (F), Bhalugri Hill, 19.ix.1987, M. Prasad; 1 (F), Jhalda, 20.ix.1987, M. Prasad.

Diagnosis : Of very small size (5 mm); head blackish with 4 pale lines on the occiput; maxillary palpi blackish at base, with 4th & 5th joints white; anterior and median femora whitish in their basal half, brownish in the apical half; posterior femora testaceous, adorned with three blackish bands; posterior tibiae brown, annulated with whitish, 3 spines on external and 4 on internal in male, 3 on each margin in the female.

Distribution : India : West Bengal (Bankura, Barddhaman, Birbhum, Calcutta, Darjiling, Jalpaiguri, Maldah, Medinipur, 24 Parganas and Puruliya), Arunachal Pradesh, Assam, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Sikkim, Tamilnadu, Tripura and Uttar Pradesh; Burma; China; Malaysia; Philippines; Taiwan.

Remarks : Very commonly distributed in India.

39. *** *Pteronemobius indicus* (Walker)

1869. *Nemobius indicus* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 58.

1969. *Pteronemobius indicus* : Chopard, *Fauna of India, Grylloid.*, 2 : 158.

Diagnosis : Of small size (7.5-8.5 mm), but large to the genus; colouration uniformly pale testaceous; head feebly marked with lines; posterior tibiae adorned with 4 spines on each margin in both sexes; genitalia forming a forceps with double branches.

Distribution : India : West Bengal (Jalpaiguri District), Assam, Maharashtra, Tamilnadu. Elsewhere : Burma; Malaya; Pahang and Sri Lanka.

Remarks : We have not studied this species in our collection. However, Bhowmik (1976) has reported it from West Bengal.

40. * *Pteronemobius montanus* Chopard

1933. *Pteronemobius montanus* Chopard, *Stylops*, 2 : 117.

1969. *Pteronemobius montanus* : Chopard, *Fauna of India, Grylloid.*, 2 : 158.

Diagnosis : Of very small size (4 mm); head large, as wide as pronotum, feebly marked dark bands on the occiput; last joint of palpi darker; abdomen brown above, yellowish beneath; posterior tibiae armed with 4 internal, 3 external spines, the first internal very small; wings short; genitalia more strongly curved at apex than those of *concolor*.

Distribution : India : West Bengal (Darjiling), Assam, Sikkim. Elsewhere : Upper Burma.

Remarks : We have not studied this species in the present collection. However, Chopard (1969) reported it from Darjiling District.

41. * *Pteronemobius pantelchopardorum* Shishodia & Varshney

1969. *Pteronemobius panteli* Chopard, *Fauna of India, Grylloid.*, 2 : 158, 167.

1987. *Pteronemobius pantelchopardorum* Shishodia & Varshney, *J. Bombay Nat. Hist. Soc.*, 84(1) : 168.

Diagnosis : Of very small size (5 mm); general shape short and stout; uniformly brown in colour; shining and glabrous; maxillary palpi brown with the two last joints white; lateral lobes of pronotum and lateral field of elytra of the same colour as the upper part; elytra extending to the apex of abdomen; posterior femora unicolorous; posterior tibiae with 3 external and 4 internal spines, the first tuberculiform, 4th strongly swollen at base, in female 3 spines on each margin; wings absent.

Distribution : India : West Bengal (Darjiling Dist.), Kerala.

Remarks : We have not found this species in the present collection.

42. * *Pteronemobius rufipes* Chopard

1969. *Pteronemobius rufipes* Chopard, *Fauna of India, Grylloid.*, 2 : 158, 163.

Diagnosis : Of very small size (5 mm); body blackish brown with light rufous legs; 4th and 5th joints of maxillary palpi white; abdomen blackish; lateral lobes of pronotum and lateral field of elytra of the same colour as the upper part; elytra extending to the apex of abdomen; posterior femora unicolorous; posterior tibiae with 3 long spines on each margin in the female sex; wings absent.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the present collection.

43. * *Pteronemobius (?) strigipennis* (Chopard)

1928. *Nemobius (?) strigipennis* Chopard, *Rec. Indian Mus.*, 30 : 4.

1969. *Pteronemobius (?) strigipennis* : Chopard, *Fauna of India, Grylloid.*, 2 : 158, 168.

Diagnosis : Of very small size (5.5 mm); head brown, forehead adorned with seven yellow stripes, extending on occiput and vertex; maxillary palpi with first three joints brown, 4th nearly white, 5th long, triangular, whitish in its basal half, apex brownish; pronotum adorned with yellow stripes and spots; elytra extending almost to the apex of abdomen, dorsal field with four longitudinal veins, separated by false veins.

Distribution : India : West Bengal (Calcutta, Darjiling District).

Remarks : We have not studied this species in the present collection. Chopard (1969) and Bhowmik (1969) reported it from West Bengal.

44. *Pteronemobius taprobanensis* (Walker)

1869. *Trigonidium taprobanensis* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 102.

1969. *Pteronemobius taprobanensis* : Chopard, *Fauna of India, Grylloid.*, 2 : 163.

Material examined : Barddhaman District: 2 (M), 4 (F), Asansol, 18.x.1985, S.K. Ghosh. Jalpaiguri Dist. : 1 (M), Palasbari, 24.xii.1986, R.S. Barman; 1 (M), Oodlabari, 9.x.1987, S.K. Tandon; 2 (M), 2 (F), Kathambari, 11.x.1987, S.K. Tandon; 1 (M), Joygaon, 13.x.1987, S.K. Tandon; 3 (M), 4 (F), Chilapata, 13.x.1987, S.K. Tandon; 2 (M), Bania forest, Chilapata, 14.x.1987, S.K. Tandon.

Diagnosis : Of very small size (5-5.3 mm); head fulvous above with four pale lines on the occiput; last joint of the maxillary palpi almost blackish; lateral margin of pronotum and lateral field of elytra blackish, contrasting with the upper which is testaceous; elytra extending to the apex of abdomen, spotted with brown above; posterior femora unicolorous; posterior tibiae armed with 3 external and 4 internal spines in male, and 3 on each margin in the female.

Distribution : India : West Bengal (Barddhaman, Calcutta, Darjiling, Medinipur, Maldah, Nadia, Jalpaiguri and 24-Parganas Districts), Andaman Isl., Arunachal Pradesh, Assam, Bihar, Karnataka, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamilnadu and Tripura. Elsewhere : Bangladesh; Burma;

China; Malacca; Malaysia; Perak; Sri Lanka and Vietnam.

Remarks : Widely distributed in India.

Genus *Scottiola* Uvarov, 1912

Key to the species of *Scottiola*

1. Size small (4.5-5 mm); ovipositor straight, apical valves with prominent teeth.....
.....*diverna* Bhowmik
- Size medium (9.2-9.5 mm); ovipositor upcurved, apical valves smooth, pointed.....
..... *elongata* Bhowmik

45. *** *Scottiola diverna* Bhowmik

1976. *Scottiola diverna* Bhowmik, *Indian Mus. Bull.*, 11(1) : 47.

Diagnosis : Of very small size (4.5-5 mm); male and female apterous; head, abdomen dark rufous contrasting with pronotum; legs, cerci, maxillary palpi and antennae pale yellowish; pronotum and abdomen without distinct bristles; anterior tibiae without tympanum, posterior tibiae with 3 external and 4 internal spines, 1st internal spine tuberculiform, 4th internal differentiated in female; ovipositor with superior apical valve with five teeth of which three are very prominent.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the present collection.

46. *** *Scottiola elongata* Bhowmik

1976. *Scottiola elongata* Bhowmik, *Indian Mus. Bull.*, 11 (1) : 47

Diagnosis : Of medium size (9.2-9.5 mm) but bigger to the genus; both the sexes are apterous, body pubescent except head; colouration black brown to brownish; head dark brown, shining, almost glabrous, densely pubescent; cerci longer than ovipositor; ovipositor with apical valves pointed and smooth; anterior tibiae unperforated, posterior tibiae with 3-4 spines on each side; subgenital plate of male navicular.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the present collection.

Genus *Speonemobius* Chopard, 1924

47. * *Speonemobius decolyi* Chopard

1969. *Speonemobius decolyi* Chopard, *Fauna of India, Grylloid.*, 2 : 170.

Diagnosis : Of very small size (6.2 mm); body short, broad, and dark in colour; head big and rounded; antennae yellowish with feebly marked and widely distant brown rings; pronotum broader than long; anterior tibiae perforated with an external, oval tympanum; posterior femora obliquely striated with brown on external face; elytra extending to the apex of abdomen; mirror with three cells in the apical part; wings absent.

Distribution : India : West Bengal (Darjiling District).

Remarks : No specimen of this species was found in the present collection. Chopard (1969) reported it from Kurseong (Darjiling Dist.)

Family SCLEROPTERIDAE

Genus *Scleropterus* Haan, 1842

Head small, globular; pronotum long, narrowing in front, disk punctated and rounded; anterior tibiae perforated; posterior tibiae without spines, but serrulated; elytra mirror large, divided by angulate vein; elytra in female with corneous and longitudinal veins.

Key to the species of *Scleropterus*

1. Elytra of male with 2 oblique veins..... *variolosus* Chopard
- Elytra of male with 3 oblique veins..... *coriaceus* (Haan)

48. ** *Scleropterus coriaceus* (Haan) (Map 5)

1842. *Gryllus (Scleropterus) coriaceus* Haan, *Temminck Verhandl. Orth.*, 232.

1969. *Scleropterus coriaceus* : Chopard, *Fauna of India, Grylloid.*, 2 : 211.

Material examined : Sex (?), Kalimpong, 2000-4500 ft., Darjiling Dist., Sutherland.

Diagnosis : Of medium size (9.5-11.5 mm); black in colour; head and pronotum finely punctate; frontal rostrum as wide as first antennal joint; antennae black with a wide whitish ring in the middle; pronotum longer than broad, narrowing in front; anterior and median legs yellowish, the femora darkened laterally, posterior femora short, blackish, apex yellowish; posterior tibiae with 12 small denticles on external and 6 large on internal side; elytra extend upto the apex in male and shorter than abdomen in female; mirror divided by a curved vein; 3 oblique veins; wings caudate.

Distribution : India : West Bengal (Darjiling), Assam, Kerala. Elsewhere : Burma; China; Japan; Java; Malaysia; Sarawak; Sumatra; Taiwan.

Remarks : Sex of specimen not known (damaged).

49. * *Scleropterus variolosus* Chopard

1933. *Scleropterus variolosus* Chopard, *Stylops*, 2 : 118.

1969. *Scleropterus variolosus* : Chopard, *Fauna of India, Grylloid.*, 2 : 213.

Diagnosis : Smaller than *coriaceus* (7.5 mm); head and pronotum as in *coriaceus*; antennae blackish with a yellow ring a little beyond the base; posterior femora shorter and thicker than *coriaceus*; elytra smoky, nearly extending upto the apex of abdomen; mirror may or may not be divided; 2 oblique veins; lateral field black, with 4 veins which are more regularly distant than *coriaceus*; wings short.

Distribution : India : West Bengal (24-Parganas Dist.). Elsewhere : Malaysia.

Remarks : No specimen of this species was found in this collection.

Family CACOPLISTIDAE

Genus *Cacoplistes* Brunner, 1873

Looks like beetle; head small and globular; vertex sloping; frontal rostrum narrow; pronotum almost square and excavated above; lateral edges lamellate in the shape of a crest; legs short; tibiae quadrangular; elytra extend to the apex of abdomen; wings short.

50. *Cacoplistes rogenhoferi* (Saussure)

1877. *Cachoplistus rogenhoferi* Saussure, *Mem. Soc. Geneve*, 25 : 329.

1977. *Cacoplistes rogenhoferi* : Chopard, *Fauna of India, Grylloid.*, 2 : 228.

Material examined : 1 (F), Calcutta, 1906, Museum Collector (Reg. No. 587/H 1), damaged.

Diagnosis : Of large size (24-25 mm); body black in colour, punctate, head small, globular; antennae black with a large white ring; elytra of male large, wide, with brown veins; mirror wider than long, presenting two parallel, equidistant dividing veins; 8-10 oblique veins; wings short.

Distribution : India : West Bengal (Calcutta, Darjiling Districts), Assam, Jammu & Kashmir.

Remarks : No specimen of this species have been found in the present collection.

Family PHALANGOPSIDAE

Key to the genera of Phalangopsidae

1. Superio-internal apical spur of the posterior tibiae shorter than the median.....*Arachnomimus* Saussure
- Superio-internal apical spur of the posterior tibiae longer than the median..*Speluncacris* Sjostedt

Genus *Arachnomimus* Saussure, 187851. *** *Arachnomimus nietneri* (Saussure)1878. *Arachnopsis nietneri* Saussure, *Mem. Soc. Geneve*, 25 : 442.1969. *Arachnomimus nietneri* : Chopard, *Fauna of India, Grylloid.*, 2 : 257.

Diagnosis : Of medium size (12 mm). Chopard (1969) has given the adequate description of this species. This species can easily be identified in having very long maxillary palpi with 5th joint abruptly and feebly enlarged near the apex only.

Distribution : India : West Bengal (Darjiling Dist.), Kerala. Elsewhere : Sri Lanka.

Remarks : Bhowmik (1976) has recorded this species from Ghoombanj in Darjiling District. The specimen were not available for study.

Genus *Speluncacris* Sjostedt, 191052. * *Speluncacris (?) annandalei* Chopard1928. *Speluncacris (?) annandalei* Chopard, *Rec. Indian Mus.*, 30 : 26.1967. *Speluncacris (?) annandalei* : Chopard, *Orthopterorum Catalogus*, Part 12 : 299.

Diagnosis : Of medium size (11 mm). Chopard (1928) has given the adequate description of the species.

Distribution : India : West Bengal (Darjiling District).

Remarks : Chopard (1928) has described this species on the basis of a single female and could not fix the real identity of the genus in the absence of male. During the present study, we could not found the species in the collection.

Family OECANTHIDAE

Genus *Oecanthus* Serville, 1831Key to the species of *Oecanthus*

1. Size larger (17 mm); anterior tibiae slightly dilated, the tympanum long and narrow.....
..... *rufescens* Serville
- Size smaller (14 mm); anterior tibiae more strongly dilated at base, the tympanum not so narrow
..... *indicus* Saussure

53. *Oecanthus indicus* Saussure

1878. *Oecanthus indicus* Saussure, *Mem. Soc. Geneve*, 25 : 454.
 1969. *Oecanthus indicus* : Chopard, *Fauna of India, Grylloid*, 2 : 267.

Material examined : Maldah Dist. : 1 (M), Gangaramapur, 15.vi.1987, K.P. Mukherjee; 1 (M), Parbatidanga, 22.vi.1987, K.P. Mukherji; 1 (M), Bhaluk Stn. 26.vi.1987, K.P. Mukherjee. Murshidabad Dist. : 1 (M), 1 (F), Khandua village, Lalgola, 5.iii.1984, S.K. Mitra. Puruliya Dist. : 1 (F), Pancha, 29.xi.1986, T.R. Mitra.

Diagnosis : Of medium size (13-15 mm); slender, glabrous, whitish with almost transparent elytra; pronotum elongated; narrowing in front; anterior tibiae strongly dilated in basal half, with very large, oval tympanum; wings a little longer than elytra; ovipositor short.

Distribution : India : West Bengal (Darjiling, Maldah, Murshidabad and Puruliya District); Andaman, Tamilnadu, Tripura. Elsewhere : Amboine; China; Japan; Malaysia; Philippines and Sumba.

Remarks : Generally found among bushes in forest.

54. ** *Oecanthus rufescens* Serville

1830. *Oecanthus rufescens* Serville, *Ins. Orth.*, 361.
 1969. *Oecanthus rufescens* : Chopard, *Fauna of India, Grylloid.*, 2 : 268.

Material examined : 1 (F), Calcutta, 21.xii.1906, N. Annandale; 1 (F), Calcutta, 12.ii.1907, N. Annandale.

Diagnosis : Similar to *O. indicus*, but slightly larger (14.5-17 mm); anterior tibiae slightly dilated, the tympanum long and narrow, elytra of male slightly wider, the mirror longer than broad, wings longer than elytra.

Distribution : India : West Bengal (Calcutta), Maharashtra, Tamilnadu. Elsewhere : Australia; Celebes; Fiji; Malaysia; Sri Lanka; Timor

Family TRIGONIDIIDAE

Key to the genera of Trigonidiidae

1. Elytra glabrous..... 2
 Elytra with numerous fine pubescence hairs.....*Amusurgus* Brunner
2. Elytra venation quite different in both sexes, showing very neat anal field and mirror in male...3
- Elytra venation similar or almost similar in both sexes..... 5

3. Pronotum narrow and rounded in front; elytra presenting in the female false veins between the principal veins.....*Homoeoxipha* Saussure
- Pronotum with anterior margin slightly convex, but neither rounded nor strongly narrowing; no false veins between the principal veins in female..... 4
4. Elytra of male membranaceous, in female it is corneous and strongly convex.....*Paratrigonidium* Brunner
- Elytra membranaceous in both sexes, in female it is feebly convex.....*Anaxipha* Saussure
5. Elytra presenting false veins between the principal veins, and striated.....*Trigonidium* Rambur
- Elytra without false veins between the principal veins.....*Metioche* Stal

Genus *Amusurgus* Brunner, 1853Key to the species of *Amusurgus*

1. Face yellowish, more or less mottled with light brown; lateral field of the pronotum and elytra without any distinct brown band..*oedemeroides* (Walker)
- Face presenting two distinct colouration, the superior part dark brown, the inferior part yellow; lateral brown band on the pronotum and elytra distinct.....*lateralis* Chopard

55. * *Amusurgus lateralis* Chopard

1969. *Amusurgus lateralis* Chopard, *Fauna of India, Grylloid.*, 2 : 291.

Diagnosis : Of small size (7 mm); head a little rufous above; face presenting two very distinct colouration, superior part dark brown, inferior part yellow; lateral brown band on the pronotum and elytra distinct.

Distribution : India : West Bengal (Calcutta), Karnataka. Elsewhere : Malaysia; Sri Lanka and Sumatra.

Remarks : We have not found this species in the present collection. Chopard (1969) recorded it from West Bengal.

56. ** *Amusurgus oedemeroides* (Walker)

1871. *Eneoptera oedemeroides* Walker, *Cat. Derm. Salt. Br. Mus.*, 5 suppl. : 11.

1969. *Amusurgus oedemeroides* : Chopard, *Fauna of India, Grylloid.*, 2 : 290.

Material examined : 1 (F), Calcutta, 12.xi.1906, N. Annandale; 1 (F), Pashok, Darjiling., vi.1916, L.C. Hartless.

Diagnosis : Of very small size (6-7 mm); general colouration pale testaceous, face yellowish, mottled with light brown; pronotum narrowing in front; lateral lobes of the pronotum and lateral field of the elytra without any distinct dark brown band; elytra covered with numerous fine pubescence, veins of male elytra forming large cells but no trace of mirror, extending to the apex of abdomen; wings caudate.

Distribution : India : West Bengal (Calcutta and Darjiling Districts), Tamilnadu. Elsewhere : Burma; Sri Lanka.

Genus *Anaxipha* Saussure, 1874

57. *Anaxipha longipennis* (Serville)

1839. *Trigonidium longipennis* Serville, *Ins. Orth.*, : 351.

1969. *Anaxipha longipennis* : Chopard, *Fauna of India, Grylloid 2* : 278.

Material examined : 6 (M), 3 (F), Calcutta, 12,14.xi.1906, 11.i.1907 and 1.xi.1907, N. Annandale.

Diagnosis : Of very small size (5 mm); body narrow and slender; uniformly pale yellowish; head without rufous spots; last maxillary palpi triangulate, anterior tibiae perforated on each side with an oval tympanum; posterior femora without brown bands; elytra extend upto the apex of abdomen, mirror longer than broad, transparent; wings caudate.

Distribution : India : West Bengal (Calcutta), Andaman Island, Assam, Karnataka, Orissa and Tamilnadu. Elsewhere : Africa east; Asia tropical; Madagascar; Malaya; Mauritius; Philippines; Queensland; Seychelles; Sri Lanka.

Remarks : We have not found this species in the collection.

Genus *Homoeoxipha* Saussure, 1874

58. *Homoeoxipha lycoides* (Walker)

1869. *Phyllopalpus lycoides* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 71.

1969. *Homoeoxipha lycoides* : Chopard, *Fauna of India, Grylloid.*, 2 : 275.

Material examined : 1 (M), Calcutta, 17.ix.1906, N. Annandale; 1 (M), Calcutta, 29.x.1907, Museum Collector.

Diagnosis : Of very small size (5-5.3 mm); head dark rufous -brown, elongate, narrow towards the neck; pronotum narrowing in front; anterior tibiae blackish; posterior femora long and slender; elytra long and narrow, glabrous, transparent, whitish, with four large blackish spots in male, mirror very large than its width; wings generally caudate.

Distribution : India : West Bengal (Calcutta, Darjiling and Jalpaiguri Dists.), Arunachal Pradesh, Assam, Bihar, Karnataka, Tamilnadu; Burma; China; Malaysia; Queensland; Sri Lanka; Taiwan.

Remarks : Bhowmik (1976) has reported it from North Bengal.

Genus *Metoche* Stal, 1887

59. * *Metoche pallidinervis* Chopard

1928. *Metoche pallidinervis* Chopard, *Rec. Indian Mus.*, 30 : 28.

1969. *Metoche pallidinervis* : Chopard, *Fauna of India, Grylloid.*, 2 : 297.

Diagnosis : Of small size (7 mm) but large to the genus; body elongated; head convex above, rufous, with two brown spots on the occiput; 5th joint of maxillary palpi a little longer and widen at apex; pronotum nearly black, lateral lobes yellowish at inferior; anterior tibiae perforated on external face; elytra black with yellow veins; wings long, black and iridescent.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the present collection.

Genus *Paratrigonidium* Brunner, 1839

60. * *Paratrigonidium unifasciatum* Chopard

1928. *Paratrigonidium unifasciatum* Chopard, *Rec. Indian Mus.*, 30 : 28.

1969. *Paratrigonidium unifasciatum* : Chopard, *Fauna of India, Grylloid.*, 2 : 286.

Diagnosis : Of very small size (5.5 mm); head brown, with three indistinct light bands on occiput; antennae with first two joints brown; pronotum blackish brown; anterior and middle legs blackish brown; posterior femora presenting a broad, longitudinal brown band; elytra transparent except for three smoky spots; mirror as long as broad, lateral field with 3 veins, the superior of which straight, the other two sinuate; wings short.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the present collection.

Genus *Trigonidium* Rambur, 1839

Key to the species of *Trigonidium*

1. Elytra strongly convex; wings short; anterior tibiae unperforated..... *cicindeloides* Rambur
- Elytra longer and less convex; wings usually caudate; anterior tibiae perforated.....
.....*humbertianum* (Saussure)

61. *Trigonidium cicindeloides* Rambur

1839. *Trigonidium cicindeloides* Rambur, *Fauna Andal.*, 2 : 39.

1969. *Trigonidium cicindeloides* : Chopard, *Fauna of India, Grylloid.*, 2 : 304.

Material examined : Bankura District : 1 (F), Simplipal, 31.x.1985, M. Dutta. Barddhaman Dist. : 2 (M), Asansol, 18.x.1985, S. K. Ghosh. Birbhum Dist. : 1 (F), Illambazar, 14.iii.1986, K.P. Mukherjee. Jalpaiguri Dist. : 1 (F), Bhatkhawa, 16.xii.1986, B.C. Das; 2 (F), Alipurwar, 14.i.1987, V.D. Srivastava; 1 (M), 1 (F), Bagracot, 11.x.1987, S.K. Tandon; 2 (F), Joygaon, 13.x.1987, S.K. Tandon. Medinipur Dist. : 1 (F), Kapra village, 25.xii.1985, A.K. Hazra. Murshidabad Dist. : 3 (M), 1 (F), Ajimgunj, 5.ii.1986, I.J. Gupta. Puruliya Dist. : 2 (M), 2 (F), Puruliya, 2.xi.1985, S. Sen.

Distribution : India: West Bengal (Bankura, Barddhaman, Birbhum, Calcutta, Darjiling, Jalpaiguri, Murshidabad and Puruliya Districts), Andaman Islands, Arunachal Pradesh, Assam, Bihar, Tamilnadu. Elsewhere : Africa; Asia; Comorron; Madagascar; Mauritius Island; Mediterranean region.

62. *Trigonidium humberianum* (Saussure)

1878. *Homoeoxipha humberianus* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 25 : 468.

1969. *Trigonidium humberianum* : Chopard, *Fauna of India, Grylloid.*, 2 : 305.

Material examined : Barddhaman Dist. : 1 (M), Durgapur, 15.x.1985, S.K. Ghosh. Calcutta : 3 (M), Calcutta, 21.xi.1907, Museum Collector. Darjiling District : 1 (M), Kurseong, E. Himalaya, 10-26.ix.1909, N. Annandale. Jalpaiguri Dist. : 1 (F), Rajabhat Khawa, 16.xii.1986, B.C. Das; 1 (M), Joygaon, 17.xii.1986, R.S. Barman; 1 (M), Alipurwar, 14.i.1987, V.D. Srivastava. Koch Bihar Dist. : 1 (M), 3 (F), Toofangunj, 12.xii.1986, R.S. Barman. Maldah Dist. : 1 (M), Agriculture farm, Maldah, 19.xii.1986, B.C. Das; 1 (F), Gaur, 20.xii.1986, B.C. Das. Medinipur Dist. : 1 (M), Belpahari, 8.viii.1985, B.C. Das; 2 (F), Kakrajhar forest, 19.xii.1985, A.K. Hazra; 2 (M), Kapra village, 25.xii.1985, A.K. Hazra. Murshidabad Dist. : 1 (M), Berhampur, 11.ii.1986, I. J. Gupta. Puruliya Dist. : 1 (M), Puruliya, 3.xi.1985, S. Sen; 1 (M), Velladih village, 18.ix.1987, M. Prasad. W. Dinajpur Dist. : 1 (M), Islampur, Chowsia, 10.xii.1986, B.C. Das.

Diagnosis : This species is similar in general aspect, colour, elytral venation and genitalia of male; ovipositor of female also same as in the preceding species. However, it differs from it in the characters as mentioned in the key.

Distribution : India : West Bengal (Barddhaman, Calcutta, Darjiling, Jalpaiguri, Koch Bihar, Maldah, Medinipur, Murshidabad, Puruliya and W. Dinajpur Districts), Assam, Bihar, Kerala, Maharashtra, Orissa, Tamilnadu and Tripura. Elsewhere : Malaya and Sri Lanka.

Remarks : It is distributed only in the Oriental Region.

Family ENEOPTERIDAE

Key to the Subfamilies

1. Posterior tibiae usually armed with three long apical spines..... 2
- Posterior tibiae with short, subequal external apical spines; posterior metatarsi short.....
..... Podoscirtinae
2. Head big; frontal rostrum with parallel margins; eyes protruding laterally; elytra of male moderately wide; generally with 2 oblique veins..... Eneopterinae
- Head small; frontal rostrum somewhat narrowing in front; eyes protruding forwards; elytra of male very wide, with several oblique veins..... Itarinae

Subfamily PODOSCIRTINAE

Key to the genera of Podoscirtinae

1. Elytra of male with well developed mirror..... *Madasumma* Walker
- Elytra with similar venation in both sexes..... 2
2. Elytra veins very regular, longitudinal and parallel..... *Patiscus* Stal
- Elytra veins more or less oblique and irregular..... *Euscyrtus* Guerin

Genus *Euscyrtus* Guerin, 1844Key to the species of *Euscyrtus*

1. Frontal rostrum as wide or almost as wide as the first antennal joint..... *hemelytrus* (Haan)
- Frontal rostrum narrower than the first antennal joint..... *concinus* (Haan)

63. * *Euscyrtus concinns* (Haan)

1842. *Gryllus (Eneoptera) concinns*, Haan, *Temminck Verhandel., Orth.* : 231.

1969. *Euscyrtus concinns* : Chopard, *Fauna of India, Grylloid.*, 2 : 394.

Diagnosis : Of small size (8-10 mm); head with 4 broad brown bands; frontal rostrum as long as the first joint of antennae; anterior ocellus placed almost in the middle; pronotum with 2 yellowish humeral bands; lateral lobes with a wide brown band; 9th tergite of abdomen large, hollowed in the middle; subgenital plate of male long, acute at apex; posterior tibiae armed with 8 external and 10 internal spines; elytra with a pale brown band on the sides; mirror with 4 oblique veins; wings caudate.

Distribution : India : West Bengal (Calcutta and environs), Andaman Islands, Arunachal Pradesh, Assam, Karnataka. Elsewhere : Asia Tropical; Australia North; Burma; Cochin China; Java; Malaya and Malaya Archipelago; Moluccas; Philippines; Selangor; Singapore and Sri Lanka.

Remarks : We have not found this species in the present collection.

64. *Eusyrthus hemelytrus* (Haan)

1842. *Gryllus (Eneoptera) hemelytrus* Haan, *Temminck Verhandel., Orth.*, : 231.
 1969. *Eusyrthus hemelytrus* : Chopard, *Fauna of India, Grylloid.*, 2 : 392.

Material examined : Jalpaiguri Dist. : 1 (F), Chilapata, 15.x.1987, S.K. Tandon Medinipur Dist. : 3 (M), 1 (F), Medinipur, 3.vi.1971, S. Khera and Party. West Dinajpur Dist. : 3 (M), 1 (F), Islampur, Chowsia, 10.ii.1986, B.C. Das; 4 (M), 2 (F), Birnagar, Raigunj, 16.xii.1986, B.C. Das; 1 (M), 5 (F), Tunidighi, 26.xi.1987, T.R. Mitra.

Diagnosis : Of small size (8-10 mm) and slender; frontal rostrum short, flattened above, as wide or almost as wide as the first antennal joint; anterior ocellus placed almost at apex; head little broader than pronotum, adorned with 4 broad longitudinal brown bands; elytra short, rounded at apex; wings as long as elytra; ovipositor sinuated in the shape of 'S'

Distribution : India : West Bengal (Calcutta, Darjiling, Jalpaiguri, Mednipur and West Dinajpur Districts) Andaman Islands, Asam and Orissa. Elsewhere : China; Korea; Japan; N. Australia; Taiwan; Asia tropical (Including Batavia, Burma, Moluccas, Malaya, Java and Sri Lanka).

Remarks : It may be collected in large numbers either by sweeping or at light.

Genus *Madasumma* Walker, 1860.

Key to the species of *Madasumma*

1. Elytral mirror almost as long as wide; body smaller (22 mm)..... *gravelyi* Chopard
 - Elytral mirror longer than broad; body longer (25 mm)..... *darjilingensis* Chopard

65. * *Madasumma darjilingensis* Chopard

1928. *Madasumma darjilingensis* Chopard, *Rec. Indian Mus.*, 30 : 34.
 1969. *Madasumma darjilingensis* : Chopard, *Fauna of India, Grylloid.*, 2 : 355.

Diagnosis : Size larger than *gravely* (25 mm); frontal rostrum narrowing in front; yellow stripe on the lateral lobes of pronotum and on the margins of elytral; 9th tergite of abdomen feebly notched, 10th widely notched; subgenital plate long and apex rounded; posterior tibiae with 5 spines on each margin; elytra wide, pubescent, without spot of yellow colour; mirror as long as broad, divided before the middle; 7 oblique veins, 3 straight, 4 short and curved; wings caudate.

Distribution : India : West Bengal (Darjiling District), Meghalaya. Elsewhere : Bhutan.

Remarks : We have not found this species in the present collection. Chopard (1928) has rcordeed it from West Bengal.

66. * *Madasumma gravelyi* Chopard1928. *Madasumma gravelyi* Chopard, *Rec. Indian Mus.*, 30 : 33.1969. *Madasumma gravelyi* : Chopard, *Fauna of India, Grylloid.*, 2 : 354.

Diagnosis : Of large size (22 mm), but smaller to the genus; shape elongated; frontal rostrum as broad as the first antennal joint; ocelli small; elytra without any white spots, long, narrow, with a lateral yellow band; mirror longer than broad; 5 oblique veins, 3 short and curved, 2 long and parallel; wings longer than elytra; subgenital plate long, triangular; genitalia with a very long median process.

Distribution : India : West Bengal (Darjiling District).

Remarks : We have not found this species in the present collection. Chopard (1928) has reported it from West Bengal.

Genus *Patiscus* Stal, 187767. ** *Patiscus cephalotes* (Saussure)1878. *Euscirtus cephalotes* Saussure, *Mem. Soc. Geneva*, 25 : 628.1969. *Patiscus cephalotes* : Chopard, *Fauna of India, Grylloid.*, 2 : 402.

Material examined : 1 (M), Pashok, Darjiling District, 26.V. and 14.vi. 1916, F.H. Gravely.

Diagnosis : Of medium size (15-17 mm); head wider than pronotum; frontal rostrum long and parallel margins; eyes horizontally lengthened; pronotum square, lateral margin with a brown band in continuation of a band of the head behind the eyes; elytra extend upto the middle of abdomen, dorsal field with 5 straight veins, lateral field with 5 veins; wings shorter than elytra; ovipositor sinuated.

Distribution : India : West Bengal (Darjiling District), Assam, Sikkim. Elsewhere : Taiwan.

Remarks : This specimen is deposited in Zoological survey of India, by Chopard, but could not be included in his fauna as well as in Catalogue. Hence it is the first record from the State.

Subfamily ENEOPTERINAE

Genus *Xenogryllus* Bolivar, 1890

Frontal rostrum as wide as first antennal joint; pronotum narrow in front; posterior femora relatively short; posterior tibiae almost serrulated at the base; elytra of male large and divided by a straight vein, female elytra with oblique veins.

Key to the species of *Xenogryllus*

1. Size large (25-31 mm); mirror longer than wide; subgenital plate of female deeply notched at apex *transversus* (Walker)

Size small (17 mm); mirror as long as wide; subgenital plate of female feebly emarginate at apex
*carmichaeli* (Chopard)

68. * *Xenogryllus carmichaeli* (Chopard)

1928. *Dionymus carmichaeli* Chopard, *Rec. Indian Mus.*, 30 : 30.

1969. *Xenogryllus carmichaeli* : Chopard, *Fauna of India, Grylloid.*, 2 : 310.

Diagnosis : Of small size (17 mm); head-small, indistinct light bands on the occiput; frontal rostrum broad, truncated at apex; mirror as long as wide, 5 oblique veins, transverse veinlets numerous in female; subgenital plate of female very feebly emarginate at apex; wing caudate.

Distribution : India : West Bengal (Darjiling District). Elsewhere : China.

Remarks : Chopard (1928) has reported it from Darjiling District.

69. *** *Xenogryllus transversus* (Walker)

1869. *Platydictylus transversus* Walker, *Cat. Derm. Salt. Br. Mus.*, 1 : 88.

1969. *Xenogryllus transversus* : Chopard, *Fauna of India, Grylloid.*, 2 : 310.

Diagnosis : Of large size (male 31, female 25 mm); brown lines distinct on head and these extend upto the pronotum; elytra longer than abdomen; mirror a little longer than wide; oblique veins longer, straight, parallel and 2 in number; wings longer than elytra; subgenital plate of female deeply notched at apex.

Distribution : India : West Bengal (Darjiling District), Assam, Sikkim. Elsewhere : Bangladesh and Burma.

Remarks : We have not found this species in the present collection. Bhowmik (1976) has reported it from Siliguri (Darjiling District).

Subfamily ITARINAE

Genus *Itara* Walker, 1869

Head small, rounded; frontal rostrum wide, convex above; pronotum strongly narrowing in front; posterior femora short, feebly dilated at base; posterior tibiae serrulated and armed with short spines; elytra of male large, wide; mirror transverse; oblique veins numerous, apical field Long.

70. * *Itara minor* Chopard

1925. *Itara minor* Chopard, *Ann. Soc. ent. Fr.*, 96 : 312.

1969. *Itara minor* : Chopard, *Fauna of India, Grylloid.*, 2 : 316.

Diagnosis : Of medium size (15-16 mm); lateral lobes and apex of posterior femora brown; apical field of male elytra shorter, with 6 veins only; genitalia with superior bridge less truncated and denticulated.

Distribution : India : West Bengal (Darjiling District), Kerala, Meghalaya. Elsewhere : Malaya; Pahang; Selangor; Tonkin and Vietnam.

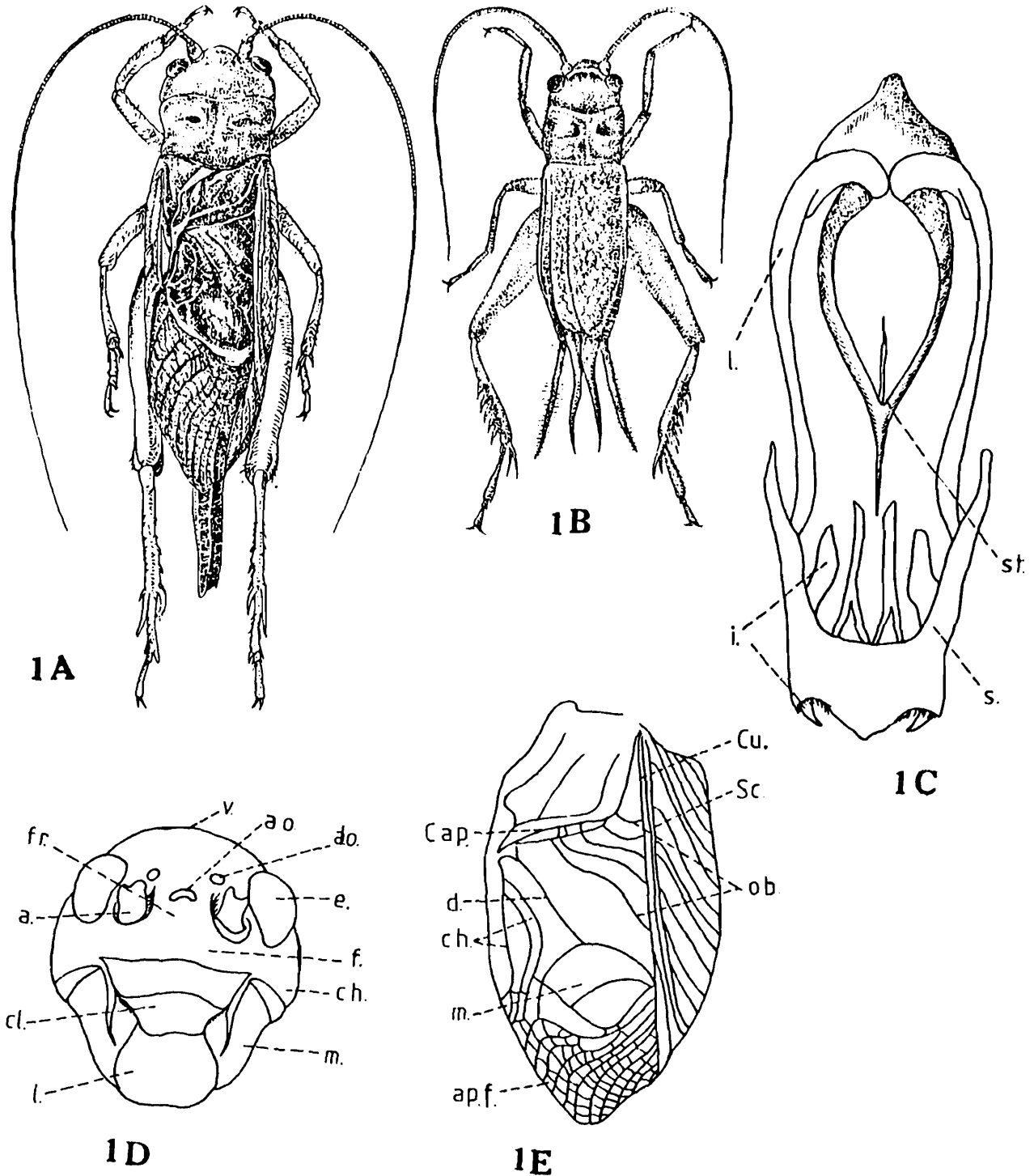
Remarks : No specimen of this species was found in the present collection. Chopard (1925) has recorded it from West Bengal.

SUMMARY

The present paper deals with 70 species of Grylloidea, eight species are being recorded for the first time from the State of West Bengal. The distribution, diagnosis of each species is also given.

ACKNOWLEDGEMENTS

We offer our grateful thanks to the Director, Zoological Survey of India, for his keen interest and encouragement in this work and to Dr. A.K. Ghosh, Joint Director, Co-ordinator, West Bengal Fauna Project for useful suggestion. We are also thankful to Dr. A. Singh and Dr. S.K. Bhattacharya, Joint Directors for helping us in many ways to complete this work. Our thanks are also due to officers and staff of the survey for the collection of this interesting material from West Bengal.



1A : Showing the external morphology of a typical cricket, *Brachytrypes terrificus* Walker, dorsal view, male. 1B. Showing the external morphology of *Acheta domestica* Linne; dorsal view, female. 1C. External genitalia of *Acheta domestica* Linne. s. - superior part of pseudepiphallus; i. - inferior part of pseudepiphallus; l. - lateral rod; st. - stile of the spermatophore sac. 1D. Head of typical *Gryllus* sp. : a.o. - anterior ocellus; l.o. - lateral ocellus; a. base of antennae; e. - eyes; f. - forehead; fr. - frontal rostrum; v. - vertex; ch. - check; m. - mandible; cl. - clypeus; l. labrum. 1E. Male elytron of *Acheta domestica* : Sc. subcoastal vein; Cu. - cubital vein; Cup. - posterior branch of cubital; ob. - oblique vein; ch. - chords; m. - mirror; ap.f. - apical field; d. diagonal vein.

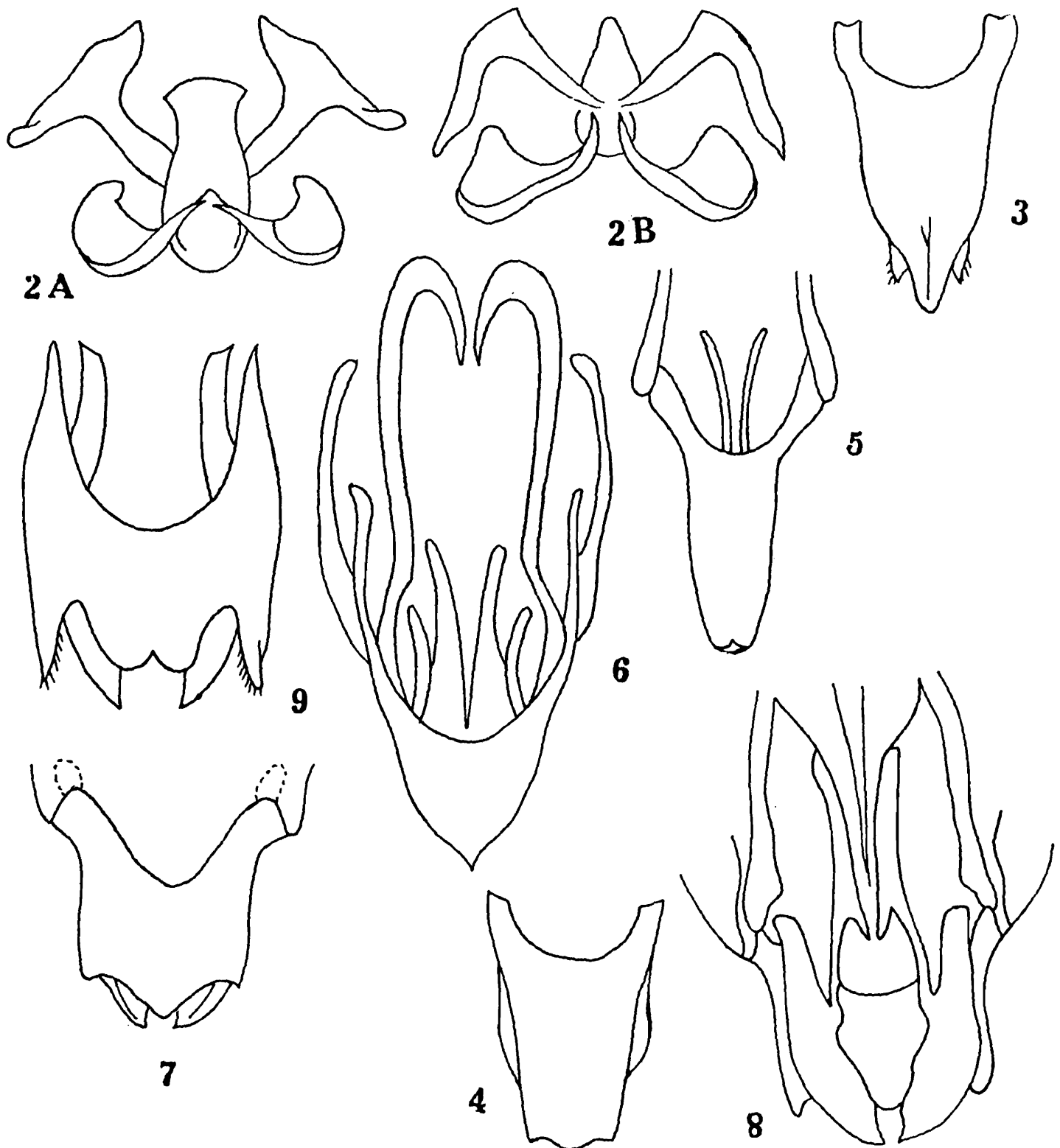


Diagram showing the genitalia of - 2A. *Gryllotalpa orata* Walker; 2B. *Gryllotalpa africana* Beauvois; 3. *Taleogryllus testaceus* (Walker); 4. *Teleogryllus mitratus* (Burmeister); 5. *Teleogryllus himalayanus* (Chopard); 6. *Plebeiogryllus guttiventris* (Walker); 7. *Acheta domesticus* Linne, dorsal view; 8. *Acheta domesticus* Linne, ventral view of apical end. 9. *Velarifictorus parvus* (Chopard)

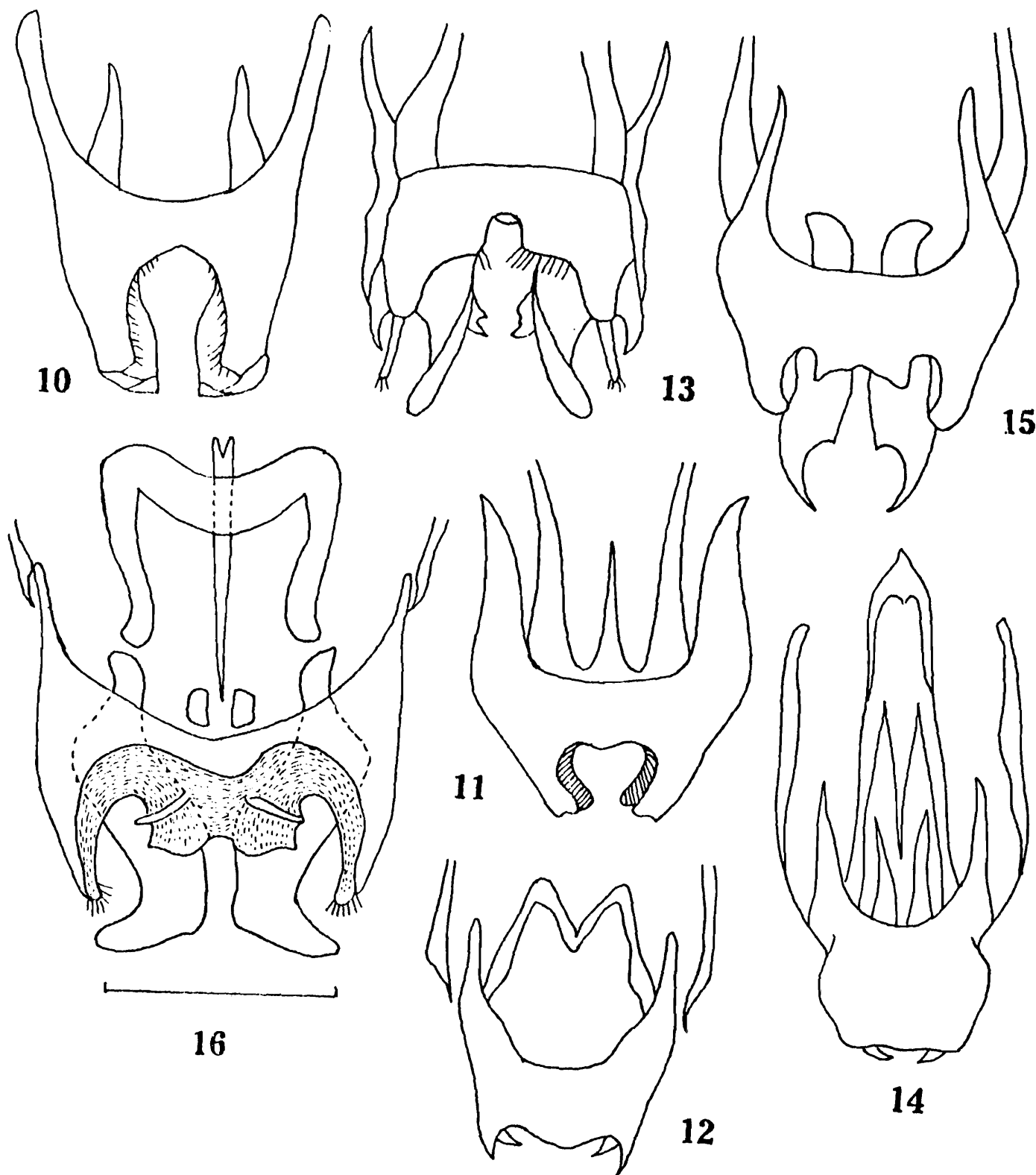
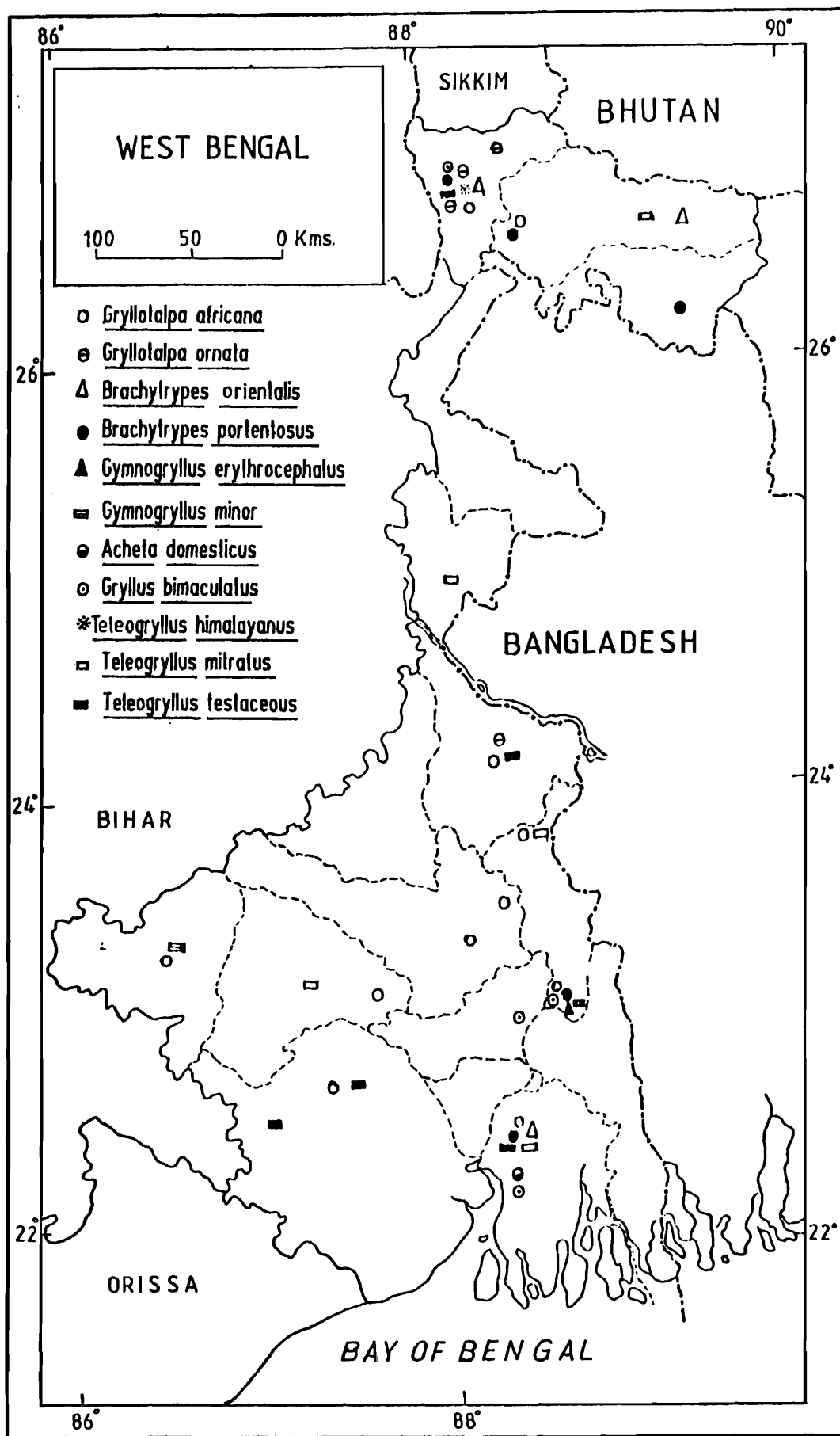
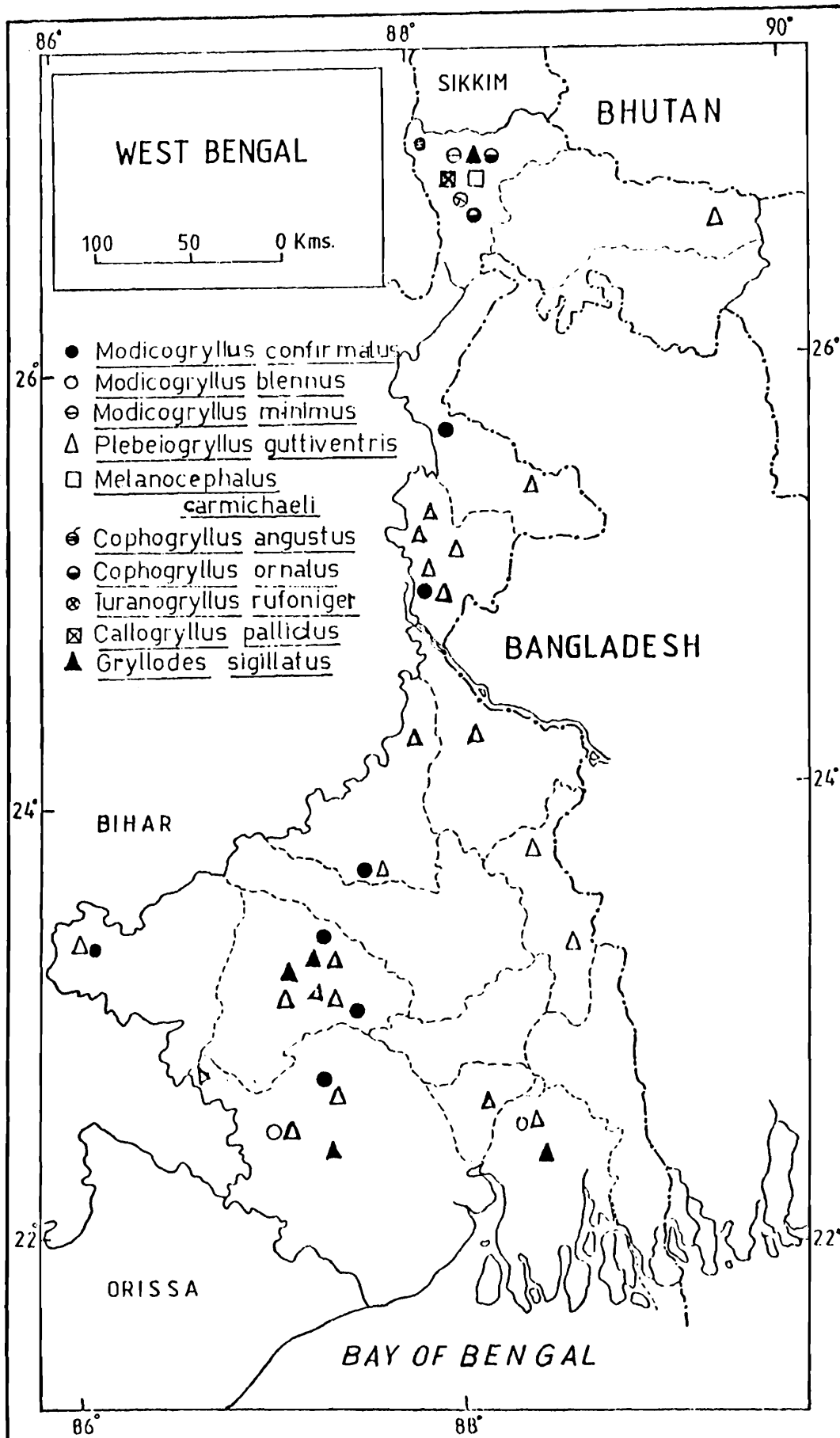


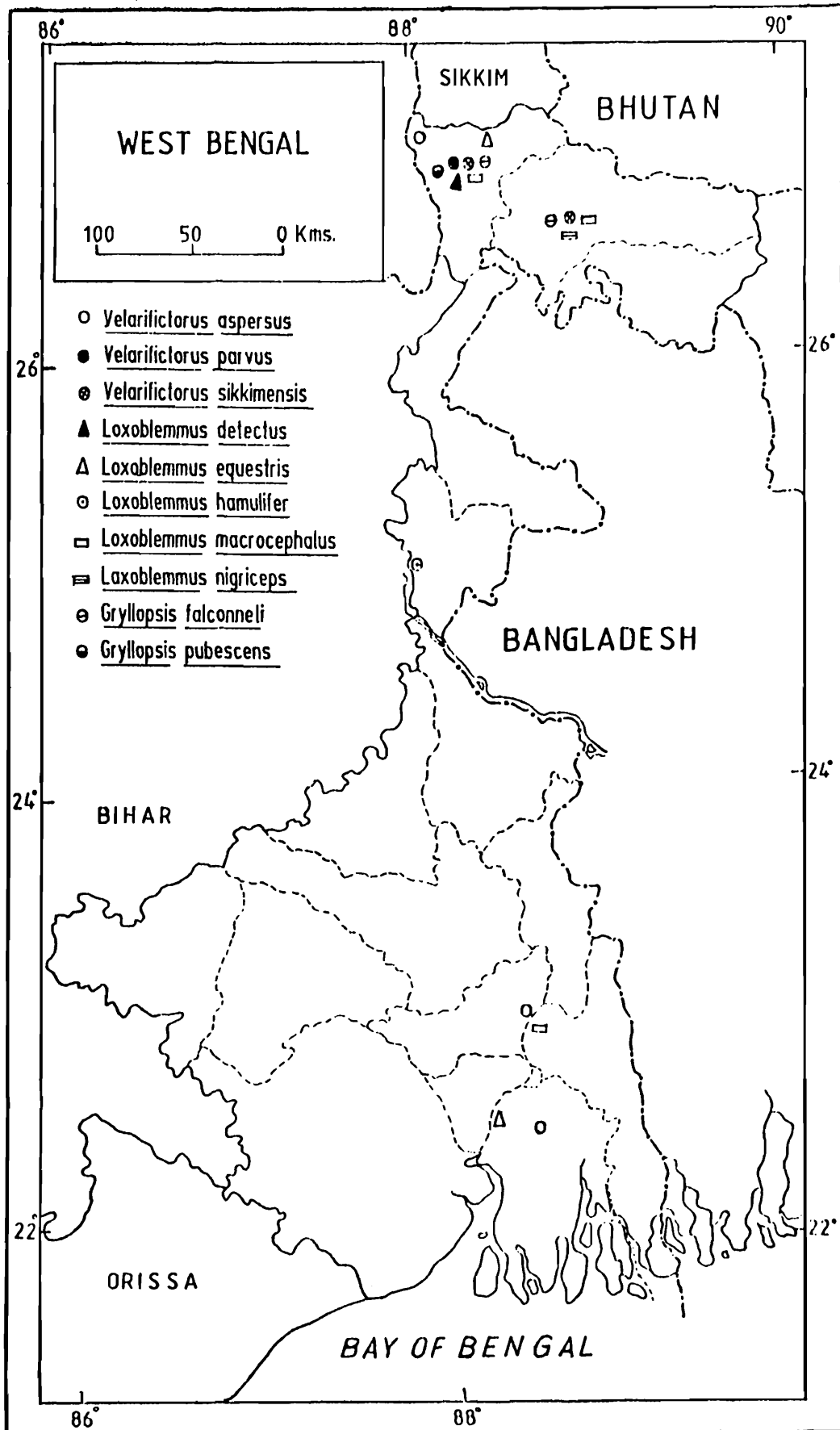
Diagram showing the genitalia of - 10. *Modicogryllus confirmatus* (Walker); 11. *Modicogryllus blennus* (Saussure); 12. *Modicogryllus minimus* (Chopard); 13. *Turanogryllus rufoniger* (Chopard); 14. *Platygylluocephalus* (Serville); 15. *Velarifictorus aspersus* (Walker); 16. *Velarifictorus sikkimensis* (Bhowmik).



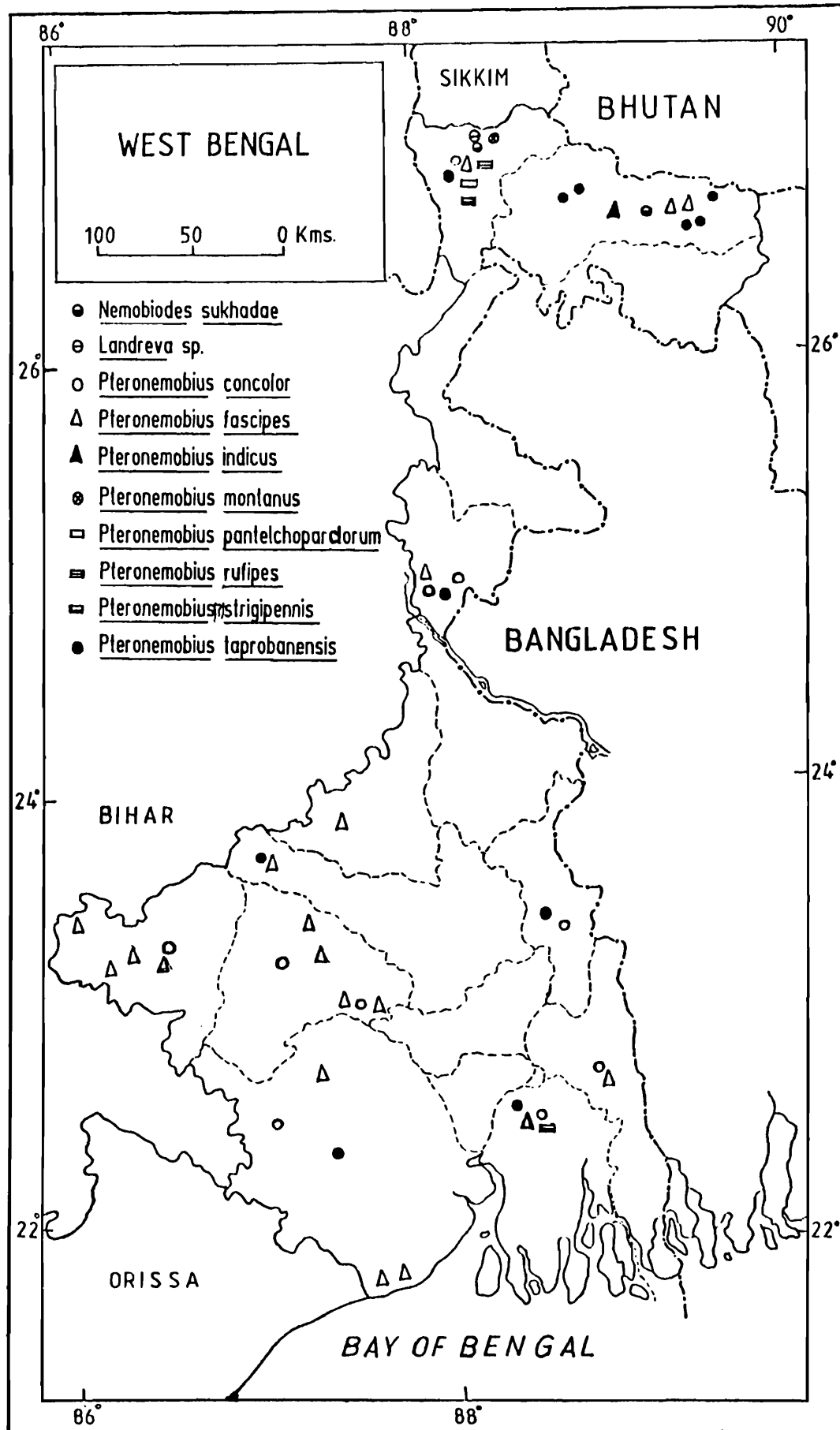
Map 1. Showing the distribution of 11 species of Grylloidea.



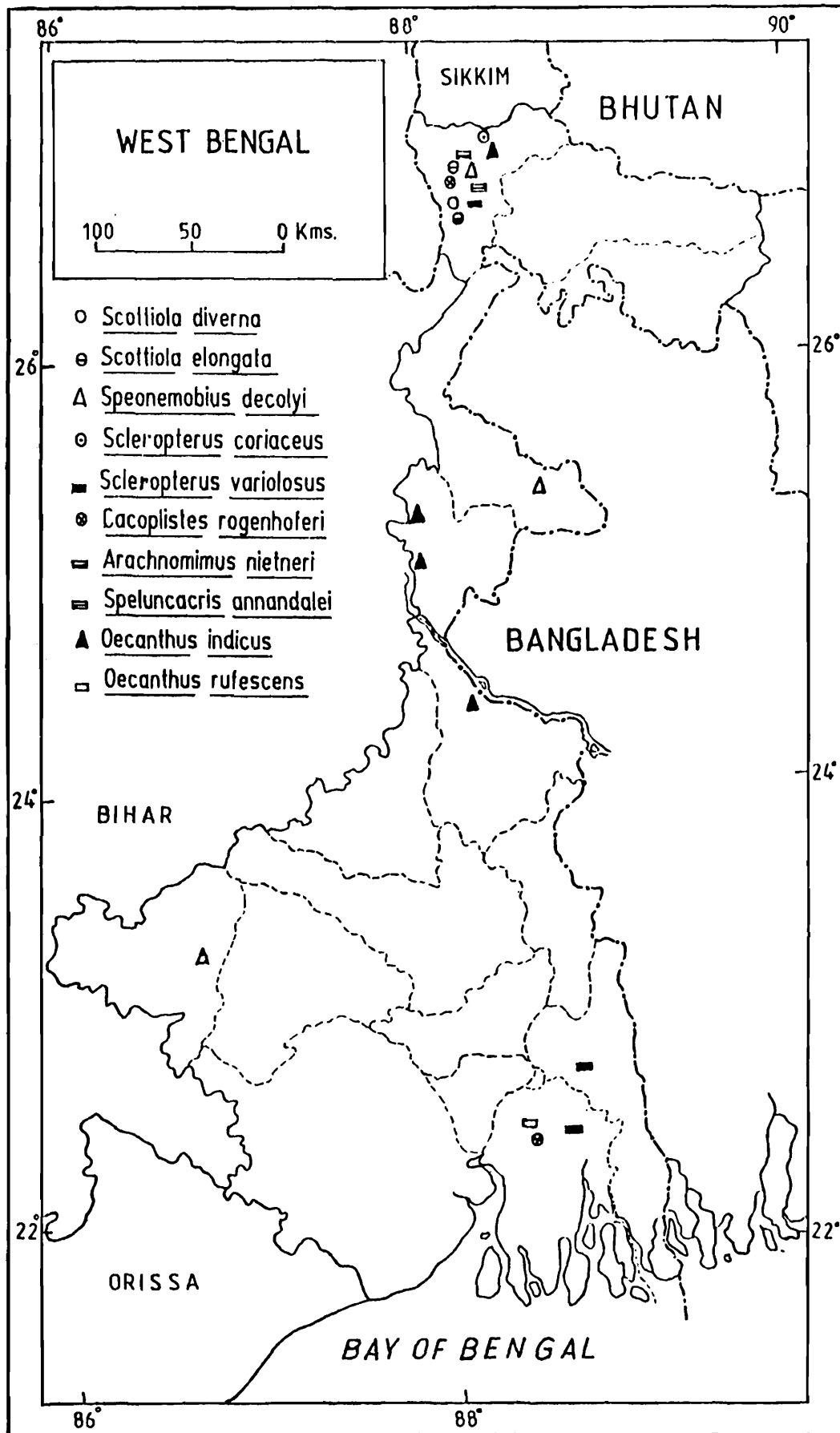
Map 2. Showing the distribution of 10 species of Grylloidea.



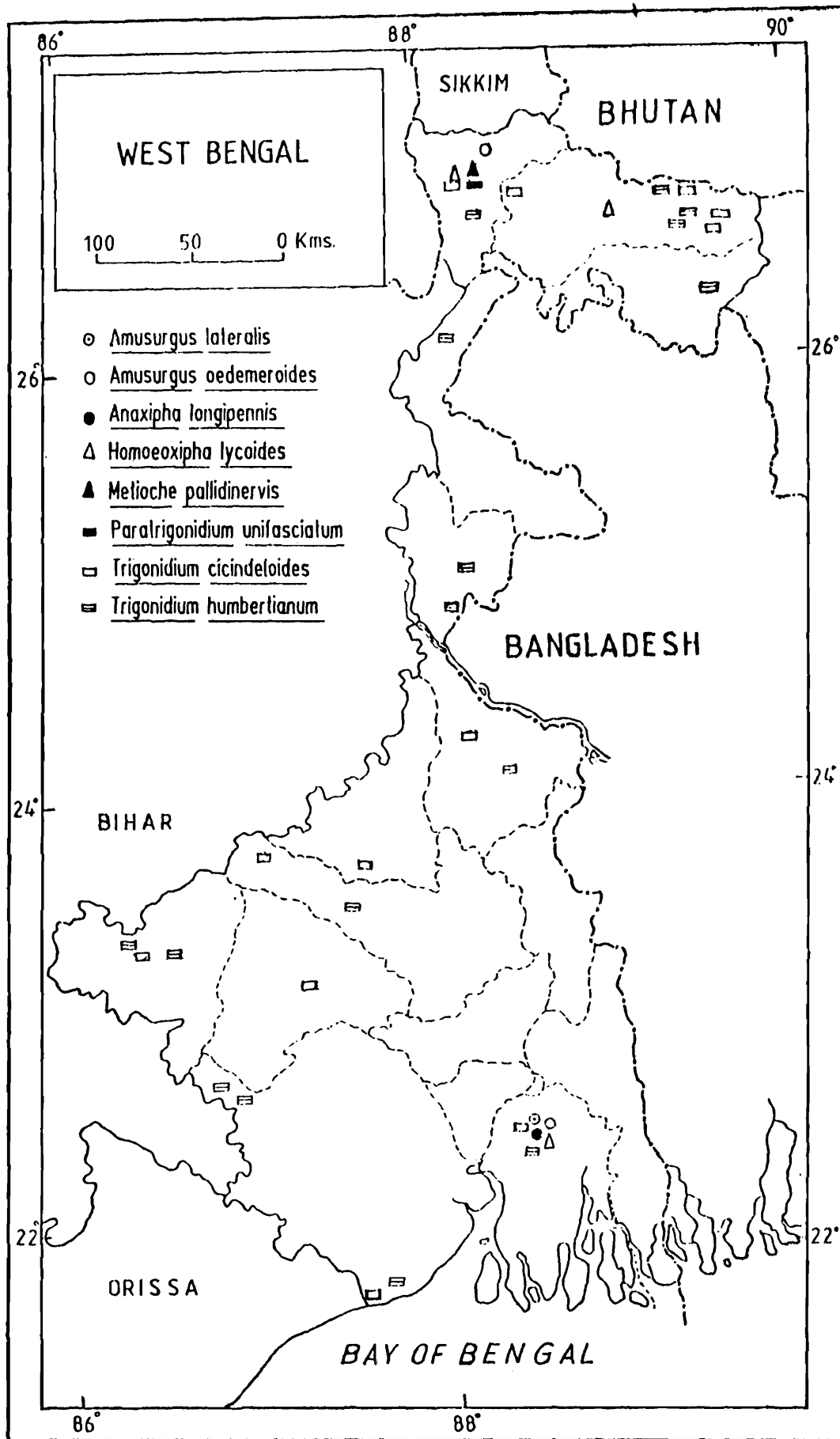
Map 3. Showing the distribution of 10 species of Grylloidea



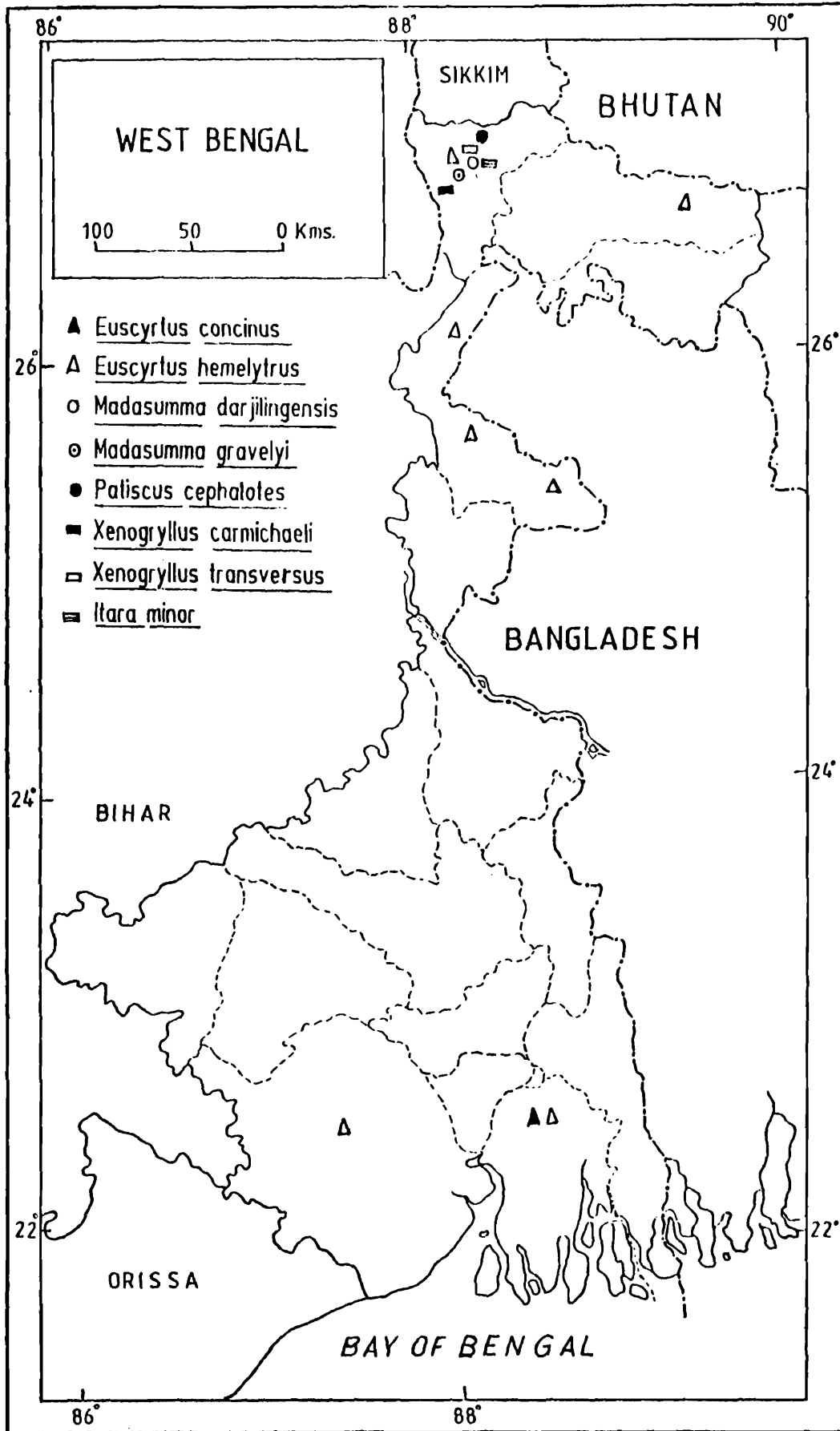
Map 4. Showing the distribution of 10 species of Grylloidea.



Map 5. Showing the distribution of 10 species of Grylloidea.



Map 6. Showing the distribution of eight species of Grylloidea.



Map 7. Showing the distribution of eight species of Grylloidea.

**DISTRIBUTIONAL RECORDS OF THE SPECIES OF GRYLLOIDEA IN WEST BENGAL
(DISTRICT WISE)**

	Bankura	Bardhaman	Birbhum	Calcutta	Darjiling	Haora	Hugli	Jalpaiguri	Koch Bihar	Maldah	Medinipur	Murshidabad	Nadia	North 24 Parganas	Puruliya	South 24 Parganas	West Dinajpur
Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. <i>Gryllotalpa africana</i>	+	+	-	+	+	-	-	+	-	-	+	+	+	+	+	-	
2. <i>Gryllotalpa ornata</i>	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-		
Family : Gryllidae																	
3. <i>Brachytrypes orientalis</i>	-	-	-	+	+	-	-	+	-	-	-	-	-	-	-	-	
4. <i>Brachytrypes portentosus</i>	-	-	-	+	+	-	-	+	+	-	-	-	+	-	-	-	
5. <i>Brachytrypes sp.</i>	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	
6. <i>Gymnogryllus erythrocephalus</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	
7. <i>Gymnogryllus minor</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	
8. <i>Acheta domesticus</i>	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	
9. <i>Gryllus bimaculatus</i>	-	-	-	+	+	-	+	-	-	-	-	-	+	-	-	-	
10. <i>Teleogryllus himalayanus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
11. <i>Teleogryllus mitratus</i>	+	-	-	+	+	-	-	+	-	+	-	-	+	-	-	-	
12. <i>Teleogryllus testaceus</i>	-	-	-	+	+	-	-	-	-	-	+	+	+	-	-	-	
13. <i>Modicogryllus blennus</i>	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
14. <i>Modicogryllus confirmatus</i>	+	-	+	+	-	-	-	-	-	+	+	-	-	+	+	+	
15. <i>Modicogryllus minimus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
16. <i>Plebeiogryllus guttiventris</i>	+	-	+	+	+	+	-	+	-	+	+	+	+	+	+	-	
17. <i>Melanogryllus carmichaeli</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
18. <i>Cophogryllus angustus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
19. <i>Cophogryllus ornatus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
20. <i>Turanogryllus rufoniger</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
21. <i>Callogryllus pallidus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
22. <i>Platygryllus melanocephalus</i>	No specific district mentioned																
23. <i>Velarifictorus aspersus</i>	-	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	
24. <i>Velarifictorus parvus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
25. <i>Velarifictorus sikkimensis</i>	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	
26. <i>Grylloides sigillatus</i>	+	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-	
27. <i>Loxoblemmus detectus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
28. <i>Loxoblemmus equestris</i>	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	
29. <i>Loxoblemmus hamulifer</i>	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	
30. <i>Loxoblemmus macrocephalus</i>	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	
31. <i>Loxoblemmus nigriceps</i>	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	
32. <i>Gryllopsis falconneti</i>	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
33. <i>Gryllopsis pubescens</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
34. <i>Nemobiodes sukhadae</i>	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
35. <i>Itaropsis tenella</i>	No specific district mentioned																
36. <i>Landreva sp.</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
37. <i>Pteronemobius concolor</i>	+	-	-	+	+	-	-	-	-	+	+	-	+	+	+	-	-
38. <i>Pteronemobius fascipes</i>	+	+	+	+	+	-	-	+	-	+	+	-	-	+	+	-	-
39. <i>Pteronemobius indicus</i>	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
40. <i>Pteronemobius montanus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
41. <i>Pteronemobius pantelchopardorum</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
42. <i>Pteronemobius rufipes</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
43. <i>Pteronemobius (?) strigipennis</i>	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
44. <i>Pteronemobius taprobanensis</i>	-	+	-	+	+	-	-	+	-	+	+	-	+	+	-	-	-
45. <i>Scottiola diverna</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
46. <i>Scottiola elongata</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
47. <i>Speonemobius decolyi</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Family : Scleropteridae																	
48. <i>Scleropterus coriaceus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
49. <i>Scleropterus variolosus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Family : Cacoplistidae																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>50. Cacoplistes rogenhoferi</i>	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Family : Phalangopsidae																	
<i>51. Arachnomimus nietneri</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>52. Speluncacris annandalei</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>53. Oecanthus indicus</i>	-	-	-	-	+	-	-	-	-	+	-	+	-	-	+	-	-
<i>54. Oecanthus rufescens</i>	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Family : Trigonidiidae																	
<i>55. Amusurgus lateralis</i>	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>56. Amusurgus oedemeroides</i>	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>57. Anaxipha longipennis</i>	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>58. Homoeoxipha lycoides</i>	-	-	-	+	+	-	-	+	-	-	-	-	-	-	-	-	-
<i>59. Metioche pallidinervis</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>60. Paratrigonidium unifasciatum</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>61. Trigonidium cicindeloides</i>	+	+	+	+	+	-	-	+	-	-	+	+	-	-	+	+	+
<i>62. Trigonidium humberianum</i>	-	+	-	+	+	-	-	+	+	+	+	+	-	-	+	+	+
Family : Eneopteridae																	
<i>63. Euscyrthus concinus</i>	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>64. Euscyrthus hemelytrus</i>	-	-	-	+	+	-	-	+	-	-	+	-	-	-	-	-	+
<i>65. Madasumma darjilingensis</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>66. Madasumma gravelyi</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>67. Patiscus cephalotes</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>68. Xenogryllus carmichaeli</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>69. Xenogryllus transversus</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
<i>70. Itara minor</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-

+ indicate present ; -indicate absent

ANNEXURE - I

LIST OF SPECIES OF GRYLLOIDEA (ORTHOPTERA) FROM WEST BENGAL

- I. Family GRYLLOTALPIDAE
1. *Grylotalpa africana* Beauvois
 2. *Grylotalpa ornata* Walker *
- II. Family GRYLLIDAE
- (1) Subfamily GRYLLINAE
3. *Brachytrypes orientalis* (Burmeister)
 4. *Brachytrypes portentosus* (Lichtenstein)
 5. *Brachytrypes* sp.
 6. *Gymnogryllus erythrocephalus* (Serville) **
 7. *Gymnogryllus minor* Chopard **
 8. *Acheta domesticus* (Linne)
 9. *Gryllus bimaculatus* De Geer
 10. *Teleogryllus himalayanus* (Chopard) *
 11. *Teleogryllus mitratus* (Burmeister)
 12. *Teleogryllus testaceus* (Walker)
 13. *Modicogryllus blennus* (Saussure) ***
 14. *Modicogryllus confirmatus* (Walker)
 15. *Modicogryllus minimus* (Chopard) *
 16. *Plebeiogryllus guttiventris* (Walker)
 17. *Melanogryllus carmichaeli* (Chopard) *
 18. *Cophogryllus angustus* (Chopard) *
 19. *Cophogryllus ornatus* (Chopard) *
 20. *Turanogryllus rufoniger* (Chopard) *
 21. *Callogryllus pallidus* (Chopard) *

22. *Platygyllus melanocephalus* (Serville) *
23. *Velarifictorus aspersus* (Walker) *
24. *Velarifictorus parvus* (Chopard) *
25. *Velarifictorus sikkimensis* (Bhowmik) ***
26. *Gryllodes sigillatus* (Walker)
27. *Loxoblemmus detectus* (Serville) *
28. *Loxoblemmus equestris* Saussure
29. *Loxoblemmus hamulifer* Chopard **
30. *Loxoblemmus macrocephalus* Chopard ***
31. *Loxoblemmus nigriceps* Chopard
32. *Gryllopsis falconneti* (Saussure) ***
33. *Gryllopsis pubescens* (Chopard) *
34. *Nemobiodes sukhadae* Bhowmik ***
35. *Itaropsis tenella* (Walker) *
36. *Landreva* sp. **

(2)

Subfamily

37. *Pteronemobius concolor* (Walker)
38. *Pteronemobius fascipes* (Walker)
39. *Pteronemobius indicus* (Walker) ***
40. *Pteronemobius montanus* Chopard *
41. *P. pantelchopardorum* Shishodia & Varshney
42. *Pteronemobius rufipes* Chopard *
43. *P. (?) strigipennis* (Chopard) *
44. *P. taprobanensis* (Walker)
45. *Scottiola diverna* Bhowmik ***
46. *Scottiola elongata* Bhowmik ***

47. *Speonemobius decolyi* Chopard *

III. Family SCLEROPTERIDAE

48. *Scleropterus coriaceus* (Haan) **

49. *Scleropterus variolosus* Chopard *

IV. Family CACOPLISTIDAE

50. *Cacoplistes rogenhoferi* (Saussure)

V. Family PHALANGOPSIDAE

51. *Arachnomimus nietneri* (Saussure) ***

52. *Speluncacris annandalei* Chopard *

VI. Family OECANTHIDAE

53. *Oecanthus indicus* Saussure

54. *Oecanthus rufescens* Serville **

VII Family TRIGONIDIIDAE

55. *Amusurgus lateralis* Chopard *

56. *Amusurgus oedemeroides* (Walker) **

57. *Anaxipha longipennis* (Serville)

58. *Homoexipha lycoides* (Walker)

59. *Metioche pallidinervis* Chopard*

60. *Paratrigonidium unifasciatum* Chopard*

61. *Trigonidium cicindeloides* Rambur

62. *Trigonidium humbertianum* (Saussure)

VIII. Family ENEOPTERIDAE

(1) Subfamily PODOSCIRTINAE

63. *Euscyrthus concinus* (Haan) *

64. *Euscyrthus hemelytrus* (Haan)

65. *Madasumma darjilingensis* Chopard *

66. *Madasumma gravelyi* Chopard *
67. *Patiscus cephalotes* (Saussure) **
- (2) Subfamily ENEOPTERINAE
68. *Xenogryllus carmichaeli* (Chopard) *
69. *Xenogryllus transversus* (Walker) ***
- (3) Subfamily ITARINAE
70. *Itara minor* Chopard *

* Not studied in the present collection, but Chopard (1925, 1928, 1969) recorded.

** First record from West Bengal

*** Bhowmik (1976, 1977) reported

Without any marked species are studied by us as well as other earlier workers.

REFERENCES

- Bhowmik, H.K. 1967. Five new species of crickets of the genus *Scapsipedus* Saussure (Insecta : Orthoptera) from India. *proc. zool. Soc. Calcutta*, 20 (2) : 123-127.
- Bhowmik, H.K. 1969. Studies on Indian crickets (Orthoptera : Insecta), Part I. *Zool. Anz.*, 182 (1/2) : 143-152.
- Bhowmik, H.K. 1970. The Gryllid Fauna (Orthoptera : Insecta) of the Great Nicobar Island, India. *J. Zool. Soc. India*, 22 (1&2) : 69-86.
- Bhowmik, H.K. 1976. On the Gryllid Fauna (Gryllidae : Orthoptera) of the Districts of the North Bengal, with description of three new species. *Indian Mus. Bull.*, 11 (NO. 1) : 42-48.
- Bhowmik, H.K. 1977. Studies on Indian Crickets (Orthoptera : Insecta) with descriptions of two new species. *Rec. zool. Surv. India*, 73 : 23-39.
- Bhowmik, H.K. 1977. Studies on some Indian Crickets with new distributional records of the subfamily Gryllinae (Gryllidae : Orthoptera). *Rec. zool. Surv. India*, 73 : 229-238.
- Chopard, L. 1928. Revision of the Indian Gryllidae. *Rec. Indian Mus.*, 30 : 1-36.
- Chopard, L. 1936. The Tridactylidae and Gryllidae of Ceylon. *Ceylon J. Sc.* B 20 : 9-87.

- Chopard, L. 1961. Les divisions du genre *Gryllus* basees sur l'etude de l'appareil copulateur (orth. Gryllidae). *Eos, Madr.*, **37** : 267-287, pls.2-14.
- Chopard, L. 1967. *Orthopterorum Catalogus*, Part 10 : 1-211.
- Chopard, L. 1968. *Orthopterorum Catalogus*, Part 12 : 215-500.
- Chopard, L. 1969. *The Fauna of India and The Adjacent Countries Orthoptera, Grylloidea*, **2** : 1-421, figs. 1-284.
- Randell, R.L. 1964. The Male Genitalia in Gryllinae (Orthoptera : Gryllidae) and a Tribal Revision. *Canad. Ent.*, **96** : 1565-1607.
- Shishodia, M.S. & Tandon, S.K. 1989. Fauna of Orissa.-*Insecta : Orthoptera : Grylloidea and Tridactyloidea*. State Fauna series No. 1, Pt. I, 113-128 (Zoological Survey of India, Calcutta).

INSECTA : ORTHOPTERA : ACRIDOIDEA

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INTRODUCTION

The Acridids popularly known as "grasshoppers and locusts" constitutes an interesting and agriculturally important group of insects. In spite of their direct impact on agriculture a very little information is available on the Acridid fauna of West Bengal. Preliminary information about the occurrence of various Acridid species in West Bengal is available in the early works of Walker (1870, 1871), Saussure (1884, 1888), Novas (1904, 1905), Bolivar (1902, 1909) and Kirby (1914) in his volume of Acrididae under Fauna of British India Series has recorded several species from the area now constitute the State of West Bengal. Subsequently Uvarov (1921, 1927) also contributed to the Acridid fauna of the State during the course of his studies. Willemse (1968) has also recorded same species from West Bengal in his work on Acridoidea of Indo-Malayan region. Recently, Tandon (1973, 1975) and Bhowmik (1984) has contributed to study of Acridid fauna of State during course of their work on Acridoidea of India in general. Bhowmik (1986) has published an account of Acrididae of West Bengal. His study is based mainly on the collections from districts of Darjiling and Jalpaiguri.

The present work was initiated to make a systematic study of the Acridoidea of West Bengal with special reference to its detailed distribution. This study is based on the large collection comprising a little over 3000 exs. of grasshoppers made by different parties of the Survey in almost all the districts of the State from 1983-1988, under a scheme of department for intensive faunistic survey of West Bengal. The Acridids were collected from a wide variety of ecological niches. Some of these niches are wooded forests of North Bengal, open forests of Southern Bengal, grasslands, paddy fields, marshes etc. and nocturnal collections were also made by using light traps.

We have also examined the earlier collections of grasshoppers from the State present in the National Zoological Collections. For general topography and list of collecting localities reference may be made to. Introductory part of this volume.

The present paper deals with 70 species of grasshoppers distributed over four families and 51 genera, of which 8 species marked with single astrisk are recorded for the first time from West Bengal, and the species marked with double astriks are not recorded during the present survey.

The present work provides key to families, genera and species. We have also given diagnostic characters for indentification of individual species. The detailed distribution of each species is traced within West Bengal and is supported by maps.

The classifications followed here is after Dirsh (1961).

SYSTEMATIC ACCOUNT

Order ORTHOPTERA
Superfamily ACRIDOIDEA

Key to families

1. Foveolae of the Vertex contiguous, superior and forming the extremity of the fastigium. Stridulatory mechanism absentPyrgomorphidae
- Foveolae lateral or inferior, never forming the tip of the fastigium, stridulation mechanism present
...Acrididae

Famiy I. PYRGOMORPHIDAE

Key to genera

1. Anterior margin of prosternum strongly reflexed and dilated*Chrotogonus* Serville, 1839
- Anterior margin of prosternum neither reflexed nor dilated..2
2. antennae remote from the eyes, placed in front of the ocelli3
- Antennae near the eyes and inserted below the ocelli4
3. Tegmina long and narrow, body moderately slender*Atractomorpha* Saussure, 1862
- Tegmina rather short and broader; body very robust*Tagasta* Bolivar, 1905
4. Posterior lobe of pronotum on the level of anterior lobe; abdomen without callosities5
- Posterior lobe of pronotum convex, raised above the level of the anterior lobes; abdomen with dorsal callosity*Aularches* Stal, 1873
5. Outer apical spine of posterior tibiae absent or difficult to detect; size normal
.....*Pyrgomorpha* Serville, 1831
- Outer apical spine of posterior tibiae very distinct ; robust in size ..*Pockilocerus* Serville, 1831.

Genus *Atractomorpha* Saussure, 1861

Key to species

1. Eyes comparatively short, roundish-oval or ovoid; lateral pronotal lobes, except in robust form,

- typically with a distinct, even if small, membranous area specially in female; robust forms with colourless hind wings.2
- Eyes comparatively long, elongate-oval; lateral pronotal lobes without trace of membranous area, even in the slender forms; more robust forms with coloured hind Wings.3
2. Body robust and somewhat large for the genus; lateral pronotal lobes without a membranous area; hind femora with external face strongly keeled and convex; hind Wings usually colourless or very faintly pinkish at base *himalayica* Bolivar
- Body normally more slender, rather small to the genus; lateral pronotal lobes usually with distinct membranous area, specially in female; hind femora not clearly convex or strongly keeled on inner face; hind wings normally distinctly rosy or purplish at base; eyes generally shorter and convex; hind wings normally tyrian pink to light mallow purple magenta at base, but quite often rather heavily infumated *crenulata* (Fabricius)
3. Body rather short and moderately stout; head and pronotum relatively short; fastigium of vertex shorter; lateral pronotal lobes fairly deep and without a membranous area; outer face of hind femora strongly convex and keeled; hind wings long, spines not much shorter than tegmina when at rest, tyrian pink to light mallow purple at base; apex of male genital plate blunt in profile.
..... *burri* Bolivar
- Body very slender; head and pronotum relatively long; fastigium of vertex narrow and slender; lateral pronotal lobes shallower; hind wings normally comparatively long in relation to tegmina, not falling much short of them when at rest, usually magenta purple, often rather pale at base; apex of male subgenital plate somewhat pointed in profile. *psittacina* (Haan)

1. *Atractomorpha crenulata* (Fabricius)

1793. *Truxalis crenlatus* Fabricius, *Ent. Syst.*, 2 : 28

1969. *Atractomorpha crenulata* : Kevan and Chen, *Zool. J. Linn. Soc.*, 48 : 187

Material examined : *Bankura District* : 1 (M), Indas, 5.iii.1986, K.P. Mukherjee; 1 (F) Pokarna, 7.iii.1986, K.P. Mukherjee, 2 (M), 2 (F), Bankura, 9.iii.1986, K.P. Mukherjee; 1 (M), 2(F), Kachanpur Forest, 10.iii.1986, K.P. Mukherjee; 2 (M), 2(F) Bishnupur Sericulture Campus, 10.ix.1986, R.S. Barman; 1 (M),(F) 24.xi.1986, T.R. Mitra. *Birbhum Dist.* : 2 (M), 2 (F), Illambazar, 14.iii.1986, K.P. Mukherjee; 4 (M), 1(F), Rampurhat, 1.iv.1986, M.s. Shishodia. *Bardhaman Dist.* : 6 (F), Damodar River Bed, 16.vi.1979, A.K. Hazra; 2 (M), 4 (F), Barsul, 20.v.1980, A.K. Hazra; 2 (M), Panagarh, 13.x.1986, S.K. Ghosh; 1 (M), Bardhaman, 14.x.1985, S.K. Ghosh. *Koch Bihar Dist.* : 3 (M), 5 (F), Mathabhanga, 11.xii.1986, R.S. Barman; 2 oo, Toofangunj, 12.xii.1986, R.S. Barman, 3 (M), 1 (F), Basirhat, 13.xii.1986, R.S. Barman; 3 oo, Jori, 15.xii.1986, R.S. Barman. *Darjiling Dist.* : 5 (M), 2 (F), Sonapur, 7.xii.1986, R.S. Barman; 1 (M), 1 (F), Teesta Riber Belt, 8.xii.1986, R.S. Barman; 3 (M), 2 (F), Kharibari, 9.xii.1986, R.S. Barman. *Haora Dist.* : 48 (M), 17 (F), Botanical garden 14.vi., 19, vii., 18.ix., 22.xi., 18.xii.1979, A.K. Hazra; 1(M), Bagnan, 28.i.1986, B. Dutta. *Jalpaiguri Dist.* : 1 (M), Alipurduar, 28.iv.1986, B.C. Das; 3 (M), 2 (F), Teesta River Belt (Sevok), 8.xii.1986, R.S. Barman; 2 (M), Noorpoor, 18.xii.1986, R.S.

Barman. *Maldah Dist.* : 3 (M), 2 (F), Pandua, 20.x.1983, A.K. Hazra; 4 (M), 1 (F), Kachuberia, 22.x.1983, A.K. Hazra; 1 (M), Adina, 2.xii.1983, A.K. Sanyal; 3(M) , Haldibari, 16.vii.1986, M.S. Shishodia; 2 (M), Chanchal, 20.vii.1986, M.S. Shishodia; 2 (M), Ratua, 22.vii.1986, M.S. Shishodia, 1 (M), Gaur, 10.xii.1986, B.C. Das; 1 (F), Maldah Agriculture Farm, 21.xii.1986, B.C. Das; 3 (M), Nimbari, 8.vi.1987, K.P. Mukherjee. *Medinipur Dist.* : 4 (M), 2 (F), West of Digha Sea Beach, 27.ix.1983, A.K. Hazra; 5 (M), 3 (F), Junput, 30.xi.1983, A.K. Hazra; 1 (M), Kalabani, 5.ix.1983, A.K. Hazra; 1 (F), 1 (M), Haldia, 4.iii.1984, A.K. Roy; 1 (M), 1 (F), Belpahari, 8.ix.1985, S. Biswas; 1 (M), Bholaveda, 10.ix.1985, S. Biswas; 3 (M), 4 (F), Kankrajhore, 14.xii.1985, A.K. Hazra; 14 (M), 3Fo, Digha, 22-26.xii.1985, A.K. Hazra; 1 (M), Junput, 25.xii.1985, A.K. Hazra. *Murshidabad Dist.* : 2 (F), Berhampur Sericulture Campus, 12.x.1983, A.K. Hazra; 3 (M), 3 (F), Beldanga., 13.x.1983, A.K. Hazra; 2 (M), 3 (F), Berhampur, 15.x.1983, A.K. Hazra; 1 (M), 2 (F), Dumkal, 17.x.1983, A.K. Hazra; 2 (M), 2 (F), Sagardighi, 15.ii.1986, I.J. Gupta; 1 (F), Kashimbazar, 26.ii.1986, S.K. Mitra; 2 (M), 1(F), Berhampur, 28.ii.1986, S.K. Mitra; 1 (M), Lalgola, 4.iii.1986, S.K. Mitra. *Nadia Dist.* : 2 (M), Debagram, 20.xii.1985, B.N. Das; 2 (M), Palpara, 2.ii.1986, A.R. Lahiri, 2 (M), Fulia, 6.ii.1986, A.R. Lahiri; 1 (M), Plassey, 28.i.1986, A.R. Lahiri. *24-Parganas Dist.* : 2 (M), 1 (F), Canning, 20.xi.1983, S.K. Mondal, 2(M), 4 (F), Ramdharia, 18.iv.1986, B.N. Das; 1 (F), Achipur, 20.iv.1986, B.N. Das; 4 (M), 1 o(F), Lakhikantpur, 28.iv.1986, B.N. Das; 7 (M), 1 (F) Joka, 30.iv.1986, B.N. Das; Madhabpur, 3.v.1986, B.N. Das, *Puruliya Dist.* : 2 (M), Belmunda, 7.x.1983, A.K. Hazra; 3 (M), (F), Puruliya (Ramkrishna Mission), 8.x.1983, A.K. Hazra; 2 (M), 1 (F), Koris, 6.ix.1985, R.S. Barman; 1 (M), Puruliya Ramkrishna Sericulture Campus, 1.xi.1985, S. Sen; 2 (M), Patna, 3.xi.1985, S. Sen. *West Dinajpur Dist.* : 1 (M), 1(F), Islampur, 11-12.xii.1986, B.C. Das.

Diagnosis : Of medium size. Lateral pronotal lobe always with a membranous area near posterior margin; pronotal carinae ill-defined; lateral margin of pronotal disc well defined; divergent and somewhat convex in the metazone; tegmina pointed, extending for one-fourth of their length beyond the hind femora.

Distribution : West Bengal (Bankura, Bardhaman, Birbhum, Darjeeling, Haora, Hoogly, Jalpaiguri, Maldah, Medinipur, Murshidabad, Nadia, Puruliya, 24-Parganas, W. Dinajpur), Andaman & Nicobar Islands, Andhra Pradesh, Bihar, Goa, Jammu & Kashmir, Kerala, Lakshadweep, Islands, Orissa, Rajasthan; Bangladesh, Burma, N.W. Sumatra; Pakistan; South Vietnam and Sri Lanka.

Remarks : Widely distributed throughout West Bengal. We have found it from Gangetic West Bengal to hilly region of North Bengal. This species is very thickly distributed and dominant in the Gangetic West Bengal and we have record of its occurrence from all the districts of the State (Map - 1).

2. *Atractomorpha burri* Bolivar

1905. *Atractomorpha burri* Bolivar, *Bol. Soc. Espan Hist. nat.*, 5 : 197, 203.

1969. *Atractomorpha burri* : Keven and Chen, *Zool. J. Linn. Soc.*, 48 : 158, 160, 193.

Diagnosis : Body short and moderately stout; head and pronotum relatively short; fastigium of vertex as long as the eye, roundly crenulate in front, margins crenulated in female; eyes comparatively long, elongate-oval; lateral pronotal lobes often without trace of a membranous area in the metazona; hind wings relatively long, tyrian pink to light mallow purple at base; apex of male genital plate blunt in profile.

Distribution : India : North-east India including Arunachal Pradesh. Elsewhere : Bhutan, Bangladesh, Malaya to Indo-China.

Remarks : No specimens of this species was found in the recent collections. However, a few examples collected earlier from Kurseong in Darjiling District were studied.

3. ** *Atractomorpha himalayica* Bolivar

1905. *Atractomorpha himalayica* Bolivar, *Bol. Soc. Espan Hist. nat.*, 5 : 198, 204.

1969. *Atractomorpha himalayica* : Keven and Chen, *Zool. J. Linn. Soc.*, 48 : 152, 160, 189.

Diagnosis : Body robust and somewhat large; lateral pronotal lobes without membranous area in metazona; eyes comparatively short, roundish-oval; hind femora with external face strongly keeled and convex; hind wings usually colourless or very faintly pinkish at extreme base only.

Distribution : India : West Bengal (Kurseong, Ghumti, Pashok, Siliguri, Darjiling districts), North East India. Elsewhere : Bangladesh, southwards to Malaya and south east to Indo-China and Nepal.

Remarks : During the present study we have not found this species in the collections. It was reported by Uvarov (1927) from Darjiling District.

4. * *Atractomorpha psittacina psittacina* (De-Haan)

1842. *Acridium (Truxalis) psittacinum* De Haan, *Temminck, Verhandel., Orth* : 146

1969. *Atractomorpha psittacina psittacina* : Kevan & Chen, *Zool. J. Linn. Soc.*, 48 : 191.

Material examined : Darjiling District : 21 (M), Fansidawa, 6.xii.1986, R.S. Barman. *Jalpaiguri Dist.* : 4(M), 4 (F), Kathambari, 11.x.1987, S.K. Tandon

Diagnosis : Body very slender; fastigium of vertex narrower and longer; Membranous area present near the posterior margin of the pronotal lobe; hind wings normally comparatively long in relation to tegmina; colour of wing generally dull magenta purple, often rather pale, at extreme base, sometimes colourless.

Distribution : India : West Bengal (Darjeeling, Jalpaiguri), Arunachal Pradesh, Assam and Rajasthan. Elsewhere : The whole range of South and east Asia except north and west.

Remarks : *A. Psittacina psittacina* is very rare in the State of West Bengal and we have found it only in Darjiling and Jalpaiguri districts (Map 1). The species is rather limited in distribution in India and is so far known from north eastern and western region of India.

Genus *Aularches* Stal, 1873

5. * *Aularches miliaris* (Linnaeus)

1758. *Gryllus (Locusta) miliaris* Linnaeus, *Syst. Nat.* (ed.x.) : 432.

1793. *Gryllus scabiosae* Fabricius *Ent. Syst.*, 2 : 51.

1963. *Aularches miliaris* : Kevan, *Ark. zool.*, 16 : 75

Material examined : Jalpaiguri District : 5(M), 7 (F), Kathambari, 11.x.1987, S.K. Tandon.

Diagnosis : Size large, body stout. Head yellowish, sometimes brown above; pronotum yellow on the sides; the space between the sulci with several strong pointed conical tubercles on each side; tegmina thickly reticulated with yellow nervures and with a variable number of large and small yellow spots; wings purple brown, darker towards the base.

Distribution : India : West Bengal (Jalpaiguri), Jammu and Kashmir, Orissa, Sikkim, Tamilnadu and Uttar Pradesh. Elsewhere : Indonesia, Java, Nepal and Sri Lanka.

Remarks : *A. miliaris* is apparently confined to thick forest region of north Bengal as we have found it only in Kathambari reserve forest (Map 1). The specimen were collected in the reserve forest adjoining Teesta river bed in October, 1987 in swarming condition.

Genus *Chrotogonus* Serville, 1839

6. *Chrotogonus (Chrotogonus) t. trachypterus* (Blanchard)

1836. *Ommexecha trachypterus* Blanchard, *Ann. Soc. Ent. France*, 5 : 618.

1959. *Chrotogonus (Ch.) t. trachypterus* : Kevan, *Publcoes cult. Co. Diam. angola*, no. 43 : 147.

Material examined : Bankura Dist. : 1(M), Indas, 5.iii.1986, K.P. Mukherjee. Birbhum Dist. : 1 (M), 1 (F), Bolpur, 24.ii.1986, S.B. Roy; 1 (M), Dubrajpur, 25.i.1986, S.B. Roy; 2 (F), 2 (F), Darmuda, 27.i.1986, S.B. Roy. Koch Bihar Dist. : 1 (F), Kochbihar, 26.i.1984, M. Prasad. Haora Dist. : 1 (M), 1 (F), Meheshpur, 25.i.1986, B. Dutta; 1 (M), Laotala, 28.i.1986, B. Dutta. Jalpaiguri Dist. : 1 (M), 1 (F), Alipurdwar, 24.iv.1986, B.C. Das; 1 (M), Hatkhola, 28.iv.1986, B.C. Das. Maldah Dist. : 2 (M), 1 (F), Ramkeli, 19.x.1983, A.K. Hazra; 2 (M), Naranpur, 20.x.1983, A.K. Hazra; 1 (M), 7 (F), Maldah Agricultural Farm, 21.xii.1986, B.C. Das. Medinipur Dist. : 3 (M), 8 (F), N.E. Digha, 22.xii.1985, A.K. Hazra; 1 (M), S. Digha, 23.xii.1985, A.K. Hazra; 4 (M), 2 (F), Chittamati, Digha, 26.xii.1985, A.K. Hazra. Murshidabad Dist. : 4 (M), 4(F), Manickchak, 14.x.1983, A.K. Hazra; 1 (M), Jangipur, 10.ii.1986, I.J. Gupta. 24-Parganas Dist. : 2 (M), 2 (F), Jharkhali, 22.iv.1986, B.N. Das.

Diagnosis : Hind wings hyaline or occassionally faintly tinged yellowish brown but never infumated or infuscated, apparently always fairly well developed and always at least two-third as long as tegmina.

Distribution : India : West Bengal (Bankura, Birbhum, Darjeeling, Haora, Jalpaiguri, Kochbihar, Maldah, Medinipur, Murshidabad, Puruliya, 24 Paraganas), Bihar, madhya Pradesh, Orissa and Rajasthan; Bangladesh, Nepal and Pakistan.

In general it is widely distributed in the northern part of India.

Remarks : It is, generally found in dry condition on a bare sandy ground and a pest of various crops.

Genus *Poecilocer* Serville, 18317. * *Poecilocer pictus* (Fabricius)

1775. *Gryllus pictus* Fabricius, *Syst. Ent.* : 289.

1966. *Poecilocer pictus* : Ambar, *Sind Univ. Sci. Res. Journal, Karachi* : 1.

Material examined : Medinipur Dist. : 2 (M), 3 (F), Digha, 22.xii.1985, A.K. Hazra.

Diagnosis : Large sized with finely rugose integument. Head and pronotum with faint median carina; antennae blue black with yellow beyond the basal third of their length; lateral carinae of pronotum obsolete.

Distribution : India : West Bengal (Medinipur), Andhra Pradesh, Karnataka, Orissa, Maharashtra and Rajasthan. Elsewhere : Pakistan.

Remarks : *Poecilocer pictus* is a widely distributed species in India but in our present study we have found it only in Medinipur district of West Bengal (Map 2). This species is associated with Aak plant.

Genus *Pyrgomorpha* Serville, 18398. * *Pyrgomorpha conica* (Olivier)

1791. *Acrydium conicum* Olivier, *Encycl. Meth. Ins.* 6 : 230.

1914. *Pyrgomorpha conica* : Kirby, *Fauna British India, Orthoptera* (Acridiidae) : 175.

Material examined : Medinipur Dist. : 1 (F), Garbeta, 21.ix.1985, S. Biswas, 4 (M), 3 (F), Digha, 22-26.xii.1985, A.K. Hazra.

Diagnosis : Lateral carinae of pronotum well marked; tegmina extending beyond the apex of abdomen at least in female; wings hyaline, generally pink towards the base and along the nervures; hind tibiae above with no outer apical spine; abdomen spotted with black above.

Distribution : India : West Bengal (Medinipur), Karnataka, Rajasthan. Elsewhere : N & W. Africa; W. Asia; S. Europe.

Remarks : *Pyrgomorpha conica* is rather limited in distribution in West Bengal and we have found it only in Medinipur district.

Genus *Tagasta* Bolivar, 19059. *Tagasta indica* Bolivar

1905. *Tagaesta indica* Bolivar, *Bol. Soc. esp. Hist. Nat.*, 5 : 112,113.

Material examined : Maldah District : 2 (M), 1 (F), Gaur and Environs, 18.vii.1987, M.S. Shishodia.

Diagnosis : Olivaceous, finely rugose punctate, fastigium of vertex equilaterally triangular; antennae inserted near the eyes; pronotum rounded in front, obtusely angulated behind; median carina almost, and lateral carina wholly obsolete; tegmina nearly as long as the hind femora, tip narrowly obtuse, olive in colour, with a brown spot at the base; wings one-fifth shorter, hyaline.

Remarks : We have found only few examples of the species from Maldah district (Map 2). It has also been collected earlier from Darjiling district.

Family ARIDIDAE

Key to the subfamilies

1. Prosternal process or tubercle usually absent.....2
 Posternal process or tubercle present3
2. Stridulatory serration on inner side of hind femur present Truxalinae
 Stridulatory serration on inner side of hind femur absent Acridinae
3. Radial area of tegmen with a series of regular, parallel stridulatory veinlets..... Hemiacruidinae
 Stridulatory veinlets of radial area of tegmen absent 4
4. Lower external lobe of hind knee with spine-like apex. Oxyinae
 - Lower external lobe of hind knee with apex rounded, angular or subacute, but not spine-like .. 5
5. Last abdominal tergite in male (in most of the genera) with well developed furcula; supra-anal plate mostly with attenuate or trilobate apex.. Coptacridinae
 Last abdominal tergite without well developed furcula; supra- anal plate variable. 6
6. Mesosternal interspace closed Tropidopolinae
 - Mesosternal interspace mostly open 7
7. Mesosternal lobes rounded or obtuse angular or acute-angular, but not rectangular. 8
 Mesosternal lobes rectangular Crytacanthacridinae
8. Dorsum of pronotum flat or weakly tectiform, with median and lateral carinae linear (Linear carinae some times obliterated); male cercus with strongly compressed, lobiform or sub acute, down curved apex Eyprepocnemidinae

- Dorsum of pronotum of variable shape; lateral carinae, if present, not linear; male cercus variable, but not as mentioned aboveCatantopinae

Subfamily TRUXALINAE

Key to genera

- 1. Fastigium with acute apex; frontal ridge with obtuse lateral carinulae*Leva* Bolivar 1909
- Fastigium with truncate apex; frontal ridge without lateral carinulae*Dnopherula* Karsch

Genus *Dnopherula* Karsch, 1896

10. ** *Dnopherula (aulacobothrus) decisa* (Walker)

1871. *Stenobothrus decisa* Walker,

1921. *Aulacobothrus decisa* : Uvarov, *Ann. Mag. nat. Hist.*, 7(9) : 482.

Diagnosis : Size small general colouration brownish, a pale stripe usually runs starting from fastigium of vertex to end of pronotum. Tegmen rufo-testaceous. Wings hyaline, with the nervures of the costal area reddish. Fastigium of vertex almost subtriangular. Abdomen carinated above. Tibia with 12 small black spines on each carina.

Distribution : India : West Bengal, Maharashtra.

Remarks : No specimen of this species has been recorded during the present study. However we have studied the material present in our National Zoological Collection.

11. *Dnopherula (Aulacobothrus) luteipes* (Walker)

1871. *Stenobothrus luteipes* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 : 82.

1921. *Aulacobothrus luteipes* : Uvarov, *Ann. Mag. nat. Hist.*, 7(9) : 482.

1971. *Dnopherula (Aulacobothrus) luteipes* : Jago, *Proc. Acad. nat. Sci. philad.*, 123(8) : 243.

Material examined : *Birbhum Dist.* : 1 (F), Ballavpur forest, 22.i.1986, S.B. Roy; 1 (M), Illumbazar, 27.i.1986, S.B. Roy; 1 (M), Ballavpur, 29.i.1986, S.B. Roy. *Bardhaman Dist.* : 2 (M), (nymphs), Pallaghat, 23.xii.1980. R.S. Barman; 3(F) (nymphs); Barsul, 24.ii.1981, A.K. Hazra. *Haora Dist.* : 3 (F), (nymphs), Botanical Garden, 18.iv.1981, S.K. Mitra. *Nadia Dist.* : 20 (M), Bethuadohori reserve forest, 5.v.1985, A.K. Hazra; 1 (M), 2 (F), Bethadohori, 26.ix.1980, A.K. Hazra.

Diagnosis : Size small; antennae filiform, longer than head and pronotum together; fastigium of vertex almost trapezoidal, with truncate apex, concave, and with transverse basal furrow, lateral carinae sharp, merging with the carinulae of vertex; fastigial foveolae not visible from above; hind femur with three black bands on the dorsal surface and with a black one at distal end; pronotum with nearly parallel lateral

carinae which are weakly concave in the middle part, posterior margin obtusely angulate, median carinae distinct; hind tibiae reddish in the apical part.

Distribution : West Bengal (Bankura, Birbhum, Bardhaman, Haora, Jalpaiguri, Maldah, Nadia), Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Maharashtra, Sikkim and Karnataka. Elsewhere : N. America; Burma, China, Europe, Japan and Pakistan.

Remarks : There are few records of occurrence of this species in West Bengal. It appears to be confined to south and central region (map 3). It is generally found amongst long grasses and cultivated fields.

12.** *Dnopherula (Aulacobothrus) physopoda* Navas

1904. *Scyllina physopoda* Navas, *Bol. Sci. Argon*, 3 : 133.

1914. *Aulacobothrus physopoda* : Kirby, *Fauna British India, orth*; 1 : 125.

1986. *Dnopherula (Aulacobothrus) physopoda* : Bhowmik, *Tec. Monogr., Zool. surv. India*, No. 14 : 53.

Diagnosis : Size small; antennae filiform, antennae longer than head and pronotum together; fastigium of vertex moderately sloping; tegmina longer than abdomen, narrow rounded at tips, wings hyaline, with brownish black nervures. Hind femora compressed, longer than abdomen but shorter than tegmina.

Remarks : No specimen of this species has been found during the present survey. Bhowmik (1986) rightly reported that since its description in 1904, it was never again reported from anywhere. Now as described it on a single male specimen from Kurseong.

13.** *Dnopherula (Aulacobothrus) rubripes* Navas

1905. *Scyllina rubripes* Navas, *Bol. Sci., Argon*, 4 : 53.

1914. *Aulacobothrus rubripes* : Kirby, *Fauna British India*, Vol. 1 : 126.

1986. *Dnopherula (Aulacobothrus) rubripes* : Bhowmick, *Tech. Mongr., Zool. surv. India* : No. 14 : 53-54.

Diagnosis : Size small, antennae filiform, yellow tinge at bases and black at tips. Abdomen pale beneath, no spot, wings hyaline. Tegmina and wings longer than abdomen, former brown, with small distinct spots and a large irregular one. Rest of its descriptions are given nicely in Kirby (1914).

Remarks : No specimen of this species has been found during the present study. Like the preceding species. Now as 1904 described on a single female specimen from Kurseong since then there is no record.

Genus *Leva* Bolivar 1909

Key to species

1. Lateral carinae of pronotum in prozona nearly parallel, divergent in metazona *indica* Bolivar

Lateral carinae of pronotum in front of medio-prozona excurved and also divergent in metazona to make it 'X' shaped *cruciata* Bolivar

14. *Leva cruciata* Bolivar

1914. *Leva cruciata* Bolivar, *Trab. Mus. nac. Cienc. Nat. madr.* (Ser. Zool.) : 65.

1929. *Leva crucita* : Uvarov, *Revue suisse Zool.* 36 : 450.

Material examined : Birbhum Dist. : 1 (M), Tilapara, 24.i.1986, S.B. Roy; 1 (F), Mallarpur 4.iv.1986, M.S. Shishodia. Bardhaman Dist. : 1 (F), Kaksa village, 13.x.1985, S. Ghosh. Maldah Dist. : 1 (F), Ratua, 2.vii.1986, M.S. Shishodia. Medinipur Dist. : 1 (M), Bholaveda, 10.ix.1985, S. Biswas. Murshidabad Dist. : 1(M), 1 (F), Bahrapur, 11.ii.1986, I.J. Gupta, 4 (M), Sagardighi, 13.ii.1986, I. J. Gupta. Nadia Dist. : (F), Plassey, 23.i.1986, A.R. Lahiri.

Diagnosis : Pale yellowish, dull reddish brown; fastigium angularly produced, in female subtransverse; inferior foveolae indistinct; frontal costa of fastigium angular; dorsum of pronotum constricted, anteriorly truncate, obtusely angulate posteriorly; median carina produced; lateral carinae excurved in prozona and metazona to form 'X' shaped marking.

Distribution : India : West Bengal (Birbhum, Bardhaman, Maldah, Medinipur, Murshidabad, Nadia), Bihar, Karnataka, Tamil Nadu. Oriental Region.

Remarks : *Leva crucita* is rather limited in distribution and appear to be confined to Central and South Central region of the State (map 3). The species is generally found in open fields amongst short grasses.

15. *Leva indica* (Bolivar)

1909. *Gymnbothrus indicus* Bolivar, *Bol. Soc. esp. Hist. nat.*, 9 : 295.

1921. *Leva indica* : Uvarov, *Ann. Mag. nat. Hist.*, 7(9) : 485.

Material examined : Bankura Dist. : 2 (M), Sushunia, 9.x.1985, K.K. Roy. Birbhum Dist. : 1 (F), Bolpur, 24.i.1986, I.J. Gupta; 1 (F), Rampurhat, 5.iv.1986, M.S. Shishodia. Bardhaman Dist. : 1 (F), Durgapur, 15.x.1985, S.K. Ghosh. Haora Dist. : 1 (F), Bagnan, 28.i.1986, B. Dutta. Maldah Dist. : 1 (F), Manikchak, 4.vii.1986, M.s. Shishodia; 5 (M), 2 (F), Gangarampur, 15.vi.1987, K.P. Mukherjee. Murshidabad Dist. : 2 (M), Lalbag, 13.ii.1986, I. J. Gupta; 1 (M), 1 (F), Sagardighi, 15.ii.1986, I.J. Gupta. Puruliya Dist. : 1 (F), Ajodhya Hill, 2.xi.1986, M. Dutta.

Diagnosis : Size small; antennae filiform, basal segments slightly depressed, longer than head and pronotum together; fastigium of vertex long, angular with acute apex; lateral carinulae strong; foveolae not visible from above; frontal ridge almost parallel sided, lateral carinae strong, slightly curved; lateral carinae of pronotum parallel in prozona, divergent at metazone; median carina cut by 3rd sulcus in middle; tegmen surpass tip of abdomen; females very similar to males; valves of ovipositor moderately curved.

Distribution : India : West Bengal (Bankura, Bardhaman, Birbhum, Haora, Maldah, Murshidabad, Puruliya, 24 Parganas), Bihar, Delhi, Orissa, Tamil Nadu and Tripura. Elsewhere : Sri Lanka.

Remarks : The species is fairly well distributed in the Central region of the State. There are few records from southern, south western and northern parts of the State also (Map 3). It occurs in association with *Leva crucita*.

Subfamily ACRIDINAE

Key to genera

1. Hind femur, with a spine on the dorso-external and dorso-internal genicular lobes.2
- Hind femur, with rounded dorso- external and dorso-internal genicular lobes3
2. Head large, its length considerably greater than that of the pronotum; eyes situated on the anterior part of the head.....*Acrida* Linnaeus
- Head small, its length equal to less than or somewhat greater than that of the pronotum; eyes situated nearly in the middle part of head.*Geleastorrhinus* Brunner
3. Head angulate in Front.....4
- Head rounded in front7
4. Antennae ensiform at least on basal half6
- Antennae filiform.....5
5. Lateral carinae of pronotum absent*Aiolopus* Fieber
- Lateral carinae present*Ceracris* Walker
6. Lateral carina of pronotum continuous; fastigium of vertex shallowly concave and often with a strong median dividing carinula; posterior femora thickened at base.*Phlaeoba* Stal
- Lateral carina of pronotum diverging in metazona; fastigium moderately concave and with or without indistinct median carinala; posterior femora slender*Holopercna* Kartsch
7. Median carina of pronotum cut by two grooves 13
- Median carina of pronotum complete on cut by one groove8
8. Transverse vein in apical part of tegmina erect, cells square or oblong9
- Transverse veins in apical part of tegmina oblique and arranged zig-zag.*Pternoscirta* Saussure

9. Wing without well marked fasciae. 10
 - Wings usually with black fasciae 12
10. Tegmina relatively broad, with square or oblong cells; robust habitus. *Chloebora* Saussure
 - Tegmina narrow, with square or elongated cells. 11
11. Internal spur of posterior tibiae greatly unequal, lower one much longer than other.
 *Heteropternis* Stal
 - Internal spur of posterior tibiae equal *Dittopternis* Saussure
12. Pronotum with raised median crest and with pale 'X' shaped marks... *Oedaleus* Fieber
 - Pronotum with strongly median crest or acutely tectiform, and without 'X' shaped colour marks
 *Gastrimargus*
13. Pronotum without very distinct crest. 14
 - Pronotum with well marked crest, which when views sideways, is strongly bilobed in front.
 *Trilophidia* Stal
14. Tegmina of male rather short and dilated; apical third strongly curved backwards; antennae
 acuminate at apex. *Meristopteryx* Saussure
 - Tegmina longer; antennae filiform 15
15. Pronotum short, broadly rounded behind or very slightly angular, strongly tuberculate and
 sculptured; frontal ridge strongly constructed at apex. *Acrotylus* Fieber
 - Pronotum never shorter than its width, distinctly angular behind, generally not tuberculated and
 usually not sculptured; frontal ridge not constructed at apex. 16
16. Pronotum with tubercles, metazona strongly rugose, its length about double of prozona, width of
 mesosternal interspace more than three times, in female, than its length; posterior femora very wide,
 with its upper carina expanded; robust habitus *Chondronotulus* Uvarov
 - Pronotum without tubercles; metazona moderately rugose, its length never double of prozona;
 mesosternal interspace shorter than the preceding genus; posterior femora never so wide nor
 expanded on its upper carina; less robust habitus. *Sphingonotus* (Fieber)

Genus *Acrida* Linnacus, 1758

16. *Acrida exaltata* (Walker)

1859. *Truxalis exaltata* Walker, *Ann. Mag. nat. Hist.*, 4(3) 222

1954. *Acrida exaltata* : Dirsh, *Bull. Soc. Faud. Ent.*, 38 : 149.

Material examined : Bankura District : 1 (F), Jhcmil, 5.x.1985, K.K. Roy; 1 (F), Sushunia Hill, 9.x.1985, K.K. Roy; 1 (F), Sonamukhi forest, 8.iii.1986, K.P. Mukherjee; 2 (M), Tantipukur, 24.xi.1986, T.R. Mitra; 1 (F), Gopalnagar, 25.xi.1986, T.R. Mitra. *Birbhum Dist.* : 1 (M), 1 (F), Nalhati, 21.ii.1986, S.B. Roy; 1 (M), Chandrapur, 23.i.1986, S.B. Roy; 3 (M), Illabazar, 27.1.1986, S.B. Roy; 1 (M), 2 (F), Mollarpur, 4.iv.1986, M.S. shishodia; 3 (M), Bolpur, 6.iv.1986, M.S. shishodia. *Bardhaman Dist.* : 2 (M), 1 (F), Bardhaman, 14.x.1985, S.K. Ghosh. *Darjiling Dist.* : 4 (M), 1 (F), Naxalbari forest Rest House, 19.vi.1979, P. halder; 2 (F), Mirrik, 24.vi.1979, P. Halder; 2 (F), Himul, 4.xii.1986, R.S. Barman. *Haora Dist.* : 1 (F), Maheshpur, 25.i.1986, B. Dutta. *Hugli Dist.* : 4 (M), 2 (F), Chandannagar, 8.ix.1978, P. Halder. *Jalpaiguri Dist.* : 1 (F), Baribhasa, 20.i.1987, V.D. Srivastava; 1 o, Bagracot, 11.x.1987, S.K. Tandon and A.K. Hazra. *Maldah Dist.* : 1 (F), Chanchal, 23.vii.1986, M.S. Shishodia. *Medinipur Dist.* : Belpahair, 11.ix.1985, S. Biswas, 1 (F), Gidni forest, 20.xii.1985, A.K. Hazra; 1 (F), Garbeta, 22.xii.1985, A.K. Hazra; 1 (F), Junput, 25.xii.1985, A.K. Hazra; 2 (F), Embankment of Digha, 26.xii.1985, A.K. Hazra. *Murshidabad Dist.* : 2 (M), 3 (F), Raghunathganj, 8.ii.1986, I.J. Gupta; 2 (M), Phulbari, 9.ii.1986, I.J. Gupta; 3 (M), 1 (F), Sagardighi, 15.ii.1986, I.J. Gupta. *Nadia Dist.* : 2 (F), Gharanipara, 1.ii.1986, A.R. Lahiri; 1(F), Palpara, 2.ii.1986, A.R. Lahiri. *24-Parganas Dist.* : 1 (M), 1 (F), Canning, Ramdharia, 18.ii.1986, B.N. Das; 1 (F), Raidighi, 28.iv.1986, B.N. Das. *Puruliya Dist.* : 4 (M), Velladihi village, 18.ix.1987, M. Prasad; 1 (M), 2 (F), Bhaldangri Hills, 19.ix.1987, M. Prasad; 1 (F), Ajodhya Hill, 2.xi.1988, M. Dutta.

Diagnosis : Head conically ascending, basal part narrow; fastigium of vertex broad, laminate and truncate at extremity; transverse sulcus of pronotum present about the middle of pronotal disc; male subgenital plate, in profile, comparatively long, with more elongated part, the upper margin with small projection, tegmen without pointed apex, a little produced beyond the hind knee; and wings slightly shorter than tegmina.

Distribution : India : West Bengal (Bankura, Birbhum, Bardhaman, Haora, Hugli, Jalpaiguri, Maldah, Medinipur, Murshidabad), Aurnachal Pradesh, Jammu & Kashmir, Kerala, Rajasthan, Tamil Nadu. Elsewhere : Afghanistan, Bangladesh, Iran, Pakistan, Saudi Arabia, S.E. Tibet, Yemen and West Adcn.

Remarks : *Acrida exaltata* is found almost throughout West Bengal (Map 4) and it may well be occurring in many areas from where it has not yet been recorded. It is found in grasses and cultivated fields.

Genus *Acrotylus* Fieber, 1853

17. *Acrotylus humbertianus* Saussure

1884. *Acrotylus humbertianus* Saussure, *Mem. Soc. Phys. nat. Geneva*, 28(9) : 189

1914. *Acrotylus humbertianus* : Kirby, *Fauna British India, Orthopt. (Acridiidae)* : 153.

Material examined : Bankura Dist. : 1(M), Bishnupur, 25.x.1985, M. Dutta, 1 (F), Indos, 5.iii.1986, K.P. Mukherjee; 2 (M), 2 (F), Joypur Forest, 6.iii.1986, K.P. Mukherjee; 1 (M) Bishnupur, Sericulture Campus, 10.ix.1986, R.S. Barman. *Birbhum Dist.* : 1 (M), 1 (F), Dubrajpur, 25.i.1986, S.B. Roy; 1 (M),

Darunda, 27.i.1986, S.B. Roy. *Darjiling Dist.* : 1 (M), 2 (F), Mapong, 15.ii.1974, H.K. Bhowmik; 1 O, Scvok, 22.ii.1974, H.K. Bhowmik. *Medinipur Dist.* : 1 (M), Digha, 24.xii.1985, A.K. Hazra; 2 (M), 2 (F), Chittimati village (near Digha), 26.xii.1985, A.K. Hazra; 2 (M), 2 (F), Digha, 26.xii.1985, A.K. Hazra. *Puruliya Dist.* : 1 (M), Ajodhya Hill, 4.xii.1985, S. Sen.

Diagnosis : Size small, body pilose, antennae longer than head and pronotum together; the tip of vertex conical, concave, with a carina on each side; pronotum finely carinate; prozona with two fuscous fascia, the lateral margin white below; tegmina with two oblique white fascia or spots; posterior intercalate space with a line of fuscous spots; wings hyaline, yellow at the base; the radial area with a semilunar fuscous fascia; the posterior femora fasciate.

Distribution : India : West Bengal (Bankura, Birbhum, Darjiling, Medinipur, Nadia, Puruliya), Goa, Andhra Pradesh, Madhya Pradesh, Assam, Punjab, Rajasthan; Afghanistan. Elsewhere : Sri Lanka.

Remarks : *A. humberianus* occurs in low numbers in central and south western parts of West Bengal (Map 4). There is one isolated record of its occurrence in northern hilly region of Darjiling (Map 4). It is generally found on bare ground.

18. *Acrotylus insubricus inficita* (Walker)

1870. *Oedipoda inficita* Walker, *Cat. Derm. Salt. Br. Mus.*, 4 : 742.

1914. *Acrotylus inficita* : Kirby, *Fauna British India*, 1 : 152.

1986. *Acrotylus insubricus inficita* : Bhowmik, *Tech. Monogr., Zool. surv. India* No.14 : 75-76

Diagnosis : Brownish in colour, antennae black at tips. Hind femur with two black patches on inner side. Base of tegmen light brown. Base of the wing bright red. Half of the tegmen from the base light brown.

Distribution : India : (North Bengal). Elsewhere : Afghanistan; Africa; Central Asia; Sri Lanka and Russia.

Remarks : No specimen of this species has been found during the present study. However we have studied two examples from Orissa present in the National Zoological collection.

Genus *Aiolopus* Fieber, 1853

19. *Aiolopus thalassinus tamulus* (Fabricius)

1798. *Gryllus tamulus* Fabricius, *Ent. syst. Suppl.*, : 195.

1968. *Aiolopus thalassinus tamulus* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)* 22 (1) : 347.

Material examined : *Bankura Dist* : 1 (F), Bishnupur, 10.ix.1986, R.S. Barman. *Birbhum Dist.* : 1 (F), Kachanpur forest, 10.iii.1986, K.P. Mukherjee. *Bardhaman Dist.* : 1 (M), Bardhaman, 14.x.1985, S.K. Ghosh; 2 (M), 1 (F), Galsi, 14.x.1985, S.K. Ghosh. *Darjiling Dist* : 4 (M), 1 (F), Naxalbari forest Rest House, 19.vi.1979, P. Halder; 2 (M), Mirrik, 24.vi.1979, P. Halder; 2 (F), Himul, 4.xii.1986, R.S. Barman.

Hugli Dist. : 4 (M), 2 (F), Chandannagar, 8.ix.1978, P. Halder. *Haora Dist.* : 1 (F), Botanical Garden, 16.v.1980, P. Halder. *Jalpaiguri Dist.* : 1 (M), Hatkhola, 28.iv.1986, B.C. Das; 1 (M), Oodlabari forest, 9.x.1987, S.K. Tandon and A.K. Hazra ; 1 (M), Hansimara, 15.x.1987, S.K. Tandon and A.K. Hazra. *Maldah Dist.* : 1 (M), 1 (F), Ghosimore, 17.vii.1986, M.S. Shishodia; 1 (M), 2(F), Gaur and Environ, 18.vii.1986, M.S. Shishodia; 1 (M), Samsi, 21.vii.1986, M.S. Shishodia. *Medinipur Dist.* : 1 (M), Jhargram, 6.ix.1985, S. Biswas; 1 (M), Bholadeva, 10.ix.1985, S. Biswas; 1 (M), Jhargram, 17.ix.1985, S. Biswas; 1 (M), 1(F), Garbeta, 19.ix.1985, S. Biswas. *Nadia Dist.* : 2(M), Nakasipara, 27.1.1986, A.R. Lahiri, 1(M), 1 (F), Swarupganj, 31.1.1986, A.R. Lahiri. *24-Parganas Distt* : 1(F), Kumarsha, 20.iv.1986, B.N. Das ; 1(M), Joka, 30.vi.1986, B.N. Das ; 1(M), 1(F), Bakkhali, i.v. 1986, B.N. Das. *Puruliya Dist.* : 1 (F), Sirkabad, 14.ix.1981, H.K. Bhowmik.

Diagnosis : Size medium; antennae as long as head and pronotum together; fastigium with forward angle more acute; foveolae narrowly trapezoid, about twice as long as wide; frontal ridge gradually narrowing and almost angular towards fastigial end; sparsely punctured; pronotum somewhat saddle-shaped, posterior margin rounded; tegmina, longer, exceeding hind femur; posterior femur unicolourous, without any oblique fascia or marking, posterior tibiae usually with red colouration in apical fourth and broadly separated from black band by a wide bluish grey band.

Distribution : India : West Bengal (Bankura, Bardhaman, Birbhum, Darjiling, Haora, Hoogly, Jalpaiguri, Maldah, Medinipur, Nadia, Puruliya, 24 Parganas), Andaman & Nicobar Islands, Bihar, Delhi, Himachal Pradesh, Karnataka, Madhya Pradesh, Rajasthan, Tamil Nadu. Elsewhere : Australia, Borneo, Brunei, Burma, China, Hainain, Japan, Java, Malaya, New Guinea, E. Pakistan, Singapore, Sri Lanka, Sumatra, Taiwan.

Remarks : *A. thalassinus tamulus* is widely distributed in West Bengal and occurs in almost all the districts (Map 4). It is found in grasses and cultivated fields. Mainly paddy. This species causes considerable damage to paddy plants feeding a green leaves.

Genus *Ceracris* Walker, 1870

20. *Ceracris nigricornis nigricornis* (Walker)

1870. *Ceracris nigricornis* Walker, *Cat. Derm. Salt. Brit. Mus. nat. Hist.*, 4 : 791.

1925. *Ceracris nigricornis nigricornis* : Uvarov, *Ent. Mitt. Berl.* 14 : 13.

Material examined : *Darjiling Dist.* : 4 (F), Mirrik, 17.ix.1974, H.K. Bhowmik; 1 (F), Bamanpokri, 22.viii.1975, H.K. Bhowmik. *Jalpaiguri Dist.* : 1 (F), Noorpoor, 18.xiii.1986, R.S. Barman.

Diagnosis : Brownish-green or olive-green colour; black lateral fascia on the head and the upper margin of pronotal lobes, not extending on the disc of metazona; face and pronotum coarsely punctured; tegmina brown, with the anal field upple green or olive-green; hind femora more or less reddish, especially below with a narrow pale pre-apical ring, preceded by a narrow blackish (Sometimes interrupted) ring; knees black, but their lobes in female pale; hind tibiae disty-blusih, with the base black, a pale post basal ring, followed by a blackish ring.

Distribution : India : West Bengal (Darjiling, Jalpaiguri), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Tamil Nadu, Uttar Pradesh. Elsewhere : Afghanistan.

Remarks : A few specimens of *Ceracris nigricornis nigricornis* has been collected from northern districts of Darjiling and Jalpaiguri in West Bengal so far (Map 5). This species occurs in forest in north-east India mainly.

Genus *Chloebora* Saussure

21. *Chloebora grossa* Saussure

1884. *Chloebora grossa* Saussure, *Mem. Soc. Phys. Hist. nat. Geneve*, 28(9) : 132(o).

1932. *Scintharista punjabi* Willemse, *Natuursh. Maandbl.* 21 : 105, fig. 2(o).

1986. *Chloebora grossa* : Bhowmik, *Tech. Monogr. Zool. surv. India*, No. 14:80-81.

Diagnosis : Strong sexual dimorphism exists in this species. The females are very long robust than males and basally violaceous wings and apex of the wing is hyaline. The males are small, slender, with the wings basally light primose-yellow and the apex of wing is infumates. A good description of both male and females are given by Bhowmik (1986).

Distribution : India : West Bengal (Darjiling); Himachal Pradesh (Simla); Uttar Pradesh (Dehradun, Kalsi); Punjab (Dhar). Elsewhere : Pakistan.

Remarks : No specimens of this species has been recorded during the present study. However we have studied a single damaged example from West Bengal present in the National Zoological Collections.

Genus *Ditopternis* Saussure, 1884

22. *Ditopternis venusta* (Walker)

1870. *Oedipoda venusta* Walker, *Cat. Derm. Salt. Br. Mus.*, 4:740.

1914. *Ditopternis venusta* : Kirby, *Fauna British India, Orthopt. (Acridiidae)* : 140.

Material examined : *Bankura Dist.* : 1 (M), 1 (F), Jhotipahari, 9.iii.1986, K.P. Mukherjee. *Birbhum Dist.* : 14 (M), 9 (F), Dubrajpur, 25.i.1986, S.B. Roy; 1 (M), 2 (F), Ballavpur, 29.i.1986, S.B. Roy. *Darjiling Dist.* : 2 (F), Bamanpokri, 4.ix.1975, H.K. Bhowmik; 1 (F), Bhutanghat, 7.ix.1975, P. Halder. *Medinipur Dist.* : 1 (M), 2 (F), Bholaveda, 10.ix.1986, S. Biswas; 2 (M), 1 (F), Daighari forest, 11.xii.1988, A.K. Hazra. *Murshidabad Dist.* : 1 (F), Lalbag, 13.ii.1986, I.J. Gupta. *Nadia Dist.* : 1 (F), Bethuadohori forest, 23.ii.1982, S.K. Mondal and A.K. Hazra.

Diagnosis : Brown, pale beneath; vertex with four diverging rows of pale granules running backwards from between the eyes; a blackish band runs backwards from each eye over the occiput and part of pronotum, bordered above and below by a slight yellow line; pronotum rugose granulated and strongly carinated, cut by principal sulcus before the middle, obtusely angulated behind, with the tip rounded; tegmina, with the basal half and costa brown, with a large yellow blotch and a smaller yellowish spots; wings hyaline, yellow at base, with a broad suffused blackish band beyond; hind tibiae black at base, followed by a light yellow band, then blue.

Distribution : India : West Bengal (Bankura, Birbhum, Darjiling, Jalpaiguri, Medinipur, Murshidabad, Nadia), Karnataka, Madhya Pradesh, Orissa and Tamil Nadu. Elsewhere : Sri Lanka.

Remarks : *D. venusta* is fairly well distributed in Central region of the State. There are few records from southern and northern regions also (Map 5). This species is found mainly amongst short grasses and occasionally in cultivated fields.

Genus *Gastrimargus* Saussure, 1884

23. *Gastrimargus africanus orientalis* Sjostedt

1888. *Oedaleus (Gastrimargus) marmoratus* var. *africana* Saussure *Mem. Soc. Phys. Hist. nat. Geneve*, 30(1) : 39.

1928. *Gastrimargus africanus orientalis* Sjostedt, *K. svenska Vetensk-Acad. Handl.*, (3) 6(1) : 41.

Material examined : Birbhum Dist. : 1 (M), Rampurhat, 22.i.1986, S.B. Roy. Darjiling Dist. : 1 (M), Panitanki, 17.vi.1979, P. Halder; 1 (M), 3 (F), Tukriajhar, Naxalbari, 18.vi.1979, P. Halder. Jalpaiguri Dist. : 2 (M), 1 (F), Bhutanghat, 6.ix.1975, H.K. Bhowmik & P. Halder.

Diagnosis : Size large; general colouration green or brown; antennae as long as head and pronotum together or slightly larger; pronotum tectiform with high sharp median carina; metazona of pronotum with X-marking usually effaced and without pale striae; tegmen surpassing hind knee by one-quarter to one-half of hind femur length, basal pale transverse band sometimes reduced or absent; wing with complete fascia, basal area usually bright yellow, apex variably infumate; interno-ventral carinula and ventral surface of hind femur blue-grey or blue-black; hind tibiae basally brownish or reddish.

Distribution : India : West Bengal (Birbhum, Darjiling, Jalpaiguri), Goa, Orissa, Rajasthan, Sikkim. Elsewhere : Africa; Arabia; Burma; Nepal; Pakistan; Sri Lanka; Thailand ; Tiber.

Remarks : This species is limited in distribution in West Bengal, and we have found a few specimens from Birbhum, Jalpaiguri and Darjiling districts (Map 5). It is usually found in forest regions.

Genus *Gelastorrhinus* Brunner, 1893

24.* *Gelastorrhinus (?) laticornis* (Serville)

1839. *Opomala laticornis* Serville, *Ins. Orth.* : 590

1914. *Gelastorrhinus (?) laticornis* : Kirby, *Fauna British India, Orthopt.*, (Acridiidae) : 217.

Material examined : Koch Bihar District : 1 (M), 1 (F), Baxirhat, 12.xii.1986, R.S. Barman.

Diagnosis : Head large, conical; antennae much thickened and flattened at base; Pronotum tricarinate; a dark lateral stripe runs behind each antenna, interrupted by the eye, but beyond to the pronotum, and below the lateral carinae; tegmina longer than the abdomen, linear, obtusely pointed at tip, uniformly yellowish green.

Distribution : India : West Bengal (Koch Bihar), Maharashtra (Bombay).

Remarks : This species is very rare in collection and we have found only two specimens from Koch Bihar district in northern region of the state adjoining Bangladesh. It is found in long grasses. We have not found the species in collections examined from West Bengal.

25. *Heteropternis respondens* (Walker)

1859. *Acrydium respondens* Walker, *Ann. Mag. nat. Hist.*, 4(3) : 223.
 1914. *Heteropternis respondens* : Kirby, *Fauna British India, Orth.* 1 : 128.
 1986. *Heteropternis respondens* : Bhowmik, *Tech. Mongr. Zool. surv. India.*, No. 14 : 65-66.

Diagnosis : Size medium. Females are larger than male. Antennae filiform and brown in colour. Head and pronotum not granulated with red spot. Tibia with unequal internal spurs. Maxillary and labial palpi yellowish white. Sternal region with black markings. Wing yellowish at base and darker towards outside.

Distribution : India : West Bengal (Darjiling, Jalpaiguri), Arunachal Pradesh, Bihar, Orissa, Uttar Pradesh, Tamil Nadu. Elsewhere : Burma; China; South east Asia; Sri Lanka.

Remarks : No specimen of this species has been recorded during the present study. But we have studied the specimens from West Bengal present in the National Zoological Collections.

Genus *Meristopteryx* Saussure 1888

26. *Meristopteryx rotundata* Walker

1870. *Oedipoda rotundata* Walker, *Cat. Derm. Salt. Br. Mus.*, 4 : 743.
 1880. *Meristopteryx rotundata* Saussure, *Mem. Soc. Phys. Hist. nat., Geneve*, 30(1) : 53, pl. ii, fig.3.
 1986. *Meristopteryx rotundata* : Bhowmik, *Tech. Mongr. Zool. surv. India* No. 14 : 77.

Diagnosis : Wing bluish hyaline, with clouded border, head and pronotum brown, antennae reddish and pale towards base. Tegmina light brown. Hind femora yellowish, inner and lower surface black with three yellowish bands.

Distribution : India : West Bengal (North Bengal).

Remarks : We have not come across this species during the present survey. Since its discovery by Walker (1870); it has never been recorded again.

Genus *Morphacris* Walker, 1870

27. * *Morphacris citrina* Kirby

1815. *Gryllus fasciatus* Thunberg, *Mem. Acad. Sci. St. Petersb.*, 5 : 29.
 1914. *Morphacris citrina* : Kirby, *Fauna British India, Orthopt.* (Acridiidae) : 137.

Material examined : Birbhum Dist. : 1 (M), 1 (F), Rampurhat 1.iv.1986, M.S. Shishodia.

Diagnosis : Size medium; antennae filiform longer than head and pronotum together; pronotum brown, with a black band on pleura, marked below with a raised yellowish line, tectiform, without lateral carinae; median carina sharp and high; dorsum of pronotum covered with parallel sharp longitudinal ridges; wings light yellow at base, bordered by a broad blackish band.

Distribution : India : West Bengal (Birbhum), Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu. Elsewhere : Ethiopia, Sri Lanka, Syria.

Remarks : This species occurs only in Birbhum district of West Bengal (Map 5) although it is widely distributed in India. There is a possibility of its occurrence in other districts also.

Genus *Oedaleus* Fieber, 1853

28. *Oedaleus abruptus* (Thunberg)

1815. *Gryllus abruptus* Thunberg, *Mem. Aca. Sci. St. Petersb.*, 5 : 233.

1981. *Oedaleus abruptus* : Ritchie, *Bull. Br. Mus. nat. Hist. (Ent.)* 42(3) : 104.

Material examined : Bankura Dist. : 2(F), Shusunia, 9.x.1985, K.K. Roy; 2 (M), Mukutmanipur, 28.x.1985, M. Dutta; 1 (F), Simplapal, 31.x.1985, M. Dutta; 2 (M), Jhilimilli, 16.ix.1986, R.S. Barman. Birbhum Dist. : 1 o, Mollarpur, 4.iv.1986, M.S. Shishodia. Bardhaman Dist. : 1 (M), 2 (F), Damodar river bed, 16.vi.1979, A.K. Hazra, 2 (M), 2 (F), Barsul, 30.viii.1979, A.K. Hazra, 6 (M), 3 (F), 30.viii.1979, S.K. Mondal; 5 (M), 3 (F), Damodar river bed, 27.ii.1980, A.K. Hazra. Darjiling Dist. : 1 (M), 2 (F), Chunabati, 9.iii.1974, H.K. Bhowmik; 2 (M), 2 (F), Kharibari, 9.xii.1986, R.S. Barman. Hugli Dist. : 1 (M), Uttarpara, 19.iii.1966, B.K. Biswas. Haora Dist. : 1 (F), Jalpai, 29.i.1986, B. Dutta. Jalpaiguri Dist. : 2 (F), Nilpara, 28.ix.1975, H.K. Bhowmik; 2 (M), Kathambari, 10.x.1987, S.K. Tandon and A.K. Hazra, 1 (M), Hansimara, 15.x.1987, S.K. Tandon and A.K. Hazra. Maldah Dist. : 1 (F), Manikchak, 4.vii.1986, M.S. Shishodia, 1(F), Gaur and Environs, 18.vii.1986, M.S. Shishodia, 1 (M), Khajuria, 23.vii.1986, M.S. Shishodia; 1 (M), 1 (F), Alal, 19.vi.1987, K.P. Mukherjee. Medinipur Dist. : 1 (M), 2 (F), Belpahari, 8.ix.1985, S. Biswas; 1 (M), 1 (F), Patpira, 9.ix.1985, S. Biswas; 1 o, Kankyajhar forest, 19.xii.1985, A.K. Hazra, 2 (M), 1 (F), Jhargram, 20.xii.1985, A.K. Hazra. Murshidabad Dist. : 1 (M), 1 (F), Azimganj, 5.ii.1986, I.J. Gupta; 1 (F), Sagardighi, 15.ii.1986, I.J. Gupta. Nadia Dist. : 1 (M), Bethuadohori Reserve forest, 30.vi.1982, A.K. Hazra. Puruliya Dist. : 1 (F), Ajodhya Hill, 2.xi.1985, M. Dutta; 1 (F), Manbazar, 5.ix.1986, R.S. Barman; 1 (F), Manbazar, 13.ix.1987, M. Prasad; 1 (F), Vaelladih village, 18.ix.1987, M. Prasad.

Diagnosis : Size small, fastigium of head almost flat; pronotum short, with incomplete, white cruciform marks, strongly carinated, and entire, the median sulcus visible on the sides of the pronotum before the middle, pointed behind; tegmina brown at base; wings hyaline at the base, with a broad black transverse band, curving inwards to the anal angle; hind tibiae red, with a yellow ring at the base.

Distribution : India : West Bengal (Bankura, Bardhaman, Birbhum, Darjiling, Haora, Hoogly, Jalpaiguri, Koch Bihar, Maldah, Medinipur, Murshidabad, Nadia, Puruliya), Andhra Pradesh, Bihar, Goa,

Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh. Elsewhere : Bangladesh, Burma, China, Indo-China, E. Nepal, Pakistan, Sri Lanka and Thailand.

Remarks : *O. abruptus* is a fairly well distributed species and has been found in all the districts except West Dinajpur Kocjh Bihar Haora and Hugli (map 5). this is a typical species of the genus with a wide distribution in South Asia, and occurs in almost all type of vegetational cover.

29. *Oedaleus senegalensis* (Krauss)

1877. *Pachytylus senegalensis* Krauss, *Sber-Akad. Wis. Wien.*, 76(1) : 56.

1981. *Oedaleus senegalensis* Ritchie, *Bull. Br. Mus. nat. Hist. (Ent.)*, 42(3) : 94-99, figs. 8,9,18,40,60-65,160.

Diagnosis : The tegmina are long and narrow, sub hyaline. Wings greenish hyaline towards the base. Hind tibiae dark red.

Distribution : India : West Bengal (Calcutta), Kashmir, Punjab, Tamil Nadu. Elsewhere : Afghanistan, Middle east, North Africa, Western Russia.

Remarks : No specimen of this species has been found during present study. We have studied specimen present in the National Zoological Collections.

Genus *Phlaeoba* Stål, 1860

Key to the genera

1. Wings more or less fuscous at apex.2
- wings hyaline at apex, pronotum very rugulose and striated*panteli* Bolivar
2. antennae unicolours*infumata* Brunner
- Antennae ringed or tipped with obscure yellow*antennata* Brunner

30. ** *Phlaeoba angustidorsis* Bolivar

1902. *Phlaeoba angustidorsis* Bolivar, *Anns. Soc. ent. Fr.*, 70 : 590

1985. *Phlaeoba angustidorsis* : Bhowmik, *Rec. Zool. surv.* No. 78 : 14.

Diagnosis : Fastigium of vertex shorter than the eye, smooth, carinated in the middle. Pronotum very narrow. Wings bluish hyaline, infuscated towards the tips. Hind femur ferrugineous with brown knees.

Distribution : India : West Bengal, Tamil Nadu.

Remarks : No specimen of this species has found during present study. But we have studied the specimen present in the National Zoological Collections.

31. *Phlaeoba antennata* Brunner

1893. *Phlaeoba antennata* Brunner, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 125.
 1914. *Phlaeoba antennata* : Kirby *Fauna British India, Orthopt. (Acridiidae)* : 102.

Material examined : Jalpaiguri Dist. : 1 (F), Teesta river belt, 8.xii.1986, R.S. Barman; 1 (M), Noorpoor, 18.xii.1986, R.S. Barman; 5 (M), Kathambari, 9.x.1987, S.K. Tandon; 3 (M), 6 (F), Mendlabari, 16.x.1987, S.K. Tandon.

Diagnosis : Olive-brown, with a broad yellow band running from the vertex to the end of the tegmina, at least in the male; antennae ensiform, black tipped with yellow; pronotum smooth, with all the three carinae well marked; tegmina narrow; wings bluish hyaline at base, infumated at apex.

Distribution : India : West Bengal (Birbhum, Darjiling, Jalpaiguri), Arunachal Pradesh, Assam, Kerala, Rajasthan, Assam. Elsewhere : Bangladesh, Borneo, Burma, China, Hainan Island, Isle of Penang, Malaya Peninsula, Perak, Tonking, Sumatra.

Remarks : We have found this species in collection from few localities of Jalpaiguri district in northern region of the state (Map 6). It has been reported earlier from Darjiling and Birbhum districts. The species is found mainly in the forest regions of north-eastern India.

32. *Phlaeoba infumata* Brunner

1893. *Phlaeoba infumata* Brunner, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 124.
 1914. *Phlaeoba infumata* : Kirby, *Fauna British India, Orthopt. (Acridiidae)* : 103.

Material examined : Darjiling Dist. : 1 (F), Chatrihat, 2.xii.1986, R.S. Barman; 2 (M), Sevok, 8.xii.1986, R.S. Barman; 2 (M), Kharibari, 9.xii.1986, R.S. Barman. *Jalpaiguri Dist* : 3 (M), 3 (F), Kathambari, 10.x.1987, S.K. Tandon and A.K. Hazra, 3 (M), Hatbaria, 14.x.1987, S.K. Tandon and A.K. Hazra. *Koch Bihar Dist.* : 1 (M), 1 (F), Jori, 15.xii.1986, R.S. Barman. *Maldah Dist.* : 1 (M), Gaur and Environs, 18.vii.1986, M.S. Shishodia; 2 (M), 2 (F), Manikchak, 19.vii.1986, M.S. shishodia. *Murshidabad Dist.* : 1 (F), Murshidabad Rly. Station, 27.ii.1985, S.K. Mitra; 2 (M), Barhampur, 11.ii.1986, I.J. Gupta. *Nadia Dist.* : 1 (M), Kaliagonj, 19.xii.1985, B.N. Das. *24-Parganas Dist.* : 3 (M), Jharkhali, 22.iv.1986, B.N. Das, 3 (M), 2 (F), Raidighi, 28.iv.1986, B.N. Das, 4 (M), 1 (F), Lakhikantpur, 28.iv.1986, B.N. Das. *West Dinajpur Dist.* : 1 nymph, Islampur, 12.xii.1986, B.C. Das.

Diagnosis : Uniform brownish testaceous; fastigium above with a continuous median carina extending along the head and pronotum; antennae ensiform, as long as head and pronotum; together; pronotum rugose, with a rudimentary carina on each side btween median and lateral carinae; tegmina and wings longer than abdomen; wings fusco-hyaline, infuscated towards extremity; hind tarsi reddish.

Distribution : India : West Bengal (Darjiling, Haora, Hoogly, Jalpaiguri, Koch Bihar, Maldah, Murshidabad, Nadia, 24 Parganas, W. Dinajpur), Arunachal Pradesh, Bihar, Delhi, Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu. Elsewhere : Bangladesh, Burma, S. China, Island hainan, S & N Kuangtung, Kwangsi, Malacca, Tenasserim, Yunna.

Remarks : *Phlaeoba infumata* occurs in the state from south 24-Parganas to Jalpaiguri and Darjiling

districts in the north (Map 6). Surprising the species is absent in the South-Western districts of the West Bengal. In general the species is fairly distributed in India. The species is associated with crops of paddy, sorghum, maize, millets, etc. and is generally found throughout the year in moist areas.

33. *Phlaeoba panteli* Bolivar

1902. *Phlaeoba panteli* Bolivar, *Annal Soc. ent. fr.*, **70** : 589

1914. *Phlaeoba panteli* : Kirby, *Fauna British India, Orthopt.* (Arcidiidae) : 104.

Material examined : 3 (M), 3 (F), Naxalbari, Darjiling district, 17.ix.1974, P. Halder.

Diagnosis : Ferruginous brown, with scattered black dots; antennae ensiform, shorter than head and pronotum together, brown at apex; vertex with marginal carinae converging behind the eyes; median carina of fastigium continued on the head and pronotum; pronotum truncate in front, obtusely angulate behind; head and pronotum very rugose; tegmina longer than abdomen; wings bluish hyaline.

Distribution : India : West Bengal (Darjiling, Haora, Hugli, Jalpaiguri, 24-Parganas), Bihar, Himachal Pradesh, Meghalaya and Tamil Nadu. Elsewhere : Afghanistan.

Remarks : This species is generally occurs in forests especially in the hilly region of Darjiling (Map 6). However, Bhowmik (1986) reported this species from south eastern region of West Bengal but we have not come across any specimens of this species during our surveys.

34. ** *Pternoscirta cinctifemur* (Walker)

1859. *Acridium cinctifemur* Walker, *Ann. Mag. nat. Hist.*, **4**(3) : 223.

1914. *Pternoscirta cinctifemur* : Kirby, *Fauna British India, Orth.*, **1** : 134, fig. 97.

Diagnosis : Head and pronotum brown in colour and granulated. Pronotum and abdomen with a continuous median carina. Wing red from base another half smoky hyaline, margins are more deep cloudy. Posterior femur stout, posterior tibia with 9 or 10 black spines. Valves of ovipositor short and slightly curved.

Distribution : India : West Bengal (Kurseong), Assam, Goa, Orissa, Tamil Nadu. Elsewhere : Eastern Nepal, Sri Lanka.

Remarks : No specimen of this species has been recorded during the present survey. However we have studied the specimen from other state of India present in the National Zoological Collections.

Genus *Holopercna* Karsch, 1891

35. ** *Holopercna darjeelingensis* (Bolivar)

1914. *Sjoestedti darjeelingensis* Bolivar, *Trab. Mus. Cienc. nat. Madr., Madrid*, **20** : 77

1984. *Holopercna darjeelingensis* : Jago, *Trans. Amer. Ent. Soc.*, **109** : 78.

Diagnosis : Medium size. Fastigium of vertex concave. Foveolae absent. Female larger than male. General colour brown, mottled with dark and yellowish spaces and stripes. Eyes brownish. Posterior femur with whitish-yellow, with dark spots on carinae and carinulae.

Distribution : India : West Bengal (Darjiling), Assam, Himachal Pradesh, Sikkim, Uttar Pradesh.

Remarks : No specimen of this species has been found during present study. However, we have studied the specimen from other state present in the National Zoological Collections.

Genus *Chondronotulus* Uvarov, 1956

36. *Chondronotulus bengalensis* (Saussure)

1870. *Oedipoda blteata* Walker, *Cat. Derm. Salt. Br. Mus.* 4 : 376

1956. *Chondronotulus bengalensis* : Uvarov, *Ent. Mon. Mag.*, 92 : 218.

Diagnosis : Male is distinctly smaller than female. Head raised distinctly above pronotum. Brown body colour. Vertex broad and sharply sloping, fastigium vertical, rugose. Posterior femur on inside dark Chocolate-brown, becoming black towards apex. Tibia dirty yellow, with black base.

Distribution : India : West Bengal (North Bengal), Madhya Pradesh, Maharashtra.

Remarks : No specimen of this species has been found during the present study. This is only species of this genus. We have studied the specimen from other state present in the National Zoological Collections.

Genus *Sphingonotus* Fieber, 1852

37. ** *Sphingonotus longipennis* Saussure

1884. *Sphingonotus longipennis* Saussure, *Mem. Soc. Phys. Hist. nat. Geneva*, 28(9) : 197, 203.

Diagnosis : Wings blue to the middle, followed by a black band, varying in width, but generally with broad band, curving from the middle of the costa to above the anal angle, extending from costa to anal region; wings without dark spot at the apex; hind femora blue; tibiae alternately banded with blue and black.

Distribution : India : West Bengal (Darjiling, Jalpaiguri Districts), Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Punjab. Elsewhere : Afghanistan; Bangladesh, East Nepal, South east Tibet.

Remarks : We have not found this species in the present collection. However, Bhowmik (1986) has reported this species from West Bengal.

Genus *Trilophidia* Stål, 187338. *Trilophidia annulata* (Thunberg)

1815. *Gryllus annulatus* Thunberg, *Mem. Acad. Sci. St. Petersb.* 5 : 234.

1965. *Trilophidia annulata* : Hollis, *Trans. R. ent. Soc. Lond.*, 117 (8) : 251.

Material examined : Bankura Dist. : 1 (M), 2 (F), Shunshunia, 9.x.1985, K.K. Roy; 1 (M), Sonamukhi forest, 3.xi.1985, K.P. Mukherje Birbhum Dist. : 1 (M), Mollarpur, 4.iv.1986, M.S. Shishodia. Darjiling Dist. : 4 (M), 7 (F), Bamanpokri, 21-22.viii.1975, H.K. Bhowmik, 2 (M), 1 (F), Sukna, 16.xi.1974, H.K. Bhowmik; 2 (M), 1 (F), Fansidewa, 7.xii.1986, R.S. Barman; 2 (M), 2 (F), Kharibari, 9.xii.1986, R.S. Barman. Haora Dist. : 1(M), 1 (F), Uluberia, 18.iii.1966, M.S. Shishodia, 1 (M), 1 (F), Botanical Garden, 11.x.1986, M.S. Shishodia. Hugli Dist. : 1 (M), 1 (F), Anantapur, 9.vii.1965, M.S. Shishodia. Jalpaiguri Dist. : 2(M), 2 (F), Rydak forest, 10.ix.1975, H.K. Bhowmik, 1 (F), Noorpoor, 18.xii.1986, R.S. Barman; 1 (M), Hansimara, 15.x.1987, S.K. Tandon and A.K. Hazra. Maldah Dist. : 2 (M), 2 (F), Ramkeli, 19.x.1983, A.K. Hazra, 2 (M), 3 (F), Narayanpur, 20.x.1983, A.K. Hazra, 1 (M), 1 (F), Haldibari, 16.vii.1986, M.S. Shishodia; 2 (M), 5 (F), Ghosimore (near Farakka), 17.vii.1986, M.S. Shishodia; 3 (M), 1 (F), Gaur, 18.vii.1986, M.S. Shishodia; 4 (M), 4 (F), Manickchak, 24.vii.1986, M.S. Shishodia. Medinipur Dist. : 1 (M), 1 (F), Jhargram, 20.x.1983, A.K. Hazra, 6 (M), 5 (F), Digha, 27.ix.1983, A.K. Hazra, 3 (M), 2 (F), Junput, 30.ix.1983, A.K. Hazra, 2 (F), Belpahari, 9.Ix.1986, S. Biswas, 1 (M), Bholabheda, 10.ix.1986, s. Biswas; 2 (M), 1 (F), Kankrajhar forest, 19.xii.1986, A.K. Hazra. Murshidabad Dist. : 1 (M), 7 (F), Beldanga, 13.x.1983, A.K. Hazra, 9 (M), 4 (F), Baharampur, 15.x.1983, A.K. Hazra, 2 (M), 3 (F), Dumkal, 17.x.1983, A.K. Hazra, 2 (M), 3 (F), Jangipur, 12.ii.1986, I.J. Gupta, 2 (F), Lalgola, 4.iii.1986, S.K. Mitra. Nadia Dist. : 1 (M), Baluria, 21.xii.1985, B.N. Das, 1 (M), Dhubulia, 19.xii.1985, B.N. Das, 5 (M), Palassi, 28.i.1986, A.R. Lahiri; 5 (M), 2 (F), Krishnagar, 1.ii.1986, A.R. Lahiri; 1 (M), Ranaghat, 5.ii.1986, A.R. Lahiri. 24-Parganas Dist. : 3 (M), 2 (F), Baruipur, 20.xi.1983, S.K. Mondal; 1 (M), Amtala, 19.v.1986, B.N. Das, 2 (M), 2 (F), Achipore, 21.iv.1986, B.N. Das; 2 (M), 1 (F), Jharkhali, 22.iv.1986, B.N. Das; 2 (F), Lakhikantapur, 28.iv.1986, B.N. Das, 2 (F), Madhabpur (near Diamond Harbour), 3.v.1986, B.N. Das. Puruliya Dist. : 1 (M), Belmura, 7.x.1983, A.K. Hazra; 1 (M), Jhaldah, 9.x.1983, A.K. Hazra, 2 (M), 1 (F), Ajothya Hill, 4.xi.1986, M. Dutta; 1 (M), 1 (F), Manbazar, 5.ix.1986, R.S. Barman.

Diagnosis : Brown or grey with black markings, pubescent beneath; pronotum rugose, with a high median carina, forming two teeth in front, and with lateral carinae; tegmina grey, sometimes with two indistinct brown bands; wings yellow at the base, and brown or black beyond; hind tibiae brown, with a pale band towards the base, and with a slight pale band beyond the middle.

Distribution : India : West Bengal (Bankura, Birbhum, Darjiling, Haora, Hooghly, Jalpaiguri, Maldah, Medinipur, Murshidabad, Nadia, Puruliya, 24-Parganas), Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Kerala, Himachal Pradesh, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh. Elsewhere : Bangladesh, Bornco, Burma, Hongkong, Japan, Java, Korea, Malaya, Mongolia, Pakistan, Sarawak, Singapore, Sri Lanka, Sumatra, Taiwan.

Remarks : *Trilophidia annulata* occurs almost throughout the state from sea level to foot hills of Himalaya in Jalpaiguri and Darjiling District (Map 6). It mainly occurs on bare ground adjoining Kuccha roads.

Subfamily HEMIACRIDINAE

Key to the genera

1. Mesosternal lobes meeting with each other in a straight line; posterior femora much shorter than abdomen; thorax with white lateral stripe. *Leptacris* Walker
 Mesosternal lobes more or less separated with a gap; posterior femora not shorter than abdomen; thorax without lateral stripe. 2
2. Tegmina with a patch of densely placed transverse veinlets between radial and medial areas; apex of male cercus spine like; size small 4
 Tegmina without patches of veinlets; apex of male cercus usually bilobate or trilobate but not spine-like; size large. 3
3. Male supra-anal plate narrower than long, with sides excurved towards apex; male cercus medium sized, slightly curved and gradually narrowing, apex bifurcate. *Hieroglyphus* Krauss
 - Male supra-anal plate broader than long, with straight sides narrowing to acute-angular apex or trilobate at apex, with very small middle lobe; male cercus large trilobate, with very large expanded middle lobe. *Parahieroglyphus* Carl
4. Prosternal process spatulate; fastigium of vertex not much produced before eyes, parabolic or obtusely angular; pronotum distinctly tricarinate *Spathosternum* Krauss
 Prosternal process conical; fastigium of vertex elongate, projecting far in front of eyes; pronotum not distinctly tricarinate. *Gesonula* Uvarov

Genus *Gesonula* Uvarov, 194039. *Gesonula punctifrons* Stal

1860. *Acridium (Oxya) punctifrons* Stal, Kongl. Freg. Eug. Resa. Omkring Jorden : Insecta : 336.
 1965. *Gesonula punctifrons* : Mistchenko, Locusts and grasshoppers of U.S.S.R. and adjacent countries, Catantopinae Leningrad : 172.

Material examined : Birbhum Dist. : 3 (M), Ballavpur, 29-30.i.1986, S.B. Roy. Bardhaman Dist. : 1 (M), Asansol, 18.x.1985, B.N. Das; 1 (M), Dhatigram, 12.xii.1985, S.K. Ghosh. Koch Bihar Dist. : 1 (M), Koch Bihar, 26.i.1984, M. Prasad; 1 (M), Chaudhury Hat, 23.iii.1984, M. Prasad; 1 (F), Baxirhat, 13.xii.1986, R.S. Barman, 1 (F), Balabhut, 4.xii.1986, R.S. Barman. Darjiling Dist. : Panitanki, 5.xii.1986, R.S. Barman, 6 (M), 1 (F), Sevok, 8.xii.1986, R.S. Barman, 2 (M), 1 (F), Himul, 4.xii.1986, R.S. Barman. Jalpaiguri Dist. : 2 (M), Noorpoor, 18.xii.1986, R.S. Barman, 2 (M), Alipurduar, 17.i.1987, V.D. Srivastava. Murshidabad Dist. : 3 (M), Dumkal, 17.x.1983, A.K. Hazra, 1 (M), 1 (F), Kashimbazar, 26.ii.1986, S.K. Mitra. Nadia Dist. : 1 (F), Balgona, 9.xii.1985, B.N. Das. 24-Parganas Dist. : 1 (M), 1

(F), Govindapur, 24.iv.1986, B.N. Das, 4 (M), Deulia, 2.v.1986, B.N. Das. *West Dinajpur Dist.* : 4 (M), Raigunj, 29.xi.1983, A.K. Sanyal; 1 (M), Birnagar, Raigunj, 16.xii.1986, B.C. Das.

Diagnosis : Eyes large; antennae longer than head and pronotum together; pronotum narrow, long, rugose; lateral lobes very wide, anterior margin oblique, anterior and ventral angles rounded; supra-anal plate spoon shaped, wide basally, with wide longitudinal median groove; hind tibiae dirty bluish, Reddish at base, blackish at apex, the apical part modified for swimming.

Distribution : India : West Bengal (Bardhaman, Birbhum, Darjiling, Haora, Hoogly, Jalpaiguri, Koch Bihar, Murshidabad, Nadia, W. Dinajpur, 24 Parganas), Arunachal Pradesh, Assam, Goa, Kerala, Orissa and Tamil Nadu. Elsewhere : Burma, Borneo, China, Hainan, Japan, Java, Malacca, Philippines, Sri Lanka, Taiwan, Tongking and Thailand. It is also studied from Andaman and Nicobar Islands.

Remarks : In West Bengal this species is fairly well distributed and we have found it occurring in southern, central and northern regions (Map 7). This species is generally found in vegetation adjoining paddy fields, ponds etc. and attack water-hyacinth in India.

Genus *Hieroglyphus* Krauss, 1877

40. *Hieroglyphus banian* (Fabricius)

1798. *Gryllus banian* Fabricius, *Entom. System. Suppl.*, : 194

1973. *Hieroglyphus banian* : Mason, *Bull. Br. Mus. nat. Hist. (Ent.)* 28(7) : 540.

Material examined : *Bankura Dist.* : 1 (F), Chatna, N.W. Bankura, 10.x.1985, K.K. Roy, 2 (M), Bishnupur, 6.xi.1985, K.P. Mukherjee. *Bardhaman Dist.* : 5 (M), 2 (F), Barsul, 27.x.1983, A.K. Hazra. *Nadia Dist.* : 4 (M), 2 (F), Bethuadahori, 26.ix.1981, S.K. Mondal. *24-Parganas Dist.* : 3 (M), 1 (F), Garia, 7.x.1987, S.K. Mondal. *Puruliya Dist.* : 2 (M), 2 (F), Lorsi, 6.ix.1985, R.S. Barman.

Diagnosis : Male cercus with apex bifurcate, relatively slender, with upper branch of fork recurved anteriorly towards head and lower branch elongate and acute. Lower valves of ovipositor long and slender with external lateral projection well defined and acute.

Distribution : India : West Bengal (Bankura, Bardhaman, Naida, Puruliya, 24-Parganas), Andhra Pradesh, Himachal Pradesh, Orissa, Rajasthan and Tamil Nadu. Elsewhere : Bangladesh, Bhutan, Burma, China, Nepal, Thailand and Vietnam.

Remarks : *H. banian* is a major pest of paddy in India and in West Bengal we found it mainly in the paddy growing district (Map 7).

41. ** *Hieroglyphus nigrorepletus* Bolivar

1912. *Hieroglyphus nigrorepletus* Bolivar, *Trab. Mus. nac. Cienc. nat. Madr.*, No. 6 : 56.

1973. *Hieroglyphus nigrorepletus*, Mason, *Bull. Br. Mus. nat. Hist. (Ent.)* 28 (7) : 526.

Diagnosis : Colour buff with yellowish buff patches; large and robust, in size, female is slightly larger than male; fastigium of vertex one and a half time as broad as long; frontal ridge parallel sided;

female subgenital plate with very acute median lobe.

Distribution : India : West Bengal, Assam, Bihar, Karnataka, Kashmir, Orissa, Punjab, Uttar Pradesh. Elsewhere : Pakistan.

Remarks : No specimen of this species has been recorded from the present survey. However, we have studied the material from other state present in our National Zoological Collection.

42. ** *Hieroglyphus oryzivorus* Carl

1916. *Hieroglyphus oryzivorus* Carl, *Revue suisse Zool.*, 24 : 480.

Diagnosis : Female larger than male; frontal ridge divergent downwards and with moderately, shallow sulcus; Cercus simple, short, upcurved and incurved. General body colour pale green or buff with yellowish brown patches.

Distribution : India : West Bengal (Murshidabad), Orissa. Elsewhere : Pakistan.

Remarks : No specimen of this species has been found during the present study.

Genus *Parahieroglyphus* Carl, 1916

43.** *Parahieroglyphus bilineatus* (Bolivar)

1912. *Hieroceryx bilineatus* Bolivar, *Trab. Mus. nac. Cienc. nat. Madr.* No. 6 : 60.

1916. *Parahieroglyphus bilineatus* Carl., *Revue suisse Zool.*, 24 : 483.

Diagnosis : Medium size; frontal ridge parallel-sided or may diverge just below median ocellus; cercus very large, divided into 3 lobes; female larger than male. General body colour is buff with black markings.

Distribution : India : West Bengal (no specific locality), Maharashtra, Himachal Pradesh.

Remarks : No specimen of this species has been found during present study. However we have examined the specimen present in National Zoological Collections.

Genus *Leptacris* Walker, 1870

44.** *Leptacris vittata* (Fabricius)

1787. *Truxalis vittatus* Fabricius, *Mantissa Insectorum*, 1 : 231.

1870. *Opomala convergens* Walker, *Cat. Derm. Salt. Br. Mus.*, 3 : 511.

1873. *Ischnacrida vittata* : Stal, *Recencio Orthopterorum*, 1 : 87.

1910. *Ischnacrida convergens* : Kirb, *Syn. Cat. Orth.*, 3 : 405.

1953. *Leptacris vittata* : Willemse, *Ergebn der Sumba Exped. des Museums fur Volker Kund und des Naturh. Museums in Basel*, 93.

Diagnosis : Body slender; basal segments ensiform, apical filiform; fastigium of vertex produced

in front of eyes; foveolae large, triangular and visible from above; pronotum cut by three transverse sulci, median carina indistinct; tegmina longer than posterior femora; prosternum smooth; supra-anal plate somewhat tongue shaped with a median longitudinal groove; subgenital plate very long, as long as head and pronotum.

Distribution : India : West Bengal (North Bengal), Andhra Pradesh. Elsewhere : China, Indonesia, Pakistan and Sri Lanka.

Remarks : No material was available from West Bengal.

Genus *Spathosternum* Karsch, 1877

45. *Spathosternum prasiniferum prasiniferum* (Walker)

1871. *Heteracris* (?) *prasinifera* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 Suppl. : 65.

1936. *Spathosternum prasiniferum prasiniferum* : Tinkham, Lingnan. *Sci. J.*, 15 : 51.

Material examined : Bankura Dist. : 2 (M), 1 (F), Bishnupur Sericulture nursery, 25-26.x.1985, M. Dutta; 2 (M), 2 (F), Bishnupur, 6.xi.1985, K.P. Mukherjee. Birbhum Dist. : 2 (M), 1 (F) Rampurhat, 20.xi.1987, S.B. Roy. Bardhaman Dist. : 1 (M), Bardhaman, 13.x.1985, S.K. Ghosh; 1 (F), Galsi, 14.x.1985, S.K. Ghosh. Koch Bihar Dist. : 2 (F), Mathabhanga, 11.xii.1986, R.S. Burman. Darjiling Dist. : 2 (M), 1 (F), Tindharia, 18.xi.1974, H.K. Bhowmik; 1 (M), 2 (F), Himul, 4.xii.1986, R.S. Barman; 1 (M), Panitanki, 5.xii.1986, R.S. Barman; 2 (M), Sonarpur, 7.xii.1986, R.S. Barman; 4 (M), 2 (F), Kharibari, 9.xii.1986, R.S. Barman. Haora Dist. : 1 (M), 3 (F), Andul, 11.vii.1978, P. Halder. Jalpaiguri Dist. : 3 (M), Joygaon, 17.xii.1986, R.S. Barman; 2 (M), 1 (F), Binaguri, 20.xii.1986, R.S. Barman; 1 (F), Hansimara, 15.x.1987, S.K. Tandon. Maldah Dist. : 3 (F), Khajuria, 23.vii.1986, M.S. Shishodia. Medinipur Dist. : 6 (M), 3 (F), Digha, 16.x.1983, A.K. Hazra; 1 (M), 1 (F), Kankrajhore, 19.xii.1985, A.K. Hazra; 1 (M), Jambani, 22.i.1986, A.K. Hazra. Murshidabad Dist. : 1 (M), Raghunathgunj, 17.ii.1986, I.J. Gupta; 2 (M), 1 (F), Amarpur, 8.II.1986, I.J. Gupta; 1 (M), 1 (F), Sagardighi, 15.ii.1986, I.J. Gupta. Nadia Dist. : 1 (M), Kalyani 21.i.1986, A.R. Lahiri; 1 (M), 1 (F), Habibpur, 4.ii.1986, A.R. Lahiri. 24-Parganas Dist. : 4 (M), 1 (F), Jharkhali, 22.iv.1986, B.N. Das; 4 (M), 4 (F), Raidighi, 28.iv.1986, B.N. Das; 3 (M), Kakdwip, 2.v.1986, B.N. Das. Puruliya Dist. : 2 (M), 3 (F), Velladih village, 18.ix.1987, M. Prasad.

Diagnosis : Broad blackish or dark green stripe running behind the lower part of the eyes and below the lateral carinae of the pronotum, central area of tegmina with a longitudinal black streak, generally almost obsolete in the male and well marked in the female, but very variable, sometimes being entire; tegmina reaching distal end of hind femora or slightly beyond it; wings well developed.

Distribution : India : West Bengal (Bankura, Bardhaman, Birbhum, Darjiling, Haora, Hoogly, Jalpaiguri, Koch Bihar, Maldah, Medinipur, Murshidabad, Puruliya, 24-Parganas), Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu. Elsewhere : Burma, S.E. China, Thailand and Vietnam.

Remarks : *S. prasiniferum prasiniferum* occurs almost throughout India and is associated with most

grassy habitats. This species is well distributed in West Bengal and we have found it in almost all the districts of the state (Map 7).

Subfamily OXYINAE

Genus *Oxya* Serville, 1831

Key to species (male)

1. Supra-anal plate with a tubercle on each side of a median apical process2
 Supra-anal plate without lateral tubercles4
2. Cercus laterally compressed, hardly narrowing towards apex, weakly bifurcate at apex
 *fuscovittata* (Marschall)
- Cercus conical, narrowing towards apex, which is obtuse or truncate.3
3. Inner pair of lophi usually well developed.....*hyla hyla* Serville
 - Inner pair of lophi usually poorly developed.....*hyla intricata* (Stål)
4. Supra-anal plate rounded triangular; cercus, conical, with strongly truncate apex; outer lophi relatively straight, inner lophi small and slender.*nitidula* (Walker)
 Supra-anal plate sub-acutely triangular; cercus, with subacute apex; outer lophi hook-like, inner lophi large and tooth-like*velox* (Fabricius)

Key to species (Female)

1. Anterior margin of tegmen with a dense row of short bristles extending from costal bulge to apex of tegmen, ovipositor valves with long tooth, the apical one curved.2
 Anterior margin of tegmen weakly or not at all spined; valves of ovipositor with short teeth. ...4
2. Ventral surface of subgenital plate almost completely flat or weakly concave, appearing widen posteriorly*fuscovittata* (Marschall)
 Ventral surface of subgenital plate flat or concave only in median posterior half, not widening posteriorly.....3
3. Ventral surface of subgenital plate with two longitudinal ridges extending forwards from posterior margin*hyla hyla* Serville

- Ventral surface of subgenital plate without longitudinal ridges, or with only slightly traces of them apically*hyla intricata* (Stal)
- 4. Ventral surface of subgenital plate with a subapical tooth on each side of a median apical spine.*nitidula* (Walker)
- Ventral surface of subgenital plate without tooth on its lateral margin*velox* (Fabricius)

46. *Oxya fuscovittata* (Marschall)

1836. *Gryllus fuscovittatus* Marschall, *Ann. wien. Mus. Naturg.*, 1 : 211.

1971. *Oxya fuscovittata* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)*, 26(7) : 289.

Material examined : Birbhum Dist. : 2 (M), Narayanpur, 2.iv.1986, K.P. Mukherjee Bardhaman Dist. : 4 (M), Panagarh, 13.x.1985, S.K. Ghosh. Koch Bihar Dist. : 4 (M), 1 (F), Tufangunj, 12.xii.1986, R.S. Barman; 2 (M), Baxirhat, 13.xii.1986, R.S. Barman. Darjiling Dist. : 2 (F), Chatirhat, 3.xii.1986, R.S. Barman; 2 (M), Fansidewa, 6.xii.1986, R.S. Barman. Haora Dist. : 1 (M), 1 (F), Botanical Garden, 19.viii.1986, S.K. Ghosh. Jalpaiguri Dist. : 1 (M), Alipurduar, 1.i.1987, M. Dutta; 1 (M), 1 (F), Hansimara, 15.x.1987, S.K. Tandon. Maldah Dist. : 2 (M), Manickchak, 4.vii.1986, M.S. Shishodia; 3 (M), Chanchal, 20.vii.1986, M.S. Shishodia. Medinipur Dist. : 6 (M), Kopra village, West of Digha, 25.xii.1985, A.K. Hazra. Murshidabad Dist. : 1 (F), Raghunathganj, 7.ii.1986, I.J. Gupta. 24-Parganas Dist. : 3 (M), 4 (F), Govindapur, 24.iv.1986, B.N. Das.

Diagnosis : Integument finely pitted and shiny; female large in size; cercus of male compressed and weakly bifurcate, and ventral surface of subgenital plate, in female, almost completely flat or weakly concave.

Distribution : India : West Bengal (Bardhaman, Birbhum, Darjiling, Haora, Hoogly, Jalpaiguri, Koch Bihar, Maldah, Medinipur, Murshidabad, Nadia, 24 Parganas), Andhra Pradesh, Jammu & Kashmir, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh. Elsewhere : Afghanistan, Pakistan, U.S.S.R. (South West).

Remarks : *O. fuscovittata* is well distributed in West Bengal and occurs in most of the districts but in low numbers (Map 8). this species is associated with paddy and grasses adjoining cultivated fields.

47. *Oxya hyla hyla* Serville

1831. *Oxya hyla* Serville, *Annl. Sci. nat. (Zool.)*, 22 : 287.

1971. *Oxya hyla hyla* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)* 26 (7) : 282.

Material examined : Bankura Dist. : 1 (M), Sonamukhi forest, 4.xi.1986, K.P. Mukherjee, 1 (M), 2 (F), Bishnupur, 6.xi.1986, K.P. Mukherjee. Birbhum Dist. : 2 (M), Bolpur, 6.iv.1986, M.S. Shishodia. Bardhaman Dist. : 1 (M), 3 (F), Damodar river bed, 16.vi.1979, A.K. Hazra; 1(M), 1 (F), Borsul, 30.viii.1979, A.K. Hazra. Koch Bihar Dist. : 1 (F), TufanGunj, 12.xii.1986, R.S. Barman, 3 (M), 2 (F), Baxirhat, 13.xii.1986, R.S. Barman. Darjiling Dist. : 4 (M), Panitanki, 5.xii.1986, R.S. Barman. Haora

Dist. : 1 (M), Haora, 19.viii.1986, S.K. Ghosh; 1 (M), Laotala, 28.i.1986, B. Dutta, 1 (F), Jayan, 19.i.1983, B. Dutta. *Jalpaiguri Dist.* : 2 (M), Noorpoor, 18.xii.1986, R.S. Barman; 1 (F), Kathambari, 10.x.1987, S.K. Tandon. *Maldah Dist.* : 1 (M), Chanchal, 20.vii.1986, M.S. Shishodia; 2 (F), Khajuria, 23.vii.1986, M.S. Shishodia. *Medinipur Dist.* : 1 (M), Belpahari, 18.ix.1985, S. Biswas; 1 (M), Garbeta, 19.ix.1985, S. Biswas; 1 (M), Keyajhoria Forest, Digha, 27.xii.1985, A.K. Hazra. *Nadia Dist.* : 1 (F), Bethuadohori forest, 15.ii.1979, A.K. Hazra. *Puruliya Dist.* : 1 (M), Balarampur, 2.xi.1985, S. Sen; 1 (M), Ramkrishna Mission Vidyapith, 3.xi.1985, S. Sen. *24-Parganas Dist.* : 2(F), Amtala 19.iv.1986, B.N. Das; 2 (M), 2(F) Govindapur, 27.iv.1986, B.N. Das; 2 (M), 1 (F), Devlia, 2.v.1986, B.N. Das. *West Dinajpur Dist.* : 3 (M), Raiganj, 15.xii.1986, B.C. Das; 1 (M), Sonapur, 18.xii.1986, B.C. Das.

Diagnosis : Body finely rugulose, shiny; size small; antennae longer than head & pronotum; supra-anal plate trapezoidal with triangular apical projection; on both sides of supra-anal plate small tubercle present; cercus with sub-acute apex; subgenital plate in female with two longitudinal ridges extending forwards from posterior margin.

Distribution : India : West Bengal (Bankura, Birbhum, Bardhaman, Darjiling, Haora, Hoogly, Jalpaiguri, Koch Bihar, Maldah, Medinipur, Nadia, Puruliya, 24 Parganas, W. dinajpur), Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Himachal Pradesh, Karnataka, Kerela, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh. Elsewhere : Afghanistan; Africa; Bangladesh; Madagascar; Nepal; Pakistan; Persia; Sri Lanka.

Remarks : *O. hyla hyla* is widely distributed in different parts of West Bengal ranging from sea-level to sub-himalayan and himalayan regions of the State (Map 8). this species is found in association with cultivated crops, vegetables, grasses, etc. especially in moist areas.

48. *Oxya nitidula* (Walker)

1870. *Acridium nitidulum* Walker, *Cat. Derm. Salt. Brit. Mus.*, 4 : 631.

1971. *Oxya nitidula* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)* 26(7) : 315.

Material examined : *Darjiling Dist.* : 1 (M), Himul, 4.xii.1986, R.S. Barman. *Jalpaiguri Dist.* : 1 (M), Bagracot, 11.x.1987, S.K. Tandon; 2 (M), 1 (F), Hansimara, 14.x.1987, S.K. Tandon & A. K. Hazra. *Maldah Dist.* : 2 (M), Maldah, 20.vii.1986, R.S. Barman. *Medinipur Dist.* : 3(M), 2 (F), Sanbarpur forest, Digha, 25.xii.1985, A.K. Hazra, 2 (M), 2 (F), Keyajhoria, Digha, 27.xii.1985, A.K. Hazra. *24-Parganas Dist.* : 1 (M), Lakhikantpur, 28.iv.1986, B.N. Das, 1 (M), Joka, 30.iv.1986, B.N. Das. *Puruliya Dist.* : 2 (M), 1(F), Korsi, 6.ix.1986, R.S. Barman.

Diagnosis : Antennae with 24-26 segments; pronotum narrowing forwards, posterior margin of metazona rounded, tegmina surpassing apex of hind femur; supra-anal plate rounded triangular; outer lophi of epiphallus nearly straight, inner small and slender; female longer than male; subgenital plate of female with a single medial spine and a pair of lateral spines.

Distribution : India : West Bengal (Darjiling, Jalpaiguri, Maldah, Medinipur, Puruliya, 24 Parganas), Andhra Pradesh, Orissa. Elsewhere : Sri Lanka.

Remarks : Commonly found in penninsular region of India but its extension towards Orissa and

West Bengal is interesting. Records in West Bengal are scattered mostly in southern and northern area of the State with isolated records in central region (Map 8).

49. *Oxya velox* (Fabricius)
(Map 8)

1787. *Gryllus velox* Fabricius, *Mantissa Insectorum*, 1 : 239.

1971. *Oxya velox* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)* 26(7) : 297.

Material examined : Darjiling Dist. : 2 (F), Fansidewa, 7.xii.1986, R.S. Barman. Jalpaiguri Dist.: 1 (F), Chilapata, 14.x.1987, S.K. Tandon and A.K. Hazra; 2 (F), Mendabari, 16.x.1987, S.K. Tandon. Koch Bihar Dist. : 3 (M), 1 (F), Kaligunj, 28.iii.1984, M. Prasad.

Diagnosis : Size smaller than the preceding species described under the genus; antennae with 22-26 segments; posterior margin of the metazona widely obtuse angular; supra-anal plate with rounded triangular posterior projection, cercus conical, with subacute apex; epiphallus with hook like outer lophi and large tooth like inner lophi; female longer than male; subgenital plate of female in posterior half ventrally, with a median longitudinal cavity bordered on each side by a lateral longitudinal ridge.

Distribution : India : West Bengal (Bankura, Jalpaiguri, Hoogly, Koch Bihar), Himachal Pradesh, Jammu & Kashmir, Rajasthan. Elsewhere : Bangladesh, Burma, China, Pakistan and Thailand.

Remarks : *O. velox* is limited in distribution in West Bengal and we have found it only in The districts of Jalpaiguri, Koch Bihar and Darjiling. It appears that this species associated with forest vegetation in the State (Map 8).

Subfamily COPTACRIDINAE

Key to genera

1. Tegmen well developed, with apex obliquely or subobliquely truncate2
- Tegmen short, not extending first abdominal segment, with apex normally rounded or lobiform.
.....*Circocephalus* Willemse
2. Frontal ridge scarcely or only moderately narrowed at apex; median carina of pronotum low, line as cut by all the sulci*Eucoptarca* Bolivar
- Frontal ridge at apex narrowed almost to a point; median carina of pronotum well raised, cut by third sulcus only.*Epistaurus* Bolivar

Genus *Circocephalus* Willemse, 1921

50. *Circocephalus indica* Bhowmik & Halder

1982. *Circocephalus indica* Bhowmik and Halder, *Geobios new Reports*, 1 : 8.

Material examined : Darjiling Dist. : 1 (M), Naxalbari, Duars, 13.ix.1975, P. Halder. Jalpaiguri Dist. : 1 (M), Jayanti, Tarai, 4.ix.1975, H.K. Bhowmik; 5 (F), Rydok, Tarai, 12.ix.1975, H.K. Bhowmik, 1 (M), Mendabari, Chilpata, 16.x.1987, S.K. Tandon.

Diagnosis : Dark brown in colour; head is little longer than half of pronotum; fastigium of vertex elongate, extending in front of eyes, deeply concave, reclinate in front; foveolae visible from above, almost triangular; Post-ocular fascia with a wide dark and band which runs beyond and upto superior margin of lateral pronotal lobes; prosternal tubercle conical, slightly bent; tegment as long as 1st abdominal segment, costal half dark, anal half brownish, Wings rudiment; cercus compressed, constricted in middle, apical region dilated and upturned; female robust; valves of ovipositor typical.

Distribution : India : West Bengal (Darjiling, Jalpaiguri) found throughout the 'Duars' and 'Tarai' of eastern Himalayas at an elevation of 75 metre to 300 metre.

Remarks : Generally found in forest area of Darjiling and Jalpaiguri districts (Map 9).

Genus *Epistaurus* Bolivar, 1889

51. *Epistaurus sinetyi* Bolivar

1902. *Epistaurus sinetyi* Bolivar, *Annls Soc. Ent. Fr.*, 70 : 623.

1914. *Epistaurus sinetyi* : Kirby, *Fauna of British India, Orthopt.* (Acridiidae) : 242.

Material examined : Bankura Dist. : 1 (M), Mukutmanipur, 28.x.1985, M. Dutta; 1 (F), Indos, 5.iii.1986, K.P. Mukherjee. Haora Dist. : 1 (M), 1 (F), Botanical Garden, 14.vi.1979, T.K. Mukherjee; 1 (M), Botanical Garden, 16.iii.1982, S.K. Mondal. Medinipur Dist. : 1 (M), Bholaveda, 10.ix.1985, S. Biswas. 24-Parganas Dist. : 1 (M), Achipur, 21.iv.1986, B.N. Das.

Diagnosis : Pale reddish in colour; median carina of vertex indistinct; wings yellowish-hyaline; hind femora obliquely trifasciate; tibiae clothed with long grey hairs; brown at base, ringed with pale and then red; abdomen red, spotted on the back.

Distribution : India : West Bengal (Bankura, Haora, Medinipur, 24 Parganas), Orissa, Tamil Nadu.

Remarks : This species is mainly found southern districts of West Bengal (map 9). It is not yet recorded from Northern region of the State. It is a very uncommon species generally found in fallen dry leaves.

52. *Eucoptacra praemorsa* (Stal)

1860. *Acridium (Catantops ?) praemorsum* Stal, *Kongl. Freg. Eug. Resa. Omkring Jorden, Insects* : 330.

1914. *Eucoptacra praemorsa* : Kirby, *Fauna Brit. India, Orthopt.* (Acridiidae) : 240.

Material examined : Bankura Dist. : 2 (M), 2 (F), Mukutmanipur, 22.ix.1986, H.K. Bhowmik. Darjiling Dist. : 1 (M), Sevok, 22.vii.1974, H.K. Bhowmik; 1 (F), Tukriaghar, 18.vi.1979, P. Halder.

Jalpaiguri Dist. : 3 (M), Teesta river bed, 8.xii.1986, R.S. Barman; 4 (M), 2 (F), Jaynti hill, 17.xii.1986, R.S. Barman.

Diagnosis : Brownish testaceous; frontal costa distinctly widened between antennae and wider than the vertex between the eyes; tegmina extending beyond the hind femora, obliquely truncated at apex; wings pale brownish hyaline, greenish towards base, and clouded at the tip; hind femora without distinct black spot in or near the middle of area supra externa; posterior tibiae without external spine at the apex; subgenital plate of female with the hind margin broadly rounded or triangularly expanded.

Distribution : India : West Bengal (Bankura, Darjiling, Jalpaiguri), Arunachal Pradesh, Kerala, Maharashtra, Sikkim, Tamil Nadu. Elsewhere : Burma, China, Taiwan and Tenasserim.

Remarks : This species is fairly common in Darjiling and Jalpaiguri districts of North Bengal. From south Bengal it is recorded only from Birbhum district (Map 9).

Subfamily TROPIDOPOLINAE

Genus *Tristria* Stal, 1873

53. *Tristria pulvinata* (Uvarov)

1921. *Tapinophyma pulvinata* Uvarov, *Ann. Mag. nat. Hist.*, 7(9) : 497.

1929. *Tristria pulvinata* : Uvarov, *Revue Suisse Zool.*, 29 : 559.

Material examined : *Haora Dist.* : 1 (M), Haora, 19.viii.1986, S. Ghosh. *Jalpaiguri Dist.* : 1 (F), Hatkhola, Alipurdwar, 28.iv.1986, B.C. Das. *24-Parganas Dist.* : 1 (M), Ramdharia, 18.iv.1986, B.N. Das; 2 (M), 1 (F), Achipur, 21.iv.1986, B.N. Das; 1 (F) Govindapur, 27.iv.1986, B.N. Das. *Puruliya Dist.* : 1 (M), Shahebaad, 8.ix.1986, R.S. Barman.

Diagnosis : Fastigium of vertex parabolic, moderately narrow, antennae filiform; prosternal tubercle curved backwards, almost square in cross section, strongly widened apically, with slightly concave apical surface; tegmina and wings extending upto the apex of subgenital plate or shorter; male cercus in apical third incurved, down curved and laterally flattened posterior margin of last abdominal tergite in male, with a triangular projection on either side of mid line; female subgenital plate with an angular projection on the posterior margin on either side of mid-line; male subgenital plate almost linear, compressed knife-like.

Distribution : India : West Bengal (Haora, Jalpaiguri, Nadia, Puruliya, 24 Parganas), Assam, Bihar, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh. Elsewhere : Sri Lanka.

Remarks : This species occurs in limited numbers in the districts of south 24-Parganas & Haora in southern region and an isolate record from Puruliya in south Central region of state. We have also found this species inhabiting forested region of Jalpaiguri district in northern region (Map 9).

Subfamily CALLIPTAMINAE

Genus *Peripolus* Martinez 190254. ** *Peripolus pedarius* Stal

1878. *Calliptamus pedarius* Stal, Bih. Svensk. Vet. Akad. Handl., 5(4) : 75.

1914. *Peripolus pedarius* Kirby, Fauna British India, Ortho., 1 : 261.

Diagnosis: Colour brownish mixed with dark, abdomen uniformly dark; antennae yellowish brown with apical segments less dark; fastigium of vertex grooved, almost rounded; cercus short.

Distribution : India : West Bengal (Darjiling), Assam, Sikkim, Uttar Pradesh.

Remarks : No specimen of this species has been found in the present study. However we have studied the specimen present in the National Zoological Collections.

Subfamily EYPREPOCNEMIDINAE

Key to genera

1. Male cercus wide, compressed on apical half, apex rounded2
- Male cercus narrow, may be slightly compressed at base but acute to subacute at apex.4
2. Apex of abdomen inflated; supranal plate with somewhat obtuse rounded apex.3
- Apex of abdomen not inflated; supra- anal plate with angular apex.....*Heteracris* Walker, 1870
3. Antennae filiform; frontal ridge slightly constricted at apex; male cercus long; subgenital plate conical and compressed at apical region, almost pointed at apex.*Choreodocus* Bolivar, 1914
- Antennae somewhat flattened and dilated in middle; frontal ridge almost parallel sided throughout; male cercus shorter; subgenital plate transverse and very much obtuse.
.....*Eupreponotus* Fieber, 1853
4. Posterior femur moderately long, produced beyond abdomen, neither inflated basally nor strongly narrowing on apical half; prosternal tubercle with rounded or inflated apex.
.....*Eypreponemis* Fieber, 1853
- Posterior femur long, produced far beyond end of abdomen, inflated basally and strongly narrowed on apical half; prosternal process almost spathulate, with rounded, sometimes slightly inflated apex.
.....*Tylotropidius* Stal, 1873

Genus *Choreodocus* Bolivar, 191455. *Choreodocus robustus* (Serville)1839. *Acridium robustum* Serville, *Ins. Orth.*, 647.1921. *Choreodocus robustus* : Uvarov, *Trans. ent. Soc. Lond.*, 69 : 109

Material examined : Darjiling Dist. : 4 (M), 3 (F), Naxalbari, 11-12.ix.1974, H.K. Bhowmik. Jalpaiguri Dist. : 1 (F), Bhutanghat, 6.ix.1975, H.K. Bhowmik; 1 (M, 2 (F), Medlabari, Chailapata, 16.x.1987, S.K. Tandon.

Diagnosis : Moderately long; antennae filiform, median segments almost twice as long as wide; fastigium rounded in front; frontal ridge flat, narrowing between antennae, gradually widening towards clypeus; median carina of pronotum cut by all the three transverse sulci; prosternal tubercle gradually tapering apically, weakly incurved and pubescent; tegmina extending well beyond posterior knee, without spots; supra-anal plate tongue shaped, apex broadly rounded; subgenital plate gradually tapering apically apex truncate; cercus wide, thick, strongly compressed, incurved and down curved.

Distribution : India : West Bengal (Calcutta, Darjiling, Jalpaiguri), Arunchal Pradesh, Assam. Elsewhere : Bangladesh.

Remarks : This species is generally confined to the districts of Darjiling and Jalpaiguri. However a few specimens have also been collected from bushes adjoining cultivated fields in district of south 24 Parganas and Medinipur in southern regions of the state (Map 10). A single specimen has been recorded from southern part of Bengal. It prefers hilly forest habitat rather than grass land of plains.

Genus *Eupreponotus* Uvarov, 192156. *Eupreponotus inflatus* Uvaro1921. *Eupreponotus inflatus* Uvarov, *Ann. Mag. nat. Hist.*, (9) 7 : 508.

Material examined : Darjiling Dist. : 1 (M), 1 (F), Bamanpokri, 22.viii.1975, H.K. Bhowmik. Haora Dist. : 1 (M), Sankrail, 8.vii.1980, P. Halder. 24-Parganas Dist. : 2 (M), 2 (F), Garia, 30.ix.1977, S.K. Mondal.

Diagnosis : Deep velvety colouration of the head and pronotum; size moderate; antennae longer than head and pronotum together; pronotum not punctured; lateral lobe slightly higher than long; tegmina extending beyond posterior knees; male cercus short, more or less entirely coriaceous; apex of abdomen inflated; supra-anal plate of female tongue shaped, with medially a longitudinal groove.

Distribution : India : West Bengal (Calcutta, Darjiling, Haora, 24-Parganas), Orissa.

Remarks : This species is found only in southern and northern regions of the state and usually occurs in less numbers (Map 10).

Genus *Eyrepocnemis* Fieber, 185357. *Eyrepocnemis alacris alacris* (Serville)

1839. *Acridium alacre* Serville, *Hist. Nat. Ins. Orth.*, 682.

1958. *Eyrepocnemis alacris alacris* : Dirsh, *Proc. R. ent. soc. Lond.*, (B) 27(3-4) : 40.

Material examined : Birbhum Dist. : 1 (M), Rampurhat, 5.iv.1986, K.P. Mukherjee Bardhaman Dist. : 1 (M), Kaichar, 5.ix.1986, K.K. Roy. Darjiling Dist. : 1 (M), 1 (F), Sukna, 16.ii.1974, P. Halder; 2 (M), Himul, 4.xii.1986, Rs.S. Barman. Jalpaiguri Dist. : 1 (M), Nilpara, 30-31.viii.1975, H.K. Bhowmik. Maldah Dist. : 1 (F), Gosaimor, 17.vii.1986, M.S. Shishodia. Medinipur Dist. : 1 (M), Belpahari, 9.ix.1985, S. Biswas. 24-Parganas Dist. : 1 (M), 1 (F), Daria (Canning), 18.iv.1986, B.N. Das.

Diagnosis : Concavity of fastigium of vertex distinct, with a low apical carinula, separating it from frontal ridge; pronotum above with a characteristic narrow dark spot; lateral carinae of pronotum converging forwards; prozona about as long as metazone (Sometimes slightly longer or slightly shorter); dark spots present on the wings; hind tibiae bluish-grey, with two whitish rings at the base and reddish apex and tarsus; male cercus gradually narrowing towards apex, incurved and downcurved.

Distribution : India : West Bengal (Bardhaman, Birbhum, Darjiling, Jalpaiguri, Maldah, Medinipur, 24 Parganas), Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Kerala, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu. Elsewhere : Afghanistan, Bangladesh, East Persia, Pakistan and Sri Lanka.

Remarks : It is fairly abundant in Darjiling district and also in low numbers in Birbhum, Bardhaman, Medinipur and south 24-Parganas (Map 10).

Genus *Heteracris* Walker, 187058. *Heteracris pulchra* (Bolivar)

1902. *Eyrepocnemis pulchra* Bolivar, *Annl. Soc. ent. Fr.*, 70 : 630.

1958. *Heteracris pulcher* : Dirsh, *Tijdschr. Ent.* 101 : 54.

Material examined : Darjiling Dist. : 3 (M), 2 (F), Naxalbari, 13.ix.1975, P. Halder. Haora Dist. : 1 (M), Botanical Garden, 19.viii.1986, S.Ghosh. Koch Bihar Dist. : 1 (M), 1 (F), Falacata, 14.ix.1975, H.K. Bhowmik. Maldah Dist. : 2 (M), 1 (F), Gaur, 19.ix.1975, P. Halder.

Diagnosis : Colour olivaceous in general. Head pale red, broadly banded with black below the eyes; front slightly oblique; fastigium of the vertex smooth, slightly sulcated; pronotum with a broad velvety-black stripe on the back, distinctly expanded and paler in the middle, borders green; prosternal tubercle subcylindrical, compressed in front, obtuse at apex; tegmina extending beyond the hind femora in male, but not in female, thickly spotted with brown or green, anal area green; hind tibiae brown at the base, with a pale ring, the apical half dull red; cerci compressed and curved.

Distribution : India : West Bengal (Calcutta, Darjiling, Haora, Koch- Bihar, Maldah), Tamil Nadu; Sri Lanka.

Remarks : The distribution is very sparse but range of distribution is wide. It occurs in Darjiling, Jalpaiguri, Maldah and Haora districts (Map 10).

Genus *Tylotropidius* Stal, 1873

59. *Tylotropidius varicornis* (Walker)

1870. *Heteracris varicornis* Walker, *Cat. Derm. Salv. Brit. Mus.*, 4 : 667.

1914. *Tylotropidius varicornis* : Kirby, *Fauna British India, Orthopt.* (Acridiidae) : 265.

Material examined : *Darjiling Dist.* : 2 (M), Sevok, 22.ii.1974, H.K. Bhowmik. *Jalpaiguri Dist.*: 1 (F), Teesta river forest belt, 8.xii.1986, R.S. Barman.

Diagnosis : General colouration yellowish to greenish yellow; pronotum brown with lateral carinae pale; antennae filiform, as long as head and pronotum together; prosternal tubercle compressed, truncated, bituberculate at apex; tegmina and wings longer than abdomen but shorter than posterior femora; tegmina with a row of triangular whitish spots upon the radial stripe in the costal area; wings bluish hyaline; hind femora thickened at the base, very slender towards the tip; hind tibiae and tarsi dull blue; supra-anal lamina of male elongate-triangular, sulcated; cerci straight, slightly compressed, acuminate.

Distribution : India : West Bengal (Darjiling, Jalpaiguri), Andhra Pradesh, Goa, Orissa, Rajasthan, Tamil Nadu. Elsewhere : Burma, Sri Lanka.

Remarks : Altogether it is recorded only from three districts namely Darjiling, Jalpaiguri and Haora. It prefers forest areas than grassland of plains (Map 10).

Subfamily CATANTOPINAE

Key to genera

1. Tegmina lateral, lobiform, extending beyond first abdominal segment.5
- Tegmina and wing well developed, reaching upto or shorter than abdomen.....2
2. Pronotum slightly tectiform; vertex between eyes wider than frontal ridge; tegmina usually with a black spot. *Gerenia* Stal
- Pronotum flat or subcylindrical; vertex between eyes narrower than frontal ridge; tegmina without black spot.3
3. Prosternal tubercle cylindrical and rounded at apex; pronotum subcylindrical.
..... *Catantops* Schaum
- Prosternal tubercle neither cylindrical nor with rounded apex; pronotum not subcylindrical. ...4
4. Pronotum not constricted; prosternal tubercle laterally compressed
..... *Stenocatantops* Dirsh and Uvarov

- Pronotum constricted; prosternal tubercle conical.*Xenocatantops* Dirsh and Uvarov
- 5. Fastigium of vertex separated from frontal ridge by a distinct transverse carina; fastigial foveolae absent*Mesambria* Stal
- Fastigium reclinate, sloping towards frontal ridge; foveolae present
.....*Paraconophyma* Uvarov

Genus *Catantops* Schaum 1853

60. *Catantops pinguis innotabilis* (Walker)

1870. *Acridium innotabile* Walker, *Cat. Derm. Salt. Brit. Mus.* 4 : 629

1956. *Catantops pinguis innotabilis* : Dirsh, *publcoes cult. Co. Diam. Angola*, 28 : 105.

Material examined : Bankura Dist. : 1 (F), Daldanga, 14.ix.1986, R.S. Barman. Darjiling Dist.: 4 (M), 1(F), Naxalbari, 13.ix.1974, P. Halder; 1 (F), Mirik, 17.ix.1974, H.K. Bhowmik. Koch Bihar Dist.: 1 (M), Mathabhanga, 11.xii.1986, R.S. Barman. Medinipur Dist. : 1 (M), 1 (F), Belpahari, 13.ix.1985, S. Biswas, 1 (M) Kankrajhor forest, 19.xii.1985, A.K. Hazra, 1 (F), Keyajaria, 27.xii.1985, A.K. Hazra.

Diagnosis : Antennae shorter than head and pronotum together; prosternal tubercle short, subcylindrical, at base weakly compressed with rounded apex; lateral lobe of pronotum without coloured pattern; tegmina exceeds the hind knee by more than the length of pronotum; external disc of hind femur without the black median spot below the upper carinula (the spots different size in the transient form); male cercus more upcurved, with more broadened apex and more Projecting upper apical angle.

Distribution : India : West Bengal (Bankura, Darjiling, Koch Bihar, Medinipur, 24 Parganas), Arunachal Pradesh, Assam, Himachal Pradesh, Kerala, Orissa, Tamil Nadu, Uttar Pradesh. Elsewhere : Burma, Java, Indo-China, Malaya, New Guinea, Philippines, Sri Lanka, Sumatra, S. Tibet, Thailand, Yunan.

Remarks : This species is rather limited in distribution and we have found it in Medinipur and Bankura in south and Koch Bihar and Darjiling Districts in the north (Map 11).

61.** *Catantops erubescens* (Walker)

1870. *Caloptenus erubescens* Walker, *Cat. Derm. Salt. Br. Mus.* 4 : 703.

1914. *Catantops erubescens* : Kirby, *Fauna British India, Orth.*, 1 : 253-54. fig. 134.

Diagnosis : Colour redish brown, frontal ridge very slightly depressed in male and flattened in female. Base of the wing is rose red.

Distribution: India : West Bengal.

Remarks : No specimen of this species has been found in the present study. According to Bhowmik

(1986) " Since its description in 1870, from North Bengal, the species has never again been reported from any where"

Genus *Gerania* Stall 1878

62.** *Gerania bengalensis* Bhowmik & Halder

1983. *Gerania bengalensis* Bhowmick & halder, *Rec. zool. surv. India*, 81 : 23.

Diagnosis : Colour olive green; the tegmina has medial dark band; size medium; antennae filiform; head short; frontal ridge widened between antennae; wing hyaline, shorter than tegmen.

Distribution : Inida : West Bengal (Darjiling and Jalpaiguri).

Remarks : No specimen of this species has been found during present study.

Genus *Mesambria* Stall, 1878

63. ** *Mesambria dubia* (Walker)

1870. *Acridium dubium* Walker, *Cat. Derm. Salt. Br. Mus.*, 4 : 632.

1914. *Mesambria dubia* : Kirby, *Fauna British India, Orth.*, 1 : 221.

Diagnosis : Size small, slender; head short. Colouration generally deep olive green, sometime brown; antennae pale orange red; metazona short and design of lateral pronotal lobes and upturned apical abdominal end.

Distribution : India : West Bengal (Darjiling), Nagaland. Elsewhere : Sri Lanka.

Remarks : No specimen of this species has been found during the present study. However we examined the material present in National Zoological Collection.

Genus *Paraconophyama* Uvarov 1921

64. * * *Paraconophyama scabra* (Walker)

1870. *Caloptenus scaber*, *Cat. Derm. Salt. Br. Mus.*, 4 : 707.

1921. *Paraconophyama scabra* : Uvarov, *Ann. Mag. nat. Hist.*, (9) 7 : 480-509.

Diagnosis : Small in size. Dark brown in colour, with black markings, tegmina narrow, parallel-sided, truncate at extremity; median carina of pronotum crossed by 2 sulci, tegmina with upper rugulose and cover polished; supra anal plate of male with posterior angle straight, sharp.

Distribution : India : West Bengal (Bardhaman), Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir.

Remarks : No specimen of this species has been found during present study. However we have examined the specimen of other state present in our National Zoological Collection.

Genus *Xenocatantops* Dirsh, 1953

65. *Xenocatantops humilis humilis* (Serville)

1839. *Acridium, humile* Serville, *Ins. orth.*, 622.

1953. *Xenocatantops humilis humilis* : Dirsh and Uvarov, *Tijdschr. Ent.*, 96 : 237.

Material examined : *Darjiling Dist.* : 2 (M), 3 (F), Adalpur, Sukna, 15.ii. 1974, H.K. Bhowmik. *Jalpaiguri Dist.* : 3 (M), 2 (F), Bagracot, 11.x. 1987, S.K. Tandon; 1 (F), Chilapata, 14.x. 1987, S.K. Tandon; 4 (F), Noorpoor, 18. xii. 1986, R.S. Barman. *Koch Bihar Dist.* : 1 (M), Mathabhanga, 11.xii. 1986, R.S. Barman.

Diagnosis : Antennae longer than Head and pronotum together, its median segments twice as long as broad; prosternal tubercle slightly inclined backwards, conical, with obtuse apex; tegmina projecting strongly beyond the hind knee; external disc of hind femur yellowish with two brown fasciae, broadening forwards the lower margin and fused with the brown lower margin of femur; male cercus single with rounded apex.

Distribution : India : West Bengal, (Darjiling, Jalpaiguri, Koch-bihar). Arunachal Pradesh, Assam, Kerala, Madhya Pradesh, Tamil Nadu, Uttar Pradesh. Elsewhere : Borneo; Burma; Indo-China; Java; Malaya; Nepal; New Guinea; Philippines; Sri Lanka; Sumatra; Thailand; Tibet; Yunnan.

Remarks : *Xenocatantops humilis humilis* occurs only in Koch Bihar, Jalpaiguri and Darjiling dist. of North Bengal (Map 11). It is generally found in large numbers in the fields of maize and paddy in the forest zones especially when the crop is mature.

Subfamily CYRTACANTHACRIDINAE

Key to genera

1. Prosternal tubercle strongly curved backward, touching or almost touching mesosternum, inflated in middle, with conical apex.2
- Prosternal process straight, vertical or slightly incurved backward but far from reaching mesosternum, conical or compressed.3
2. Pronotum strongly tectiform, integument strongly rugose, median carina of pronotum sharp; male cercus incurved at base about half as wide as its length.*Chondracris* Uvarov, 1923
- Pronotum moderately tectiform, slightly constricted, integument fairly rugose or dotted, costal area of elytra with coarse net like reticulations; male cercus with subacute apex.
.....*Cyrtacanthacris* 1870

3. Tegmina with oblique ventation in apical part, transverse veins situated obliquely to principal veins, hind tibiae with 7 spines on outer dorsal margin, prosternal tubercle conical; male cercus conical with acuminate apex; male subgenital plate acuminate, apex pointed.
.....*Pachuyacris* Uvarov, 1923
- Tegmina with a straight ventation in apical part, transverse, veins forming almost right angle with principal veins hind tibiae with 8 spines on outer dorsal margin, prosternal process almost cylindrical with rounded apex, male subgenital plate long curved upwards, conical apex pointed.
.....*Patanga* Uvarov, 1923

Genus *Chondracris* Uvarov, 192366. *Chondracris rosea* (de Geer)1773. *Acrydium roseum* de Geer, *Mem. Ins.*, 3 : 488.1923. *Chondracris rosea* : Uvarov, *Bull. ent. res.*, 14 : 39.

Material examined : Darjiling dist. : 2 (M), 1 (F), Fansidewa; 7.xiii. 1986, R.S. Arman. Jalpaiguri dist. : 3 (M), Kathambari, 9.x. 1987, S.K. Tandon. Koch Bihar dist. : 2 (F) Balabhut, 4.xii. 1986, R.S. Barman. Medinipur dist. : 1 (F), Jhargram, 3.x. 1983, A.K. Hazra.

Diagnosis : Size large body robust, coarsely punctured; fastigium of vertex strongly sloping; lateral fascial keel slightly curved; median keel of pronotum moderately raised in prozona and low, straight in profile in metazone; metazona feebly tectiform, disc forming distinct angles with the lateral lobes; tegmina exceeding the hind knees by one fourth of their total length, uniformly green; wings hyaline with the base rose, hind tibiae and tarsi red.

Distribution : India : West Bengal (Darjiling, Jalpaiguri, Koch Bihar, Medinipur). Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Manipur, Orissa, Sikkim, Tamil nadu, Tripura, Uttar Pradesh. Elsewhere : Bangladesh; Bhutan; China; Hainan, Islands; Indonesia; Java; Korea; Manchuria; Philippines; Taiwan; Thailand and Vietnam.

Remarks : *Chondracris rosea* occurs mostly in thick forest regions of Darjiling and Jalpaiguri districts of West Bengal. However, there is an isolated record from Jhargram in Medinipur district of South Bengal (Map 11).

Genus *Cyrtacanthacris* Walker, 187067. *Cyrtacanthacris tatarica* (Linnaeus)1758. *Gryllus locusta tataricus* Linnaeus, *Syst. Nat.* (10th ed) : 432.1923. *Cyrtacanthacris tatarica* Uvarov, *Bull. ent. Res.*, 14 : 39.

Material examined : Bankura Dist. : 1 (F), Bishnupur Sericulture campus, 26.x. 1985, M. Dutta;

1 (F), Jhilimill, 23.ix. 1987, M. Prasad. *Darjiling Dist.* : 4 (M), 4 (F), Bijanbari, 12.ix. 1974, H.K. Bhowmik, 1 (M), 1 (F), Tukriajhar, Naxalbari, 18.vi. 1978, P. Halder. *Koch Bihar Dist.* : 1 (M), Tufangonj, 12.xii. 1986, R.S. Barman. *Maldah Dist.* : 1 (M), Chanchal, 20.vii. 1986, M.S. Shishodia. *Medinipur Dist.* : 2 (F), Jhargram, 3.x. 1983, A.K. Hazra; 2 (F), Junput forest, 25.xii. 1985, A.K. Hazra. *Puruliya Dist.* : 2 (F), Bhaldongri, 19.xi. 1987, M. Prasad.

Diagnosis : Size large; general colouration yellow with brown and white; occiput mostly with on each side a darker coloured stripe, cheeks sometimes with indefinite darker spots or stripes; pronotum above on both sides with a broad velvety blackish brown band; tegmina with dense and thick reticulation and transverse oblique fasciae or irregular spots; wings hyalinous, at the base somewhat yellowish; hind tibiae from below yellowish brown or yellowish hind tarsi red or brown.

Distribution : India : West Bengal (Bankura, Darjiling, Koch-bihar, Maldah, Medinipur, Purulia) Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Jammu & Kashmir, Kerala, Orissa, Rajasthan, Tamil Nadu. Elsewhere : Africa (except N. Africa) and Shara; Hainan; Madagas; Philippines; Seychelles; Sri Lanka; Sumatra and Thailand.

Remarks : *C. tatarica* occurs both in the plains as well as in the hilly regions of West Bengal (Map 11). The species is generally found in the thick forest and sometimes also in the cultivated zones especially in mature paddy and maize fields.

Genus *Pachyacris* Uvraov, 1923

68. *Pachyacris vinosa* (Walker)

1870. *Acridium vinosum* Walker, *Cat. Derm. Salt. Br. Mus.*, 3 : 588.

1923. *Pachyacris vinosa* : Uvarov, *Ann. mag. nat. Hist.* (i) 11 : 478.

Material examined : Bankura Dist. : 1(F), Sushunia, 27.x. 1985, M. Dutta. Medinipur Dist. : 2(M), Bholabheda, 10.ix. 1985, S. Biswas.

Diagnosis : Fastigium of vertex almost flat; tegmina surpassing the top of hind femur by a distance distinctly less than length of pronotum, with oblique to principal vein, wings infumata throughout, with or without rosy at base; hind femur brown or yellowish brown with an indication of 2-3 blackish transverse bands from above; male cercus elongate conical with acuminate apex.

Distribution : India : West Bengal (North Bengal), Assam, Bihar, Goa, Himachal Pradesh, Mizoram, Orissa, Uttar Pradesh. Elsewhere : Burma; China; Nepal.

Remarks : This species is limited in distribution and is found to occur in forest regions of Bankura and Medinipur in south Western region of the state (Map. 11).

Genus *Patanga* Uvarov, 192369.* *Patanga succincta* (Johansson)

1763. *Gryllus locusta succinctus* Johansson, *Amoen, Acad. 6 Centur, Ins. rarior* : 398.
 1923. *Patanga succincta* : Uvarov, *Ann. Mag. nat. Hist.*, (9) 11 : 364.

Material examined : Nadia Dist : 1 (M), Bethuadohori Reserve Forest, 26.viii. 1980, A.K. Hazra, 1 (F), Nakasipara, Bethuadohori, 16.xii. 1987, A.K. hazra.

Diagnosis : General colouration pale with grey, brown or more or less uniformely greyist or brownish; vertex in the middle with a broad yellow or reddish brown and continuing on pronotum; pronotum stouter, shorter, hind margin obtuse to rectangular; hind femore with the carina media superior with fewer and more spaced serrulations; cerci in the male stouter and broader in lateral aspect, more in-crassately compressed.

Distribution : India : West Bengal (Nadia), Arunachal Pradesh, Goa, Delhi, Himachal Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh. Elsewhere : S. Arabian Desert; Burma; China; Island Hainan; Japan; S.E. Asia; Sri Lanka; Taiwan.

Remarks : This species is very rare in the State and we have found only two specimens in reserve forest zone of Nadia district in West Bengal (map 11). *Patanga succincta* or Bombay locust is well distributed in peninsular India from where it extends through eastern region upto Arunachal Pradesh in the North east.

70.** *Patanga (Patanga) japonica* (Bolivar)

1998. *Acridium japonicum* Bolivar, *Annali, Mus. civ. Stov. nat. Giacomo doria Genova*, 39 : 98.
 1923. *Patanga japonica* : Uvarov, *Ann. Mag. nat. Hist.*, 12(9) : 364.

Diagnosis : Colour more or less pale varied with greyish and brownish; antennae pale brownish or darker; abroad blue black stripe below each eye; denticles of upper carina black; fastigium of vertex more or less deep concavely its lateral margin being raised; pronotum distinctly compressed laterally, punctate, crossed by 3 sulci; prosternal tubercle cylindrical with rounded apex and a little inclined; cercus short; conical spine-like.

Distribution : India : West Bengal (Darjiling District), Sikkim. Elsewhere : China; Japan; Pakistan.

Remarks : No specimen of this species has been found during present study.

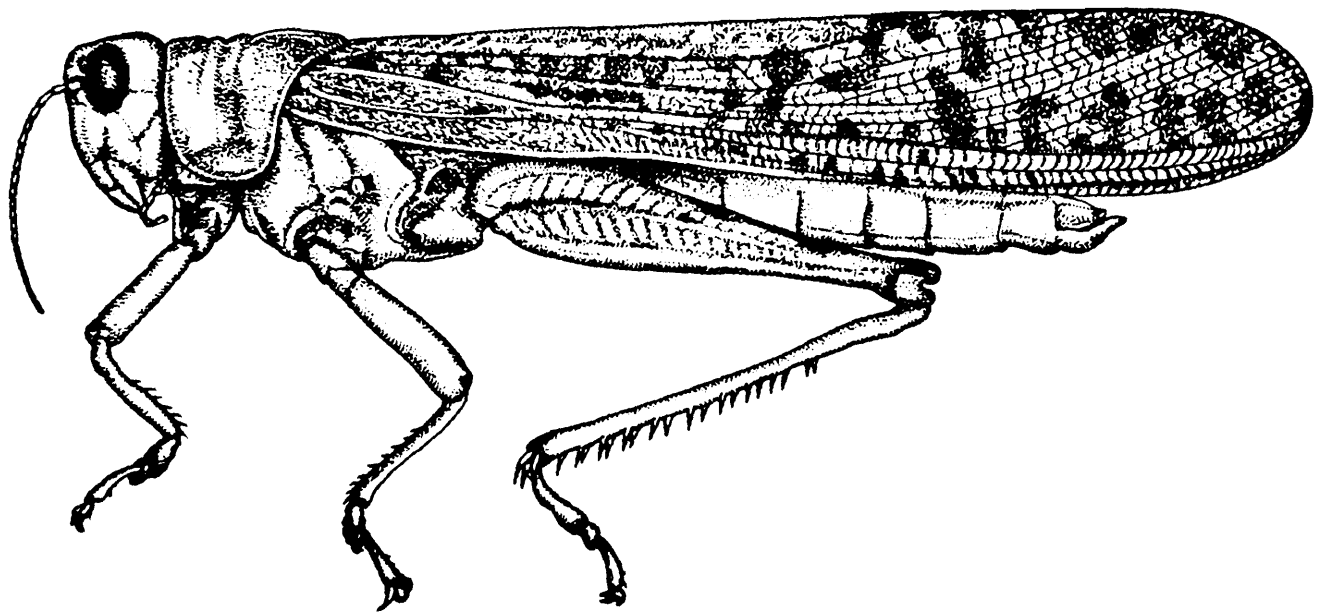
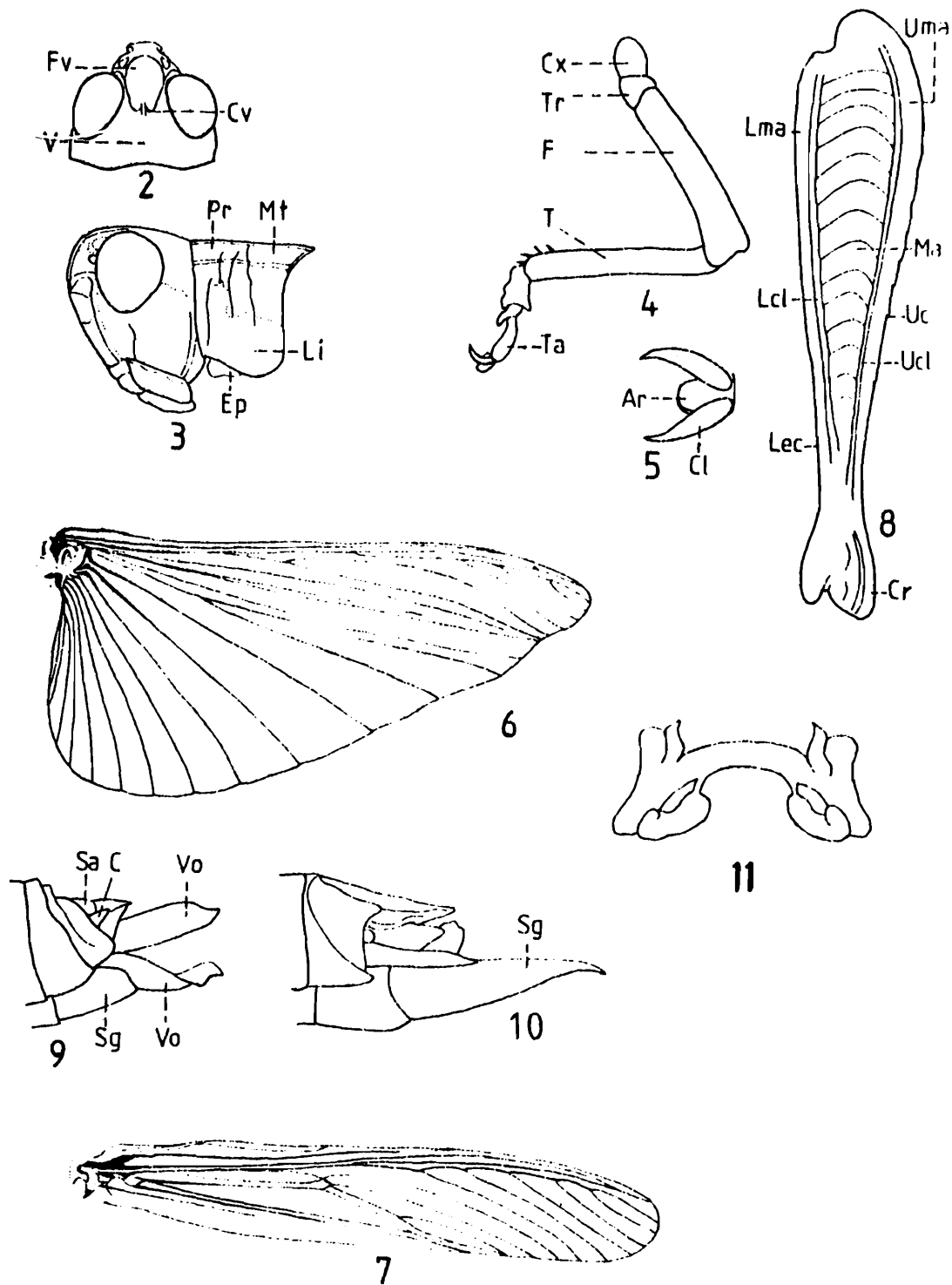


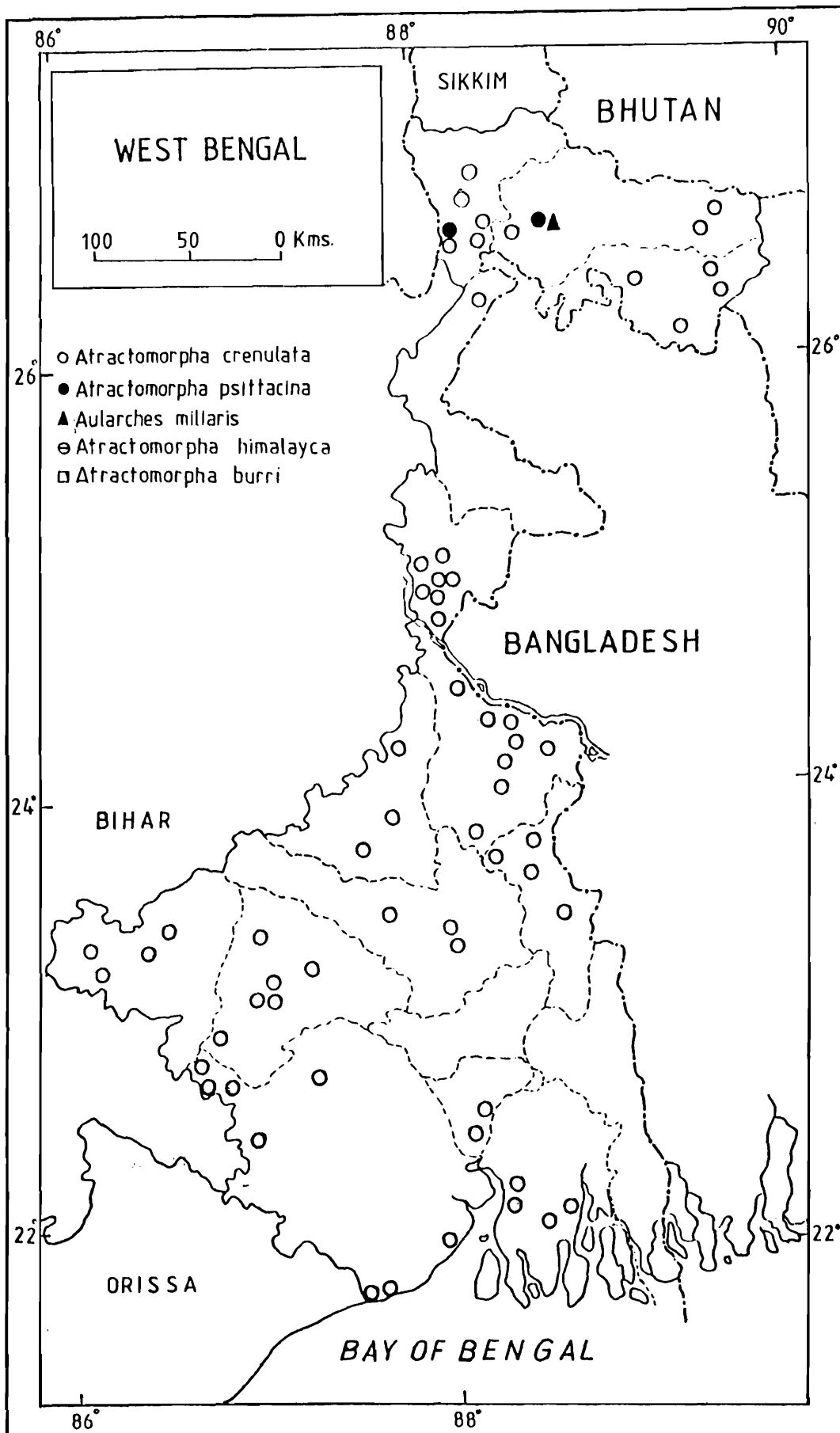
FIG.-1

Fig. 1. Showing external morphology of a typical acridoidea, *Schistocerca gregaria* (Forsk.)

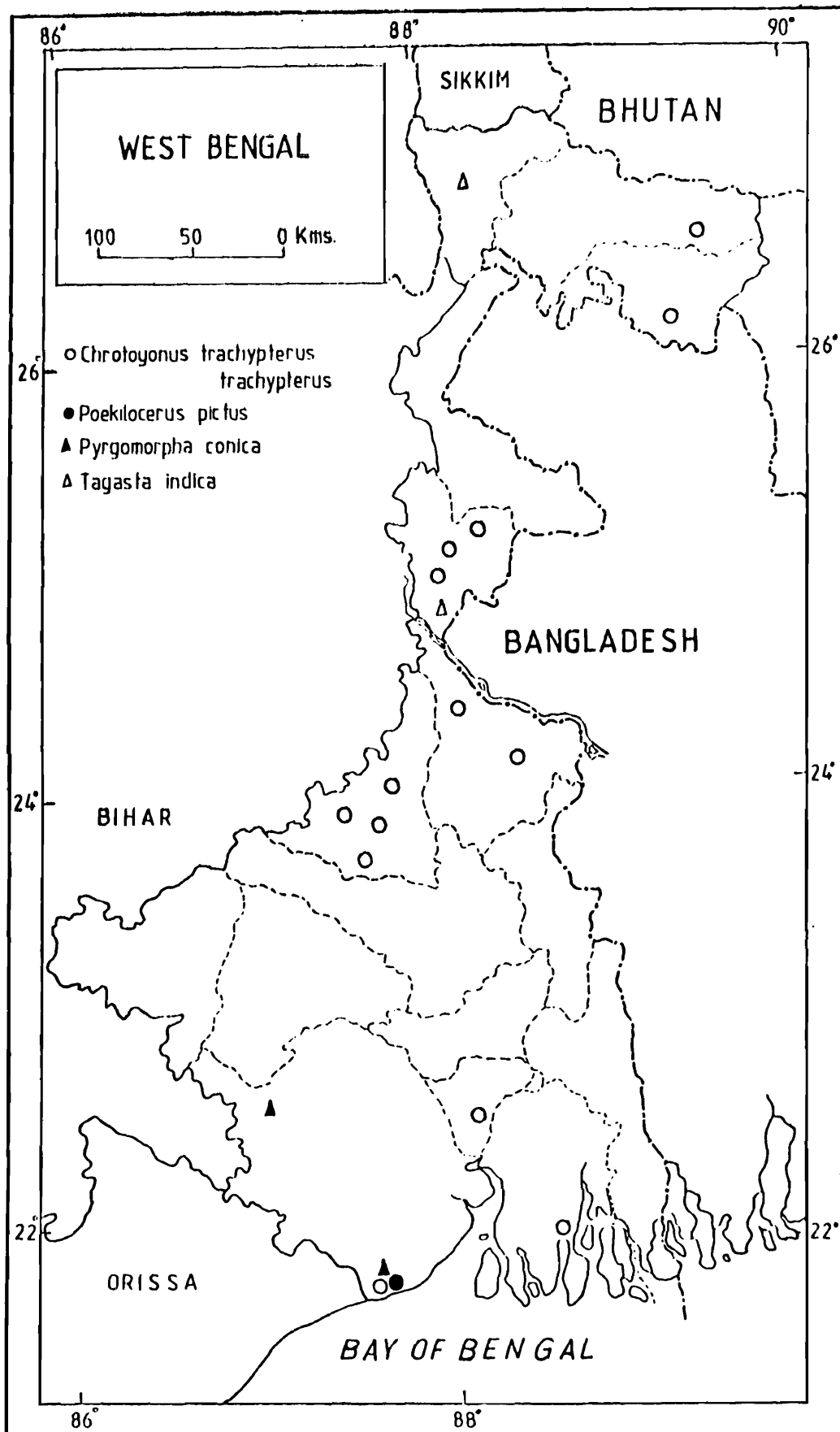


The morphological characters used in the taxonomy of Acridoidea.

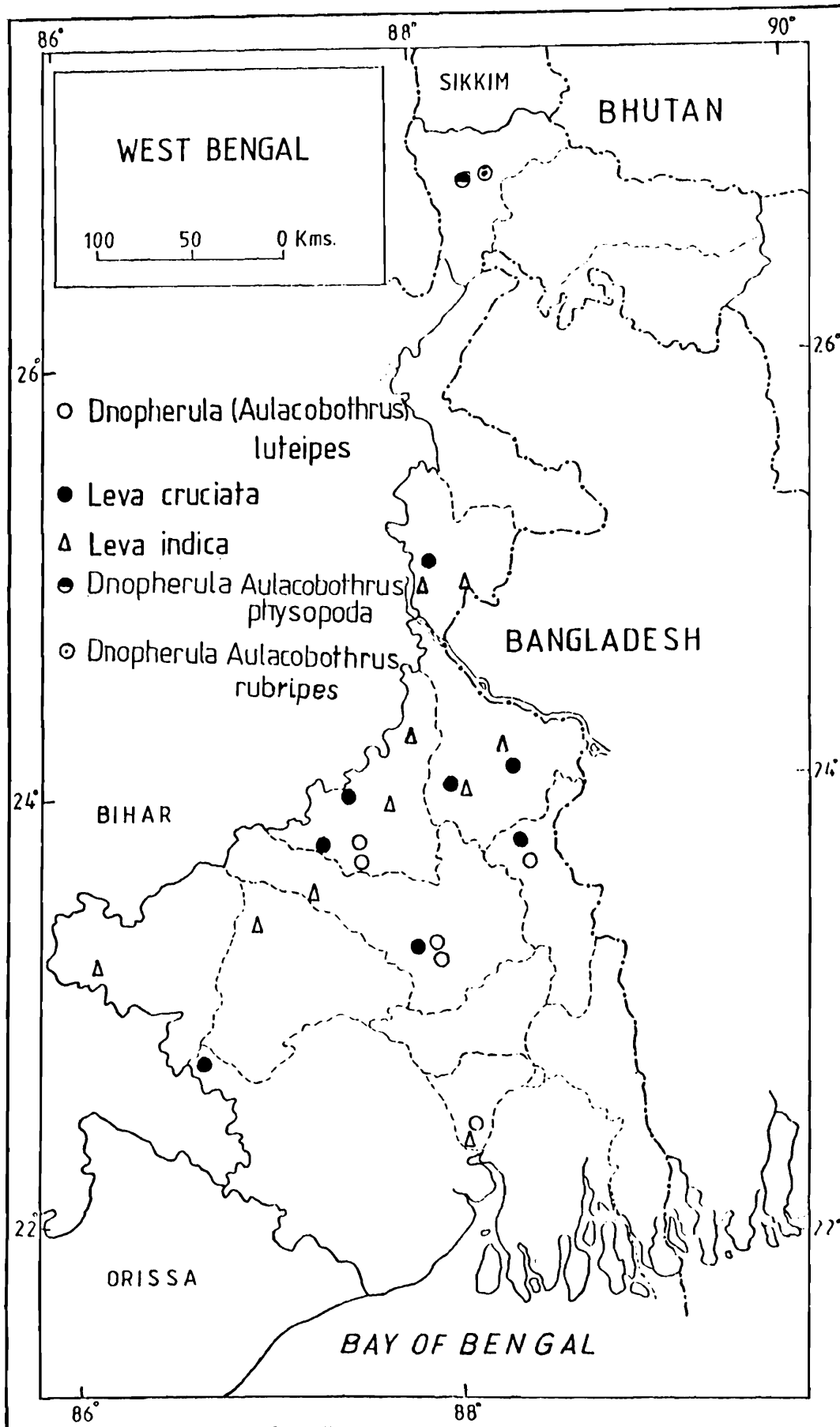
Fig. 2. Head, topview : Cv, Carinula Fv. fastigium of vertex; V, vertex. Fig. 3. head and pronotum lateral view; Ep. episternum; LT lateral lobe of pronotum; Mt. areas of hind wing metazona; Pr, prozona of pronotum. Tarsus. Fig. 5. Ar, arolium; cl, claw. Fig. 6. mains reins and fig. 8 hind femur; Uma, upper marginal area; Lma, lower marginal Ma, medial area ; Vc, upper carina; UCl, upper carinula, Lec, lower external carina, Cr, crescent. Fig. 9. female abdominal tip; C. cercus; Sa, supra anal plate; Sg. Sub-genital plate; Vo, valves of ovipositor. Fig. 10. male abdominal tip. Fig. 11. phallic complex of a typical acridoidea.



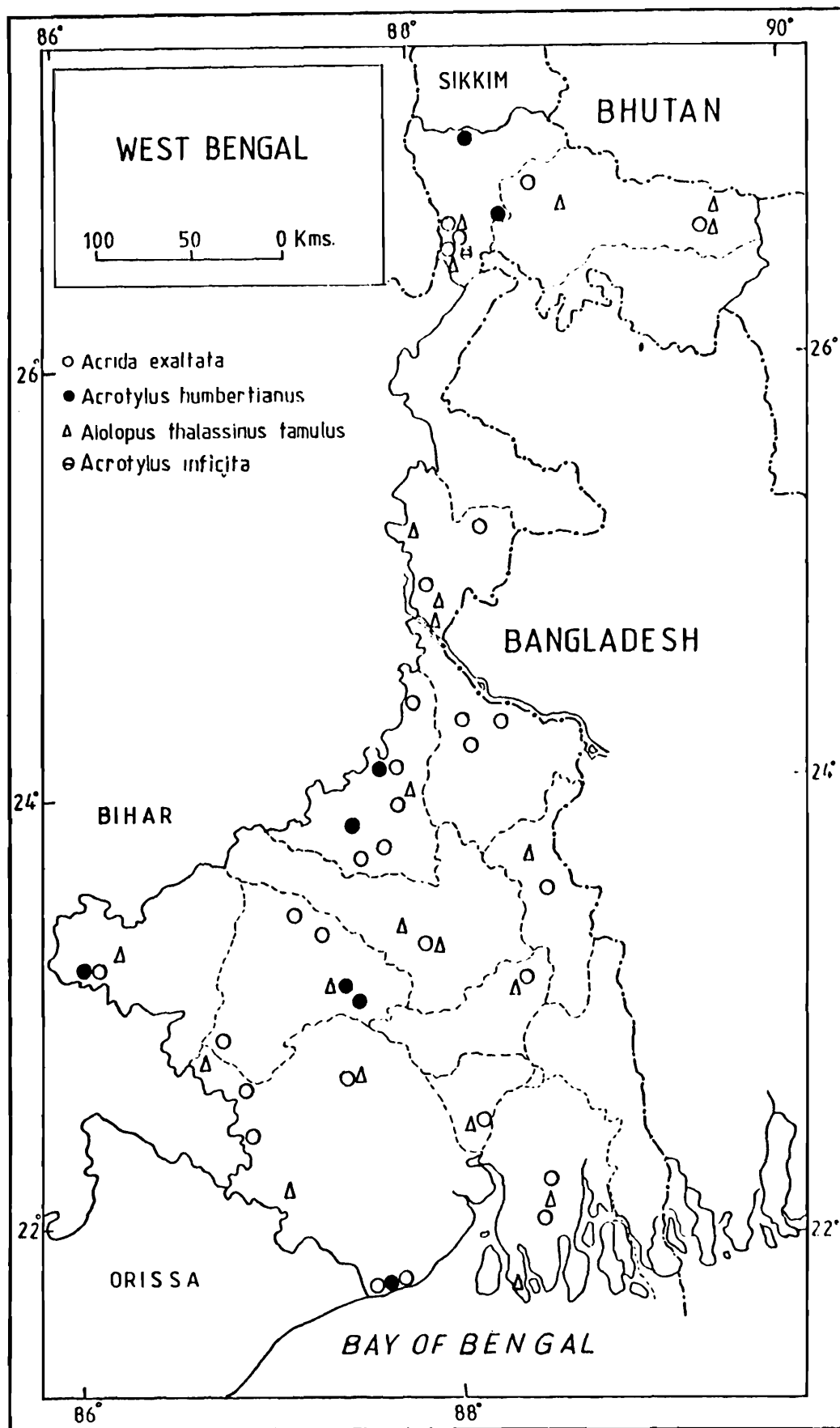
Map 1. Showing the distribution of five species of Acridoidea.



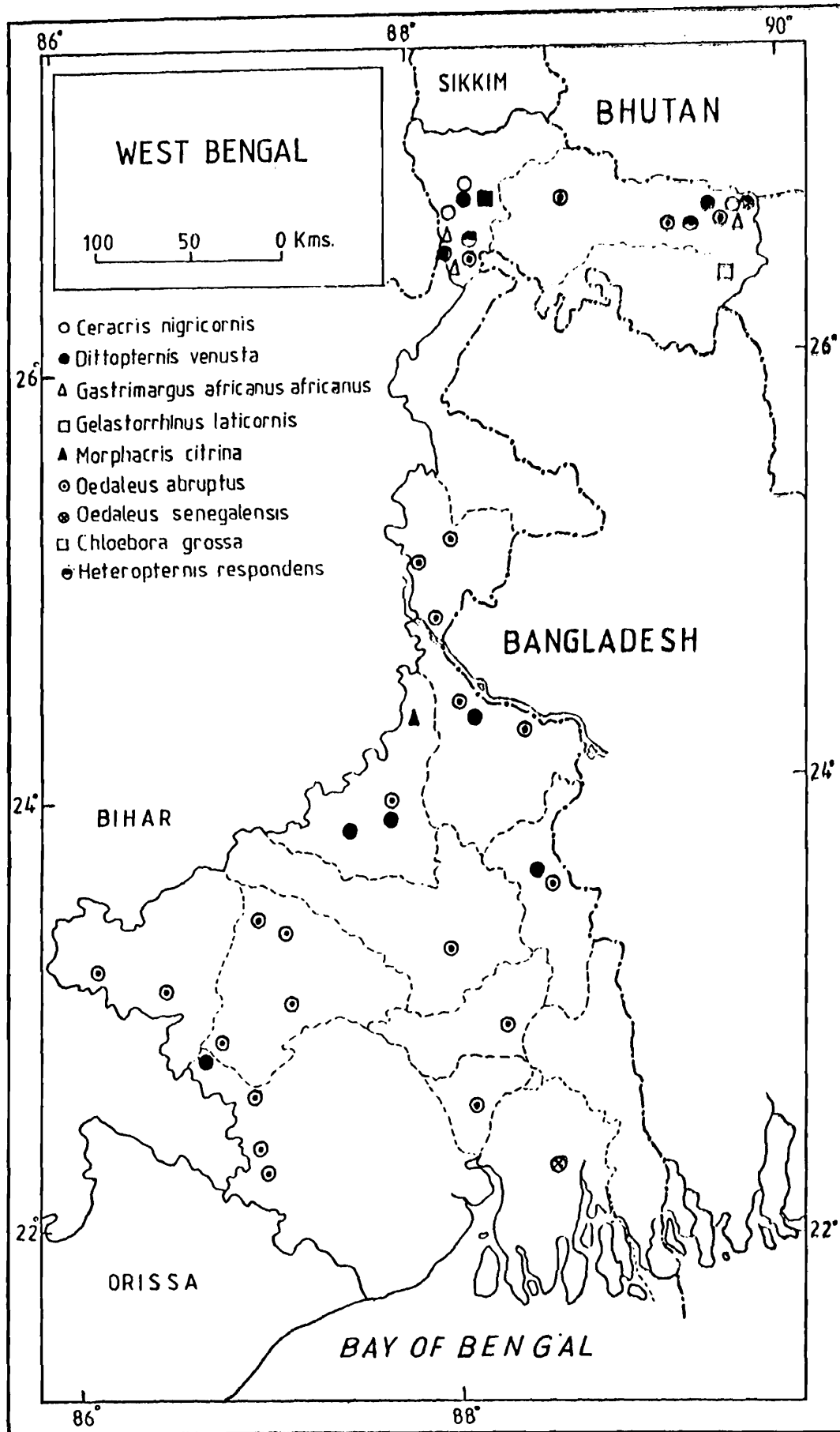
Map 2. Showing the distribution of four species of Acridoidea.



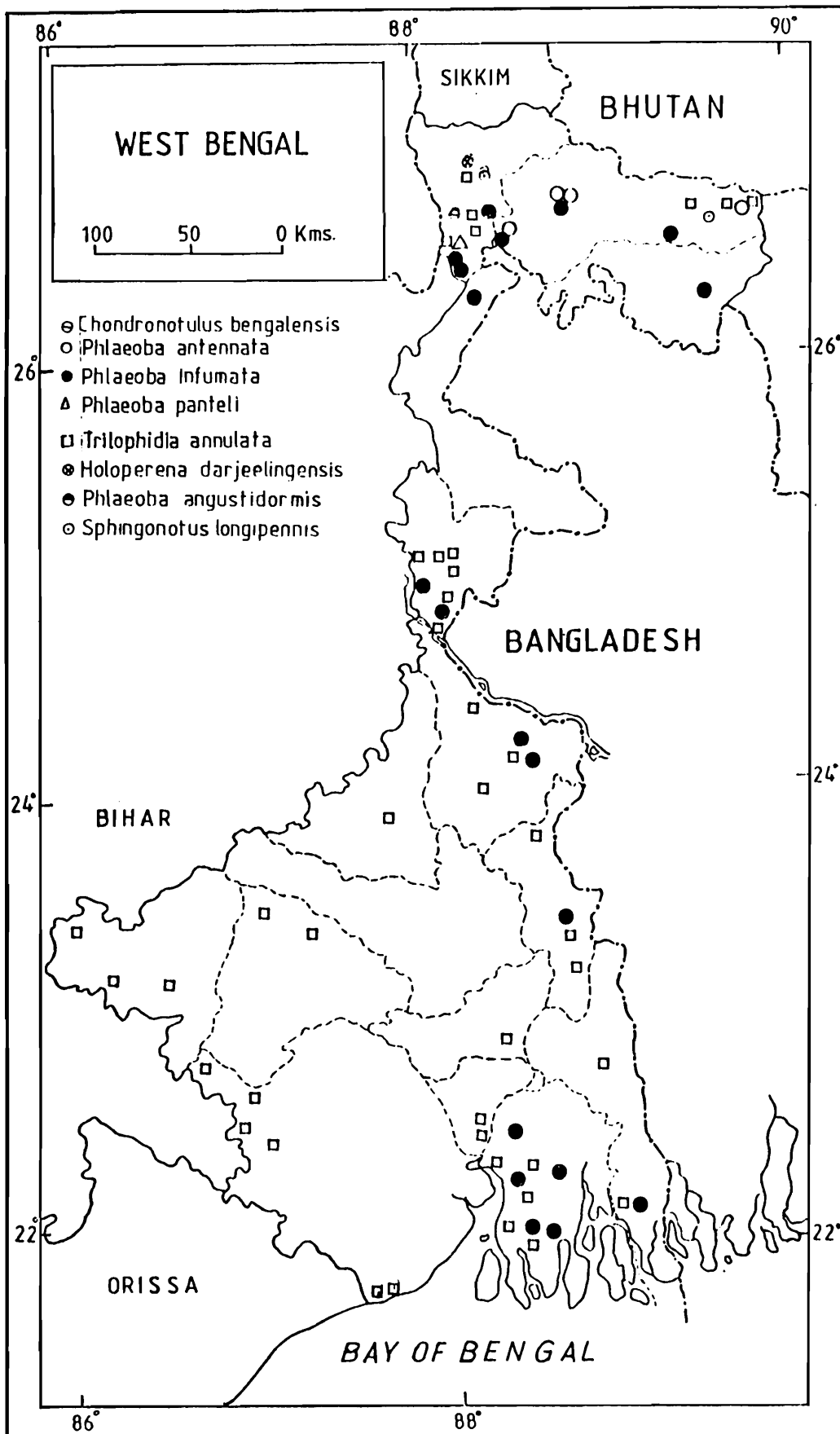
Map 3. Showing the distribution of five species of Acridoidea.



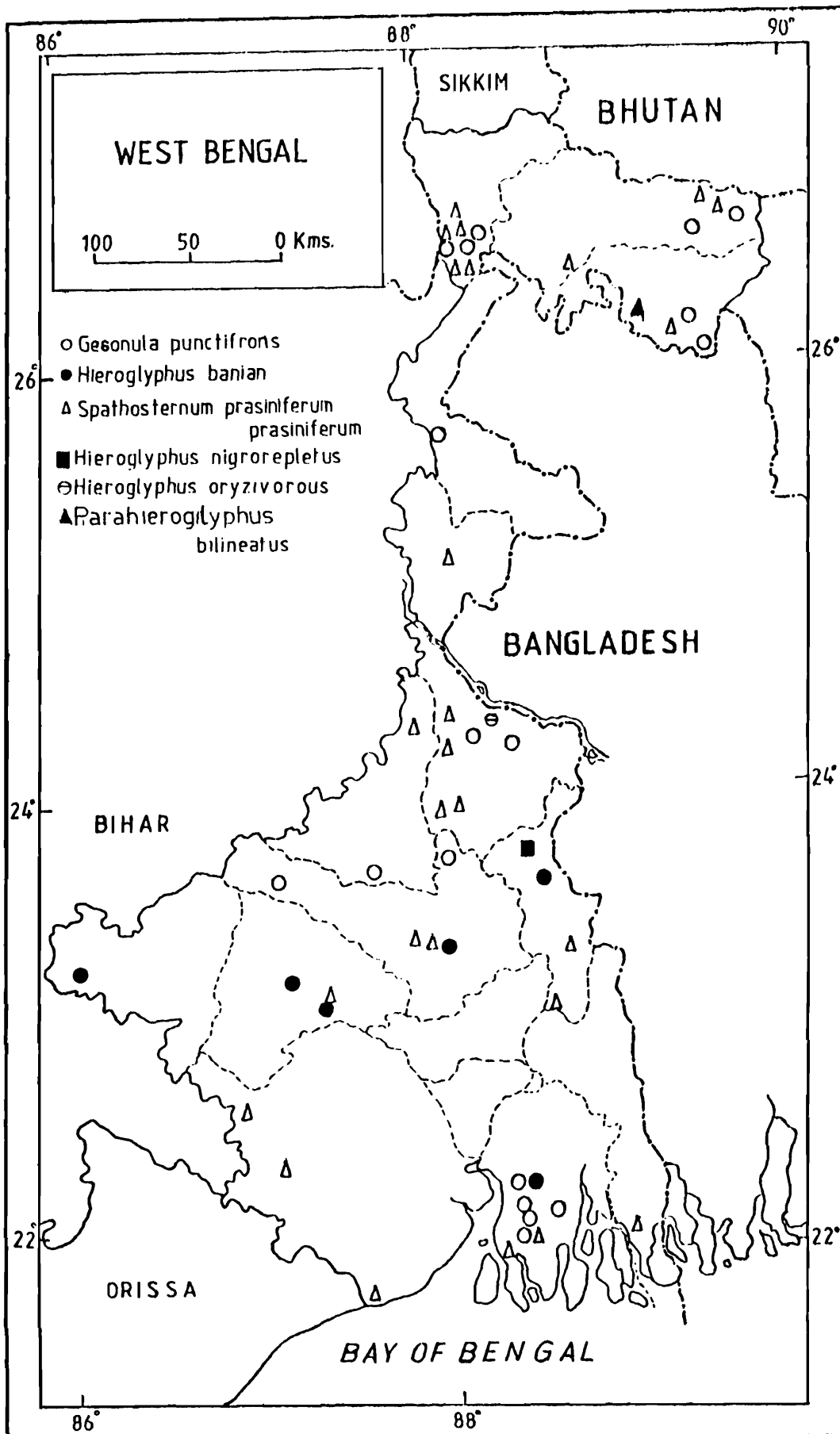
Map 4. Showing the distribution of four species of Acridoidea



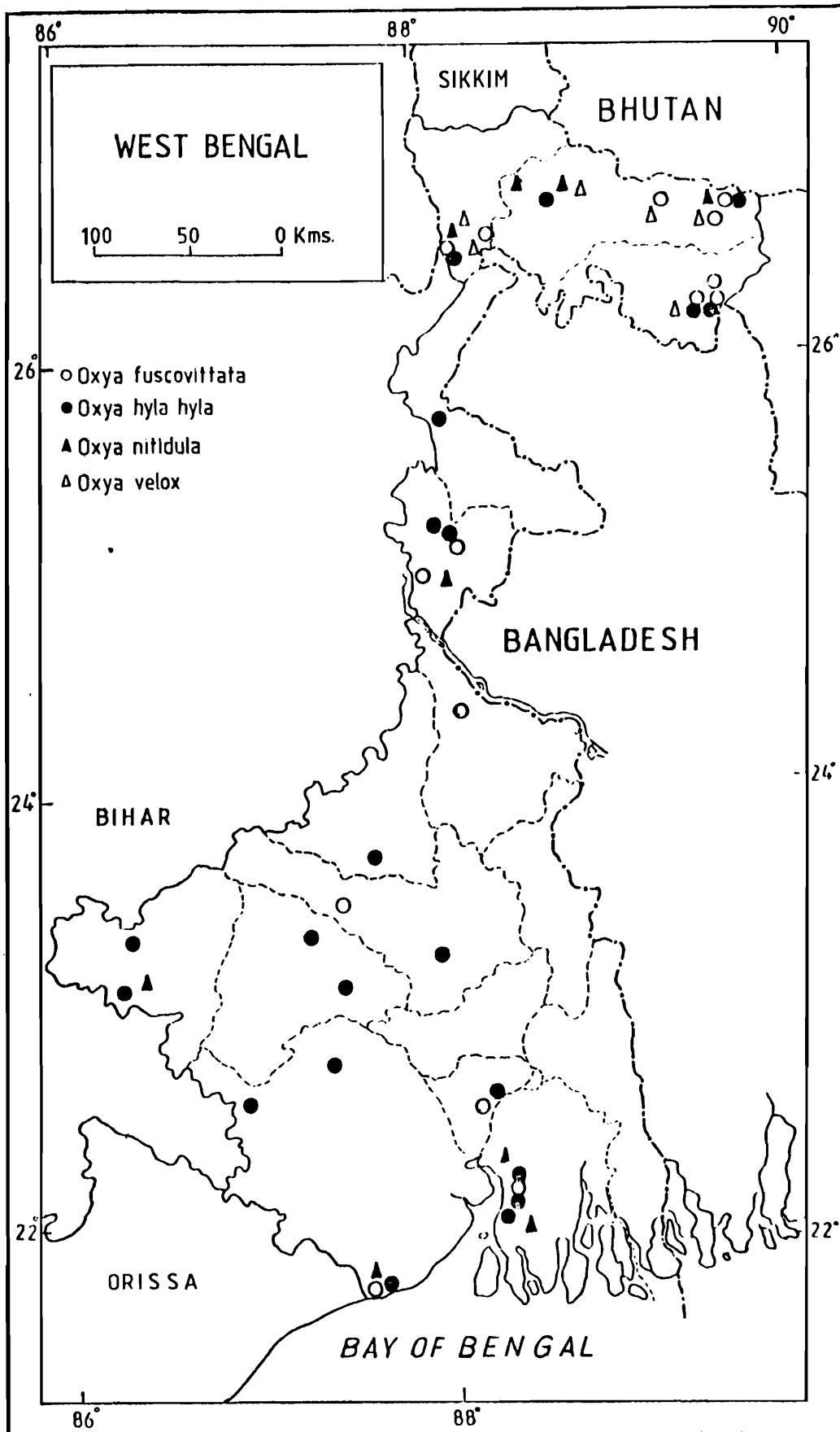
Map 5. Showing the distribution of nine species of Acridoidea.



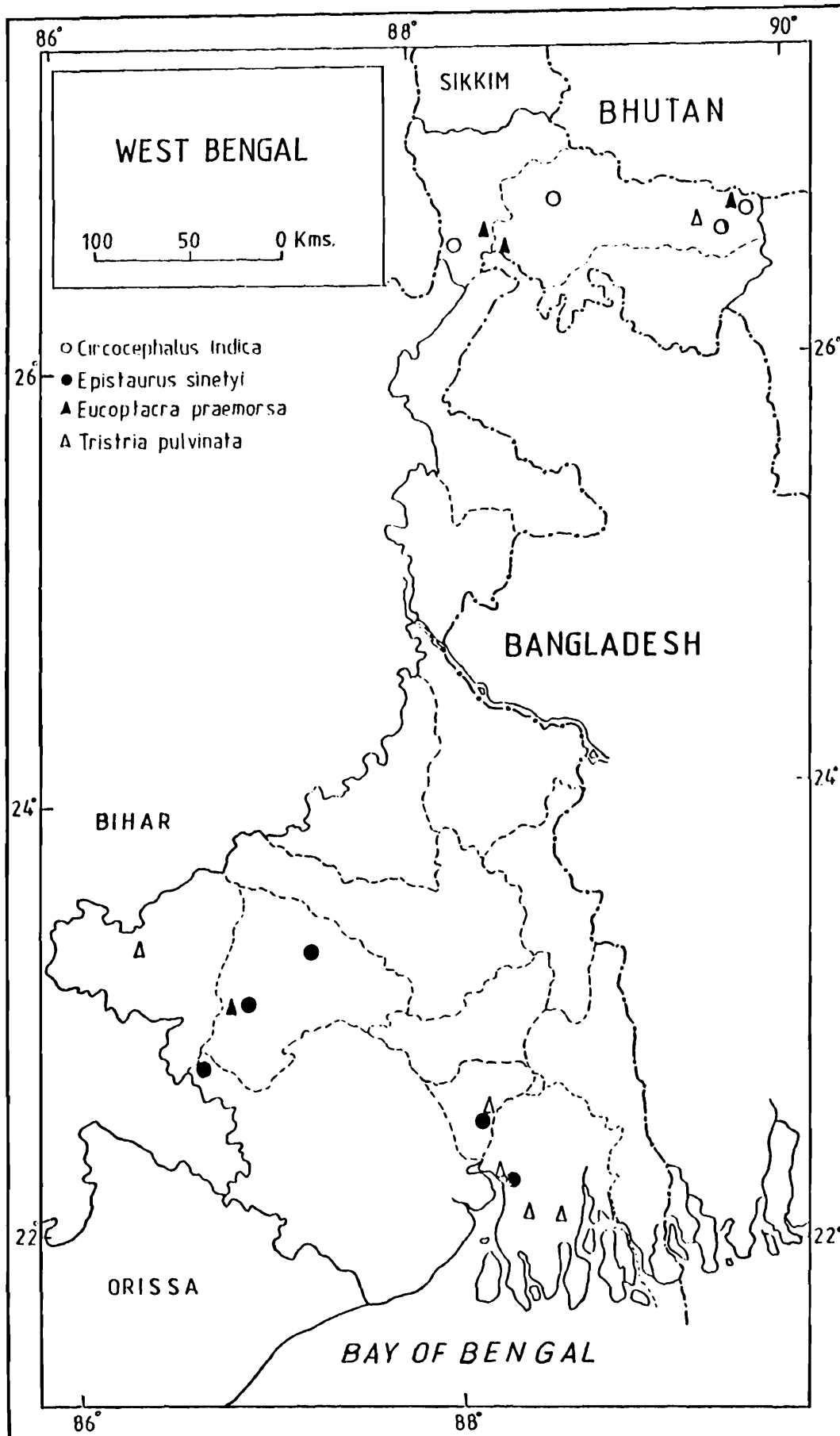
Map 6. Showing the distribution of eight species of Acridoidea



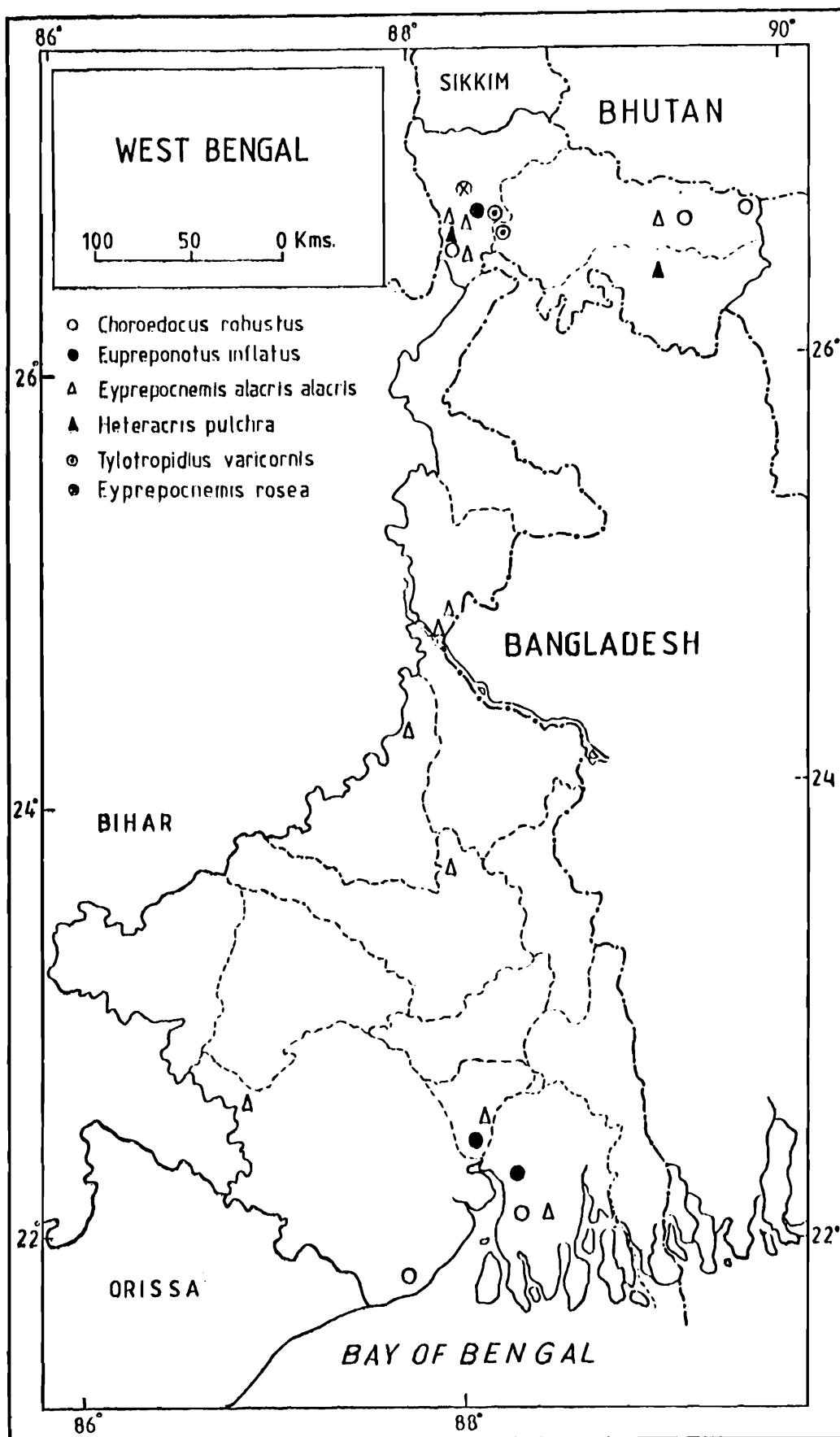
Map 7. Showing the distribution of six species of Acridoidea.



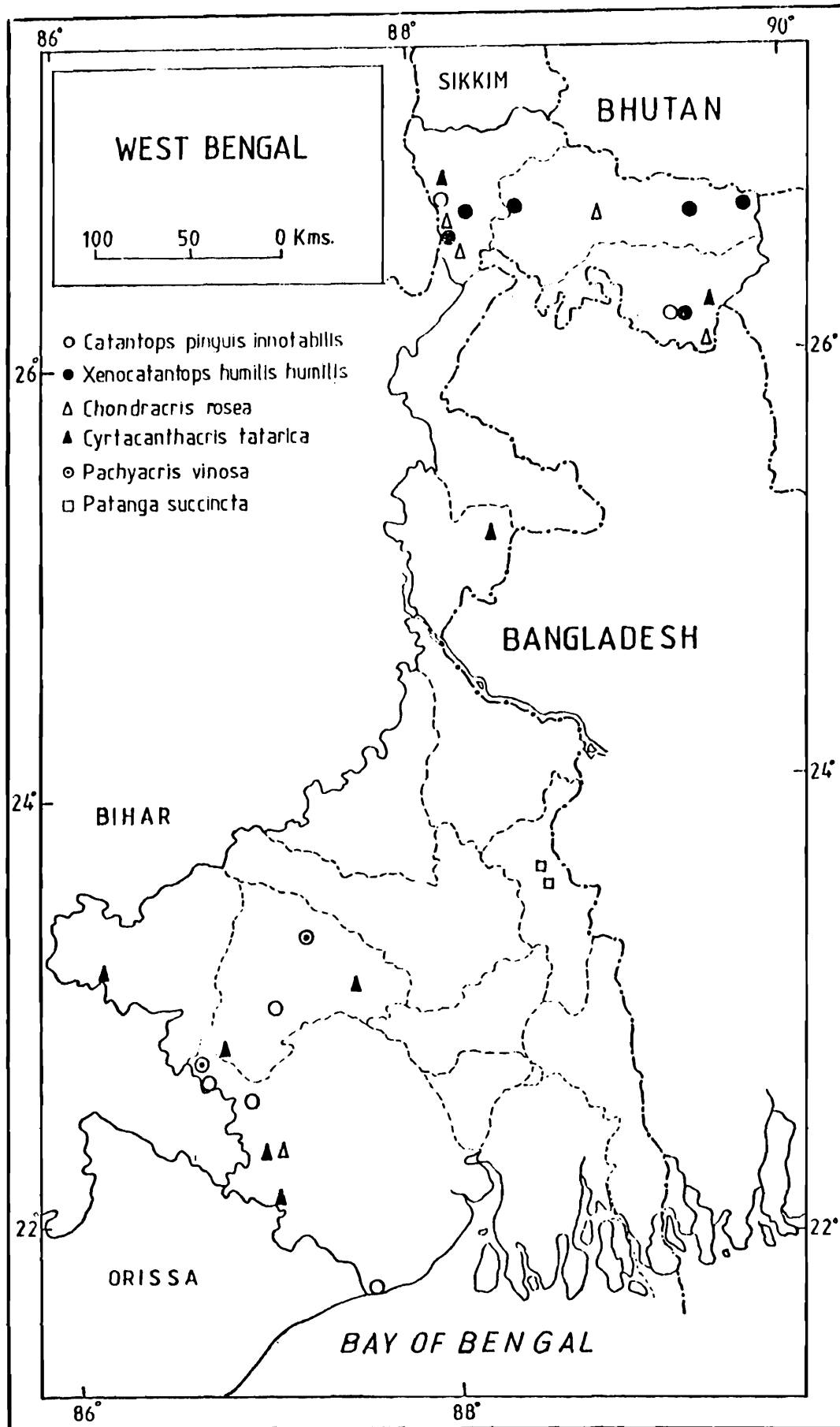
Map 8. Showing the distribution of four species of Acridoidea



Map 9. Showing the distribution of four species of Acridoidea.



Map 10. Showing the distribution of six species of Acridoidea.



Map 11. Showing the distribution of six species of Acridoidea.

LIST OF SPECIES OF GRASSHOPPER FROM WEST BENGAL, DISTRICT WISE

Name of the Species	Bankura	Bardhaman	Birbhum	Calcutta	Darjiling	Haora	Hugli	Jalpaiguri	Koch Bihar	Maldah	Medinipur	Murshidabad	Nadia	North 24 Parganas	Puruliya	South 24 Parganas	West Dinajpur
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Family : PYRGINIROGUDAE																	
1. <i>Atractomorpha crenulata</i> (Fabr.)	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+		
2. <i>Atractomorpha burri</i> Bolivar	+	-	-	-	-	-	-		-	-	-	-	-	-	-		
3. <i>Atractomorpha himalayica</i> Bolivar	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4. <i>Atractomorpha psittacina psittacina</i> (De Haan)	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-		
5. <i>Aularches miliaris</i> (Linnaeus)	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-		
6. <i>Chrotogonus</i> (<i>Chrotogonus</i>) <i>tr. trachypterus</i> (Blanchard)	-	+	-	-	+	+	-		+	-	+	+	-	+	+		
7. <i>Poeciloceris pictus</i> (Fabricius)	-	-		-	-	-	-	-	-	-	-	-	-	-			+
8. <i>Pyrgomorpha conica</i> (Bolivar)	-	-			-	-	-	-	-	-	-	-	-	-			+
9. <i>Tagasta indica</i> Bolivar	-	-	-		+	-	-	-	-	+	-	-	-	-	-		
FAMILY ACRIDIDAE																	
Sub-family - TRUXALINAE																	
10. <i>Dnopherula</i> (<i>Aulacobothrus</i>) <i>decisus</i> (Walker)	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-		

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
28. <i>Oedaleus abruptus</i> (Thunb)	+	+	-	-	+	+	+	+	+	+	+	+	+	-	+		
29. <i>Oedaleus senegalensis</i> (Krauss)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-		
30. <i>Phlaeoba angustidornis</i> Bolivar	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-		
31. <i>Phlaeoba antennata</i> Brunner	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
32. <i>Phlaeoba infumata</i> Brunner	+	+	-	-	+	+	-	+	-	-	-	-	-	+	-		
33. <i>Phlaeoba panteli</i> Bolivar	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-		
34. <i>Pternoscirta cinctifemur</i> (Walker)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
35. <i>Holopercna darjeelingensis</i> (Walker)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
36. <i>Chondronotalus bengalensis</i> (Saussure)	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-		
37. <i>Sphingonotus longipennis</i> saussure	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-		
38. <i>Trilophidia annulata</i> (Thunberg)	+	+	-	-	+	+	+	+	-	+	+	+	+	+	+		
Sub- family - Hemiacridinae																	
39. <i>Gesonula punctifrons</i> Stål	+	+	+	+	-	+	+	+	+	-	-	-	-	+	-		
40. <i>Hieroglyphus banian</i> (Fabricious)	-	-	-	-	-	-	-	+	+	+	+	+	-	+	+		
41. <i>Hieroglyphus nigrorepletus</i> Bolivar	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-		
42. <i>Hieroglyphus oryzivorous</i> Carl.	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-		
43. <i>Parahieroglyphus bilineatus</i> Bolivar	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
44. <i>Leptacris vittata</i> (Fabricius)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>45. Spathosternum prasiniferum prasiniferum (Walker)</i>	+	+	+	-	+	+	+	+	+	+	+	+	-	+			
Subfamily - OXYINAE																	
<i>46. Oxya fuscovittata (Marschall)</i>	+	+	+	-	+	+	+	-	+	-	-	+	-	+	+		
<i>47. Oxya hyla hyla Serville</i>	+	+	+	+	+		+	+	+	+	+	+	-	+	+		
<i>48. Oxya nitidula (Walker)</i>	+	+	-	-	+	-	-	-	-	+	-	-	-	+	+		
<i>49. Oxya velox (Fabricius)</i>	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-		
Subfamily - COPTACRIDINAE																	
<i>50. Circocephalus indica Bhowmik & Halder</i>	+	+	-	-	-	-	-		-	-	-	-	-	-	-		
<i>51. Epistaurus sinetyi Bolivar</i>	-	-	-	-	-	-	-	-	+	+	-	-	-	+	+		
<i>52. Eucoptacra praemorsa Stal</i>	+	+	-	-	-		-	-	+	-	-	+	-	-	-		
Subfamily - TROPIDOPOLINAE																	
<i>53. Tristria pulvinata (Uvarov)</i>	-	+	-	-	-	-	-	-	-	+	-	+	-	+	-		
Subfamily - CALLIPTAMINAE																	
<i>54. Peripolus pedarius (Stål)</i>	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Subfamily - EYPREPOCNEMIDINAE																	
<i>55. Choroedocus robustus (Serville)</i>	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-		
<i>56. Eupreponotus inflatus Uvarov</i>	+	-	-	-	-	-	-	-	-	-	-	+	-	+	-		
<i>57. Eyprepocnemis alacris alacris (Serville)</i>	+	+	-	-	+	-	+	-	+	-	-	-	-	+	+		
<i>58. Heteracris pulchra (Bolivar)</i>	+	-	+	-	+	-	-	-	-	-	-	+	-	+	-		

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
59. <i>Tylotropidius varicornis</i> (Walker)	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subfamily - CATANTOPINAE																	
60. <i>Catantops pinguis innotabilis</i> (Walker)	+	+	+	-	+	-	-	-	+	+	+	-	-	-	-	-	+
61. <i>Catantops erubescens</i> (Walker)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62. <i>Gerania bengalensis</i> Bhowmik & Halder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63. <i>Mesambria dubia</i> (Walker)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64. <i>Paraconophyma scabra</i> (Walker)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65. <i>Xenocatantops humilis humilis</i> (Serville)	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subfamily - CYRTACANTHACRIDINAE																	
66. <i>Chondracris rosea</i> (De Geer)	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+
67. <i>Cyrtacanthacris tatarica</i> (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68. <i>Pachyacris Vinosa</i> (Walker)	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+
69. <i>Pantanga succincta</i> (Johansson)	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
70. <i>Patanga (Patanga) japonica</i> (Bolivar)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

'+' indicate present and '-' indicate absent

SUMMARY

The present paper deals with 70 species of grasshoppers distributed over 4 families and 47 genera collected from the districts of West Bengal. Eight species are recorded for the first time from the State. A key to the identification of families, genera and species of Acridoidea has been provided. Diagnostic characters are given for identification of species. The distribution maps are also provided for each species known from various districts of West Bengal.

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REFERENCES

- Akbar, S. S. 1966. Studies on the female copulatory armature of six pyrgomorph genera (Pyrgomorphidae: Acridoidea : Orthoptera). *Sind Univ. Sci. Res. J.*, : 1-8, t II.
- Bhowmik, H.K. and Halder, P. 1982. A new species of *Circocephalus* Willemse 1928 from the foot hill of the Eastern Himalaya. *Geobios, new reports*, I : 8-10.
- Bhowmik, H. K. 1984. Report on a collection of orthopteran from the district of Purulia and Bankura. *Bull. zool. Surv. India*, 6(1-3) : 109-114.
- Bhowmik, H.K. 1986. Grasshopper fauna of West Bengal, India (Orthoptera : Acrididae). *Zool. Surv. India, Tech. Monograph* No. 14, 1-178.
- Blanchard, E. 1836. Monographie du genre *Ommexecha* de la famille des Acridiens. *Ann. Soc. Ent. Fr.*, 5 : 603-624.
- Bolivar, I. 1902. Les Orthopteres de st. Joseph's college, a Trichinapoly (Sud de Inde). 3 e partie. *Ann. Soc. ent.* ., 70 : 580-634.
- Bolivar, I. 1905. Notas sobre los Pirgomophidos (Pyrgomorphidae). *Bol. Soc. Esp. Hist. nat.* 5 : 105-115, 196-277, 278-289, 298-307.
- Bolivar, I. 1909. Observaciones sobre los Truxaliones. *Bol. Soc. esp. Hist. nat.*, 9 : 285-96.
- Bolivar, I. 1914. Estudios entomologicos, Segunda parte. *Trab. Mus. Cienc. nat. Madr.* (Ser. Zool.), No. 20 : 1-110.

- Bolivar, 1918.I. Contribucion al conocimiento de la fauna indica orthoptera (Locustidae vel acridiidae). *Revta R. Acad. Cienc. Exact. fis. nat. Madr.*, 16 : 347-412.
- Brunner, von Wattenwyl C. 1893. Revision due systeme des orthopteres et descriptions des especes reportees par M. Leonardo Fea de Birmanie. *Annali Mus. Civ. Stor. nat. Giacomo Doria* (2) 13 : 1-230.
- Dirsh, V. M. and Uvarov, B.P. 1953. Preliminary diagnosis of new genera and new synonymy in Acrididae. *Tijdschr. Ent.*, 96(3) : 231-37.
- Dirsh, V.M. 1954. Revision of the species of the genus *Acrida* Linne (Orthoptera, Acrididae). *Bull. Soc. Fouad I. Ent.*, 38: 107-160.
- Dirsh, V.M. 1956. Preliminary revision of the genus *Catantops* Schaum and review of the group catantopini (Orthoptera : Acrididae). *Publcoes cult. Co. Diam. Angola*, 28 : 11-150.
- Dirsh, V.M. 1958a. Revision of the genus *Eyprepocnemis* Fieber, 1853 (Orthoptera : Acridoidea). *Proc. R. ent. Soc. Lond.*, (B) 27 : 33-45, 27Figs.
- Dirsh, V.M. 1958b. *Acridological notes*, *Tijdschr. Ent. The Hague* : 51-63.
- Dirsh, V.M. 1961. A Preliminary revision of the families and subfamilies of Acridoidea (Orthoptera, Insects), *Bull. Br. Mus. nat. Hist. (Ent.)* 10(9) : 351-419.
- Fabricius, J.C. 1775. *Systema entomologiae* : 269-93, 826-27.
- Fabricius, J.C. 1787. *Mantissa Insectorum*, I : 224-39.
- Fabricius, J.C. 1793. *Entomologia Systematica*, 2 : 1-62.
- Fabricius, J.C. 1798. *Supplementum Entomologiae Systematicae*, (4) + 572 p. Hafniae.
- Hollis, D. 1965. A revision of the genus *Trilophidia* Stal (Orthoptera : Acridoidea). *Trans. R. Ent. Soc. Lond.*, 117 (8) : 245-262.
- Hollis, D. 1966. A revision of the genus *Dnopherula* Karsch (Orth ; Acridoidea). *EOS. Madr.* 41 : 267-329.
- Hollis, D. 1968. A revision of the genus *Aiolopus* Fieber (Orthoptera Acridoidea). *Bull. Br. Mus. nat. Hist. (Ent.)*, 22 (7) : 309-355.
- Hollis, D. 1971. A preliminary revision of the genus *Oxya* Audinet Serville (Orthoptera : Acridoidea). *Bull. Br. Mus. nat. Hist. (Ent.)* 26 (7) : 269-343.

- Jago, N. D. 1971. A review of the Gomphocerinae of the World with a key to the genera (Orthoptera, Acrididae). *Proc. Acad. nat. Sci. Philad.*, 123 (8) : 205-343.
- Johansson, B. 1763. Centuria insectorum rariorum. *Amoenitates Academicae*, 6 : 384-415.
- Kevan, D. K. McE 1959. A study of the genus *Chrotogonus* Audinet Serville 1839 (Orthoptera : Acridoidea: Pyrgomorphidae) V. A revisional monograph of the chrotogonini VI. The History and biogeography of the Chrotogonin. *Publ. coes cult. Co. Diam. Angola*, 43 : 15-199. 201-46.
- Kevan, D. K. Mck. 1963. Pyrgomorphidae (Orthoptera : Acridoidea) in the collection of C.P. Thunberg, Uppsala, with notes on type material of the species represented. *Ark. Zool.* (2) 16 : 69-96.
- Kevan, D.K. McE. 1969. A revised synopsis of the genus *Atractomorpha* Saussure, 1862 (Orthoptera : Pyrgomorphidae), with an account of the African abarrans group. *Zool. J. Linn. Soc.* 248 : 141-198.
- Kirby, W.F. 1910. A synonymic Catalogue of Orthoptera , 3 Orthoptera Saltatoria part II Locustidae vel acrididae ix +674 pp., London.
- Kirby, W.F. 1914. The fauna of British India, including Ceylon and Burma. Orthoptera (Acrididae) : Ix+276 pp. London.
- Linnaeus, C. 1758. Systema naturea per Regna tria naturea (10 th ed.) Holmiae, *Syst., nat.* (ed. X) : 432.
- Mistchnko, L.L. 1965. Fauna of the U.S.R., *Orthoptera*, Vol. 4(2) : XIII + 1-560.
- Navas, L. 1904. Notes Zoologicas. algunos Insectos de Kurseong en la Cordillera del Himalayas. *Bol. Sci. Aragon*, 3 : 129-134.
- Navas, L. 1905. Notes Zoologicas (neuroptera, Orthoptera). *ibid.*, 4 : 49-55, pl.2.
- Oliver, A.G. 1971, Encyclopedie methodique. Dictionaire des insects. Bd. 6. Orthopteres *Encyl. Meth. Ins.*, 6 : 204-236.
- Ritchie, J.N. 1981. A taxonomic revision of the genus *Oedojeus* Fieber (Orth. Acrididae). *bull. Br. Mus. nat. Hist. (Ent.)* 42(3) : 83-183.
- Saussure, H. DE. 1884. Prodormus Oedipodimium, insectorum exordine Orthopteromum. *Mem. Soc. Phys. Hist. nat. Geneve*, 29(9) : 1-254, pl. 1.
- Saussure, H. DE. 1888. Addimenta ad prodormum, Insectorum exordine Orthopterorum. *Mem. Soc. Phys. Hist. nat. Geneve*, 30 (1) : 1-180.
- Serville, J.G.A. 1831. Revue methodipuedes insects de 1' order des Orthopters. *Ann. Sic. nat. (Zool.)*,

Paris 22 : 262-292.

Serville, J.G.A. 1839. Histoire naturelle des insects. In : Roret, Collection des Suites a' Buffer, *Orthopters*, 776 pp. 14 pls. Paris.

Sjostedt, Y. 1928. Monographie der Gattung *Gastrimargus* Sauss. (Orthoptera, Oedipodidae) K. Svenska Vetenskapshandbl., Stockholm (3) 6 (1) : 1051.

Stal, C. 1860. Orthoptera, Species novas descriptas. Kong. Svenska Vetenskapshandbl. Resa omkring Jorden, Stockholm, 3 : 299-350.

Stål, C. 1973. *Revue Critique des Orthopteres decrits par Linne, DeGeer et Jhunberg*. 1 (Acrididodea) 20 + 154 pp. Stockholm.

Tandon, S.K. 1973. Identity and distribution of the genus *Xenocatantops* Dirsh and Uvarov. (Orthoptera : Acrididae : Acrididae) *Rec. zool. Surv. India*, 67(1-4) : 59-64.

Tandon, S.K. 1975. On the genus *Chondracris* Uvarov (Insecta : Orthoptera : Acridoidea : Acrididae : Cytacanthacridinae) in India. Dr. B.S. Chauhan comm. vol. 395-402.

Thunberg, C.P. 1815. Hemipterum maxillosorum genera illustrata plurimisque specibus dilata ac descripta. *Mem. Acad. Sci. St. - Petersburg*. 5 : 201-311.

Tinkham, E.R. 1936. *Spathosternum sinense* Uvarov, considered to be a race of *S. prasiniferum* (Walker), *Orthoptera : Acrididae*. *Lingnan Sci. Journ. Canton*, 15 : 47-54.

Uvarov, B.P. 1921a. Notes on the Orthoptera in the British Museum 1. The group Eupreocnemini *Trans. R. ent. Soc. Lond.* 69 : 106-144.

Uvarov, B.P. 1921b. Records and descriptions of Indian Acrididae. *Ann. Mag. nat. Hist.* (9) 7 : 480-509.

Uvarov, B.P. 1923. Notes on Locusts of economic importance with some new data on the periodicity of Locusts invasion. *Bull. ent. Res. Lond.* 14 : 31-39.

Uvarov, B.P. 1923. A revision of the old world Cytacanthacridini (Orthoptera : Acrididae) - Part I. Introduction and Key to genera. *Ann. mag. nat. Hist. London* (9) 11 : 473-90

Uvarov, B.P. 1925. *Insecta : orthopteres, Acrididae*. In : Mission Guy Babault dans les provinces centrales de l'Inde et dans la region occidentale de l'Himalaya, 1914. *Insectors* : 40 pp. 1 pl.

Uvarov, B.P. 1927. Some orthoptera of the families Mantidae, Tettigoniidae and Acrididae from Ceylon. - *Spolia Zelandica*, 14 : 85-114.

- Uvarov, B.P. 1929. Acrididae (Orthoptera) aus Sud-Indian - *Rev. Suisse Zool.*, Geneva, 36 : 533-563.
- Walker, F. 1859. Characters of some apparently underscribed Ceylon Insects. *Ann. Mag. nat. Hist.*, (3) 4: 217-223.
- Walker, F. 1870a. Catalogue of the specimen of Dermaptera and Saltanria in the collection of the British Museum, 3 Locustidae (Concluded) and Acrididae (Part) pp. 4+425-604-London.
- Walker, F. 1870b. Catalogue of the specimens of Dermaptera and Saltoria in the collection of the British Museum part IV Acrididae (Concluded). *Cat. Derm.Salt. Brit. Mus. nat. Hist.* 4 : 4 + 605-809. - London.
- Walker, F. 1871. Catalogue of the specimens of Dermaptera and Saltatoria in the collection of the British Museum Part V Tettigidae and suppliments to earlier parts. London ; pp., 4 + 811-850 + 43+116 (*Brit. Mus. nat. Hist.*).
- Willemse, C. 1953. On a collection of orthoptera from the sumba Islands (Indonesia). - Wessens, Ergehn, der sumba Exped. des Museums fur volker. *Junde and des naturh. Museums in Basel*, : 89-104.
- Willemse, F. 1968. Revision of the genera Stenocatantops and Xenocatantops (Orthoptera : Acrididae : Catantopinae). *Mon. Ned. Ent. Ver.*, 4 : 77, 109 figs.

INSECTA : ORTHOPTERA : TETTIGONIDAE

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INTRODUCTION

To explore the 'Fauna of West Bengal' extensive surveys were undertaken by the scientists of Zoological Survey of India, Calcutta, in various districts of West Bengal since 1985. The paper deals with 17 species under 15 genera of which 5 species have been recorded here for the first time from West Bengal, 7 species common to Southern India and 4 species common to Northern India and 2 species common to all these parts of India. So far a total of 80 species under 72 genera are known to occur in India.

Important contributions on Indian Tettigoniidae were made by Brunner (1891), Redtenbacher (1891), Caudel (1911, 1912), Karny (1912), Karny (1931), Hebard (1922), Jong (1939), Beer (1962-1966).

SYSTEMATIC ACCOUNT

Family TETTIGONIDAE

Key to subfamilies

1. Male subgenital plate with a pair of styles; first two tarsi grooved laterally 2
 - Male subgenital plate without style; first two tarsi without groove laterally two series of spines present on posterior tibia, which continue to the apex Phaneropterinae
2. Fore tibia without apical spine 3
 - Fore tibia with long movable spines, fastigium narrow, strongly compressed laterally Listroscelinae
3. Pronotum bears two distinct sutures, antennal socket strongly marginal, fastigium shorten apially crowded antennary fossa Pseudophyllinae
 - Pronotum without suture 4
4. Fore and middle femora spined below, fastigium cone-shaped, male subgenital plate bifurcated at apex Copiphorinae
 - Fore and middle femora unspined below, fastigium not produced, male subgenital plate bifurcated at about the middle Mecopodinae

Key to genera of Pheneropterinae

1. Antenna slender, about double the length of body, elytron very narrow and thickly reticulated...
..... *Letana* Walker
- Antenna not so long..... 2
2. Margins of pronotum crenulate, sulcate, meso and metanotal lobes triangular.....
..... *Trigonocorypha* Stal
- Shape of pronotum different.....3
3. Hind margin of pronotum circular..... 4
- Hind margin of pronotum truncate, epiproct subconical..... *Elimea* Stal
4. Epiproct conically produced, radius sector 2 arises from the middle of elytron, ovipositor serrate
..... *Allodapa* Brunn.
- Epiproct triangular, radius sector 2 arises from before the middle of elytron, ovipositor not serrate
..... *Holochlora* Stal

Genus *Letana* Walker, 18691. *Letana despecta* (Brunner)

1878. *Pyrrhicea despecta* Brunner, *Mon. Phan.* : 115.

1906. *Letana despecta* : Kirby, *Syn. Cat. Orthopt.*, 2 : 400.

Material examined : 1 (F) (Darjeeling dist., Darjeeling Botanical Garden, 13.1.1968, coll. A.K. Chatterjee; 2 (F), Tista river belt, 8.12.1986, coll. R.S. Barman.

Diagnosis : Fastigium conically produced; pronotum concave at anterior margin and convex at posterior margin; an oval-shaped, mirror-like stridulating organ basally at right tegmina; only hind femur spinose; male subgenital plate bifurcated at base and developed uniformly wide and curved; cerci long, rodshaped, slightly bend and bears a spine at apex; ovipositor curved.

Distribution : India : West Bengal (Darjeeling). Also known from China.

Remarks : The species has so far been recorded only from West Bengal in India.

Genus *Trigonocorypha* Stal, 18732. *Trigonocorypha unicolor* (Stal)

1813. *Gryllus (Tettigonia) unicolor* Stal, *Spectres, Saut.* : 13.

1906. *Trigonocarypha unicolor* : Kirby, *Syn. Cat. Orth.*, 2 : 448.

Material examined : 1(M), 1(F), Puruulia dist, Ajodhya Hills, 4.11.1986, coll. R.S. Barman.

Diagnosis : Fastigium conically produced with semicircular apex; pronotum concave at anterior margin almost straight; elytron highly undulating at anterior margin, posterior margin almost straight, anal vein very short; hind wing wholly transparent except a little brown area dorsally at apex; fore femuur only with 2 or 3 spines and maximum in the hind pair, male subgenital plate with deep concavity and style conically developed; ovipositor curved with a pair of horny projections at base.

Distribution : India : West Bengal (Purulia); Orissa, Rajasthan. Also known from Java.

Remarks : The species was recorded from Orissa and Rajasthan in India. Here it is recorded for the first time from West Bengal.

Genus *Elimaea* Stål, 1874

3. *Elimaea securigera* Burnner

1891. *Elimaea secuuirigera* Burnner, *Verh. zool. bot. Ges. Win*, Vienna, 40 : 47.

Material examined : 4(M), 6(F), Nadia dist, Bethuadohari, coll. R.S. Barman; 1(M), 2(F), 24-Parganas dist. Raidighi, 28.4.1986; 2(F), Raidighi, 29.4.1986; 2(M), Puruulia dist., Ajodhya Hills, 2.11.1985, coll. M. Datta; 1(F), Garh Dhuluswar, 7.11.1985, coll. M. Datta.

Diagnosis : Medium sized species; fastigium cone-shaped, poorly developed; posterior margin of pronotum semi-circular; both edge of elytron straight, male subgenital plate hook shaped with profuse tiny spines arranged innerrside; ovipositor hookshaped, epiproct with acute apex.

Distribution : India : West Bengal (Nadia, Purulia, 24-Pargana); Assam. Also known from Sri Lanka.

Remarks : The species was recorded only from Assam in India. Here it is recorded for the first time from West Bengal.

Genus *Allodapa* Brunner, 1878

4. *Allodapa aliena* Brunner

1891. *Allodapa aliena* Brunner, *Verh. zool. Bot. Ges. Wien.*, 41 : 111.

Material examined : 1(F), Darjeeling, 7.8.1958, coll. H. Khajuria.

Diagnosis : Fastigium conically produced; posterior margin of pronotum circular, both edges of elytron almost straight, bristles in hind tibia well developed and predominant than other tibiae; ovipositor

curved, apical region serrate; apex of male subgenital plate deeply notched inside.

Distribution : India : West Bengal (Darjeeling); Assam, Tamil Nadu. Also known from Sri Lanka,

Remarks : The species has been recorded from Assam, Tamil Nadu and West Bengal in India.

Genus *Holochlora* Stal, 1873

5. *Holochlora indica* Kirby

1906. *Holochlora indica* Kirby, *Syn. Cat. Orthopt.* 2 : 430.

Material examined : 1 (F), Bardhaman dist., Panagarh, 13.10.1986, coll. S.K. Ghosh; 1 (M), 1 (F), Jalpaiguri dist., Alipurduar, 28.4.1986, coll. B.C. Das; 1 (M), 2 (F), Madinipur dist., Digha, 26.12.1985, coll. A.K. Hazra; 2 (F), Sambarpur, 25.12.1985, coll. A.K. Hazra; 2 (M), 3 (F), Murshidabad dist., Beldanga, 13.10.1983, coll. A.K. Hazra; 1 (F), Nadia dist., Debgram, 20.12.1985, coll. B.N. Das.

Diagnosis : Fastigium concially produced with round apex; anterior margin of pronotum concave and posterior margin convex, radius sector 2 arises from middle of wing and bifurcated at its basal third; hind femur with spines on apical half and anterior two pairs bare of spines; male subgenital plate at the region of bifurcation forms a circle, style foot-shaped; circus gradually narrowed and curved at apex; ovipositor curved and serrate at apical region.

Distribution : India : West Bengal (Bardhaman, Jalpaiguri, Medinipur, Murshidabad, Nadia); Madras, Orissa. Also known from Java and Sri Lanka.

Remarks : The species was earlier recorded from Orissa and Tamil Nadu in India and here it is recorded for the first time from West Bengal.

Key to genera of Pseudophyllinae

1. Elytron with dark-brown and reddish-brown spots and uniformly curved at apex.....*Sanaa* Walker
- Elytron without such markings..... 2
2. Elytron broadly undulating at both or fore edge only..... 3
- Elytron not or very faintly undulating and tapered at apex dorsally..... .4
3. Radius sector 2 originates from basal fourth, elytron broadly undulating both at fore and hind border and tapered at apex ventrally.....*Onomarchus* Stal
- Radius sector 2 originates at or before middle of wing, epiproct with ridge in the middle, base ... swollen and gradually narrowed at apex..... *Acanthoprion* Pictet and Saussure

4. Elytron almost straight at posterior edge and narrowed at apex dorsally, radius sector 2 arises from before middle of wing..... *Sathrophyllia* Stål
 Elytron almost uniformly broad, radius sector 2 arises from middle of wing.....
 *Meroncedius* Serv.

Key to species of *Sathrophyllia*

1. Dark spots in cells of elytron more or less round or oval shaped, presence of swollen median crest on basal part of pronotum*rugosa* (Linnaeus)
 Dark spots in the cells of elytron more or less semilunar shaped, pronotum without median crest
 *femorata* (Fabricius)

Genus *Sathrophyllia* Stål, 1874

6. *Sathrophyllia rugosa* (Linnaeus)

1758. *Gryllus (Tettigonia) rugosa* Linnaeus, *Syst. nat.* (10 ed) 1 : 430.

1954. *Sathrophyllia rugosa* : Beier, *Rev der Pseud. Madred.* : 233.

1962. *Sathrophyllia rugosa* : Beier, *Das Tierreich* 73 : 199-200.

Material examined : 1(M), 2(F), Bankura distt, Bishnupur Sericulture Campus, 10.9.1986, coll. R.S. Barman; 3(F), Bardhaman dist., Damodar river bed, 16.4.1979, coll. A.K. Hazra; 2(F), Birbhum dist., Noorpur, 18.12.1986, coll. R.S. Barman; 10 exs, Murshidabad dist., Murshidabad, no other data; 1(M), Purulia dist, Ayodhya Hills, 4.11.1986, coll. M. Datta.

Diagnosis : Median crest large, often swollen on the basal part pronotum, appearance rugose and rough, colour ash brown tegmina convex.

Distribution : India : West Bengal (Bankura, Bardhaman, Birbhum, Jalpaiguri, Murshidabad, Purulia); Karnataka, Sikkim and Tamil Nadu. Also known from Java.

Remarks : The species has been recorded from Karnataka, Sikkim, Tamil Nadu and West Bengal in India.

7. *Sathrophyllia femorata* (Fabricius)

1787. *Locusta femorata* Fabricius, *Mantiess Ins.*, 1 : 233.

1963. *Sathrophyllia femorata* : Beier, *Orthopterorum Catalogus*, part 5 : 64.

Material examined : 1(F), Calcutta, coll. J. Wood Mason, no other data.

Diagnosis : Large brownish species; vertex excavated, apex with two horney projection; pronotum

crested over; elytron undulating with rounded apex, all femora waved below; male subgenital plate broad, stylus conical; epiproct rounded, cerci curved with black apex; ovipositor sword-like with black apex.

Distribution : India : West Bengal (Calcutta); Sikkim. Also known from Burma, Borneo, Java, Nias and Sumatra.

Remarks : The species has so far been recorded from Sikkim and West Bengal in India.

Genus *Sanna*

8. *Sanna regalis* (Brunner)

1895. *Termera regalis* Brunner, *Monogr. Pseudophyll.*; 94.

1963. *Sanna regalis* : Beier, *Orthopterorum catalogus* part 5 : 68.

Material examined : 1 (F), Darjeeling dist., Kurseong, no other data (purchased).

Diagnosis : Pronotum yellow, elytron brown with black spots, hind wing spotted anteriorly ; meso and metasternum brown ; pleura black ; legs largely brownish, all femora medially and ventrally black ; male subgenital plate large, broad, black ; style straight but somewhat curved at apex ; ovipositor black at the base.

Distribution : India : West Bengal (Darjeling) ; Assam, Nagaland, Sikkim.

Remarks : The species has so far been recorded from Assam, Sikkim and West Bengal in India.

Genus *Onomarchus* Stal, 1874

9. *Onomarchus leuconotus* (Serville)

1839. *Pseudophyllus leuconotus* Serville, *Hist nat. ins.* : 469.

1874. *Onomarchus leuconotus* : Stål, *Recens Orthopt.*, 2: 68

1963. *Onomarchus leuconotus* : Beier, *Orthopterorum catalogus* Part 5 : 17.

Material examined : 1(M), 1(F), Calcutta, coll. J. Wood Masson, no other data.

Diagnosis ; Bluish to brownish-green species; pronotum with scattered granules; elytron broadly undulating anteriorly, brown; hind tibia dorsally mostly with 5 strong thorns on the inner corner; ovipositor about 4 times longer than broad.

Distribution : India : West Bengal (Calcutta); Assam. Also known from Malacca, Mokkein (Amboina), Sundra Island (Sumatra, Java).

Remarks : The species has been recorded from Assam and West Bengal in India.

Genus *Acanthoprion* Pictet and Santsure 1892

10. *Acanthoprion suspectum* (Burnner)

1985. *Aprion suspectum* Brunner von Wattenwyl, *Monogr. pseudophyll* : 77.

1954. *Acanthoprion suspectum* : Beier, *Revis. Pseudophyll*, : 200.

Material examined : 1(F), Calcutta, coll. J. Wood-Mason, no other data. This specimen was identified as *Aprion subpectus* Brun.

Diagnosis : Brownish species; fastigium conically produced with blunt apex; posterior margin of pronotum almost conically produced; elytronn uniformly brown; radius sector 2 arises from basal third of wing; ovipositor sword-shaped.

Distrubution : India : West Bengal (Calcutta); Tamil Nadu. Also known from Sri Lanka.

Remarks : The species has so far been recorded only from West Bengal in India.

Genus *Meroncidius* Serv., 1831

11. *Meroncidius ochraceous* Stål

1831. *Meroncidius ochraceous* Stal; *Serv. Ann. Sci. Nat.*, 22 : 149.

Material examined : Reported from literature.

Diagnosis : Pronotum conical with a projection in the middle at the anterior margin and two projections laterally, posterior margin circular, both edge of elytron almost straight; radius sector 2 arises from middle of wing; all femora with series of well developed spines ventrally; upperr edge of ovipositor almost straight, lower edge curved at apex, epiproct shield shaped.

Distribution : India : West Bengal (Calcutta); Karnataka. Also known from Brazil, Paragway, Montevedeo.

Remarks : The species has so far been recorded from Karnataka and West Bengal in India.

Subfamily LESTEROCELINAE

Key to genera

1. Cephalic and middle tibiae armed with well developed spines..... 2
- Cephalic and middle tibiae without well developed spines, elytron broadly undulating at upper edge and lower edge almost straight and the apex tapered..... *Phisis* Stål

2. Posterior margin of pronotum semicircular with a little incurving in the middle, fore and middle tibiae armed with highly developed spines.....*Euhexacentru* Stal

Posterior margin of pronotum oval shaped, fore and middle tibiae armed with not so developed spines*Xiphidiposis* Redtenbacher

Genus *Phisis* Stal, 1860.

12. *Phisis pectinata* (Guerin)

1830. *Listroscelis pectinata* Guerin, *Voyage de la Coquille. zool.*, 2, part II : 153.

1922. *Phisis pectinata* : Hebard, *Proc. Acad. nat. Sci. Philad.*, 74 : 266.

Material examined ; 1 (M), Calcutta, 3.1983, no other data; 1 (M), 1 (F), Jalpaiguri, 17.12.1974, coll. W. Cane.

Diagnosis: Fastigium conicaly produced; pronotum granulated all over; posterior margin convex, elytron strongly undulating with narrow apex; radius sector 2 arises from middle of wing; hind femur bears series of spines; length of ovipositor about 4 times its breadth; epiproct cone-shaped.

Distribution: India ; West Bengal (Calcutta, Jalpaiguri); Nicobar Island. Also known from Barneo, Bowra, Samoa, Sri Lanka, Tahit.

Remarks : The species has so far been recorded only from West Bengal.

Genus *Euhexacentrus* Stal, 1877

13. *Euhexacentrus annulicornis* Stal

1877. *H. (exacentrus) annulicornis* Stal. *fv. k. Vetensk., - Akad., Forh.*, No. 10 : 46.

1922. *Euhexacentrus annulicornis* : Hebard, *Proc. Acax. Nat. Sci. Phelade*, 74 : 271.

Material examined : 1 (F), Puruliya dist., Ajodhya Hills, 4.9.1986, coll. R.S. Barman.

Diagnosis : Medium sized species; yellowish buff coloured; vertex dark-brown dorsally; elytron pale green or green yellow, both edges nearly straight; hind femoral spines blackish-brown except paler apical ones; male subgenital plate slightly longer than broad; basal third of ovipositor swollen, its length nearly half the length of body.

Distribution : India : West Bengal (Purulia); Assam, Maharashtra. Also known from China, Japan, Mouccas, Philippines.

Remarks : The species has been recorded from Assam and Maharashtra in India. Here it is recorded for the first time from West Bengal.

Genus *Xiphidiopsis* Redtenbacher, 1831

14. *Xiphidiopsis straminnula* (Walker)

1871. *Locusta straminnula* Walker, *Cat. Dermapt. Saltat. Brit. Mus.* 4 suppl. : 36.

1966. *Xiphidiopsis straminnula* : Beier, *Orthopterum Catalogus*, part 9 : 267.

Material examined : 2(F), Bankura dist, Jhilmil, 16.9.1986, coll. R.S. Barman; 2(M), 5(F), Birbhum dist., Rampurhat, 1.4.1986, coll. M.S. Shishodia; 1(M), Cooch Bihar dist, Tuanganj, 15.12.1986, coll. R.S. barman; 1(M), 3(F), Darjeeling dist., Fansidewa, 6.12.1986; 3(F), Kharibari 9.12.1986, coll. R.S. Barman; 1(M), (F), Jalpaiguri dist., Noorpur, 18.12.1986, coll. R.S. Barman; 2(M), 4(F), Maldah dist, Pandua, 20.10.1983, coll. A.K. Hazra; 2(M), 2(F), Gaur, 10.12.1986, coll. B.C. Das; 3(F), Murshidabad dist., Berhampore, 17.10.1983, coll. A.K. Hazra; 1(M) 2(F), 24-Parganas dist, 1(M), 2(F), Lakhikantapur, 28.4.1986, coll. B.N. Das.

Diagnosis : Slender straw coloured species; vertex brown dorsally with a pale longitudinal line; mesonotum unicolourous with vertex middle and hind tibia bears a round dark-brown spot basally at anterodorsal region; fore and mid tibiae with two rows of spines ventrally, hind tibia also with two rows of spines but ventrally; male subgenital plate rectangular with two styles projected outwards; cerci of male highly developed with a spinous projection; ovvipositor nearly half the length of body.

Distribution : India : West Bengal (Bankura, Birbhum, Cooch-Bihar, Darjeeling, Jalpaiguri, Maldah, Murshidabad, 24-Parganas; Madras and Maharashtra. Also known from Sri Lanka.

Remarks : The earlier record is from Madras only. So, here it is recorded for the first time from the State.

Subfamily MECOPODINAE

Genus *Mecopoda* Serrville, 1831

Diagnosis : Fastigium uniformly wide; posterior margin of pronotum one and half times the width of anterior margin; tympanum highly developed; thorns at borders of fore tibia comparatively fewer dorsally than ventrally; arrangement of hind tibial thorns just the reverse; hind femur bare off bristles dorsally.

15. *Mecopoda elongata* (Linn.)

1758. *Gryllus elongatus* Linnaeus, *Syst. Nat.* (10 ed) 1 : 429

1922. *Macopoda elongata* Habard, *Proc. Acad. Nat. Sci. Phila.* 74 : 182.

Material examined : 1(M), Bardhaman dist., Panagarh, 13.10.1986 coll. S.K. Ghosh; 1(M), 4(F), Darjeeling dist., Tista river belt, 8.12.1986, coll. R.S. barman; 3(F), Medinipur dist., Belpahari, 8.9.1985, coll. S. Biswas; 2(F), Puruliya dist., Ajodhya Hills, 4.9.1986, R.S. Barman.

Diagnosis : Brownish species, fastigium wide, posterior end of pronotum almost double species, festigum wide, posterior end of pronotum almost double the width than anterior region ; subcosta sharply sinuate just beyond middle; male subgenital plate developed conically from region of bifurcation; ovipositor straight being slightly narrowed at apex.

Distribution : India : West Bengal (Bardhaman, Darjeeling, Medinipur, Purulia), Andamans; Assam, Karnataka, Maharashtra. Also known from China, Japan, Malacca, Malay and Moluccus.

Remarks : The species has been recorded from Andamans, Assam, Karnataka, Maharashtra, Orissa, Uttar Pradesh and West Bengal in India.

Subfamily COIPHORINAE

Genus *Euconocephalus* Karny, 1907.

Diagnosis : Mesosternal patch oval or triangul; rarely at the end with prolonged bump; fastigium conically protruded with obtuse apex, pronotum sellate type; radius sector 2 originates from little before the middle of wing.

Key to species of *Euconocephalus*

1. Fastigium protruded obtusely, radius sector 2 arises from middle of wing, length of ovipositor three fourth the length of body..... *pallidus* Redtenbacher
- Fastigium protruded conically, radius sector 2 arises much before middle of wing, length of ovipositor subequal to the length of body..... *incertus* (Walker)

16. *Euconocephalus incertus* (Walker)

1869. *Conocephalus incertus* Walker, *Cat. Derm. Salt. Brit. Mus.*, 2 : 320.

1906. *Conocephalus incertus* : Kirby, *Syn. Cat. Orthopt.*, 2 : 251.

1912. *Euconocephalus incertus* : Karny, *Gen. Insectorum* 2 (139) : 35.

Material examined ; 2 (M), 3 (F), Haora dist., Botanical Garden, 14.6. & 18.9.1979, coll. A.K. Hazra; 1 (M), 1 (F), 24-Parganas dist., Barasat, 2.2.1979, coll. A.K. Hazra; 1 (F), 24-Parganas dist., Barasat, 2.2.1965, coll. S.K. Bhattacharjee.

Distribution : India : West Bengal (Calcutta, Habra, 24-Parganas); Orissa.

Remarks ; The species has been so far recorded from Orissa and West Bengal.

17. *Euconocephalus pallidus* Redtenbacher

1891. *Conocephalus pallidus* Redtenbacher, *Verh. zool. bot. Ges. Wien.* 41 : 414.

1922. *Euconocephalus pallidus* : Hebard, *Proc. Acad. Nat. Sci. Phil.* 74 : 239-240.

Material examined : 1(M) 1(F), Bardhaman dist., Damodar river bed, 16.4.1979, coll. A.K. Hazra; 1(M), Cooch Bihar dist., Jorai, 19.12.1986, coll. R.S. barman; 2(F), Calcutta, 19.2.1907, coll. N. Annandale; 1(M), 2(F), 24-Parganas dist., Canning 20.11.1983, coll. S.K. Mondal.

Distribution : India : West Bengal (Bardhaman, Calcutta, Cooch-Bihar, 24- Parganas); Himachal Pradesh, Uttar Pradesh. Also known from Burma, Borneo, Java, Pinang, Philippines.

Remarks : The species has so far been recorded from Himachal Pradesh, Uttar Pradesh and West Bengal in India.

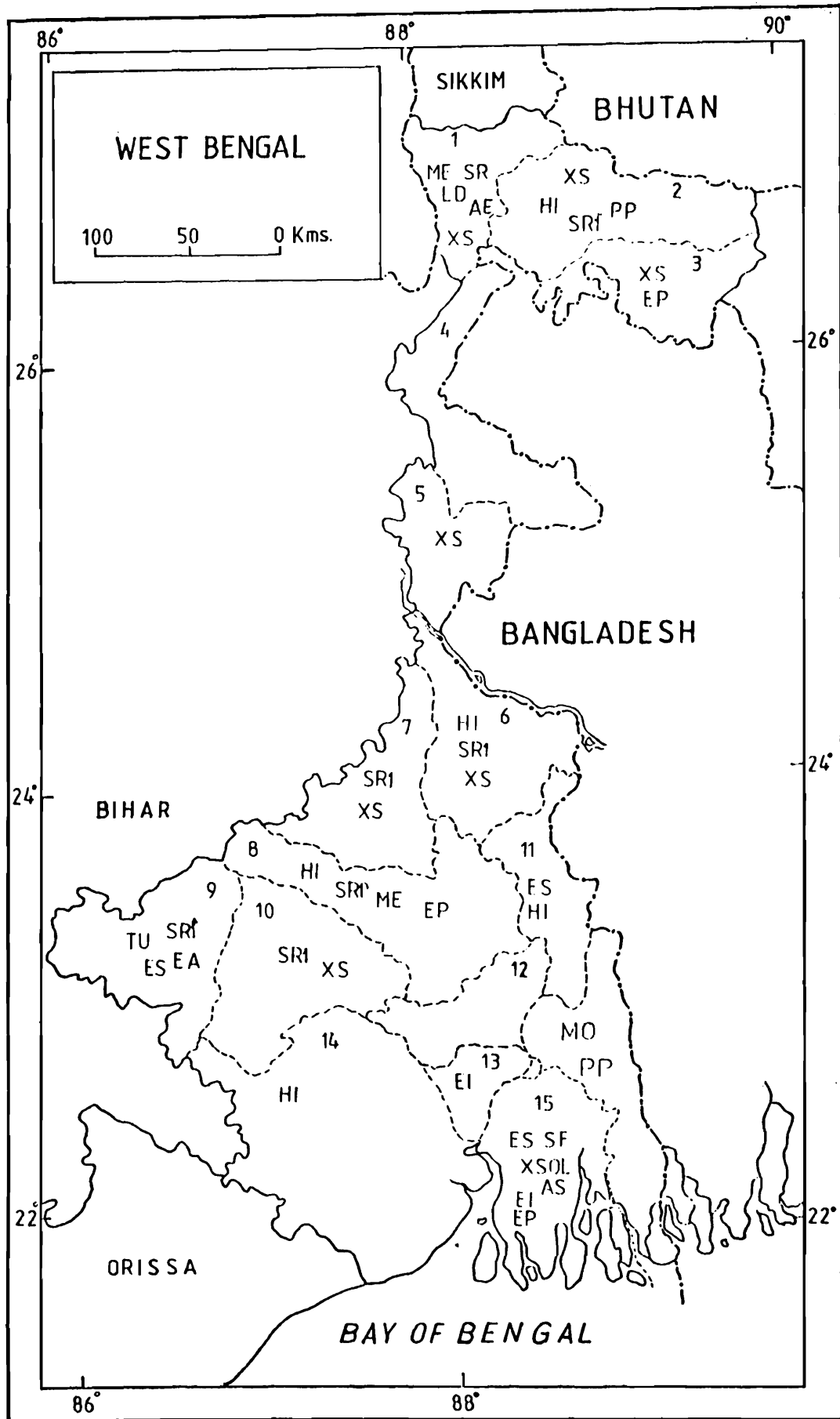
EXPLANATION OF MAP ON PAGE 366

(For Districts)

1. Darjeeling dist.; 2. Jalpaiguri dist.; 3. Kochbihar dist.; 4. West Dinajpur dist.; 5. Maldah dist.; 7. Birbhum dist.; 8. Bardhaman dist.; 9. Puruliya dist.; 10. Bankura dist.; 11. Nadia dist.; 12. Hugly dist.; 13. Haora dist.; 14. Medinipur dist.; 15. 24-Parganas dist.

(For Species of Tettigoniidae)

Letana despectas-LD; *Trigonocorypha unicolor*-TU; *Elimaea securigera*-ES; *Allodapa aliena*-AE; *Holochlora indica*-HI; *Sathrophyllia rugosa*-SRI; *S. femorata* SF; *Sanaa regalis*-SR; *Onomarchus leuconatus*-OL; *Acanthoprion suspectum*-AS; *Meroncidius ochraceous*-MO; *Phisispectinata*-PP; *Euhexacentrus annulecornis*-EA; *Xiphidiopsis straminnula*-SX; *Mecopoda elongata*-ME; *Euconocephalus incertus*-EI; *E. pallidu*-EP.



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REFERENCES

- Beier, M. 1962. Orthoptera : Tettigoniidae (Pseudophyllinae). *Das Tierreich*. 73 : XI + 468 pp.
- Beier, M. 1963. *Orthopterorum Catalogus* part 5 : 1-246.
- Beier, M. 1966. *Orthopterorum Catalogus* part 9 : 248-342.
- Brunner, v. Wattenwyl, 1891. Additamenta zur Monographie der Phaneropteriden. *Verh. zool. Bot. Ges. Wien.*, 41 : 1-196.
- Caudel, A.N. 1911. *Genera Insectorum*, 2 (120) : 1-7.
- Caudel, A.N. 1912. *Genera Insectorum*, 2 (138) : 1-25; 2(140): 1- 10.
- Hebard, M. 1922. Studies in malayan, Melanesian and Australian Tettigoniidae (Orthoptera). *Proc. Acad. Nat. Sci. Philad.*, 74 : 121-299.
- Harz, K. 1969. *Die Orthopteran Europas*, 1-XX + 749 pp. (Dr. W. Junk N.V. The Hague).
- Jong C. De. 1939. On Indo-Malayan Pterophyllinae (Orthoptera, Family Tettigoniidae). *Zoologische Mededeelingen*, 21 : 1-109.
- Karny, H. 1912. *Genera Insectorum* 2(131) : 1-20 : 2(135) : 1-77; 2(139) : 1-50; 2(141) : 1-47.
- Karny, H.H. 1931. Fam. Tettigoniidae. *Treubia* 12 Supplement : 1- 140.
- Pitkin, L.M. 1980. A revision of the Pacific species of *Cephalus Thunberg* (Orthoptera : Tettigoniidae). *Bul Br. Mus. nat. Hist. (Ent.)* 41(5) : 315-355.
- Redtenbacher, J. 1891. Monographie der Conocephaliden. *Verh. zool. Bot. Ges. Wien.*, 41 : 315-362.

INSECTA : DERMAPTERA

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INTRODUCTION

There is no consolidated account of Dermaptera available from West Bengal. Most of the information is scattered and the present work is an attempt to fill this lacunae. It is primarily based on the material present in the Survey and on those procured through various World Museums, indicated at appropriate places in the text.

Altogether 78 species belonging to 36 genera are recorded which represented 3.9% of total known world fauna (about 2000 species) and 24.6% of Indian fauna (320 species). It includes a new species, *Anechura biswasi*, besides synonymising *Brachylabis tegminata* Steinmann under *Liparura dentata* Srivastava and *Kosmetor josephi* Kapoor under *Pterygida vishnu* (Burr). Diagnostic characters of various species are given besides providing keys to discrimination of various species and supra-specific taxa. During the preparation of this paper, a lot of fresh material from the area under study was collected and examined and in such cases where no material was available from the State, the diagnosis and interpretations were based on specimens from other States of India. Intraspecific variations wherever possible are discussed.

For general external features including male genitalia, figs. 1-5 may be referred wherein various body parts are properly labelled. It is generally necessary to have knowledge of the male genitalia for most of the species since the taxonomy of the whole Order is based, primarily on males. The male genitalia is lodged on the inner side of penultimate sternite and can be easily extracted by pulling it out by means of fine forceps.

Intraspecific variations are common in this group. Therefore, for proper understanding of a species it is desirable to have a representative collection including both sexes. Although male forceps are quite characteristic these exhibit variations in length in relation to other body parts. These may be shorter (cyclolabic form) or longer (macrolabic forms). In some cases there is no appreciable variation in length but may be thin (microlabic) or stout and robust (macrolabic form).

DISTRIBUTION AND ZOOGEOGRAPHICAL NOTES

The accompanying table and map (fig.6) providing districtwise distribution of species reveals that out of 78 species so far known from the State, 69 are recorded from Darjeeling district alone. Only 19 are distributed in other 12 districts which include 10 species that are common to both Darjeeling and above twelve districts and 9 only restricted to latter. At present, there is no record from four districts, namely, Koch Bihar, Bardhaman, Murshidabad and West Dinajpur.

Reasons for this great concentration of species in one district seem to be various. Firstly, the

district Darjeeling extends right from high Himalayan ranges to foot hills, interspersed by various valleys and forested slopes, which provide varied and favourable habitats for these insects. Secondly, Darjeeling being one of the most favourable tourist spots it was frequented by naturalists as well other tourists who have provided large number of specimens to various World Museums. Beside it alongwith Jalpaiguri forms integral part of NE Himalayas which is faunastically rich not only in numbers but in diversity of species as well.

The paucity of fauna in the plains and southern part of the State may be attributed to large scale reclamation of land for farming and other social purposes. Here, only those species that are either worldwide in distribution or widely distributed in Oriental Region are able to survive. There is nothing special of above genera about the species composition except that if further explorations are taken up in SW districts, some more species may be recorded.

The faunal composition of district Darjeeling has an interesting admixture of various faunal elements. In the foot hills and forested slopes of hills there is preponderance of tropical genera viz., *Diplatys* Serville, *Haplodiplatys* Hincks and different genera of Chelisochidae. However, members of certain species of above genera are found even at high altitudes which is not their natural habitat since these are represented by meagre numbers.

Genera *Allodahlia* Verhoeff and *Forficula* Linnaeus, are represented by three and twelve species, respectively, mostly occurring between 1500 and a little above 3000 m, which is indicative of the fact that there is dominance of Palearctic element at high altitudes. The Indo-Malayan and Chinese elements are represented by some of the species of *Hamaxas* Burr, *Timomenus* Burr and *Eparchus* Burr.

KEY TO THE SUPER GENERIC TAXA REPRESENTED FROM WEST BENGAL

- 1(8) Neck blattoid type, i.e., anterior and posterior cervical sclerites anterior to prosternum separated from each other but hind margin of posterior sclerite may be separate or fused with apical margin of prosternum; male genitalia with two functional distal lobes, sometimes one of them reducedPygidicranoidea (Pygidicranidae)
- 2(3) Antennal segments 4-5 transverse, 25 segmented or more.....PYGIDICRANINAE Verhoeff
- 3(2) Antennal segments 4-6 longer than broad, 20 segmented or less
- 4(5) Femora compressed with sharp longitudinal ridges ; male genitalia with parameres armed internally in various ways..... Diplatyinae Verhoeff
- 5(4) Femora not compressed, usually smooth, occasionally with a faint ridge; male genitalia with parameres simple (unarmed)
- 6(7) Body convex, covered with thick characteristic setae and long pubescence; femora occasionally with a faint ridge; pygidium with hind margin projecting; forceps cylindrical..... Echinomatinae Burr

- 7(6) Body depressed, glabrous and smooth; femora devoid of any ridge; pygidium vertical with hind margin not projecting; forceps trigonal in basal one third, afterwards depressed.....
.....Prolabiscinae Bey-Bienko
- 8(1) Neck forficuloid type, i.e., anterior and posterior cervical sclerites fused and the hind margin of latter joined with anterior margin of prosternum; male genitalia with one or two functional distal lobes, sometimes one of them reduced.
- 9(20) Male genitalia with two functional distal lobes, often one of them reduced or atrophied
- 10(19) Pygidium in both sexes vertical with its hind margin not free; forceps partially trigonal near base and moderately depressed afterwards or cylindrical
- 11(16) Male genitalia, if virga present, usually not wider at base and without a sinuous inner tube; otherwise denticulate pads present..... Anisolabididae Sakai
- 12(13) Mesosternum briefly convex posteriorly.....Carcinophorinae Hincks
- 13(12) Mesosternum truncate posteriorly
- 14(15) First antennal segment longer than the distance between antennal bases; mesonotum with a well defined ridge laterally..... Brachylabidinae Burr
- 15(14) First antennal segment shorter than the distance between antennal bases; mesonotum without ridge laterally..... Anisolabidinae Brindle
- 16(11) Male genitalia with virga distinct, dilated at base with a distinct inner sinuous tube.....
..... Labiduridae Verhoeff
- 17(18) Elytra with a sharp ridge along the costal margin; legs relatively short, posterior femora not longer than the pronotum..... Nalinae Steinmann
- 18(17) Elytra without any sharp ridge along the costal margin; legs longer, posterior femora longer than the pronotum..... Labidurinae Burr
- 19(10) Pygidium in both sexes forming a flat process with hind margin free; forceps with branches broad and flat..... APACHYOIDEA (=Apachyidae Verhoeff)
- 20(9) Male genitalia with a median functional lobe..... FORFICULOIDEA
- 21(28) Second tarsal segment simple (not lobed)..... Spongiphoridae Burr
- 22(25) Hind tarsi with second segment longer than broad
- 23(24) Hind second tarsal segment, in profile, almost of uniform width, only scarcely narrowed basally

- and slightly shorter than the third and first segment slightly longer than the combined length of second and third..... Homotaginae Srivastava
- 24(23) Hind second tarsal segment, in profile, about half as long as the third and first segment slightly shorter than the combined length of second and third..... Spongiphorinae Burr
- 25(22) Hind tarsi with second segment broader than long or about as long as broad
- 26(27) Hind tarsal comparatively longer and slender, first segment five times longer than its width; elytra smooth (occasionally costal margin with a row of small tubercles, each with a thick seta)..... Irdexinae Srivastava
- 27(26) Hind tarsi comparatively shorter and stout, first segment three to four times longer than its widthLabiinae Burr
- 28(21) Second tarsal segment dilated or produced in the form of a narrow lobe below the third segment
- 29(30) Antennae 17-22 segmented; second tarsal segment spiniform, extending below up to the middle of third, visible from sides only.....Chelisochoidea Burr (=Chelisochoinae Burr)
- 30(29) Antennae 12-16 segmented; second tarsal segment lobed, visible from above on either side of third segment..... Forficulidae Stephens
- 31(34) Antennal joints long and slender, 4th longer than the 3rd or almost equal, both of similar build, i.e. slender.
- 32(33) Elytra with a sharp ridge along the costal margin.....Cosmiellinae Steinmann
- 33(34) Elytra without any ridge along the costal margin..... Opisthocosmiinae Verhoeff
- 34(31) Antennal joints shorter and wider, occasionally apical ones long and slender, 4th shorter or almost equal to 3rd but 4th always wider
- 35(38) Mesosternum broader than long
- 36(37) Elytra with a sharp ridge long the costal margin.....Allodahliinae Verhoeff
- 37(36) Elytra without any ridge along the costal margin..... Anechurinae Burr
- 38(35) Mesosternum about as broad as long
- 39(40) Forceps generally curved or elongated cylindrical, not deplanate at base..... Eudohrniinae Burr
- 40(39) Forceps in most of the species deplanate in basal half or less, afterwards cylindrical or depressed Forficulinae Burr

PYGIDICRANOIDEA
 PYGIDICRANIDAE
 PYGIDICRANINAE

Genus 1. *Acrania* Burr

1915. *Acrania* Burr, *J.R. micr. Soc.*, 1915 : 432, 436. (Type - *Pygidicrana picta* Guerin - Meneville, 1839).
 1986. *Mucocranopygia* Steinmann, *Das Tierreich*, 102 : 266 (Type - *Pygidicrana horsfieldi* Kirby, 1891).
 1986. *Epicranopygia* (part) Steinmann, *Das Tierreich*, 102 : 269 (Type - *Pygidicrana picta* Guerin - Meneville, 1838).
 1992. *Acrania*; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 44.

Key to species (Based on males only)

- 1(2) Penultimate sternite with hind margin slightly emarginate in middle and area little before hind margin thickened; ultimate tergite strongly rugose; forceps feebly emarginate at base externally, elongated, in external margin arcuate, enclosing an elongated oval space.....
*A. picta* (Guerin-Meneville)
- 2(1) Penultimate sternite broadly rounded posteriorly with a faint emargination in middle and margin normal (not thickened); ultimate tergite not strongly rugose; forceps stout, externally at base with a strong emargination, internal margin arcuate enclosing a rhomboidal space.....
*A. constricta* (Hincks)

1. *Acrania picta* (Guerin-Meneville)

1839. *Pygidicrana picta* Guerin-Meneville, *Magasin Zool.*, 84 : 70, p.236, fig.1. (F; India, Madras).
 1911. *Kalocrania picta*; Burr, *Genera Insect.*, 122:18.
 1915. *Acrania picta*; Burr, *J.R. Micr. Soc.*, 1915 : 436, pl.7, fig.6.
 1959. *Cranopygia picta*; Hincks, *Syst. mono. Dermaptera*, 2 : 98.
 1959. *Cranopygia triangulata* Ramamurthi, *Ann. Mag. nat. Hist.*, 13(8) : 59, figs. 1-5 (F; India, Madras).
 1966. *Cranopygia livingstoni* Kapoor, *Agra Univ. J. Res. (Sci.)*, 15(1) : 47, figs. 1-4 (M, India : Kerala, Thekkady).
 1986. *Epicranopygia picta*; Steinman, *Das Tierreich*, 102 : 276.
 1992. *Acrania picta*; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 45.

Material examined : India : W.B., Calcutta, 2 (M), 1(F), 1 nymph, 6.4.1909, 1(M), 1 nymph, 13.12.1906, 1(M), 2.1.1907 (Indian Mus. Coll.); Birbhum dist. Singur, 1(M), 4.6.1967, at light.

Diagnostic characters : General colour brownish black; head yellow, along the middle line and on borders dark blackish brown; pronotum yellow with a pair of blackish brown stripes on either side of median line.

Elytra and wings present. Penultimate sternite, ultimate tergite and forceps and genitalia, in males, as seen in figs. 7 and 8.

Measurements : (M), Length : body - 2.5-28.0 mm. forceps - 6.3 - 6.5 mm; (F), Length : body - 18.0-27.5 mm, forceps - 4.8-7.0 mm.

Distribution : India : West Bengal (Calcutta and Birbhum dists.); Kerala, Karnataka and Tamil Nadu. Also recorded from Sri Lanka and Sumatra.

Remarks : Srivastava (1988) has discussed, in detail, intraspecific variations in this species.

2. *Acrania constricta* (Hincks)
(Figs. 9-10)

1955. *Cranopygia constricta* Hincks, *Ann. Mag. Nat.Hist.*, (12) 8 : 822 (Stet; Bhutan).

1986. *Epicranopygia constricta*; Steinmann, *Das Tierreich*, 102 : 275.

1992. *Acrania constricta* ; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 46.

Material examined : India : W.B., Darjeeling dist., Chunabhati, nr. Bagrakot, 1 (M) (genitalia mounted between two coverslips and pinned with the specimen), 27.12.1973 (G.K. Srivastava).

Diagnostic characters : General colour brownish black, head smoky brown, often with a yellowish brown patch on hind portion of frons and a pair of median stripes on occiput.

Elytra and wings normal. Penultimate sternite rounded posteriorly with slight emargination in middle. Ultimate tergite and forceps and genitalia, of males, as seen in figs. 9 - 10. Female unknown.

Measurements : (M) , Length : body - 24.0 - 25.0 mm. (M), forceps - 4.5 - 5.0 mm.

Distribution : India : West Bengal (Darjeeling and Jalpaiguri dists.); Sikkim. Also recorded from Bhutan.

DIPLATYINAE

Key to genera (based on males only)

- 1(2) Parameres with a moveable epimerite apically which is usually smaller than the paramere.....
..... *Paradiplatys* Zacher
- 2(1) Paramere without any moveable epimerite or projection
- 3(4) Parameres internally armed with one or more teeth, often separated by a deep concavity or emargination..... *Diplatys* Serville
- 4(3) Parameres usually simple, internally, without any prominent teeth, occasionally margin undulate, feebly emarginate or provided with fine serrations.....*Haplodiplatys* Hincks

Genus 2 *Paradiplatys* Zacher

1910. *Paradiplatys* Zacher, *Ent. Rdsch.*, 27 : 105 (Subgenus) (Monobasic - *Diplatys conardti* Burr., 1904).

1974. *Lobodiplatys* Steinmann, *Acta zool. hung.*, 20 (1-2) : 198 (Type-*Forficula coriaceus* Kirby, 1891).

1986. *Lobodiplatys (Epidiplatys)* Steinmann, *Acta zool. hung.*, 32 (1-2): 178 (Type - *Diplatys gladiator* Burr, 1905).
 1986. *Lobodiplatys (Heterodiplatys)* Steinmann, *Acta. zool. hung.*, 32 (1-2):177 (Type - *Labia bicolor* Dubrony, 1879).
 1992. *Paradiplatys* Srivastava, *Rec.zool. Surv. India*, 92 (1-4) : 49.(above synonymy proposed).

3. *Paradiplatys gladiator* (Burr) (Figs. 11-12)

1905. *Diplatys gladiator* Burr, *J. Asiat. Soc. Beng.*, 1 : 28 (M; India, Calcutta).
 1923. *Diplatys bicoloripes* Hebard, 1923, *Mem. Dept. Agric. India, Ent. Ser.*, 7 : 196 [(M), India, Nagpur, Central Province].
 1982. *Lobodiplatys gldiator*; Steinmann, *Ent. Abh. St. Mus. Tierk Dresden*, 45(8) : 205.
 1982. *Paradiplatys gladiator*; Sakai, *Bull. Daito Bunka Univ.*, 20:20.
 1986. *Lobodiplatys (Epidiplatys) gladiator*; Steinmann, *Acta zool. hung.*, 32 (1-2): 187.
 1992. *Paradiplatys gladiator*; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 50.

Material examined ; India : W.B., Calcutta, 1(M), 13 (F), 8 nymphs, Nov., 1965, 4 (M), 3(F), August, 1966(G.K. Srivastava), Calcutta maidan, 1(F), 15.6.1911, 1(M), 31.8.1911, 1(M), 13.6.1911, Calcutta, in house in Museum premises, 1(M),-1.1912 (F.H. Gravely); Malda dist, Nishipur, 1(M), 23.11.1987, Sodhpur, 2(F), 22.11.1987, Katagar, 1 nymph, 7.12.1987 (T.R. Mitra).

Diagnostic characters : General colour light to dark brown or brownish black. Head longer than broad, hind margin broadly emarginate. Eyes slightly shorter than post-ocular length. Elytra generally abbreviated and wings wanting, rarely both well developed. Penultimate sternite, in male, with hind margin concave and angles rounded. Forceps in males (f. microlabia) almost straight, tips gently hooked and in (f. macrolabia) strongly curved, at base externally with a vertical triangular tooth. Male Genitalia as seen in fig. 12.

Measurements : (M), Length : body - 8.5-9.2 mm, forceps - 1.2-1.5 mm; (F), Length : body- 8.3-10.4 mm. forceps - 1.2-1.6 mm.

Distribution : India : West Bengal (Maldah, Calcutta and South 24-Parganas dists.); Tamil Nadu, Maharashtra, Orissa and Bihar.

Remarks : This species generally possesses abbreviated elytral and wings are wanting.

Srivastava (1988) has reported one macropterous male from Maharashtra (Burhanpur Range, Nemar Div.).

Genus 3. *Diplatys* Serville

1831. *Diplatys* (part) Serville, *Ann. Sci. Nat.*, 22 : 33 (monobasic - *Forficula macrocephala* Palisot de Beauvois, 1805).
 1881. *Dyscritina* Westwood, *Trans R. ent. Soc.*, 1888 : 601 (nymph; monobasic *Dyscritina longisetosa* Westwood, 1881).

1910. *Verhoeffiella* Zacher, *Ent. Rdsch.*, 27 : 105 (subgenus) (monobasic - *Diplatys aethiops* Burr, 1904).
 1986. *Diplatys* (*Hypodiplatys*) Steinmann, *Acta. zool. hung.*, 32 (1-2): 15 (Type-*Diplatys bormansi* Burr, 1904).
 1986. *Diplatys* (*Neodiplatys*) Steinmann, *Acta. zool. hung.*, 32 (1-2): 14 (Type-*Diplatys aethiops* Burr, 1904-New name proposed for *Verhoeffiella* Zacher, 1910, a junior primary homonym of *Verhoeffiella* Absolon, 1900 (Collembola).
 1986. *Diplatys* (*Syndiplatys*) Steinmann, *Acta zool. hung.*, 32 (1-2): 15 (Type - *Diplatys ernesti* Burr, 1910).
 1992. *Diplatys* : Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 47.

Key to species (based on males only)

- 1(2) Virga at base with a rounded vesicle or protuberance, parameres internally at middle with a sharp tooth, apical half of paramere narrow and turned externally.....*D. brindlei* Steinmann
 2(1) Virga at base without any rounded vesicle; parameres internally armed with three teeth situated in apical half, the middle one situated in a concavity separating anterior and posterior tooth, apical portion beyond teeth narrow and straight.....*D. sinuatus* Hincks

4. *Diplatys brindlei* Steinmann (Figs. 13-14)

1974. *Diplatys brindlei* Steinmann, *Act. zool. hung.*, 20(1-2) : 19 (M, F; India, W.B., Darjeeling, below north point).
 1986. *Diplatys* (*Neodiplatys*) *brindlei*; Steinmann, *Acta. zool. hung.*, 32(1-2) : 174.
 1992. *Diplatys brindlei*; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 47.

Diagnostic characters : General colour yellowish brown; mouth parts, antennae with basal segment, pronotum laterally and posteriorly and elytra yellow. Eyes slightly longer than post-ocular length. Elytra and wings well developed. Ultimate fergita and forceps and genitalia, in males, as seen in figs. 13 and 14.

Measurements : (M), Length : body - 9.9 mm, forceps - 1.1 mm; (F), Length : body-11.2 mm., forceps - 1.0 mm.

Distribution : India : W.B. (Darjeeling dist.).

Remarks : This species is so far known by its 'Types' and is unique , in males, by the presence of a large rounded vesicle at the base of virga.

5. *Diplatys sinuatus* Hincks (Figs. 15-17)

1955. *Diplatys sinuatus* Hincks, *Syst. mono Dermatera*, 1 : 120 (M; India, Bihar, Ranchi dist., Nambhum).
 1986. *Diplatys* (*Syndiplatys*) *sinuatus*; Steinmann, *Acta. zool. hung.*, 32(1-2) : 176.
 1992. *Diplatys sinuatus*; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 48.

Material examined : India : W.B. : Malda dist., Alal, 1M (genitalia mounted between two

coverslips and pinned with the specimen), 19.6.1987 (K.P. Mukherjee).

Diagnostic characters : General colour dark blackish brown to yellowish brown. Antennae, pronotum laterally and posteriorly and legs yellow. Pronotum often uniform yellowish brown and legs with femora banded with brownish black in middle and tibiae in basal half only.

Pronotum longer than broad. Elytra and wings normal . Penultimate sternite, in males, in posterior half with a rounded depression, hind margin undulate, convex in middle and postero-lateral angles a little projecting. Male genitalia with parameres strongly acuminate apically, internally with a narrow, oblique emargination near pex, armed above and below with tooth, lower one strongly hooked and a minute denticle present in the middle of emargination.

Measurements : (M), Length : body - 9.4-9.5 mm., forceps - 0.9-1.0 mm; (F), Length : body-11.7 mm., forceps - 1.0 mm

Distribution : India : W.B. (Malda dist. - first record); Elsewhere : Orissa and Himachal Pradesh.

Remarks : This species resembles strikingly with *D. adjacens* Hincks, but differs, in males, by the shape of posterior margin of penultimate sternite and the internal incision of parameres.

Genus 4 *Haplodiplatys* Hincks

- 1955. *Haplodiplatys* Hincks, *Syst.. mono. Dermaptera*, 1 : 17 (Type - *Haplodiplatys niger* Hincks, 1955).
- 1986. *Haplodiplatys* (*Eudiplatys*) Steinmann, *Acta. Zool. hung.*, 32(1-2) : 171 (Type-*Diplatys milloti* Chopard, 1940).
- 1986. *Haplodiplatys* (*Mesodiplatys*) Steinmann, *Acta. zool. hung.*, 32(1-2) : 171 (Type -*Diplatys nanus* Burr, 1911).
- 1992. *Halpodiplatys* ; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 50.

**Key to the species (based on males only)
(partly based after Srivastava, 1988)**

- 1(10) Penultimate sternite trisinuate posteriorly
- 2(5) Virga at base for some distance unpaired, afterwards branches long, one of them characteristically bent
- 3(4) Parameres almost straight, gradually narrowing from base to apex with tip pointed, inner margin with a feeble convexity, a little before apex; virga narrowed apically, without chitinous flange *H. siva* (Burr)
- 4(3) Parameres bent in middle, basal portion drawn internally as a narrow lobe extending well between median fissure of proparameres, inner margin distinctly concavae; virga almost of uniform width, provided with membranous flange near apex, resembling human foot..... *H. kurseongensis* Srivastava

- 5(2) Virga paired, often at base with a thick protuberance or thickened
- 6(9) Virga about one third as long as the distal lobes and shaped as inverted-U
- 7(8) Penultimate sternite posteriorly with lateral lobes of median situation obtusely projecting; arms of virga with a short diverticula externally, a little before apex.....
..... *H. bhowmiki* (Srivastava and Saha)
- 8(7) Penultimate sternite posteriorly with lateral lobes of median situation strongly projecting and finger shaped; arms of virga without diverticula externally.....*H. bidentatus* (Hincks)
- 9(6) Virga slightly projecting beyond the distal lobes with branches wavy, not like inverted-U.....
..... *H. chinensis* (Hincks)
- 10(1) Penultimate sternite not trisinuate posteriorly
- 11(16) Virga short, slightly shorter than the distal lobes
- 12(13) Penultimate sternite with postero-lateral angles obtuse, in middle with a small triangular emargination; parameres simple, external margin entire, feebly convex, inner margin distinctly concave in middle, apex obtuse, virga without basal thickened lobe, branches laterally with chitinous flange..... *H. stemmleri* (Brindle)
- 13(12) Penultimate sternite with postero-lateral angles rounded, in middle with a deep, broad emargination; parameres with tip pointed, external margin undulate and internal margin shallowly emarginate; virga at base thickened into a rounded lobe, arms thin, tapering apically
- 14(15) Base of posterior emargination of penultimate sternite convex.....*H. rileyi* (Hincks)
- 15(14) Base of posterior emargination of penultimate sternite truncate.....*H. urbanii* (Brindle)
- 16(11) Virga long, about as long as the distal lobes
- 17(18) Penultimate sternite deeply or feebly emarginate posteriorly..... *H. rufescens* (Kirby)
- 18(17) Penultimate sternite bisinuate posteriorly.....*H. lobatus* Srivastava

6. *Haplodiplatys siva* (Burr)
(Figs. 18-20)

1904. *Diplatys siva* Burr, *Trans. R.ent. Soc. Lond.*, 1904 : 278, 283 (M,F; India, Darjeeling).
1904. *Diplatys gerstaeckeri* var. *calidasa*, Burr, *Trans. R. ent. Soc. Lond.*, 1904 : 279, 283 (F; India, Darjeeling).
1974. *Haplodiplatys siva*; Steinmann, *Acta. zool. hung.*, 20(1-2) : 203.
1986. *Haplodiplatys (Haplodiplatys) siva*; Steinmann, *Acta. zool. hung.*, 32(1-2) : 170.
1992. *Haplodiplatys siva*; Srivastava. *Rec. zool. Surv. India*, 92 (1-4) : 51.

Diagnostic characters : General colour smoky brown; head, sides of pronotum and ultimate tergite dark blackish brown.

Pronotum about as long as broad. Elytra and wings well developed. Penultimate sternite, in males, posteriorly trisinate with deep lateral emarginations and median one comparatively shallower. Male genitalia with parameres triangular, inner margin almost straight or with slight convexity in middle, apically acuminate; virga at base unpaired for a short distance, afterwards bifurcated with inner arm almost straight and external one characteristically bent. Ultimate tergite and forceps and genitalia in males as seen in figs. 18-20.

Measurements : (M), Length : body - 10.3-15.3 mm, forceps - 1.3-2.0mm; (F), Length : body - 10.0 - 12.1 mm, forceps - 1.0 -1.2 mm.

Distribution : India : W.B. (Darjeeling dist.). Also known from China, Burma and Laos.

Remarks : This species can be differentiated from related species by the shape of posterior margin of penultimate sternite and genitalia, especially parameres and virga of male.

7. *Haplodiplatys kurseongensis* Srivastava (Figs. 21-23)

1988. *Haplodiplatys kurseongensis* Srivastava, *Fauna of India, Dermoptera* : 178, figs. 239 - 242 (M; India, W.B. Darjeeling dist.).

Material examined : India : W.B., Darjeeling dist., Kurseong, Holotype (M) (genitalia mounted between two coverslips and pinned with the specimen), 7-20.6.1922 (*T.B. Fletcher*).

Diagnostic characters : General colour dark brownish black. Head with frons and sides of occiput black; legs with knee joints darker; abdominal tergites sometimes blackish; pronotum, elytra and wings lighter.

Penultimate sternite, in males, trisinate posteriorly, lateral sinuations deep, median one somewhat triangularly incised with lateral lobes obtuse. Male genitalia (fig. 23) with parameres sigmoid, inner basal angle prominent and extending inside median fisure of proparamere; virga at base with a short median portion, arms of bifurcated portion projecting well beyond distal lobes and frilled with membranous flange and apically resembling human foot.

Penultimate sternite, ultimate tergite and forceps and genitalia, in males, as seen in figs. 21-23. Female unknown.

Measurements : (M), Length : body - 14.4 mm, forceps - 2.2mm.

Distribution : India ; W.B. (Darjeeling dist.).

Remarks : This species is so far known from type locality only.

8. *Haplodiplatys bhowmiki* (Srivastava and Saha)
(Figs. 24-27)

1975. *Diplatys bhowmiki* Srivastava and Saha, *Ceylon J.Sci. (Bio.Sci.)*, 11 (2) : 61 (M, F; India, W.B., Darjeeling dist.).
1975. *Diplatys bhutanensis* Brindle, *Ent. Basiliensia*, 1 : 12 (M, F and nymphs; Bhutan : Chimakothi).
1982. *Haplodiplatys bhowmiki*; Steinmann, *Ent. Abh. St. Mus. Tierk. Dresden*, 45 : 207.
1988. *Haplodiplatys bhowmiki*; Srivastava, *Fauna of India, Dermaptera* : 182, figs. 247-250.

Material examined ; India : W.B., Darjeeling dist., Jorporki, 2200 m, Holotype (M), Paratypes, 1 (F), 3 nymphs, 24.4.1971 (A.R. Bhowmik).

Diagnostic characters : General colour dark brown, head and pronotum shaded with black and elytra and wings pale yellow.

Elytra and wings normal. Male penultimate sternite with posterior margin trisinate, lateral lobes of median sinuation and postero-lateral angles obtusely projecting. Genitalia, in males, with parameres broad, narrowed apically; virga short, U-shaped, a small diverticula present on the external margin near apex of both the arms. Penultimate sternite, ultimate tergite and forceps and genitalia of males as seen in figs. 24-27.

Measurements : (M), Length : body - 10.0-18.6 mm, forceps - 08-2.0 mm; (F), Length : body - 14.0-26.6 mm, forceps - 1.0-2.5 mm.

Distribution : India : W.B. (Darjeeling dist.). Also recorded from Bhutan.

Remarks : This species comes close to *H. bidentatus* (Hincks) from India (North Bengal) but differs, in males, in having obtuse lateral lobes of median sinuation on the posterior margin of penultimate sternite and virga provided with a short diverticula externally near apex on both of its arms.

9. *Haplodiplatys bidentatus* (Hincks)
(Figs. 28-29)

1955. *Diplatys bidentatus* Hincks, *Syst. mono. Dermaptera*, 1 : 75, figs. 79-80 (F; India, Darjeeling dist., Kurseong).
1974. *Haplodiplatys bidentatus*; Steinmann, *Acta. zool. hung.*, 20(1-2) : 204.

Diagnostic characters : General colour uniform blackish brown. Penultimate sternite, in males, trisinate posteriorly, lateral sinuations broad and deep, median emargination narrow and shallow and its lateral lobes dentiform and projecting distinctly. Male genitalia with parameres resembling a scalene triangle, inner margin oblique, shallowly concave with a feeble convexity in middle; virga short, branches thin and tubular, accessory rod thin and long. Penultimate sternite and genitalia of male as seen in figs. 28-29. Female Unknown.

Measurements : (M), Length (including forceps) - 12.0 mm.

Distribution : India : *W.B.* (Darjeeling dist.).

Remarks : This species is known by its 'Type' specimen.

It differs from all other Indian species in having hind margin of penultimate sternite trisinate with finger like lateral lobes of median situation.

The above description and figures are after Hincks (1955)

10. *Haplodilatys chinensis* (Hincks)
(Figs. 30-32)

1955. *Diplatys chinensis* Hincks, *Sys. mono. Dermaptera*, 1 : 69, figs. 68-69 (M; China)

1974. *Haplodiplatys chinensis*, Steinmann, *Acta. zool. Hung.*, 20(1-2) : 204.

1988. *Haplodiplatys chinensis*; Srivastava, *Fauna of India, Dermaptera* : 190, Figs. 263-265.

Material examined : India : *W.B.* Darjeeling dist., Ghum Bhanjang, 7000 ft., 1(M) (genitalia mounted between two coverslips and pinned with the specimen), at light, 28.5.1975 (*J.K. Jonathan*).

Diagnostic characters : General colour dull brownish to brownish black; mouth parts and antennae somewhat lighter. Body moderateluy pubescent.

Elytra and wings well developed. Penultimate sternite, in males, with hind margin trisinate, median emargination shallow and postero-lateral angles obtusely projecting. Male genitalia with parameres triangular, basal margin hardly oblique and shorter in length than external margin, apically narrow; virga at base with a protuberance, arms of bifurcated portion stout, undulated and projecting slightly beyond the distal lobes. Penultimate sternite, ultimate tergite and forceps and genitalia, of male, as seen in figs. 30-32. Females unknown.

Measurements : (M), Length : body 13.1-15.2 mm., forceps - 1.9-2.1 mm.

Distribution : India : *W.B.* (Darjeeling dist.); *Elsewhere* : U.P. and Himachal Pradesh. Also recorded from China (Szechwan).

Remarks : It is extremely close to *H. malaisei* (Hincks), known from N.E. Burma and India (Sikkim, Gangtok) but differs in having the arms of virga bare (vs arms of virga laterally with chitinous flange and apical opening with its rim projecting in *H. malaisei*).

11. *Haplodiplatys stemmleri* (Brindle)
(Figs. 33-35)

1975. *Diplatys stemmleri* Brindle, *Ent. Basiliensia*, 1 : (M ; Bhutan).

1982. *Haplodiplatys stemmleri*; Steinmann, *Ent. Abh. St. Mus. Tierk., Dresden*, 45 (8) : 211.

1988. *Haplodiplatys stemmleri*; Srivastava, *Fauna of India, Dermeptera* : 196, figs. 276-278.

Material examined : India : W.B., Darjeeling dist., Ghoom Bhanjang, ca 2110 m, 1(M) (genitalia mounted between two coverslips and pinned with the specimen, 1(F), 16.4.1974 (R. K. Ghosh).

Diagnostic characters : General colour yellowish brown, head partially shaded with black, pronotum laterally and legs yellow.

Head transverse. Pronotum about as long as broad. Male penultimate sternite posteriorly in middle with a feeble triangular incision. Genitalia, in male, with parameres externally straight, tip pointed and turned externally; branches of virga stout and shorter than distal lobe, U-shaped and supported by distinct chitinous flange on all sides. Penultimate sternite, ultimate tergite and forceps and genitalia of males as seen in figs. 33-35.

Measurements : (M), Length : body - 10.0 - 11.0 mm, forceps - 0.9 - 1.2 mm; (F), Length : body 11.2 mm, forceps - 1.0 mm.

Distribution : India : W.B. (Darjeeling dist.). Also recorded from Bhutan.

12. *Haplodiplatys rileyi* (Hincks)
(Figs. 36 - 38)

1955. *Diplatys rileyi* Hincks, *Syst. mono. Dermaptera*, 1 : 74 (M, F; Sikkim).

1974. *Haplodiplatys rileyi*; Steinmann, *Acta. zool. hung.*, 20 (1-2) : 203.

1988. *Haplodiplatys rileyi*; Srivastava, *Fauna of India, Dermaptera* : 198, figs. 279-281.

Material examined : India : W.B., Kurseong, ca 5000 ft., 1(M) (genitalia mounted between two coverslips and pinned with the specimen), 18-30.4.1922 (Fletcher coll.)

Diagnostic characters : General colour blackish brown, head black with posterior half of frons and middle of occiput dark reddish brown, abdomen and ultimate tergite darker. Head transverse. Male penultimate sternite posteriorly with a deep emargination, base of which feebly convex, postero-lateral angles represented by broad lobe with its tip turned inwards. Genitalia (fig. 38) in males, with parameres narrow and unduated apically, virga at base with a rounded lobe, arms thin, tubular, an accessory chitinous rod present.

Measurements (M) Length : body - 9.6 - 11.5 mm, forceps - 1.2-1.5 mm; (F), Length : body - 10.2-12.0 mm, forceps 1.5-1.6 mm.

Distribution : India : W.B. (Darjeeling dist.). Also known from Sikkim.

13. *Haplodiplatys urbanii* (Brindle)
(Figs. 39-41)

1975. *Diplatys urbanii* Brindle, *Ent. Basiliensia*, 1:9 (M; Bhutan).

1986. *Haplodiplatys (Haplodiplatys) urbanii*; Steinmann, *Acta. zool. hung.*, 32 (1-2) : 171.

1992. *Haplodiplatys urbanii*; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 51.

Material examined : India : W.B., Darjeeling dist., Jhepi, 1300-1400 m, 1 (M), 17.5.1975, Rimbik-Raman, 1950-2450m, 1 (F) 19.5.1975 (W. Wittmer).

Diagnostic characters : General colour yellowish brown; head black; antennae, legs and pronotum laterally and posteriorly yellow; clytra and wings yellowish black, former with an elongated yellow spot in apical half close to sutural margin, abdominal tergites in basal half and whole of ultimate tergite black.

Pronotum more or less rounded. Male penultimate sternite posteriorly in middle with a broad emargination with its base almost truncate. Genitalia, in males, (fig. 41) with external margin of parameres almost straight, narrowed apically with tip pointed and directed inwards; virga short tubular, at base with a rounded protuberance, accessory chitinous rod straight or slightly bent in middle.

Measurements : (M), Length : body 9.1-10.8 mm, forceps - 0.3-1-2 mm; (F), Length : body 12.1-13.1 mm, forceps - 1.2-2.3 mm.

Distribution : India : W.B. (Darjeeling dist.). Also reported from Bhutan.

14. *Haplodiplatys rufescens* (Kirby) (Figs. 42-46)

1986. *Cylindrogaster rufescens* Kirby, *J. L. inn. Soc. (Zoo.)*, 25 : 524, pl. 20, fig. 2 (M) not (F; North India).
 1904. *Diplatys rufescens*; Kirby, *Syn. Cat. Orth.*, 1 : 2.
 1900. *Diplatys longisetosa* (Part) Westwood, 1881); Bormans and Krauss, *Das Tierreich*, 11: 10.
 1910. *Diplatys falcatus* (part) Burr, *Fauna British India, Dermaptera* : 40, 42, figs. 3A, pl.1, fig. 4 (excl. M; ex Burma).
 1986. *Haplodiplatys (Haplodiplatys) rufescens*; Steinmann, *Acta. zool. hung.*, 32 (1-2) : 171.
 1992. *Haplodiplatys rufescens*; Srivastava, *Rec. zool. Surv. India*, 92 (1-4) : 51.

Diagnostic characters : General colour ranges between dark brownish black and yellowish brown.

Elytra and wings normal. Male penultimate sternite concave posteriorly in f. macrolabia and less so in f. microlabia; ultimate tergite in f. macrolabia wider than the abdomen with postero-lateral angles prominent, in f. microlabia comparatively less widened; forceps in f. macrolabia deplanate in basal one fourth, afterwards strongly bowed, in f. microlabia simple and straight. Genitalia (fig. 46) in males, with parameres three times longer than the greatest width, undulate with tip pointed; virga with branches long and slender, an accessory chitinous rod present.

Measurements : (M), Length : body - 10.0-13.0 mm, forceps - 1.4-1.6 mm; (F), Length : body 11.3, forceps - 1.7 mm.

Distribution : India : W.B. (Darjeeling dist.); U.P. and Himachal Pradesh.

Remarks : Record of this species from W.B. (Darjeeling dist.) rests on a single female by Hincks

(1955) deposited in the British Museum (Natural History), London.

15. *Haplodiplatys lobatus* Srivastava
(Figs. 47-49)

1988. *Haplodiplatys lobatus* Srivastava, *Fauna of India, Dermaptera* : 209, figs. 301-304 (M; India, W.B. Darjeeling dist., Rangbong).

Material examined : India ; W.B., Darjeeling dist., Rangbong, Holotype (M) genitalia mounted between two coverslips and pinned with the specimen), 13.4.1978, ex Soil (A.R. Bhowmik).

Diagnostic characters : General colour brownish yellow; antennae and legs yellow, latter with femora and tibiae shaded with black; elytra and wings blackish brown, former with a transverse yellow stripe at base and latter with tip yellow. Eyes distinctly longer than the post-ocular area.

Elytra and wings normal. Male penultimate sternite with hind margin bisinuate, postero-lateral angles obtuse and the median lobe with its posterior margin truncate; genitalia with parameres long and narrow, undulate, tip pointed inwards, virga with a rounded median area at base, arms undulated, tubular, tapering apically, an accessory chitinous rod present. Female unknown.

Measurements : (M), Length : body - 9.7 mm., forceps - 1.0 mm.

Distribution : India : W.B. (Darjeeling dist.).

Remarks : This species is, at present, known by its Holotype (Male) and is closely related to *H. simalensis* (Kapoor).

ECHINOSOMATINAE

Genus 5 *Echinosoma* Serville

1839. *Echinosoma* Serville, *Hist. nat. Orth.* : 34 (Type - *Forficula afra* Palisot de Beauvois, 1805).
 1959. *Echinosoma*; Hincks, *Syst. mono. Dermaptera*, 2 : 118 (revision).
 1986. *Echinosoma*; Steinmann, *Das Tierreich*, 102 : 304 (World species, keys).
 1988. *Echinosoma*; Srivastava, *Fauna of India, Dermaptra* : 216 (Indian species).

Key to species

- 1(2) Male genitalia with virga S-shaped; female pygidium truncate apically
*E. convolutum* Hincks
- 2(1) Male genitalia with virga apically almost straight or gently curved; female pygidium obtuse or convex posteriorly..... *E. dentiferum* Borelli

16. *Echinosoma convolutum* Hincks
(Figs. 50-53)

1888. *Echinosoma sumatranum* (part); Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) 6 : 433 (Burma).
 1900. *Echinosoma sumatranum* (part); Bormans and Krauss, *Das Tierreich*, 11 : 26,28 (Burma).
 1910. *Echinosoma sumatranum* (part); Burr, *Fauna British India, Dermoptera* : 70 (Burma).
 1959. *Echinosoma convolutum* Hincks, *Syst. mono. Dermoptera*, 2 : 152 (M, F), Burma and Tonkin (Vietnam).
 1983. *Echinosoma convolutum*; Srivastava, *Proc. Wkshp. High Alt. Ent. & Wildl. Ecol.* : 108.
 1988. *Echinooma convolutum*; Srivastava, *Fauna of India, Dermoptera* : 226.

Material examined : India : W.B., Darjeeling dist., Rangpo, 1 (M) (genitalia mounted between two coverslips and pinned with the specimen), 1 (F) 26.12.1975 (G.K. Srivastava).

Diagnostic characters : General colour smoky brown, often abdominal tergites reddish black or blackish brown; legs yellow with femora and tibiae blackish brown in basal half only. Wings yellow with a blackish brown spot apically, intensity of spot variable. Body covered with thick setae and fine pubescence.

Male penultimate sternite emarginate posteriorly; pygidium vertical, transverse, hind margin concave; genitalia (at rest) with parameres not meeting apically, distal lobes shorter than pro-parameres, virga convoluted, loop at base short and apical one sigmoid.

Female pygidium about as long as broad or longer, hind margin truncate with a faint emargination in middle.

Measurements : (M), Length : body - 9.5-12.6 mm., forceps- 1.5-2.2 mm., (F); Length : body - 8.4-14.5 mm, forceps - 1.6-2.8 mm.

Distribution : India : W.B. (Darjeeling dist.); *Elsewhere* : Arunachal Pradesh and Assam. Also known from Burma and Vietnam.

17. *Echinosoma dentiferum* Borelli
(Figs. 54-57)

1912. *Echinosoma dentiferum* Borelli, *Bull. Mus. Hist. nat. Paris*, 18(4) : 223 (M, F; Bhutan).
 1974. *Echinosoma garoensis* Lahiri and Ghosh (part) in Biswas, Lahiri and Ghosh, *Orient. Insects.*, 8(4) : 421 (M, F, Meghalaya).
 1988. *Echinosoma dentiferum*; Srivastava, *Fauna of India, Dermoptera* : 229, figs. 332-338.

Material examined : India, W.B., Darjeeling dist., Bamanpokri, 1 (M), (genitalia mounted between two coverslips and pinned with the specimen), 1 (F), 24.8.1975 (H.K. Bhowmik); Kalijhora 1 (F), 12.4.1978 (A.R. Bhowmik), Reang, 1 (F), 8.1.1975, Nazeok 1 (F), 2 nymphs, 7.1.1974, Bhuttabari village, 3 km South of Gourubathan, 1 (F), 19.12.1973, Khumani Forest, 900 m, 1 nymph, 22.12.1973, Rambi, 1200 ft., 1 (F), (forceps missing), 6.9.1974, ex. under bark; Jalpaiguri dist., Chapramari Sanctuary, 1 (M), 1 (F), and 1 nymphs, 24.12.1973 (G.K. Srivastava), Khairbari, Madarihat, 1 (M), 2 nymphs; 9.11.1974, Hasimara, 1 (F), 3.12.74 (T. Sengupta).

Diagnostic characters : General colour blackish brown; mouth parts, two basal segments of antennae yellow; pronotum with a yellow triangular spot laterally; legs yellow with femora and tibiae shaded with blackish brown in a little beyond basal half and wings yellow with a smoky rounded spot close to internal margin. Thick setae and long and short pubescence all over the body present.

Male penultimate sternite with hind margin emarginate in middle; pygidium finely pubescent, weakly transverse, hind margin concave, postero-laterally with a fine tubercle; genitalia (at rest) with parameres meeting apically, virga in basal half with one or two convolutions, apically almost straight.

Female pygidium triangular, narrowed posteriorly or comparatively broader with hind margin obtuse or convex.

Measurements : (M), Length : body - 11.5-13.0 mm., forceps - 1.7-1.8 mm; (F), Length : body - 10.0-10.5 mm., forceps - 1.4-1.5 mm.

Distribution : India : W.B. (Darjeeling and Jalpaiguri dists.); Elsewhere : U.P. Also reported from Bhutan.

PROLABISCINAE

Genus 6 *Parapsalis* Borelli

1921. *Parapsalis* Borelli, *Bull. Musei. Zool. Anat. comp. R. Univ. Torino*, **35** (736) : 3 (Type - *P. laevis* sp.n.).
 1959. *Protolabis* Bey-Bienko (nec Cope, 1876 and Wortman, 1898), *Ent. Obozr.*, **38** : 597 (Type - *Protolabis aroliata* sp. n.).
 1959. *Prolabsica* Bey-Bienko, *Ent. Obozr.*, **38** : 493 (Type-*Prolabsica aroliata* (Bey-Bienko)).
 1988. *Parapsalis* : Srivastava, *Fauna of India, Dermptera* : 238 (Type-*Chaetospaina infernalis* Burr, 1913 (= *Parapsalis laevis* Borelli, 1921 and *Prolabsica aroliata* (Bey-Bienko, 1959)).

18. *Parapsalis infernalis* (Burr) (Figs. 58-59)

1913. *Chaetospaina* Burr.; *Rec. India Mus.*, **8**(2) : 142 (M India, Arunachal Pradesh).
 1913. *Chaetospaina infernalis* Burr, *Ent. Mitt. Berlin*, **2** : 67, figs 3 (M Dorsal view).
 1921. *Parapsalis laevis* Borelli, *Bull. Musei Zool. Anat. comp R. Univ.Torino*, **35** (736) : 3, fig. (M) genitalia (M, F, Sandakan, Borneo).
 1976. *Prolabsica infernalis*; Nishikawa, *Trans. Shikoku ent. Soc.*, **13** (1-2) : 44, figs. 1-9.
 1959. *Protolabis aroliata* Bey-Bienko, *Ent. Obozr.*, **38** : 590, figs. 10, 14(M), (F; China : Yunnan).
 1959. *Prolabsica aroliata*; Bey-Bienko, *Ent. Obozr.*, **38** : 943.
 1988. *Parapsalis infernalis*; Srivastava, *Fauna of India, Dermptera* : 238, figs. 345-351.

Material examined : India : W.B., Darjeeling dist., Bhuttabari village, 3 km S of Gorubathan, 2 (F), 2 nymphs, 19.12.1973, Samsing, 1 nymph, 24.12.1973, Jhalung, 2 (M), 6 (F), 7 nymphs, 23.12.1973, Khumani Forest, 3 (F), 4 nymphs 22.12.1973, ex all under bark of logs (G.K. Srivastava), Dangi, 2 (F), 7 nymphs, 1.11.1978, collected during sweeping (A.R. Bhowmik).

Diagnostic characters : General colour shining dark brown or black; mouth parts reddish; legs yellow. Forceps of nymphs orange red apically. Body smooth.

Elytra coriaceous, abbreviated; wings generally wanting, rarely well developed. Male penultimate sternite broadly rounded posteriorly with a faint emargination in middle; genitalia with parameres about four times longer than wide, narrowed apically with tip convex, virga longer than the distal lobes, thin, tubular, in basal 2/3 almost stright, afterwards spirally coiled.

Measurements : (M), Length : body - 6.5-8.5 mm, forceps - 1.2-1.5mm; (F), Length : body 6.1-7.1 mm, forceps - 1.3-2.0 mm.

Distribution : India : *W.B.* (Darjeeling and Jalpaiguri dists.); Arunachal Pradesh and Meghalaya. Also recorded from Bhutan, China (Yunnan, Taiwan) and Borneo.

Remarks : This species is quique since it shares the characters of Pygidicranidae and Carcinophoridae. Perhaps, it represent a transtional stag between the two.

ANISOLABOIDEA

ANISOLABIDIDAE

CARCINOPHORINAE

In the present work the arrangement of various genera is basically after Burr (1915) with certain modifications and additions.

Genus 7 *Aborolabis* Srivastava

1969. *Aborolabis* Srivastava, *Entomologists Rec. J. Var.*, 18 : 246, (fig.1 (Type - *Anisolabis pervicina* Burr, 1913).
 1978. *Aborolabis*; Steinmann, *Fol. Ent. hung.*, 31 (1) : 181.
 1979. *Aborolabis* : Srivastava, *EOS, Madr.*, 53 : 223.

Key to genera (based on males only)

- 1(2) Parameres at base armed with a large or small tooth.....*Aborolabis* Srivastava
 2(1) Parameres unarmed
 3(4) Parameres about as long as broad, square and flat, external margin convex.....*Euborellia* Burr
 4(3) Parameres three to four times longer than broad, dilated at about middle, apically narrowed with tip obtuse or convex..... *Anisolabis* Fieber

19. *Aborolabis pervicina* (Burr)
(Figs. 60-62)

1913. *Anisolabis pervicina* Burr, *Rec. Indian Mus.*, 8(2) : 137 (M, F; India, Asam and Arunachal Pradesh).
 1915. *Paralabis pervicina*; Burr, *J.R. micr. Soc.*, 1915 : 540, pl.12, fig.3.
 1969. *Aborolabis pervicina*; Srivastava, *Entomologists Rec. J.Var.*, 81 : 246, fig. 1.
 1987. *Aborolabis nigriceps* Brindle, *Courier foresch.-Inst. Senckenberg*, 93:337 (M, F; Nepal).

Material examined : India, *W.B.* Darjeeling dist., Singla Bazar, 400m, 2 (M), 1 (F), 5.1.1979, Karmaktar, Singla, 450 m, 3 (F), 1 nymph, 3.1.1976 (*G.K. Srivastava*), Jalpaiguri dist., Jainti, 1 (M), (genitalia mounted between two cloverslips and pinned with the specimen), 28.8.1986 (*T.K. Pal*).

Diagnostic characters : General colour shining reddish to black; legs yellow, femora and tibiae banded with black.

Male penultimate sternite broadly rounded, punctulate, posterior margin tructate; genitalia with parameres three times longer than broad, gently dilated at about middle and narrowed towards apex, tip rounded, external margin convex, internally at base armed with a triangular tooth, almost equal to the length of parameres with tip pointed and hooked, distal lobes with rows of minute teeth.

Measurements : (M), Length : body - 8.0-16.0 mm, forceps - 2.0-3.0 mm; (F), Length - 7.0-18.0 mm, forceps - 2.0-3.5 mm.

Distribution : India : *W.B.* (Darjeeling dist.) ; *Elsewhere* : Arunachal Pradesh, Sikkim and Himachal Pradesh.

Remarks : It has been reported occuring all along the Himachals between 100 m and a little over 3500 m.

Genus 8 *Anisolabis* Fieber

1853. *Anisolabis fieber*, *Lotos*, 3 : 257 (Type *Forficula maritima* Bonelli in Gene, 1832, by subsequent designation of Scudder, 1876).

Key to the species (based on males only)

- 1(2) Sides of abdominal segments 5th to 9th acute angled posteriorly with an oblique carina on 6th to 8th or 9th; penultimate sternite with hind margin obtusely rounded posteriorly.....
 *A. deplanata* Srivastava
- 2(1) Sides of abdominal segments 5th to 9th obtuse angled posteriorly and ecarinate; penultimate sternite with hind margin broad and scracely emarginate in middle.... *A. bhowmiki* Srivastava

20. *Anisolabis deplanata* Srivastava
(Figs. 63-65)

1985. *Anisolabis deplanata* Srivastava, *Rec zool. Surv. India*, 82 (1-4) : 42; figs. 1-6 (M; India, Arunachal Pradesh and W.B., Darjeeling dist.).
 1987. *Anisolabis martensi* Brindle, *Courier Forsch.-Inst. Senckenberg*, 93 : 336, figs. 12, 17 (M, F ; Nepal : Gorkha dist.).
 1991. *Anisolabis deplanata*; Srivastava, *Rec. zool. Surv. India*, 89 (1-4) : 248.

Material examined : India : W.B., Darjeeling dist., Sivok, Paratype 1(M), 10.5.1978 (A.R. Bhowmik).

Diagnostic characters : General colour dark brownish black; antennae with 2nd and 12th segments onwards dirty white; pronotum on sides and legs yellow but latter with femora in basal half banded with black.

Males with sides of abdominal segments 5th to 9th acute angled posteriorly, carina present on 6th to 8th or 9th; penultimate sternite narrowed posteriorly with hind margin rounded; genitalia with parameres three times longer than board, narrowed apically with tip obtuse.

Measurements : (M), Length : body - 6.9 - 7.5 mm, forceps - 0.7 - 1.0 mm; (F) Length : body - 7.5 mm, forceps - 1.5 mm.

Distribution : India : W.B. (Darjeeling dist.); Arunachal Pradesh. Also recorded from Nepal.

21. *Anisolabis bhowmiki* Srivstava
(Figs. 66-68)

1991. *Anisolabis bhowmiki* Srivastava, *Rec. zool. Surv. India*, 89 (1-4) : 246.

Material examined : India : W.B., Darjeeling dist., Sonada, 11971 m, Holotype (M), genitalia mounted between two coverslips and pinned with the specimen), 24.3.1978 (A.R. Bhowmik).

Diagnostic characters : General colour blackish brown; mouth parts, one or two ante-apical antennal segments yellow; legs yellow, basal half of femora banded with blackish brown; penultimate sternite transverse with posterior margin scarcely emarginate in middle.

Male genitalia (fig. 68) with parameres a little over one and half times longer than broad, narrowed apically with tip rounded. Female unknown.

Measurements : (M) Length : body - 9.0 mm, forceps - 1.3 mm.

Distribution : India : W.B. (Darjeeling dist.).

Remarks : This species comes close to *A. deplanata* Srivastava, but differs, in males, by the shape of penultimate sternite and genitalia.

Besides above two, only one more species, *A. gaudens* Burr, is known from India but its status is doubtful since it is known by females only.

Genus 9. *Euborellia* Burr

1909. *Borellia* Burr, *D. ent. Z.*, 1909 : 325 (Type - *Anisolabis moesta* (Gene) in Serville, 1839 - name preoccupied by *Borellia* Rehn, 1906, Orthoptera).
 1910. *Euborellia* Burr, *Proc. U.S. natn. Mus.*, 38 : 448 (Footnote - new name for *Borellia* Burr, 1909).

Key to the species (based on males only)

- 1(4) Usually apterous
 2(3) Legs yellow, often femora with a broad brownish or blackish ring; parameres with external apical angles rounded..... *E. annulipes* (Lucas)
 3(2) Legs uniform yellow; parameres with external apical angle obtuse, a little projecting.....
 *E. compressa* (Borelli)
 4(1) Elytra present as narrow ovate flaps on sides of mesonotum; wings absent
 5(6) Size larger (10-13 mm); head yellowish brown; sides of abdominal segments recurved; parameres with external apical angle a little projecting.....*E. annandalei* (Burr)
 6(5) Size smaller (8-11 mm); head black; sides of abdominal segments not recurved, external apical angle of paramere not projecting and with a distinct inner apical concavity.....*E. stali* (Dohrn)

22. *Euborellia annulipes* (Lucas)

(Fig. 69)

1847. *Forficesila annulipes*, *Annl. Soc. ent. Fr.*, (2) 5 : 84 (Sex?; Jardine des Plantes, Paris (Introduced).
 1853. *Forficula (Labidura) annulipes*; Fischer, *Orthoptera Europ*, Leipzig, 69, pl. 6, figs. 6a-c.
 1864. *Forficelisa annulipes*; Dohra, *Stettine, ent. Ztg.*, 25 : 290.
 1910. *Anisolabis annulipes*; Burr, *Fauna British India, Dermaptera* : 84, pl. 3, fig. 24.
 1915. *Euborellia annulipes*; Burr, *J.R. micr. Soc.*, 1915 : 527, 528 and 545.
 1959. *Anisolabia (Euborellia) annulipes*; Bey-Bienko, *Ent. Obozr.*, 38(3) : 607.
 1989. *Euborellia annulipes*; Srivastava, *Fauna of Orissa State*, State Fauna Series, 1 (2) : 157, figs. 19-21.

Material examined : India : W.B., Purulia Dist., Jhalda, 3 (F), 2 nymphs; 20.9.1987, Veladih vill., 1 (M), 18.9.1987; Pedda, Manbazar, 1 nymph, 13.9.1987, Puruliya, 1 (M), 1 (F), 1 nymph, 14.9.87 (*M. Prasad*), Biramdih, 1 (Male), 1 (Female) 1 nymphs, 28.2.86 (*P.K. Mukhopadhyay*); Midnapore dist., Mahishadal, 2 (M), 1 (F), 5.7 1984, Contai, 1 nymph, 27.5.1984, Junput, 1 nymph, 30.7.1984 (*G.K.*

Srivastava); Jalpaiguri dist., Jainti, 11 (M), fallen logs, 21.8.1986 (*T.K. Pal*); Malda dist., Alal, 2 (M), 3 (F), 19.6.1987 (*K.P. Mukherjee*); Darjeeling dist., Darjeeling, 2139 m, 1 (M) (genitalia mounted between two coverslips and pinned with the specimen), 17.5.1970 (*M.S. Shishodia*).

Diagnostic characters : General colour shining blackish brown to dark brown; antennae with basal and one or two ante-apical segments and sides of pronotum yellow and legs yellow and femora banded with black.

Male abdominal segments 6th to 9th on sides acute angled posteriorly, striae and carinate; penultimate sternite with hind margin briefly rounded; parameres about as broad as long, flat, external apical angle rounded; distal lobes with pads of chitinous teeth.

Measurements : (M), Length : body - 9.5 - 10.5 mm, forceps - 1.9 - 1.2 mm; (F), Length : body - 11.5 - 13.6 mm, forceps - 2.6 - 3.1 mm.

Distribution : India : *W.B.* (Puruliya, Bankura, Midnapore, Darjeeling, Jalpaiguri, and Maldah dists.). All over India. World wide in distribution.

23. *Euborellia compressa* (Borelli)

(Fig. 70)

1907. *Anisolabis compressa* Borelli, *Boll. Musei Zool. anat. comp. R. Univ. Torino*, 22 (558) : 3 (M, F) Uganda.
 1915. *Euborellia compressa*; Burr, *J.R. micr. Soc.*, 1915 : 545.
 1963. *Euboellia compressa*; Ramamurthi, *Ann. Mag. nat. Hist.*, (13) 6 : 671 (M; India : Coimbatore).

Material examined : India : *W.B.*, Puruliya dist., Chutakidh, 1 (M), 2 (F) and 3 nymphs, 16.9.1987 (*M. Prasad*); Medinipur dist., New Digha, 2 (M), 1 (F) 26.5.1984 (*G.K. Srivastava*); Bankura dist., Amtala More, 1 (M), 2 (F) 3 nymphs, 27.8.87, ex under rotten hay - stack; Amarkanan, 1 (M), 1 (F); under bark of Bantetul, 9.9.86 (*P. Mukhopadhyay*).

Diagnostic characters : General colour shining yellowish brown; two basal antennal segments and legs clear yellow.

Abdominal tergites, in males, obscurely punctulate, sides of segments 6th to 9th acute angled posteriorly with an oblique carina; penultimate sternite narrowed posteriorly with hind margin truncate; forceps with branches contiguous or subremote at base; genitalia with parameres almost rectangular.

Measurements : (M), Length : body 13.7 - 14.0 mm, forceps - 1.5 - 2.0 mm; (F), Length : body 12.5 - 14.8 mm, forceps - 1.9 - 2.2 mm.

Distribution : India : *W.B.* (Puruliya, Bankura and Medinipur dists.); Tamil Nadu. Also reported from Pakistan, Uganda, Zaire and Mozambique.

Remarks : This species is extremely close to *Euborellia annulipes* (Lucas) but differs in being lighter in colour, especially legs clear yellow and parameres almost rectangular in shape.

24. *Euborellia annandalei* (Burr)
(Figs. 71-73)

1906. *Anisolabis annandalei* Burr, *J. Asiat. Soc. Beng.* (N.S.), 2 : 387 (M; India : Purneah dist.).
1911. *Eurobellia annandalei*; Burr, *Genera Insect.*, 122 : 31.
1977. *Euborellia annandalei*; Bur, *Orient Insects*, 11 (2) : 182, fig. 1c (Male genitalia)

Material examined : India : W.B., Darjeling dist., Bamanpokri, 1 (M) genitalia mounted between two coverslips and pinned with the specimen), 24.8.1979 (*H.K. Bhowmik*); Chunabhati, nr. Bagrakot, 1 (F), 27.12.1973 (*G.K. Srivastava*).

Diagnostic characters : General colour yellowish brown; head testaceous; pronotum on sides and legs yellow, femora banded with black and basal three antennal segments yellow, remaining black.

Elytra abbreviated, represented by ovate lateral flaps on mesonotum . Male abdominal segments 5th to 9th on sides recurved, acute angled, rugosely punctate with a distinct carina on 6th to 9th only; parameres with external angles a little projecting. Ultimate tergite and forceps and ganitalia of males as seen in figs. 71 and 73.

Measurements : (M) Length : body - 10.1 - 13.6 mm., forceps - 1.7 - 2.1 mm (F), Length : body - 13.2 mm, forceps - 3.4 mm.

Distribution : India : W.B. (Darjeeling dist.); Bihar and Assam.

25. *Euborellia stali* (Dohrn)
(Fig. 74)

1864. *Forficesila stali* Dohrn, *Stettin. ent. Ztg.*, 25 : 286 (F; Java)
1867. *Anisolabis stali*; Scudder, *Proc. Boston Soc. nat. Hist.*, 18 : 308.
1910. *Borellia stali*; Burr, *Fauna British India, Dermaptera* : 88.
1911. *Euborellia stali*; Burr, *Genera Insect.*, 122 : 31.

Material examined : India : W.B., Medinipur dist., Contai, 2 (M), 2 nymphs, 31.8.1984 (*G.K. Srivastava*); Calcutta, Talapark, 10 (M), 15 (F), 9 nymphs, 18-20.6.1963, Kankurgachi, 16 (M) 10 (F), 1.6.1963, Bagmari area, 4 (M), 6 (F), 10 nymphs, 1.6.1963 (*V.D. Srivastava*).

Diagnostic characters : General colour black to brownish black; antennae with one or two ante-apical segments and pronotum laterally yellow; legs yellow, femora banded with black.

Elytra abbreviated in the form of narrow lateral ovate flaps on mesonotum and wings absent. Sides of abdominal segments, in males, from 6th to 9th ecarinate; paramere with a distinct inner apical concavity. Male genitalia as seen in fig. 74.

Measurements : (M), Length : body 8.5 - 9.8 mm., forceps - 1.2 - 2.3 mm; (F), Length : body 9.0-10.5 mm, forceps 1.0 - 2.2 mm.

Distribution : India : W.B. (Calcutta and Medinipur dists.) ; Madhya Pradesh, Tamil Nadu and Rajasthan. Also reported widely in Oriental and Eithopian Regions.

Remarks : It occupies intermediate position between *E. annulipes* (Lucas) and *E. abbreviata* Srivastava and differs from former by the presence of abbreviated elytra and from the latter by the absence of virga.

BRACHYLABIDINAE

Genus 10. *Metisolabis* Bur

1910. *Metisolabis* Burr, *Fauna British India, Dermaptera* : 108 (Type - *Brachylabis voeltzkowi* Burr, 1908).
 1966. *Metisolabis*; Popham and Brindle, *Entomologist*, 99 : 245 (= *Isolabis* Verhoeff, 1902).
 1969. *Metisolabis* ; Brindle, *Fauna de Madagascar, Tananarive*, 30 : 40.
 1989. *Metisolabis* : Steinmann, *Das Tierreich*, 105 : 281.

26. *Metisolabis caudelli* (Burr) (Figs. 75-77)

1908. *Brachylabis caudelli* Burr, *Ann. Mag. nat. Hist.*, (18) 2 : 251 (Holotype Male, Burma, Carin Cheba).
 1910. *Metisolabis caudelli*; Burr, *Fauna British India, Dermaptera* : 109.
 1968. *Isolabis caudelli*; Popham and Brindle, *Entomologists*, 99 : 245.
 1982. *Metisolabis caudelli* : Srivstava, *Basiliensia*, 7 : 63, figs. 2-4.
 1983. *Ctenisolabis fletcheri* (nec Burr, 1910); Steinmann, *Revue suisse zool.*, 90(3) : 554 (1 (M; India : W.B., Darjeeling).
 1983. *Ctenisolabis aciculata* Steinmann, *Revue suisse zool.*, 90(3) : 545, fig.3. (1 (M); India : Meghalaya.
 1983. *Ctenisolabis lobeli* Steinmann, *Revue suisse zool.*, 90(3) : 546, fig.4 1 (male) India : W.B. Darjeeling).
 1983. *Brachylabis philetas* (nec Bur, 1901, Steinmann, *Revue suisse Zool.*, 90(3) : 1 (M, nec F; India : W.B., Darjeeling dist., Algarah).
 1992. *Metisolabis caudelli*; Srivastava, *Rec. zool. surv. India*, 92 (1-4) : 54 (Above synonymy poposed).

Material examined : India : W.B., Darjeeling dist., Kurseong, 1 (M) genitalia mounted between two coverslips and pinned with the specimen), 1 (F), 5.7.1908 (*N. Annandale*) - det. by M. Burr. as *Brachylabis verhoeffi*; Tecsta, 250 m, 1 (F), 10.10.1978 (*Besuchet Lobil*) - det. by Steinmann as *Ctenisolabis fletcheri* Burr; Tigerhill, 2000-3000 m, 1 (F), 13.10.1978 (*Besuchet Lobil*) - det. by Steinmann as *Ctenisolabis loebli* sp. nov.; Algarh, 1800 m, 1 (M) (genitalia mounted between two coverslips and pinned with the specimen), 9.10.1978 (*Besuchet Lobil*)- det. by Steinmann as *Bracylabis philetas* Burr.

Diagnostic characters : General colour dark blackish brown; antennal segments, mouth parts, apical one third of femora and tibiae and tarsi yellow. Body finely pubescent.

Antennae with 1st segment longer than the distance between antennal bases; eyes about as long or distinctly longer than post - ocular area; mesosternum with a sharp carina along the lateral margin. Forceps, in males, subcontiguous or remote at base, branches almost striaght, hooked apically or regularly curved with apices gently hooked; genitalia with parameres broader at base, narrowed apically with tip

pointed, distal lobes with virga distinct. Ultimate tergite and forceps and genitalia of male as seen in figs 75-76.

Measurements : (M), Length : body - 9.3 - 10.3 mm, forceps- 1.3 -2.3 mm; (F), Length: body 8.2 -- 13.1 mm, forceps - 11.3 - 2.2 mm.

Distribution : India : W.B. (Darjeeling dist.); Meghalaya. Also recorded from Burma and Borneo, latter record need checking.

Remarks : Some variations in the size of eyes in relation to post-ocular area and the shape of male forceps are noted.

ANTISOLABIDINAE

Genus 11 *Antisolabis* Burr

1911. *Antisolabis* Burr, *Ann. S. Afr. Mus.*, 105 : 5 (Type-*Antisolabis myrmecoides* Burr).
1978. *Antisolabis*; Brindle, *Ann. Mus. Roy Afr. Centr. Tervuren*, in 8, *Zool.*, 225: 18.

Doubtful record

27. *Antisolabis formicoides* (Burr)

1911. *Nannisolabis formicoides* Burr, *J. Asiat. Soc. Beng.*, 7 : 781(M, F; Tamil Nadu, Madura dist.).
1960. *Antisolabis formicoides* ; Popham and Brindle, *Entomologist*, 99 : 244.
1983. *Antisolabis formicoides* ; Steinmann, *Revue sussie Zool.*, 90 : 584 (F; India : W.B., Darjeeling Kalimpong; Meghalaya, Cherrapunje).

Remarks : This species was originally described from South India (Burr, 1911) and subsequent record by Hebard (1923) is also from the same area.

Steinmann's (1983) record of the species from North India (W.B., Darjeeling dist. and Meghalaya: Khasi hills) are based on females only and are considered as doubtful.

LABIDURIDAE NALINAE

Genus 12 *Nala* Zacher

1910. *Nala* Zacher, *Ent. Rdsch.*, 1910 : 29 (Type - *Labidura lividipes* "H. Luc.=*Forficula lividipe* Dufour, 1828).
1910. *Paralabidura* Burr, *Trans. R. ent. Soc. Lond.*, 1910 : 184 (Type - *Forficula lividipes* Dufour, 1928).

Key to species (based on males only)

- 1(2) Forceps with branches cylindrical, incurved, often with a minute tooth in apical one third.....
..... *N. lividipes* (Dufour)

- 2(1) Forceps with inner dilation in basal half, afterwards branches cylindrical, almost straight with apices gently hooked..... *N. nepalensis* (Bur)

28. *Nala lividipes* (Dufour)
(Figs 89-79)

1820. *Forficula pallipes* Dufour, *Ann. gener, des Phys. Bruxelles*, 4 : 316, pls. 116, fig. 7, 7a and 7b (M, F; Lower Catalonia, Spain).
1828. *Forficula lividipes* Dufour, *Ann. Sci. Nat.*, 13 : 340 (New name proposed).
1900. *Labidura lividipes*; Bormans and Krauss, *Das Tierreich*, 11 : 36.
1910. *Paralabidua lividipes*; Burr, *Trans. R. ent. Soc. Lond.*, 1910:184.
1911. *Nala lividipes*; Burr, *Genera Insect.*, 122 : 36.
1976. *Nala lividiupes*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 2 : 41.

Material examined: Puruliya dist., Ueladih vill., 1(F), 18.9.87, Puruliya, 1(F), 14.9.87, Nandwara 1 (M), 1(F), 15.9.87, Birbhum dist., Suri, 1(F), 6.10.87, Balavpur, Bolpur, 1(M), 4.10.87 (*M. Prasad*); 24-Parganas dist., Diamond Harbour, 5(M), 2(F), 7.6.1978 (*M. Prasad & S. K. Ghosh*); Malda dist., Parbatidanga, 6(M), 3(F), 27.6.87, Nimbari, 2(M), 2(F) 24.6.87, Dhulian, 2(F), 17.6.87, Tulsihata, 3(M), 3(F), 25.6.87 (*K. P. Mukherjee*); Nishipur, 1(M), 1(F) 23.11.87 (*T. R. Mitra*); Bankura Dist., Sabanpur nr Darkeshwar River, 1 (M), 12.3.86, Bankura town, 1 (F), 10.10.85 (*K. K. Ray*), Amarkanan, 1 (M), 1(F), 9.9.86, Ranibandh, 2(M), 1(F), 7.9.87, Churamanipur, Sonamukhi, 1(M), 2.9.87, at light, Ganga-Jachati, 1 (M), 8.9.87, at light (*P. Mukhopadhyay*); Darjeeling dist., Bong Basti, Kalimpong, 3900 ft., 3 (F), 2 nymphs, 3.1.1974; Chunabhati, nr Bagrakot, 2 (M), 1 (F), 3 nymphs, 27.12.73 (*G. K. Srivastava*).

Diagnostic characters : General colour dull blackish brown to black with varying intensity on various body parts and leg joints dirty yellow.

Elytra and wings well developed, former rough and carinate along the costal margin. Male forceps with branches stout, incurved; genitalia with parameres narrowed apically, distal lobes with distinct virga. Ultimate tergite and forceps and genitalia of male as seen in Figs. 78-79.

Measurements : (M), Length : body - 6.1 - 8.7 mm, forceps - 1.5 - 2.6 mm; (F), Length : body 6.0 - 9.0 mm, forceps - 1.5 - 1.6 mm.

Distribution : India : W.B. (Puruliya, Bankura, Birbhum, 24-Parganas (S & N), Malda and Darjeeling dist.); Throughout India. Widely distributed all over the world.

Remarks : Variation in the body colour and the inner tooth of male forceps are common.

During post-monsoon period especially by mid October it is attracted to light in large numbers in Calcutta.

29. *Nala nepalensis* (Burr)
(Figs. 80-81)

1907. *Labidura nepalensis* Burr, *Rec. Indian Mus.*, 1 : 208 (M, F; Nepal).
1910. *Nala nepalensis*; Zacher, *Ent. Rdsch.*, 1910 : 184.
1910. *Paralabidura nepalensis*; Burr, *Trans. R. ent. soc. Lond.*, 1910 : 185.
1911. *Nala nepalensis*; Burr, *Genera Insect.*, 122 : 36.

Material examined: India: W.B., Darjeeling dist., Mongpong, 1(M) 29.12.1973 (G.K. Srivastava); Jhepi, 1 (M), 2 nymphs, 31.2.1978, Dange, 1 (M), 1.4.1978, under stones (A.R. Bhowmik).

Diagnostic characters : General colour brownish black, legs yellow with femora and tibiae blackish in basal half. Finely pubescent.

Elytra and wings normal, former with a carina along with costal margin. Male penultimate sternite feebly emarginate in middle posteriorly; forceps in basal half lamellate internally, afterwards cylindrical, almost straight, gently hooked at apices; parameres apically acuminate. Ultimate tergite and forceps and genitalia as seen in figs. 80-81.

Measurements: (M), Length : body 7.2-8.6 mm, forceps- 2.3 - 5.4 mm; (F), Length- 6.7 12.5 mm, forceps 2.0-2.7 mm.

Distribution : India : W.B. (Darjeeling dist) ; Jammu and Kashmir, U.P. (Himalayas), Himachal Pradesh, Sikkim, Meghalaya and Arunachal Pradesh. Also recorded from Pakistan, Nepal, Bhutan, Malaya and Indo-China.

It is basically a montane species occurring under stones on the edge of rivers, streams and other water bodies.

LABIDURINAE

Key to genera (based on males only)

- 1(2) Sides of certain abdominal segments, in normal males, with spines or crests; forceps long and slender, generally arcuate in basal half afterwards almost straight; parameres apically with an epimerite.....*Forcipula* Bolivar
- 2(1) Sides of abdominal segments without spines or crests; forceps stout and arcuate; parameres apically without a distinct epimerite..... *Labidura* Leach

Genus 13. *Labidura* Leach

1815. *Labidura* Leach, *Edin. Encyl.*, 9 (1) : 48 (Type - *Forficula riparia* Pallas, 1773).

30. *Labidura riparia* (Pallas)

(Figs. 82-84)

1773. *Forficula riparia* Pallas, *Reise Russ. Reichs.*, 2 : 727 (Sex ?; Shores of Irtysh River, Western Siberia).
 1863. *Labidura riparia*; Dohrn, *Stettin. ent. Ztg.*, 24 : 313.
 1954. *Diplatys himalayana* Baijal and Singh, *Agra Univ. J. Res. (Sci.)*, 3 (2) : 455 (3 nymphs, not M; India : U.P., Nainital dist.).
 1954. *Spongiphora nainitalensis* Baijal and Singh, *Agra Univ. J. Res. (Sci.)*, 3 (2) : 456 (M ; India : U.P., Nainital dist.).

1954. *Erotosis jeolikotensis* Baijal and Singh, *Agra Univ. J. Res. (Sci.)*, 3 (2) : 458 (F) India ; U.P., Nainital dist.).
 1954. *Elaunon nainitalensis* Baijal and Singh, *Agra Univ. J. Res. (Sci.)*, 3 (2) : 460 (M) India., : U.P., Nainital dist.).
 1986. *Labidura ripaia*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 89 : 4 (Above synonymy proposed).

Material examined : India : W.B. Puruliya dist., Valadih village, 3 (Male), two (Female), 2 nymphs, 18.9.87, Nandwara vill., 2 nymphs, 15.9.87 (*M. Prasad*), Hura, 1 (Male), three (Female), 30.8.87 (*T.R. Mitra*); Kakdwip), 1 (Female), 9 nymphs, at light, 27.5.1978 (*M. Prasad and S.K. Ghosh*); Malda dist., Pakuahat, 1 (Female), 16.6.87, Harischandrapur, 1 (Male), 22.6.87 (*K.P. Mukherjee*); Bankura dist., Koulput, 1 nymphs, 23.11.86 (*T.R. Mitra*).

Diagnostic characters : General colour varies between yellowish brown and dark blackish brown; antennae, legs and wings yellowish brown.

Antennae with 25-36 segments; eyes distinct but shorter than post-ocular area. Abdomen, In males, gradually enlarging posteriorly; ultimate tergite with posterior margin in middle straight or sometimes with a pair of sharp spines; parameres longer than broad with a short epimerite at apex, internally. Ultimate tergite and forceps and genitalia of males as seen figs. 82-84.

Measurements : (Male) Length : body - 14.0 - 24.0 mm, forceps 0 40 10.0 mm; (Female) Length : body - 12.0 - 19.00 mm, forceps - 3.0 - 5.0 mm.

Distribution : India : W.B. (Puruliya, Calcutta, South 24-Parganas, Maldah and Bankura dist.); Widely distributed all over the world.

Remarks : It is extremely variable in general body colour, shape of pronotum, texture and development of elytra, wings, ultimate tergite and forceps.

Genus 4. *Forcipula* Boliver

1897. *Forcipula* Bolivar, *Ann. Soc. ent. Fr.*, 66 : 283 (Type -*Labidura quadrispinosa* Dohrn, 1863 - designated by Kirby, 1904).
 1974. *Genitalata* Kapoor, *Zool. J. Linn. Soc.*, 55 (1) : 83, figs. 1-4 (Type - *Genitalata mahajani* Kapoor, 1974).

Key to species (based on males only)

- 1(2) Elytra tuberculated with a weak ridge (represented by a convexity) along the costal margin.....
*F. quadrispinosa* (Dohrn)
 2(1) Elytra smooth or punctulated, without a ridge along the costal margin
 3(6) Sides of certain abdominal segments with a single spine on each side
 4(5) Body covered with long and short, dense pubescence; forceps with a sharp internal spine in the middle of remote basal part in normal forms, in minor forms tooth of forceps weakly developed or represented by a faint protuberance.....*F. trispinosa* (Dohrn)

- 5(6) Body covered with fine and less dense pubescence except on wings; forceps crenulate internally in the remote basal part in normal forms, in minor forms forceps almost straight or gently undulate in middle..... *F. indica* Brindle
- 6(3) Sides of certain abdominal segments with a pair of spines, often of unequal size or poorly developed.....*F. abbreviata* Srivastava

31. *Forcipula indica* Brindle,
(Figs. 85-86)

1910. *Forcipula pugnax* (nec Kirby), Burr. *Fauna Britis India, Dermaptera* : 93, pl. 3, fig. 27.
1966. *Forcipula indica* Brindle, *Ann. Mag. nat. Hist.*, (12) 9 : 265 (M; Bhutan and India0.

Material examined : India : W.B., Darjeling dist., Around Rambh, ca 1200 ft., 1 (M), 1 (F) and 9 nymphs, ex under stones on dried river bed, 6.1.1979, Nazeok, 4 (M), 4 (F), 10 nymphs, under stones on dried Teesta River bed, 7.1.1974 (*G.K. Srivastava*), Pashok, 2000 ft. 1 (M), 1 (F), 20.12. 1926 (*S.L. Hora*), Nayabazar, 1 (F), 22.9.1959 (*B.K. Tikader*).

Diagostic characters : General colour shining blackish brown; antennae, legs, pronotum laterally and inner margin of wings yellow. Finely and densely pubescent except wings, ultimate tergite and forceps.

Elytra well developed, punctulate, Abdominal segments, in males, punctate, on sides of segments with a sharp spine, sometimes spine of 6th segment represented by a tubercle. Ultimate tergite and forceps and genitalia of male as seen in figs. 85-86.

Measurements : (M), Length : body - 22.0 - 26.0 mm, forceps 11.0 - 17.0 mm; (F), Length : body 21.5 - 27.0, forceps - 7.5 - 8.5 mm.

Distribution : India : *W.B.* (Darjeeling dist.); *Elsewhere* : Himachal Pradesh, Sikkim, Meghalaya, Assam and Arunachal Pradesh.

Remarks : Generally some variations are noted in the degree of development of lateral abdominal spines and forceps in males.

32. *Forcipula abbreviata* Srivastava
(Figs. 87 - 88)

1904. *Forcipula decolyi* (nec Bormans); Burr, *Trans. R. ent. Soc. Lond.*, 1904 : 289.
1988. *Forcipula abbreviata* Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 89:10, figs. 5-8 (M, F, India : Arunachal Pradesh, Sikkim and W.B. (Darjeeling dist).

Material examined : India : W.B., Darjeeling dist., Pashok, 2600 ft., 3 (M) (forceps with minor development) and 1 (M) genitalia mounted between two coverslips and pinned with the specimen), 20.12.1926, det. by *G.K. Srivastava*, 1984 (*S.L. Hora*); Darjeeling, 2 (M), 1 (F) and 5 nymphs, 23.3.1978, under stones (*A.R. Bhowmik*).

Diagnostic characters : General colour dark brownish black. Body finely pubescent. Pronotum longer than broad; elytra well developed, punctulate and wings abbreviated and concealed below elytra. Male abdominal segments 3rd to 5th on sides provided with a pair of spines, dorsal one longer and ventral one shorter or stumpy. Ultimate tergite and forceps and genitalia as seen in figs. 87-88.

Measurements : (M), Length : body - 17.0 - 25.0 mm., forceps - 12.0 - 17.0 mm; (F) Length : body - 24.0 - 17.0 mm, forceps - 5.0 - 7.0 mm.

Distribution : India : W.B. (Darjeeling dist.), Sikkim and Arunachal Pradesh. Also recorded from Nepal.

33. *Forcipula quadrispinosa* (Dohrn) (Figs. 89-91)

1863. *Labidura quadrispinosa* Dohrn, *Stettin. ent. Ztg.*, 24 : 311 (M; India : Tranquebar and Ceylon).
 1891. *Labidura morosa* Kirby, *J. Linn. soc. (Zool.)*, 23:513.
 1897. *Forcipula quadrispinosa*; Bolivar, *Anns. Soc. ent., Fr.*, 66 : 283.
 1908. *Forcipula jacobosoni* Burr, *Ann. Mag. nat. Hist.*, (8) 1 : 47.
 1970. *Forcipula simplex* Bey-Bienko, *Zool. Zh.*, 49:1815 (M North India).
 1974. *Genitalata mahajani* Kapoor, *Zool. J. Linn. Soc.*, 55 (4) : 83, figs, 1-4, nymphs, not (Male); India : Himachal Pradesh.
 1986. *Forcipula quadrispinosa* ; Srivastava, *Rec. zool. Surv. India, Occ. Pap.*, 89 : 28.

Material examined : India : W.B., Darjeeling Dist., Chunabhati, nr Bagrakot, 1 (M), 27.12.1973, ex under stones on river edge (G.K. Srivastava).

Diagnostic characters : General colour dark blackish brown; antennae, legs and sides of pronotum blackish brown; finely pubescent, especially on abdomen.

Elytra rugose with a faint carina or convexity along the costal margin. Sides of abdominal segments 3rd to 5th, in males, armed with a sharp spines; penultimate sternite with posterior margin rounded and ultimate tergite, forceps and genitalia as seen in figs. 89-91.

Measurements : (M), Length : body-18.0 - 24.0 mm, forceps - 7.5 - 17.5 mm; (F), Length : body - 18.5 - 23.6 mm, forceps - 6.0 - 8.0 mm.

Distribution : India : W.B. (Calcutta and Darjeeling dists.); Tamil Nadu, Uttar Pradesh, Bihar and Assam. Also reported from Nepal, Bhutan, Burma, Sri Lanka, Thailand, Indo-China, Java, Philippine Isls., Reunion and Mauritius.

34. *Forcipula trispinosa* (Dohrn) (Figs. 92-94)

1863. *Labidura trispinosa* Dohrn, *Stettin. ent. Ztg.*, 24:310 (M; India; Orientali).
 1891. *Labidura pugnax* Kirby, *J. Linn. Soc. (Zool.)*, 25 : 510, pl. 12, fig. 1 (M, (F; North India).

1900. *Forcipula trispinosa* ; Bormans and Krauss, *Das Tierreich*, 11 : 30.
 1910. *Forcipula trispinosa* var. *minor* Burr, *Fauna British India, Dermaptera*, : 93 , pl. 3, fig. 260 (M; Nepal).
 1966. *Forcipula trispinosa* sub. sp. *minor*; Brindle, *Ann. Mag. nat. Hist.*, (13) 9 : 268.
 1980. *Forcipula afghana* Steinmann, *Acta. zool. hung.*, 26(1-3) : 243.

Material examined : India : W.B., Darjeeling dist., Chunbhati nr Bagrakot, Churanti Forest, 4 (M), 4 (F) 3 nymphs, ex under stones on Churanti River bed, 28.12.1973, 3 (M) 3 (F) 1 nymph, 27.12.1973; Nazdok, 2 (M), 6 nymphs, ex under stones on river bank, 7. 1. 1974; Khumani, 3 (M), 1 (F) 8 nymphs, under stones on river bank, 25.12.1973; Sombarihat, 2 N of Gorubatan on road to Lava, 1 (F), 7 nymphs, ex under stones, 17.12.1973; Around Rambhi, 1200 ft., 1 (M), 1 nymph, ex under stones on river bank, 6.1.1974, Mongpong, 9 (M) 2 (F) 4 nymphs, ex under stones on the edge of stream, 29.12.1973 (*G.K. Srivastava*); Pashok, 2600 ft., 1 (M) (genitalia mounted between two coverslips and pinned with the specimen), 20.12.1926 (*S.L. Hora*); Rangton, 1 (M) 13.4.1988, ex under stones (*A.R. Bhowmik*).

Diagnostic characters : Fine pubescence present all over body. General colour shining blackish brown; antennae, sides of pronotum and inner wing tip yellow.

Elytra pubescent; wings lacking pubescence; abdomen with sides of segments 3rd to 5th with a sharp spine but last one shorter than others. Ultimate tergite and forceps and genitalia as seen in figs. 92-94.

Measurements : (M), Length : body - 15.5 - 22.5 mm, forceps - 6.0 - 15.0 mm; (F), Length : body 14.0 - 28.0 mm, forceps 5.7 - 9.0 mm.

Distribution : India : W.B. (Calcutta and Darjeeling dist.); Assam, Arunachal Pradesh, Uttar Pradesh (Himalayas) and Himachal Pradesh. Also recorded from Bhutan and Nepal.

Remarks : Occasionally specimens with minor form of forceps with sides of abdominal spines poorly marked are met with. These generally represent var or sub. sp. *minor* as recorded by several authors.

APACHYOIDEA APACHYIDAE

Genus 15. *Apachyus* Serville

1831. *Apachyus* Serville, *Ann. Sci. Nat.*, 22 : 35 (Type - *Forficula depressa* Palisot Beauvois, 1805).
 1839. *Apachya* Serville, *Hist. nat. Orth.* : 54 (Emendation of *Apachyus* Serville, 1831).

35. *Apachyus feae* Bormans (Figs. 95-97)

1891. *Apachyus pascoei* Kirby, *J. Linn. Soc. (Zool)*, 25 : 251, pl. 20, fig. 1.
 1894. *Apachyus feae* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) 14 : 373 (M, (F; Burma).
 1910. *Apachyus feae*; Burr, *Fauna British India, Dermaptera* : 33, pl. 1, figs. 1 - 2, pl. 10, fig. 93.
 1959. *Apachyus feae*; Bey-Bienko, *Ent. Obozr.*, 38:610.

Material examined : India : W.B., Darjeeling dist., Kalijhora, 1 (M), (genitalia mounted between

two coverslips and pinned with the specimen), 1 (M), 12.4.1978 (A.R. Bhowmik), Thurbo, 1 (F), 13.4.1896 (W.C. Sproull).

Diagnostic characters : General colour dark reddish brown to black; wings yellow with tip brownish; femora in basal half darker; abdomen reddish brown with shades of black; ultimate tergite, anal process and forceps lighter in colour. Form strongly depressed.

Antennae 45-segmented or more; pronotum rounded apically with sides gently convex. Elytra and wings well developed; ultimate tergite rugose with small tubercles, projecting posteriorly between the branches of forceps and known as anal process or squamopygidium. Male anal process almost pentagonal and branches of forceps strongly curved, somewhat dilated in apical half, crossing near apex and genitalia as seen in fig. 96. Female anal process triangular.

Measurements : (M), Length : body - 26.5 - 27.0 mm, forceps - 5.0 - 5.4 mm; (F), Length : 34.0 - 39.5 mm, forceps - 6.5 - 7.0 mm.

Distribution : India : W.B. (Darjeeling dist.) ; Arunachal Pradesh, Assam and Sikkim. Also recorded from Bhutan, Burma, China (Yunnan) and Vietnam.

Remarks : This species is quite unique by its flat form and the shape of anal process, in males, is quite distinctive.

FORFICULOIDEA
SPONGIPHORIDAE
IRDEXINAE

1911. *Irdex* Burr, *Dt. ent. natn. Biblthk.*, 1911 : 59 (Type - *Spongophora nitidipennis* Bormans, 1894).

Remarks : Srivastava (1985) has refined the genus after examining the type of the genus i.e., *Spongophora nitidipennis* Bormans, 1894.

It may be once again stated here that although Burr (1911a) erected the genus *Irdex* with *S. nitidipennis* Bormans as its type but based the diagnosis of the genus on *Chaetospania jupiter* Burr, 1900, which he thought was synonym of the former. The latter is now a member of *Apovostox* Hebard and a valid species.

36. *Irdex nitidipennis* (Bormans)
(Figs. 98-103)

1894. *Spongophora nitidipennis* Bormans, *Annali Mus. civ. Stor. Nat. Giacomo Doria*, (2) 14 : 383 (M) , (F ; Burma).
1900. *Spongophora nitidipennis*; Bormans and Krauss, *Das Tierreich*, 11 : 58.
1911. *Irdex nitidipennis*; Burr, *Dt. ent. natn. Biblthk.*, 1911:59.
1913. - *Spongovostox aborum*, Burr, *Rec. Indian Mus.*, 8(2) : 140 (M, (F; India).
1975. *Spongovostox wuermalii* Brindle, *Basilliensia*, 1 : 33 (M, (F; Bhutan).

1985. *Irdex nitidipennis*; Srivastava, *Annali Mus. civ. Stor. nat. Giacomo Dorla*, 85 : 209, figs. 4-15 (species redescribed).

Material examined : India : W.B. Darjeeling dist., Khumani Forest, 3 (M), 4 (F), 1 (F) (macropterus), 22.12.1973; 3 (M), 3 (F), 27.12.1973; Samsing, 18 km N of Chalsa, 1450 Ft., (macropterus), 2F and 1 nymph, 24.12.1973; Jhalung, 1000-1400 ft., 4M (1M, macropterus), 2 (F) 23.12.1973; Kalimpong, Bongbasti, 6 (M), 1 (F), 21 nymphs, 3.1.1974; Thumthangkhol, Rangpo, 300 m., 6 (M) 1 (F) (macropterus), 8 (F), 4 nymphs, 28.12.1973, all under bark of logs (G.K. Srivastava).

Diagnostic characters : General colour brownish yellow, often shaded with black on various body parts.

Eyes may be prominent i.e., longer than post-ocular area in macropteros or shorter than post-ocular area in brachypteros form. Elytra with a row of thick setae along the costal margin, each arising from a tubercle. Legs long and slender, hind tarsi with 1st segment about 5 times longer than its width. 2nd about as long as broad. Male pygidium and forceps extremely variable (figs. 99 - 102) and genitalia with parameres broader at base, apically narrowed with tip pointed, virga present (fig. 103).

Measurements : (M), Length : body - 6.0 - 10.1 mm, forceps - 2.5 - 4.0 mm; (F), Length : body - 4.2-9.7 mm, forceps - 1.0 - 4.2 mm.

Distribution : India : W.B. (Darjeeling dist.); Assam and Arunachal Pradesh.

Also recorded from Bhutan, Burma, Vietnam, Sumatra, Java and Hainan Is.

Remarks : The species exhibits great variation in the size of eye in relation to post-ocular area, presence and absence of wings, the shape of pygidium and the forceps, in males.

SPONGIPHORINAE

Key to genera

- 1(2) Basal antennal segments strongly narrowed towards base, apical ones strongly moniliform.....
.....*Marava* Burr
- 2(1) Basal antennal segments more or less cylindrical, narrowed at extreme bases, distal segments not strongly moniliform.....
.....*Spongovostox* Burr

Genus 17. *Marava* Burr

1911. *Marava* Burr, *Dt. ent. natn. Biblthk.*, 1911 : 59, 60 (Type-*Labia grandis* Dubrony, 1879 = *Forficula arachidis* Yersin, 1860).
1911. *Prolobia* Burr, *Dt. ent. natn. biblthk.*, 1911 : 60 (Type - *Forficula arachidis* Yersin, 1860).
1911. *Andex* Burr, *Dt. ent. natn. biblthk.*, 1911 : 60 (Types - *Labia nigroflavida* Rehn, 1905).

37. *Marava arachidis* (Yersin)
(Figs. 104-107)

1860. *Forficula arachidis* Yersin, *Ann. soc. ent. Fr.*, (3) 8 : 509, pl. 10, figs. 33-35 (Adventive et Marseilles, France).
 1863. *Forficesila nigripennis* Motschulsky, *Bull. soc. Imp. Moscou*, 36 : 1.
 1865. *Forficula wallacei* Dohrn, *Stettin. ent. Ztg.*, 26 : 88.
 1879. *Labia grandis* Duborny, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 14 : 366.
 1882. *Chelidura arachidis*; Burnner, *Prod. Eur. Orth.*, 10(1) : 21.
 1894. *Sphingolabis arachidis*; Bormans, *Annali Mus. civ. Stor. Nat. Giacomo Doria*, (2) 14 : 406.
 1900. *Apterygida arachidis*; Burr, *Ann. soc. Ent. Belge.*, 44 : 52.
 1905. *Labia nigroflavida* Rehn, *Proc. U.S. natn. Mus.*, 29 : 507, fig. 5.
 1910. *Labia arachidis*; Burr, *Fauna British India, Dermaptera* : 123, pl. 9, fig. 82.
 1911. *Prolabia arachidis*; Bur, *Genera Insect.*, 122 : 57.
 1954. *Marava arachidis*; Hincks, *Proc. R. ent. Soc. Lond.*, (B) 23 : 163.

Material examined : India ; W.B., Birbhum dist., Tarapith, 1 (M), 1 (F), 7.10.1987 (M. Prasad); Calcutta, 2 (M), 1 (F), (with genitalia mounted between two coverslips and pinned with the specimen), 6.4.1968 and Oct., 1978 (G.K. Srivastava); 1 (FF) 15.9.1908 (J.B.R.); 1 (F), 28.9.1940 (P.Sen).

Diagnostic characters : General colour testaceous to blackish brown; legs yellow; pronotum yellow on sides and abdomen with traces of black.

Eyes generally small, shorter than post-ocular area or rarely larger. Antennae 14-segmented, moniliform, 1st stout, clavate; 2nd short; 3rd to 5th conical remaining gradually increasing in length, each narrowed at base and gently expanded apically. Elytra well developed and wings generally wanting, rarely well developed. Legs with 1st segment of hind tarsi equal to combined length of 2nd and 3rd; 2nd distinct, slightly longer than broad and about 1/2 as long as the 3rd. Male ultimate tergite, pygidium and forceps and genitalia as seen in figs. 106-107.

Measurements : (M), Length : body - 6.8 - 8.1 mm, forceps - 1.9 - 2.5 mm; (F), Length : body - 5.9 - 7.6 mm, forceps - 1.5 - 2.2 mm.

Distribution : India : W.B. (Calcutta and Birbhum dists.); Bihar, Maharashtra and Tamil Nadu. It is widely distributed throughout the World and more commonly reported from the Oriental Region

Remarks : Some variation in the size of eyes in relation to post-ocular area and presence or absence of wings are noted. In males, pygidium may be gently concave at hind margin and sometimes provided with minute tubercles close to postero-lateral angles.

Genus 18. *Spongovostox* Burr

1911. *Songovostox* Burr, *Dt. ent. natn. Biblthk.*, 1911 : 59 (Type - *Forficula quadrimaculata* Stal, 1855).

Key to species (based on males only)

- 1(2) Build slender; size shorter (4.0-5.6 mm); male forceps slender with a triangular tooth internally near base and genitalia with parameres broad at base, narrowed apically, tip pointed.....
..... *S. mucronatus* (Stal)
- 2(1) Build stout; size larger (7.4 - 13.5 mm); male forceps stout, at base internally dilated in the form of a blunt tooth and genitalia with parameres sigmoid.....*S. semiflavus* (Bormans)

38. *Spongovostox mucronatus* (Stal)
(Figs. 108-113)

1860. *Forficula mucronata* Stal, *Eug. Resa Zool. Ins.* : 303 (M not F; Java).
1863. *Labia mucronata*; Dohrn, *Stettin. ent. Ztg.*, 25 : 403.
1957. *Sphingolabis indumathiae* Fernando, *Ceylon J. Sci. (Bio. Sco.)*, 25 : 303.
1971. *Spongovostox mucronatus*; Brindle, *Ent. Tidskr.*, 92 (1-2) : 18.

Material examined: India: W.B. Darjeeling dist., Lodhama, 3 (M), 1 (M), with genitalia mounted between two coverslips and pinned with the specimen), 30.3.1978 (A.R. Bhowmik).

Diagnostic characters: General colour dark brownish or black; antennae blackish brown; legs black with femora apically, tibiae basally and whole of tarsi yellowish brown; elytra black with a broad yellow stripe along the sutural margin; wings and forceps yellow, former with a fuscous band along the sutural margin.

Antennae 15-segmented; 1st stout, narrowed basally, shorter than the distance between antennal bases, others along and slender. Eyes shorter or longer than post-ocular area. Legs with 1st segment of hind tarsi equal to the combined length of 2nd and 3rd; 2nd slightly longer than broad, narrowed at base, gently expanded apically. Male pygidium narrowed posteriorly or broad at apex with or without lateral spines. Ultimate tergite and forceps and genitalia of males as seen in figs. 110-113.

~~Female~~ forceps internally crenulate in basal two thirds, afterwards unarmed.

Measurements: (M), Length : body - 3.6 - 4.2 mm., forceps 1.0 - 1.25 mm; (F), Length : body- 3.1-3.9 mm, forceps - 0.9 - 1.4 mm.

Distribution: India: W.B. (Darjeeling dist. - first record); Assam. Also recorded from Sri Lanka, Burma, China, Sumatra, Java, East Sumba, West Flores, Phillipines Isls., Mauritius and New Guinea.

Remarks: This species shows great variation in the size of eyes in relation to post - ocular area and in males, the shape of pygidium.

It can be easily separated from *Songovostox semiflavus* (Bormans) by the slender build and the shape of parameres being short and almost straight.

39. *Spongovosto semiflavus* (Bormans)
(Figs. 114-118)

1984. *Spongophora semiflava* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) 14 : 385 (M, F; Burma).
 1900. *Spongipora semiflava*; Bormans and Krauss, *Das Tierreich*, 11 : 59.
 1911. *Spongovostox semiflavus*; Burr, *Genera Insect.*, 122 : 52.
 1927. *Apovostox semiflavus*; Hebard, 1927, *Proc. Acad. nat. Sci. Philad.*, 79 : 23.
 1976. *Spongovostox semiflavus*, Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 2 : 31.
 In press. *Spongovostox semiflavus*; Srivastavas, *Annali Mus. civ. Stor. nat. Giacomo Doria* (Type male alongwith genitalia figured).

Material examined ; India : W.B., Darjeeling dist., around Rambhi, 1200 ft., 4 (F), nymphs, 6.1.1974; around Khumani, 1900 ft., 2 (M), 2 (F), 3 nymphs, 25.12.1973, ex under bark of long; Jhalung 1 (F), 2 nymphs, 23.12.1973, ex under bark of log; Melli, nr. Teesta, 4 (M), 1 (Female) 1 (F), nymphs, 27.12.1973, ex under bark of long; Bhuttabari village, 3 km S of Gorubathan, 1150 ft., 7 (M), 1 (M), with genitalia mounted between two coverslips and pinned with the specimen), 8 (F), 10 nymphs, 19.12.1973, ex under bark of log; Sukna, 200 m, 1 (M), 2 (F), 8 nymphs, 9.1.1974, ex under bark of log (G.K. Srivastava); Kalijhora 1 (Female) 13.4.1978 (A.R. Bhowmik); Jalpaiguri dist., Rajabhatkhawa forest, 1 (F), 11.11.1974, ex under bark of *Amoora wallichii* (T Sengupta).

Diagnostic characters : Head, pronotum and abdomen black; antennae blackish brown; femora black; tibiae in apical half and whole of tarsi yellow; elytra black with a yellow band externally extending from shoulder to middle; wings yellow with a fuscous a band along the internal margin; pygidium and forceps blackish brown.

Antennae 17-segmented, basal segment shorter than the distance between antennal bases; eyes prominent about as long as the post-ocular area. Male pygidium distinct, subvertical, apically narrowed, posteriorly with deep emargination and postero-laterally produced into minute points and forceps remote at base with a blunt tooth internally, afterwards minutely crenulate and genitalia as seen in fig. 117.

Female forceps internally crenulate throughout with a constriction.

Measurements : (M), Length : body - 5.6 - 10.0 mm, forceps - 1.8 - 3.5 mm; (F), Length : body - 6.8 - 9.7 mm, forceps - 1.7-2.6 mm.

Distribution : India : W.B. (Darjeeling and Koch Bihar dists. - first record); Tamil Nadu and Karnataka. Also recorded from Sri Lanka, Bhutan, Burma, Vietnam, Borneo, Philippine Isls., Sumatra, Sumaba and Formosa.

Remarks : Some variation in the length of forceps in males, are noted in the present material.

HOMOTAGINAE

Genus 19. *Homotages* Burr.

1909. *Homotages* Burr, *Dt. ent. Z.*, 1909 : 327 (Type - *Anechura feae* Bormans, 1888).

1911. *Homotages*; Bur, *Genera Insect.*, 122 : 77.
 1971. *Homotages*; Brindle, *Ent. Tidskr.*, 93 : 13.
 1977. *Homotages*; Srivastava, *Ceylon J. Sci (Bio. Sci.)*, 12 (2) : 109.
 1985. *Homotages*; Srivastava. *Annali Mus. civ. Stor. nat. Giacomo Doria*, 85 : 206.

Remarks : Srivastava (1985) erected subfamily Homotaginae for the reception of *Homotages* Burr. It was characterised by the presence of long slender legs with 1st segment of hind tarsi longer than the combined length of 2nd and 3rd and 2nd segment is a little over the half the length of 3rd and narrowed only at extreme base, otherwise of uniform width. Besides, the general build and shape of forceps is reminiscent of Forficuloid forms. Perhaps this subfamily, Homotaginae may serve as connecting link between Spongiphoridae, Chelisochidae and Forficulidae.

40. *Homotages feae* (Bormans)
 (Figs. 119-122)

1888. *Anechura feae* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 6 (2) : 445 (M; Burma).
 1909. *Homotages feae*; Burr. *Dt. ent. Z.*, 1909 : 327.
 1977. *Homotages feae*; Srivastava, *Ceylon J. Sci. (Bio. Sco.)*, 12 (2) : 109.

Material examined : India : W.B., Darjeeling dist., Darjeeling Botanical Garden, 2123 m (3 (M), 3 (F), 20.5.1979 (M.S. Shishodia).

Diagnostic characters : Head, pronotum, elytra and wings black; pronotum laterally yellow; elytra with a big yellow oval spot in the anterior half; abdomen dark blackish brown and forceps orange, often shaded with black.

Legs long and slender, hind tarsi with 1st segment longer than combined length of 2nd and 3rd; 2nd a little over half as long as the 3rd, of uniform width throughout, narrowed at extreme base and twice longer than its width. Pygidium in male, vertical, hind margin truncate or subtruncate, postero-lateral angles produced into sharp points, often directed upwards. Ultimate tergite and forceps and genitalia of males as seen in figs 120-122.

Female pygidium vertical, narrowed apically; forceps simple and almost straight.

Measurement : (M), Length : body - 10.6 - 15.5 mm, forceps - 3.8 - 7.5 mm; (F), Length : body - 10.4 - 14.6 mm, forceps - 4.7 - 5.5 mm.

Distribution : India : W.B. (Darjeeling dist.); Uttar Pradesh and Arunachal Pradesh. Also recorded from Nepal and Burma.

Remarks : Some variation in forceps of males are met with. In the normal form forceps are undulate with several teeth internally along the ventral border whereas in the weaker form forceps are almost horizontal. Occasionally yellow oval spot on elytra is poorly marked.

LABIINAE

Steinmann (1987 and 1989) has erected several genera on the basis of either shape of virga or parameres. It is proposed that genera based on the shape of parameres appear to be sound and others based on shape and arrangement of virga are to be treated with reserve since they may not prove stable. The details of such aspects would be discussed elsewhere.

Key to genera (based on males only)

- 1(2) Male genitalia with parameres deeply excised, with an external and internal lobes.....
.....*Labia* Leach
- 2(1) Male genitalia with parameres entire (not excised)
- 3(4) Eyes large or very large, as long or longer than the length of head behind eyes.....
.....*Apovostox* Hebard
- 4(3) Eyes small, normally shorter than length of head behind eyes
- 5(6) Branches of forceps of both sexes not strongly setulose; those of male without a ventral inner flange and those of female narrowed from base to apex with inner margin never strongly dentate or crenulate..... *Paralabella* Steinmann
- 6(5) Branches of both sexes strongly setulose, bearing numerous long stiff hairs; those of male with or without a ventral flange, and those of female not narrowed from base to apex but almost parallel-sided for most of the length, and inner margin with at least a ventral inner flange, the margins of which strongly dentate or crenulate
- 7(8) Head transverse, depressed, both head and pronotum usually punctured and pubescent at least partially; branches of forceps in both sexes usually with a ventral inner flange, or this weakly indicated; abdomen strongly depressed, usually larger in size.....*Chaetospania* Karsch
- 8(7) Head quadrate or only slightly transverse, tumid, not depressed; head and pronotum impunctate and glabrous or punctured and pubescent; branches of male forceps simple, with a ventral inner flange, those of female with a ventral and dorsal inner flange, or with dorsal flange represented by a dorsal tooth; abdomen less depressed; smaller species.....*Chaetolabia* Brindle

Genus 20. *Labia* Leach

1815. *Labia* Leach, *Edinburgh Encycl.*, 9 : 118 (Type - *Forficula minor* Linnaeus, 1758)
1853. *Copiscelis* Fieber, *Lotos*, 3 : 257 (Type - *Forficula minor* Linnaeus, 1758).

41. *Labia minor* (L)
(Figs. 123-125)

1758. *Forficula minor* Linnaeus, *Syst. Nat.* (ed. 10th), 1 : 423 (F); Europe.

1815. *Labia minor*; Leach, *Edinburgh Encyl.*, 9 : 118.
 1853. *Copiscelis minor*; Fieber, *Lotos*, 3 : 257.
 1862. *Labia minuta* Scudder, *Proc. Boston Soc. nat. Hist.*, 7 : 415.
 1876. *Forficesila minor*; Freivaldszky, *Orth. Hung. Budapest* : 46.
 1882. *Labia minor*; Brunner, *Prod. Eur. Orth.*, 10(1), figs. 3 A - C.

Material examined : India : W.B., Darjeeling dist., Kurseong, 1524 m, 1 (F), 3.7.1908 (N. Annandale), det. by M. Burr as *Labia pilicornis* (Motschulsky), Kalimpong, 1 (M), 1 (F), 7 nymphs (at various stages of development), 26.8.1978, ex paddy straw litter (A. C. Misra), Calcutta, Zoological Garden, 1 (M), 19.5.1907 (N. Annandale); Haorah dist., Sibpur, Royal Botanical Garden, 1(F) 23.1.1909, attacking fruits of *Nipa fruticans* Wmbr. (Ind. Mus.) - det. by M. Burr. as *Labia pilicornis* (Motschulsky).

Diagnostic characters : Head, pronotum, elytra and wings black and finely pubescentum pale on sides; legs yellow; abdomen blackish brown; ultimate tergite and forceps yellowish brown.

Elytra and wings well developed. Penultimate sternite, in males, posteriorly in middle produced into a long spine; forceps (in forma macrolabia) remote, long cylindrical, gently incurved in middle, inner ventral border crenulate or (in forma cyclolabia) simple, straight, subcontiguous, tapering apically, internally crenulate and genitalia with parameres with deep cleft vertically diving into two unequal lobes.

Measurements : (M), Length : body - 4.1 - 6.5 m, forceps - 0.8 - 2.5 mm; (F), Length : body 3.9 - 4.1 mm, forceps - 6.0 - 1.1 m.m.

Distribution : India : W.B. (Darjeeling, Calcutta and Haorah dists.); *Elsewhere* ; Tamil Nadu. Widely distributed in Oriental, Ethiopian, Palearctic and Neotropical Regions.

Remarks : It has close resemblance externally with *Labia pilicornis* (Motschulsky) but differs by the presence of posterior spine of penultimate sternite and deeply incised parameres, in males.

Genus 21. *Paralabella* Steinmann

1989. *Paralabella* Steinmann, *Das Tierreich*, 106 : 470 (Type - *Forficula annulata* Fabricius, 1793).

Key to the species (based on males only)

- 1(2) Forceps dilated in basal half only, strongly curved apically; pygidium scarcely visible from above.....*P. curvicauda* (Motschulsky)
 2(1) Forceps almost straight, gently incurved at apices; pygidium distinctly projecting.....*P. fulleri* (Ramamurthi)

42. *Paralabella curvicauda* (Motschulsky) (Figs. 126-130)

1863. *Forficesila curvicauda* Motschulsky, *Bull. Soc. Imp. Moscou.*, 36 : 2, pl.2., fig. 1 (M), (F), Nura Illia Mountains, Ceylon).

1864. *Labia curvicauda*; Dohrn, *Stettin. ent. Ztg.*, 25 : 428.
 1867. *Platylabia guineensis* Dohrn, *Stettin. ent. Ztg.*, 26 : 348 (M; Principle Island).
 1867. *Platylabia dimitata* Dohrn, *Stettin. ent. Ztg.* 26 : 348 (M); Luzon.
 1903. *Labia flavicollis* Bormans in Burr, *Ann. Mag. nat. Hist.*, (7) 11 : 235 (M; Samoa).
 1904. *Platylabia camerunensis* Borg, *Ark Zool.*, 1 : 570, pl.26, fig. 4 (M) ; Cameroon.
 1907. *Platylabia dimitata* var. *guineensis*; Borelli, *Annali Mus. civ. Stort, nat. Giacomo Doria*, 3 (43) : 382.
 1926. *Labia curvicauda* var. *flavicollis*; Barelli *Treubia*, 8 : 263.
 1976. *Labia curvicauda*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 2 : 32.
 1989. *Paraabella curvicauda*; Steinmann, *Das Tierreich*, 106 : 497, figs. 920-922.

Material examined : India : W.B. : North 24-Parganas dist., Ghutiari Sharif, on way to Canning, 2 (M), 1 (F) (ex decaying apex of palm leaves), 29.11.1984 (*G. K. Srivastava*); Sonadanga 2 (M) (Genitalia mounted between two coverslips and pinned with the specimen) no date (*M. Prasad*); Malda dist., Manichak, 1 (M), 1 (F), 1 nymph, 9.12.87 (*T. R. Mitra*); Darjeeling dist., around Khumani Forest, 900 ft., 10 (M), 16(F), 10 nymps , 22.12.1973; 6(M), 6(F) 25.12.1973; Bhuttabari village, 3 km S of Gorubathan, 1 (M), 1 (F), 19.12.1973; Samsing, 5(M), 5(F), 24.12.1973; around Rambhi, 14(M), 11(F), 6.1.1974; Sukna, 200 m, 14 (M), 26 (F), 9.1.76; Singla, 400 m, 1 (M), 2(F), 2.1.1976; Melli, N of Teesta, 300 mm, 2 (M), 6 (F), 27.12.1975; Karmaktar, Singla 400 m, 1 (M) (genitalia mounted between two coverslips and pinned with the specimen), 1 (F) 3.1.1976, Thumthangkholo, 13 km S of Rangpo, 300 m, 13 (M), 25 (F), 28.12.1975, all collected under rotten banana stem or under bark of felled logs (*G. K. Srivastava*).

Diagnostic characters : Head elytra and wings blackish brown; antennae and mouth parts yellowish; legs brownish yellow, abdomen with traces of black and forceps brownish. Form depressed and finely pubescent on elytra and wings.

Head weakly depressed and antennae 12-segmented. Abdomen weakly depressed. Ultimate tergite and forceps and genitalia of males as seen in figs. 127 - 130.

Measuements : (M), Length : body - 5.6 - 6.8 mm, forceps - 0.5 - 1.1 mm; (F), Length : body - 5.9 - 7.2 mm, forceps - 0.9 - 1.5 mm.

Distribution : India : W.B. (North 24-Parganas, Maldah and Darjeeling dists.); Almost throughout India. Widely distributed throughout the tropics of Old and New World and partly Palaearctic.

Remarks : This species commonly occurs in a variety of habitats, especially under the bark of trees and logs, in the layers of rotten banana stems and leaf crown of certain plants.

Some variation in general body colour are noted, especially pronotum which is normally blackish brown but in some specimens it may be yellow. Male forceps are generally dilated internally in basal half, afterwards abruptly attenuated and strongly curved but occasionally internal dilation gradually merges with posterior attenuate portion which may be weakly curved.

Male genitalia is generally provided with a long undulated virga, sometimes it is very much

reduced. The specimens exhibiting dimorphic form of virga are morphologically so similar that there is no possibility of two different species being represented. It may be the case of individual variation.

43. *Paralabella fulleri* (Ramamurthi)
(Figs. 131 - 133.)

1963. *Labia fulleri* Ramamurthi, *Ann. Mag. nat. Hist.*, (13) 6 : 647, figs. 4 - 6 (M, F; India : Darjeeling dist.).
1989. *Paralabella fulleri*; Steinmann, *Das Tierreich*, 106 : 494, figs. 914 - 915.

Diagnostic characters : General colour smoky brown ; antennae, pronotum, basal portion of elytra and legs yellow. Thickly pubescent.

Head convex; eyes much shorter than the post-ocular area; antennae 13-segmented, 1st segment almost equal to the distance between antennal bases, 3rd segment slightly longer than 4th and almost equal to 5th. Male pronotum slightly broader than long, not expanding posteriorly; legs slender, hind tarsi with 1st and 3rd segments almost equal, 2nd short; elytra well developed; wings wanting. Ultimate tergite and forceps and genitalia of males as seen in figs. 131-132.

Measurements : (M), Length : body - 7.0 mm, forceps - 3.0 mm; (F), Length : body - 7.0 mm, forceps - 2.0 mm.

Remarks : This species is known by its types only. The above description is after Ramamurthi (1963).

Genus 22. *Apovostox* Hebard

1927. *Apovostox* Hebard, *Proc. Acad. nat. Sci. Philad.*, 79 : 29 (Type - *Labia pygidiata* Dubrony, 1879).
1985. *Apovostox*; Srivastava, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 85 : 208 (genus resurrected).

Remarks : Srivastava (1985) has indicated that types of genera *Apovostox* Hebard and *Irdex* Burr are not congeneric, as result of reexamination of Holotype of *Sponogophora nitidipensis* Bormans, 1984. Therefore, the genus *Apovostox* is considered as valid.

Key to species (based on males only)

- 1(2) Eyes about as long as post-ocular area; Pygidium laterally with a single point and parameres long and broad..... *A. stella samsingensis* Srivastava
2(1) Eyes distinctly longer than the post-ocular area; pygidium gently dilated at about middle with lateral margin wavy and parameres distinctly narrowed apically.....*A. burri* Srivastava

44. *Apovostox stella samsignensis* Srivastava
(Figs. 134-135)

1975. *Irdex stella samsingensis* Srivastava, *Dr. B.S. Chauhan Comm. Vol. (Zool. Soc. India)*, 1975 : 270, figs. 3, A-D (M), (F); India : W.B. (Darjeeling dist.).

Material examined : India ; W.B.: Darjeeling dist., Lopchu, 5000 ft., 1 (M), 2 (F) 1 nymph, 21.9.1929 , ex Fungus (*J.C.M. Gardner*; Forest Research Institute, Dehra Dun coll.).

Diagnostic characters : General colour dark brownish black with elytra and wings lighter in colour, latter with a transverse yellow stripe at base; legs yellow, femora blackish brown in basal half; abdomen and forceps reddish brown, former laterally blackish. Sparsely pubescent.

Eyes prominent, about as long as post-ocular area; antennae 15-segmented, 3rd slightly longer than 4th and almost equal to 5th. Legs long and slender, hind tarsi with 1st segment equal to the combined length of 2nd and 3rd. Ultimate tergite and forceps and genitalia of males as seen in figs. 134-135.

Measurements : (M), Length : body - 7.1 - 7.8 mm, forceps - 2.3 - 2.7 mm, (F), Length : body - 7.1 - 7.5 mm, forceps - 1.8 - 2.1 mm.

Distribution : India : W.B. (Darjeeling dist.).

Remarks : So far this species was known by its Type series only.

Srivastava (1975) considered it as Indian race of *Apovostox stella* (Bromans). It comes very close to *Apovostox lita* (Hebard), from Sumatra but differs in having eyes about as long as post-ocular area and distinctive male genitalia.

45. *Apovostox burri* (Srivastava) (Figs. 136-137)

1975. *Irdex burri* Srivastava, Dr. B. S. Chauhan Comm. Vol. (*Zool. Soc. India*), 1975 : 273, figs. 4 AD (M, F; India: W.B. : Darjeeling dist.).

Material examined : India : W.B. Darjeeling dist., Kurseong, 5000 ft. Holotype (M) genitalia mounted between two coverslips and pinned with the specimen), Paratypes 2 (F) 17.9.1909 (*N. Annandale*) - det. by M. Burr, as *Irdex nitidipennis* Borm var.

Diagnostic characters : General colour yellowish brown head, pronotum and abdomen a little darker. Thickly pubescent.

Head convex; antennae 17-segmented, 1st about as long as the distance between antennal bases; 3rd longer than 4th and almost equal to 5th; eyes prominent, distinctly longer than post-ocular area. Male pygidium very much prolonged, declivous and narrowed at base, afterwards flat, dilated in middle , posteriorly incised in middle, posterolateral angles produced into minute points and forceps long, depressed, internally armed with several teeth (fig. 136) and genitalia as seen in fig. 137.

Female forceps simple straight and pygidium declivous with hind ventral margin straight and postero-lateral angles with minute points.

Measurements : (M), Length : body - 6.2 mm, forceps - 3.4 mm; (F), Length : body - 5.9 - 7.4 mm, forceps - 2.4 mm.

Distribution : India : W.B. (Darjeeling dist.); Nil. It is so far known from its type locality only.

Remarks : This species is remarkably close to *Chaetospaina fulleri* Ramamurthi, known from India, W.B., Darjeeling dist., but latter differs by the small eyes, i. e. shorter than post-ocular area and wings wanting. Since both these characters seem to vary within certain limits intraspecifically, it may not be surprising to find both conspecific when in future, a large series is available for study.

Genus 23. *Chaetospaina* Karsch

1867. *Platylabia* (part) Dohrn, *Stettin. ent. Ztg.*, 28 : 347.
 1876. *Labidophora* (part) Scudder, *Proc. Boston Soc. nat. Hist.*, 18 : 297.
 1886. *Chaetospaina* Karsch, *Berl. ent. Ztg.*, 30 : 87 (Type - *Chaetospaina inornata* Karsch, 1886).
 1902. *Sparattina* Verhoeff, *Zool. Anz.*, 25(665) : 198 (Type - *Sparattina flavicolis* Verhoeff, 1902).
 1982. *Chaetospaina*; Srivastava, *Rec. zool. Surv. India*, 79 : 463.
 1990. *Chaetospaina*; Steinmann, *Das Tierreich*, 106 : 174 (under family Sparattinae, tribe Chaetospainini).

Key to species (based on males only)

- 1(2) Pygidium longer than broad, widened in middle, sometimes laterally with a small posteriorly directed spine, a little before middle, hind margin emarginate with angles produced into minute points..... *C. feae* Bormans
- 2(1) Pygidium transverse, widened posteriorly with hind margin straight..... *C. kurseongae* Hebard

46. *Chaetospaina feae* Bormans (Figs. 138-141)

1894. *Chaetospaina feae* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) 14 : 390 (M, F; Burma).
 1910. *Sphingolabis feae*; Burr, *Fauna British India, Dermaptera* : 128, fig. 44.
 1916. *Chaetospaina bakeri* Borelli, *Boll. Musei Zool. Anat. Com. R. Univ. Torino*, 31(715) : 3 (M; Philippine Isls).
 1982. *Chaetospaina feae*; Srivastava, *Rec. zool. Surv. India*, 79 : 478, figs. 1-K and L (M) ultimate tergite and forceps figured).
 1983. *Chaetospaina feae*; Srivastava, *Boll. Mus. reg. Sci. nat. Torino*, 1(2) : 233, figs. 21-23.

Material examined : India : W.B., Darjeeling dist., Samsing, 1450 ft., 2 (M), 1 (F) with genitalia mounted between two coverslips and pinned with the specimen), 23.12.1973; 1 (M) genitalia mounted between two coverslips and pinned with the specimen), 4 (F) 24.12.1973, all under the bark of log (*G.K. Srivastava*).

Diagnostic characters : Head, antennae, pronotum, elytra and wings black; legs yellow; abdomen, pygidium and forceps reddish brown with traces of black on certain body parts. Finely pubescent.

Elytra and wings well developed, punctulated; legs with 1st segment of hind tarsi almost equal to 3rd; 2nd short, broader than long. Male pygidium declivous at base, afterwards flat, narrowed apically, hind margin emarginate, postero-lateral angles produced into minute points, occasionally broadened in middle with a posteriorly directed spine laterally, at a little before half the length. Ultimate tergite and forceps and genitalia as seen in figs. 138-141.

Female forceps simple and straight.

Measurements : (M), Length : body-5.5-5.9 mm, forceps - 2.4-2.5; (F), Length : body - 6.2-6.5 mm, forceps - 1.6 -1.7 mm.

Distribution : India : W.B. (Darjeeling dist.); Arunachal Pradesh. Widely distributed throughout the Oriental Region.

Remarks : Some variations in the shape of male pygidium and the position of inner tooth of forceps are noted.

It commonly occurs under the layers of rotten banana stems and the loose bark of logs and trees.

47. *Chaetospania kurseongae* Hebard
(Figs. 142-144)

1923. *Chaetospania kurseongae* Hebard, *Mem. Dep. Agric. India ent. Ser.*, 7 : 215, pl.19, figs. 10 - 11 (M, F; India: W.B., Darjeeling dist., Kurseong - Types at Philadelphia Academy of Sciences, Philadelphia).
1982. *Chaetospania kurseongae*; Srivastava, *Rec. zool. Surv. India*, 79 : 478, fig. IC (Ultimate tergite and forceps figured).
1987. *Chaetospania kurseongae*; Srivastava, *Boll. Mus. reg. Sci. nat. Torino*, 5 (2) : 230, fig. 7 (Ultimate tergite and forceps of Holotype (M), figured).

Material examined : India : W.B. (Darjeeling dist.), Kurseong, 4500 ft., Holotype (M) Allotype (F), April, 1920 (C. Leigh).

Diagnostic characters : Head pronotum, most of the antennal segments brownish black; a few apical segments of antennae and legs yellow; abdomen yellowish brown; ultimate tergite and forceps dark brown with shades of black. Body pubescent, moderately depressed.

Eyes small, about half as long as post-ocular area; legs short, femora stout, hind tarsi (fig. 141) with 1st segment almost equal to third. Ultimate tergite and forceps of male and females as seen in figs. 143-144.

Measurements : (M), Length : body - 7.5 mm, forceps - 2.58 mm; (F), Length : body - 7.7 mm, forceps - 2.45 mm.

Distribution : India : W.B. (Darjeeling dist.); It is, so far, known from its type locality only.

Remarks : This species differs, in males, from the other Indian species, by its pygidium being transverse, filling the space between branches of forceps, diverging posteriorly with hind margin almost straight.

The material recorded by Borelli (1926) from Philippine Isls. belongs to *Chaetospania borellii* Srivastava and another *Chaetospania* sp. (Srivastava, 1987).

Genus 24. *Chaetolabia* Brindle

1972. *Chaetolabia* Brindle, *Insects of Micronesia*, 5 (2) : 150 (Type - *Labia esakii* Menozzi, 1941).
 1973. *Chaetolabia*; Brindle, *Ann. Mus. Roy. Afr. Centr. Tervuren* in -8, *Zool.*, 205 : 159.
 1976. *Chaetolabia*; Steinmann, *Zool. Anz.*, 197 : 417.

48. *Chaetolabia bihastata* (Borg) (Figs. 145-147)

1904. *Platylabia bihastata* Borg, *Ark. Zool.*, 1 : 572, pl. 26, fig.6 (M; Cameroon).
 1911. *Labia curvicauda*; Burr, *Genera Insect.*, 122 : 56 (partim).
 1948. *Labia bihastata*; Hincks, *Entomologist's mon. Mag.*, 84 : 95 (Ivory Coast; species redescribed).
 1973. *Chaetolabia bihastata*; Brindle, *Ann. Mus. Roy. Afr. Centr. Tervuren*, in -8, *Zool.*, 205 : 160, fig. 201.

Material examined : India : W.B., Darjeeling dist., Around Khumani Forest, Khumani, 3 (M), 3 (F), 22.12.1973; Dalingkot, 4 km N of Gorubathan, 1300 ft., 2 (M), 1 (F), with genitalia mounted between two coverslips and pinned with the specimen), 3 (M), 1 nymph, 20.12.1973; Thumthangkhol, 13 Km S of Rangpo, 2 (M), 28.12.1973; Karmakta nr Singla, 1 (M), 3.1.76; Churanti Forest, Chunabhati, nr Bagrakot, 1 (M), 28.12.1973, Jhalung 1000-1400 ft., 3 (M), 6 (F) and 1 nymph, 23.12.1973, all collected under bark of logs (G.K. Srivastava).

Diagnostic characters : General colour yellowish brown to dark brown with shades of blackish brown on certain body parts. Finely pubescent.

Head about as long as broad, weakly convex; eyes small, about 1/3 as long as the post-ocular area. Pronotum slightly longer than broad; elytra well developed and wings projecting beyond elytra as narrow lateral lobes. Legs with 1st segment of hind tarsi about as long as the 3rd; 2nd short, broader than long. Ultimate tergite and forceps and genitalia of males and ultimate tergite and forceps of females as seen in figs. 145-147.

Measurements : (M), Length : body - 4.0 - 5.1 mm, forceps - 1.3 - 1.5 mm; (F), Length : body - 3.5 - 5.0 mm, forceps - 1.0-1.3 mm.

Distribution : India : W.B. (Darjeeling dist.).

Also known from West Central Africa (Ivory Coast, eastwards to Cameroon in Africa).

FORFICULOIDEA
CHELISOCHIDAE
CHELISOCHINAE

Key to genera (base on males only)

- 1(8) Elytra and wings smooth and glabrous; genitalia with parameres four to five times longer than broad, occasionally feebly dilated in middle or feebly emarginate apically, a little before apex
- 2(7) Tibiae sulcate above in distal half
- 3(4) Head strongly depressed; pronotum quadrate; legs with tarsi short; genitalia with parameres feebly emarginate apically, a little before apex.....*Laprophorella* Majoberg
- 4(3) Head comparatively less depressed; pronotum generally longer than broad and generally dilated posteriorly; legs with tarsi long; genitalia with parameres long and narrow, sometimes gently dilated at about middle
- 5(6) Distal segments of antennae long and slender; elytra and wings yellow, often with fuscous markings.....*Proreus* Burr.
- 6(5) Distal segments of antennae broad and short; elytra and wings unicolours dark.....*Chelisoches* Scudder
- 7(2) Tibiae smooth above, only at extreme apex sulcate; wings with metallic lustre.....*Adiathetus* Burr
- 8(1) Elytra and wings punctured and pubescent; genitalia with parameres twice as broad as long, greatly dilated in middle.....*Hamaxas* Burr

Genus 25. *Proreus* Burr

1907. *Proreus* Burr, *Trans. R. ent. Soc. Lond.*, 1907 : 129 (Type - *Forficula simulas* Stal, 1860).
 1910. *Proreus*; Burr, *Fauna British India, Dermaptera* : 136.
 1968. *Proreus*; Popham and Brindle, *Entomologist*, 101 : 133.
 1976. *Proreus*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 2 : 49.

Key to species (based on males only)

- 1(1) Elytra yellow with a fuscous band laterally; wings present; ultimate tergite with two pairs of compressed tubercles in the posterior median depression; forceps long (2.9 - 7.2 mm) and slender with several small and large teeth internally.....*P. abdominalis* Ramamurthi
- 2(2) Elytra unicolours, wings absent; ultimate tegite with two pairs of tubercles on posterior margin; forceps short (1.5 - 2.5 mm), stout, internally at base with a sharp trinagular tooth, otherwise unarmed..... *P. tezpurensis* (Srivastava)

49. *Poreus tezpurensis* (Srivastava)
(Figs. 148-149)

1969. *Hamaxas tezpurensis* Sivastava, *Zool. Anz.*, **182** : 136, figs. 1-3 (M, (F; India; Assam, Tezpur).
1976. *Proreus tezpurensis*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, **2** : 50.

Material examined : India : W.B., Nadia dist., Raghunathpur, 2 (M), 2 nymphs, 10.11.1977, ex leaf base of sugar cane (*P. Dey*).

Diagnostic characters : Head, antennae dark brown; pronotum dark brown with sides pale; legs light brown and abdomen and forceps blackish brown Form depressed and pliose.

Elytra abbreviated with axillary angle rounded off to show a small scutellum; wings rudimentary, concealed below elytra. Male penultimate sternite broadly rounded posteriorly; ultimate tergite with posterior margin gently concave in middle with two pairs of compressed tubercles projecting posteriorly, inner pair situated in middle and external pair over the base of forceps close to inner margin. Ultimate tergite and forceps and genitalia as seen in figs. 148-149.

Measurements : (M), Length : body-8.5 - 9.1 mm, forceps - 1.5 - 2.6 mm; (F), Length : body - 10.1-11.5 mm, forceps - 2.0 - 2.8 mm.

Distribution : India : W.B. (Nadia dist. - first record); Assam and Tripura.

Remarks : Some variations exist in the length of forceps; they may be either short, stout and strongly curved or elongated, slender and comparatively less curved.

This species occurs commonly under the sugar cane internode scales or in leaf crown.

50. *Proreus abdominalia* Ramamurthi
(Figs. 150-151)

1965. *Proreus abdominalis* Ramamurthi, *Ann. Mag. nat. Hist.*, (13) **8** : 61, figs. 8-10 (M, (F; India: Tamil Nadu).
1976. *Proreus simulans abdominalis* ; Srivastava, *Rec. zool. Surv. India, Occ. Pap.*, **2**:50.
1987. *Proreus abdominalis*; Steinmann, *Annls hist. nat. Mus. natn., hung.*, **79** : 117.
1989. *Proreus simulaus abdominalis*; Srivastava, *Fauna of Orissa, State Fauna Series (Zool Surv.)*, **1** : 164, figs. 32 - 34.

Material examined : India : W.B., Mednipur dist., Kharagpur, 1 ex (broken), 17-30.4.1911 (Hodgart); Mahisadal, 1 (M) 1 (F), 5.7.1984 (*G.K. Srivastava*); Calcuta, Eden Garden, 4 (M), 7 (F), in 2 exs. abdomen missing), 11.10.1907, 1.5.1909 and 17-26.10.1911 (*F.H. Gravely*).

Diagnostic characters : General colour yellowish brown; head orange red; pronotum yellowish laterally; legs yellowish; elytra and wings yellowish with a fuscous band along the internal and external margin.

Antennae 25-segmented, segments long and slender, 3rd slightly longer than 4th and shorter than 5th. Male Pygidium transverse, subvertical truncate posteriorly, often convex; forceps and genitalia as seen in figs. 150-151.

Measurements : (M), Length : body - 9.6-13.2 mm, forceps - 4.1 - 7.2 mm; (F), Length : body 10.3 - 12.4 mm, forceps 3.9 - 4.9 m.

Distribution : India : *W.B.* (Calcutta and Medinipur dists.); Assam, Tamil Nadu and Maharashtra. Also reported from Burma.

Remarks : It was considered as a sub-species, representing Indo-burmese race, of *P. simulans* in view of the constancy in the male forceps considered as independent valid species.

Genus 26. *Adiathetus* Burr

1907. *Adiathetus* Burr, *Tans. R. ent. Soc. Lond.*, 1907 : 132 (Type - *Chelisoches shelfordi* Burr, 1900).
 1910. *Adiathetus*; Burr, *Fauna British India, Dermaptera* : 141.
 1976. *Adiathetus*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 2:52.

51. *Adiathetus glaucopterus* (Bormans) (Figs. 152-154)

1888. *Chelisoches glaucopterus* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (21) 6 : 441, figs. (F; Burma).
 1911. *Adiathetus glaucopterus*; Bey-Bienko, *Ent. Obozr.*, 38 : 615, figs. 32-33 (M), (F); China.
 1985. *Adiathetus glaucopterus*; Srivastava, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 85:228, fig. 54-59 (figures drawn from Type (F)).

Material examined : India : *W.B.*, Darjeeling dist., Sombarihat, 2 km N of Gorubathan, on Lava road, 1200 ft., 6 (M), 5 (F), ex scar on tree trunk, 17.12.1973 (*G.K. Srivastava*); Lodhama, 2 (F), 30.3.1978 (*A.R. Bhowmik*).

Diagnostic characters : General colour reddish brown; antennae brown to blackish; pronotum, elytra and wings black with a metallic greenish sheen, rarely dull.

Antennae 20-segmented, 1st about as long as the distance between antennal bases; 2nd short; 3d longer than 4th but equal to 5th. Legs long and slender; tibia smooth above, sulcate only at extreme apex. Male pygidium transverse, subvertical, narrowed posteriorly with angles acute. Ultimate tergite and forceps and genitalia of males; ultimate tergite and forceps of females as seen in figs. 152-154.

Measurement : (F), Length : body 13.2 - 16.7 mm, forceps - 5.2 - 6.4 mm; (F), Length : body 14.5 - 15.8 mm, forceps 4.4 - 4.7 mm.

Distribution : India : *W.B.* (Darjeeling dist. - first record); Assam and Arunachal Pradesh. Also recorded from Burma, China (South) and Vietnam.

Remarks : The striking bluish-green metallic lustre on elytra and reddish brown abdomen and forceps, of male, make it easy to recognize.

It commonly occurs under the loose bark of old trees or scars on stems. On slightest provocation it tries to run away swiftly to some safer dark place especially under stones or any crack in the bark.

Genus 27. *Laprophorella* Mjoberg

1911. *Lamprophorus* Burr, *Genera Insect.*, 122 : 66 (Type - *Mecomera kervillei* Burr, 1905).
 1924. *Laprophorella* Mjoberg, *Ark. Zool.*, 16 (21) : 10 (as foot note - new name for *Lamprophorus* Burr, 1911 since name preoccupied for *Lamprophorus* Gemminger and Harold, 1869, Coleoptera).

Remarks : Although Mjoberg (1924 : 10) clearly mentions *Laprophorella* as replacement name for *Lamprophorus* Burr 1911, but *Lamprophorella* is being used by subsequent authors, perhaps due to oversight. Srivastava (1976) in his Catalogue has correctly used the name as *Laprophorella*.

52. *Laprophorella kervillei* (Burr) (figs. 155-157)

1905. *Mecomera kervillei* Burr, *Ann. nat. Mag. Hist.*, (7) 16 : 489 (M; Java).
 1911. *Lamprophorus kervillei*; Burr, *Genera Insect.*, 122 : 66, pl. 6, figs. 7, a-b.
 1913. *Lamprophorus kervillei*, Burr, *Rec. Indian Mus.*, 8 (2) : 143 (M, (F; India : Arunachal Pradesh).
 1924. *Laprophorella kervillei*, Mjoberg, *Ark. Zool.*, 16 (21) : pl.1, fig. 2d.

Material examined : India : W.B. 24-Parganas dist., Keraiwa (nr Barasat), 7 (M), 5 (F), ex Bamboo leaf sheath, 13.12.77 (*G.K. Srivastava*); Calcutta, Dum Dum, 1 (F), 30.10.1986 (*S.K. Saha*); Hooghly dist., Chandannagar, 1 (M), 2.4.1978, ex bamboo leaf sheath; Darjeeling dist., Kurseong, Bongbasti, 3900 ft., 1 (M), genitalia mounted between two coverslips and pinned with the specimen), 1 nymph, 3.1.1974, ex "bamboo scales"; Singla, 5.1.76, ex. bamboo sheath (*G.K. Srivastava*).

Diagnostic characters : General colour brown to yellowish brown; head often yellowish elytra dark brown or black; wings yellowish brown; abdomen blackish on sides; legs clear yellow and forceps reddish but blackish in apical half.

Head strongly depressed, legs short, tibiae grooved in apical half, hind tarsi (fig. 155) with first segment slightly shorter than third, clad with thick hairs on underside. Ultimate tergite and forceps and genitalia of males as seen in figs. 156-157.

Measurements : (M), Length : body - 10.0 - 13.7 mm, forceps 2.5 - 3.0 mm; (F), Length : body - 9.0 - 11.7 mm, forceps - 2.9 - 4.5 mm.

Distribution : India : W.B. (Hooghly, Calcutta, South 24-Parganas and Darjeeling dists); Assam and Arunachal Pradesh. Also recorded from Java.

Remarks : Male forceps may be short and stout with a bifid tooth internally at base followed by

smaller ones or long and slender with a bifid tooth at base, afterwards unarmed.

It commonly occurs under the bamboo scales present at the internodes. From the same habitat it has been collected from plains and hills up to an alt. 3900 ft. in West Bengal.

Genus 28. *Hamaxas* Burr

1907. *Hamaxas* Burr, *Trans. R. ent. Soc. Lond.*, 1907 : 133 (Type - *Chelisochea feae* Bormans, 1894).

Key to species (based on males only)

- 1(2) General colour brownish black; forceps armed internally with a sharp tooth at base and another one at about middle; parameres with outer angle somewhat rounded.....*H. feae* (Bormans)
- 2(1) General colour orange; forceps (in forma cyclolabia) internally armed with a distinct tooth in middle and (in forma macrolabia) at base with a dorsal and ventral tooth followed by a faint tooth in middle; parameres with outer angle obtuse.....*H. melanocephalus* (Dohrn)

53. *Hamaxas feae* (Bormans)
(Figs. 158-160)

1984. *Chelisochea feae* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) 14 : 393 (M, F; Burma).
1907. *Hamaxas feae*; Burr, *Trans. R. ent. soc. Lond.*, 1907 : 134.
1976. *Hamaxas feae*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, 2 : 54 (India : Arunachal Pradesh and other countries in Oriental Region).
1981. *Hamaxas fce*; Srivastava, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 83 : 297, figs. 24-29 (Lectotype and Paralectotypes designated).

Material examined : India : W.B., Darjeeling dist., Singhla Bazar, 400 m, 3 (M), 7 (F) and 4 nymphs, 5.1.1976, ex rotten banana stem (*G.K. Srivastava*).

Diagnostic characters : General colour brownish black; head, pronotum, elytra and wings black; pronotum laterally and legs yellow. Finely and densely pubescent.

Head depressed, occiput feebly raised. Pronotum, elytra and wings punctulated, densely pubescent. Male pygidium vertical, longer than broad, gently narrowed posteriorly, hind margin feebly concave, postero-lateral angles with minute points. Ultimate tergite and forceps and genitalia, of males, as seen in figs. 158 - 160.

Measurements : (M), Length : body - 6.6 - 7.7 mm, forceps - 1.6 - 2.7 mm; (F), Length : body - 7.0 - 8.3 mm, forceps - 1.4 - 1.5 mm.

Distribution : Reported for the first time from India on the basis of above material. Also recorded from Burma, Sumatra, New Guinea and New Zealand.

Remarks : Male forceps may be short, stout and depressed or comparatively longer.

This species generally occurs under the layers of rotten banana stems.

54. *Hamaxas melanocephalus* (Dohrn)
(Figs. 161-163)

1865. *Lobophora melanocephala* Dohrn, *Stettin. ent. Ztg.*, 26 : 75 (M, F; India, Tranquebar).
1876. *Chelisoche melanocephalus*; Scudder, *Proc. Boston nat. Soc.*, 18 : 308.
1907. *Proreus melanocephalus*; Burr, *Trans. R.ent. soc.*, 1907 : 130.
1923. *Proreus melancephalus*; Hebard, *Mem. Dep. Agric. India ent. Ser.*, 7 : 220.
1927. *Hamaxas melanocephalus*; Hebard, *Proc. Acad. nat. Sci. Philad.*, 79 : 44.

Material examined : India : W.B., Calcutta, in house, Muscum premises 1 (M), genitalia mounted between two coverslips and pinned with the specimen), 7.4.1912 (*F.H. Gravely*).

Diagnostic characters : General colour reddish orange; head black; abdomen shaded with black laterally. Elytra, wings and abdomen punctulate and pubescent.

Male ultimate tergite (in forma cyclolabia) faintly tumid above bases of forceps and the area in-between strongly sloping, depressed with two pairs of compressed tubercles or (in forma macrolabia) faintly tumid above the roots of forceps with area in middle depressed and hind margin thickened. Pygidium may be subvertical and trapezoidal (f. cyclolabia) or transverse, divisible into two triangular lobes (f. macrolabia). Ultimate tergite and forceps of cyclolabic as well as macrolabic males and genitalia as seen in figs. 161-163.

Measurements : (M), Length : body - 7.7 - 9.6 mm, forceps - 1.4 - 2.7 mm; (F), Length : body - 6.7 - 9.8 mm; forceps - 1.4-1.9 mm.

Distribution : India : W.B. (Calcutta and Darjeeling dists.); Maharashtra, Bihar, Uttar Pradesh and Tamil Nadu. Also reported from Burma and Java.

FORFICULIDAE
COSMIELLINAE

Genus 29. *Liparura* Burr

1907. *Liparura* Burr, *Trans. R.ent. Soc. Lond.*, 1907 : 119 (Type - *Neolobophora asiatica* Bormans (in Bolivar, 1897)).
1910. *Liparura* Burr, *Fauna British India, Dermoptera* : 181 (Type - *Lipaura punctata* Burr, 1910 - designated by Burr).

Key to species (based on males only)

- 1(4) Pronotum weakly transverse or about as long as broad; forceps sub-contiguous or remote and straight in basal half, afterward strongly incurved

- 2(3) Pronotum weakly transverse, forceps sub-contiguous, with a ridge above close to internal margin in basal one third only..... *L. punctata* Burr
- 3(2) Pronotum about as long as broad; forceps remote, without a ridge above, generally armed with a large triangular tooth at a little beyond middle, directed internally, sometimes internal tooth weakly marked.....*L. debrepaniensis* Kapoor Bharadwaj and Banerjee
- 4(1) Pronotum longer than broad; forceps remote, gradually curving from base to apex, internally a little beyond middle armed with a small tooth followed by another weaker tooth, sometimes second tooth poorly marked..... *L. dentata* Srivastava

54. *Liparura punctata* Burr
(Figs. 164-167)

1907. *Liparura asiatica*, Burr, nec Bormans), *Trans. R. ent. soc. Lond.*, 1907 : 119, 1 M Darjeeling, 1 F Pedong, in India, W.B., not in Sikkim and Bhutan - Paris Museum.
1908. *Neolobophora asiatica*; Burr, *Bull. Mus. nat. Paris*, 2 : 117.
1910. *Liparura punctata* Burr, *Fauna British India, Dermaptera* : 182.
1972. *Lipaura punctata* ; Borelli, *Boll. Lab. Zool. Gen. Agr. Portici*, 20 : 77.
1977. *Lipurara punctata*; Srivastava, *Orient. Insects*, 11 (2) : 189, figs.3 a-d.

Material examined ; India, W.B., Darjeeling dist., Rangirun, 6000 ft., 1 (M), 1 ex (hind portion of abdomen only), 3.9.1929 (*J.C. Gardner*, Forest Research Institute, Dehra Dun coll.), Balasone Basti, 2 km E. of Sukiapokri, 1800 m, 1 (M), 2 (F), 18.2.1973, Hill Forest, above Hima Falls, 4 Km W. of Bhanjang, 2150 m, 1 (F), 21.3.1973 (*P.K. Maiti*).

Diagnostic characters : General colour dark brownish black except antennae, tibiae and tarsi yellowish brown.

Antennal segments long, slender, 1st stout, longer than the distance between antennal bases; 3rd and 4th almost equal but both shorter than the 5th.

Elytra abbreviated, axillary angles rounded off to show transverse scutellum, costal margin, with a sharp ridge, hind margin obliquely truncate. Wings wanting. Legs slender, hind tarsi with 1st segment compressed, slightly longer than the combined length of 2nd and 3rd. Ultimate tergite and forceps and genitalia of males as seen in figs. 166-167.

Measurements : (M), Length : body - 10.6 - 11.0 mm, forceps - 7.6 - 7.2; (F), Length : body - 10.5 - 10.7 mm, forceps, 3.2-4.3 mm.

Distribution : India : W.B. (Darjiling dist.). Also reported from China (Yunnan).

55. *Lipaura dentata* Srivastava
(Figs. 168-175)

1977. *Liparura dentata* Srivastava, *Orient. Insects*, 11 (2) : 190, figs. 33 e-h.

1983. *Brachylabis tegminata* Steinmann, *Revue suisse Zool.*, 90(3) : 547, figs. 5 (F); India: W.B., Darjeeling dist.)
- *Syn.n.*

Material examined : India : W.B., Darjeeling dist., Rescium Forest, 4 km from Algarh (not Aligarh) on road to Lava, 6200 ft. Holotype (M), Paratypes 6 (M), 8 (F), 1 nymph (*Laparura dentata* Srivastava, 1977), 1.1.1974 (*G.K. Srivastava and P.K. moiti*); Algarah-Labha, 1900 m, Holotype (F), *Brachylabis tegminata* Steinmann, 1983), 11.10.78 (*Besuchet Lobl*).

Diagnostic characters : General colour dark brownish black except antennae, tibiae and tarsi yellowish brown.

Pronotum weakly transverse, slightly narrowed posteriorly, elytra abbreviated, smooth, axillary angles rounded off, showing scutellum, costal margin with a sharp ridge, hind margin obliquely truncate; wings wanting and abdomen deeply punctate. Ultimate tergite and forceps and genitalia of males as seen in figs 171-172.

Measurements : (M), Length : body - 9.2-10.0 mm, forceps- 3.4 - 3.5 mm; (F), Length : body - 9.2 - 13.1 mm, forceps - 2.9 - 3.4 mm.

Distribution : India : W.B. (Darjeeling dist.). It is so far known from the Type locality only,

Remarks : The 'Holotype male of *Brachylabis tegminata* Steinmann, was examined. since it possesses second tarsal segment lobed and elytra with a sharp ridge along the costal margin it is a member of genus *Liparura* Burr. It has been compared with Paratype females of *Liparura dentata* Srivastava, and found to be conspecific and treated here as the synonym of latter.

Besides, it may be mentioned that 'Type locality' of both these species is almost the same, may be only a few km apart on Alagarh- Lava road (India : W.B., Darjeling dist.).

56. *Liparura debrepaniensis* (Kapoor, Bharadwaj and Banerjee)
(Figs. 176-178)

1971. *Eparchus debrepanieasis* Kapoor, Bharadwaj and Banerjee, *Bull. Ent.*, 12(1) : 38 (M, F; India, W.B. : Darjeeling dist., Debrepani, 6000 ft. and Rangirun, 6000 ft..
(In press) *Liparura debrapaniensis* : Srivastava, *Rec. zool. Surv. India*.

Material examined : India : W.B., Darjeling dist., Takadah, 1 (M), (genitalia mounted between two coverslips and pinned with the specimen), 6.4.1978 (*A.R. Bhowmik*); Debrapani, 6000 ft., 9 (M), 6 (F), 22.10.1961 (*E.S. Ross and D.Q. Cavagnaro* - California Academy of Sciences, San Fancisco, U.S.A.).

Diagnostic chracters : General colour dark brownish black to brown; antennae, tibiae and tarsi lighter in colour.

Antennae with basal segment longer than the distance between antennal bases; pronotum about

as long as broad; elytra abbreviated; ridge present at costal margin, hind margin obliquely truncate; abdomen spinrle shaped, convex, punctation shallow and distally placed; legs long and slender. Male forceps with branches depressed, almost straight up to a little beyond middle, at this point internally armed with a sharp tooth, afterward strongly incurved. Ultimate tergite and forceps and genitalia of males as seen in figs. 177-178.

Measurements : (M), Length : body - 10.5 - 12.0 mm, forceps - 4.6 - 5.0 mm; (F), Length : body - 10.2-11.5 mm, forceps - 4.0-4.5 mm.

Distribution : India : W.B. (Darjeeling dist.).

Remarks : This species comes close to *L. punctata* Burr and *L. dentata* Srivastava, both known from Darjeeling dist., W.B., but differs from the former in having the branches of forceps depressed and internally armed at a little beyond middle with a tooth and from the latter by shallow punctation on abdominal tegites; and forceps, in males, with branches almost staight in a little beyond middle and afterwards strongly bowed.

OPISTHOCOSMIINAE

Key to genera (based on males only)

- 1(2) Antennae with basal segment thick clubbed, remaining thinner; legs comparatively short, femora especially anterior pair thick, hind tarsi with 1st segment almost equal to 3rd and 2nd broadly lobed.....*Timomenus* Burr
- 2(1) Antennae with 1st segment stout but not clubbed, remaining thin; legs long and slender, hind tarsi with 1st segment distinctly longer than 3rd and 2nd briefly lobed.
- 3(4) Pronotum truncate anteriorly; sides of certain abdominal segments often with small tubercles, but not recurved; forceps cylindrical, often undulated and armed on upper surface with vertical teeth *Eparchus* Burr
- 4(3) Pronotum concave anteriorly; sides of abdominal segments gently recurved; forceps depressed *Hypurgus* Burr

Genus 30. *Timomenus* Burr

1907. *Timomenus* Burr, *Trans. R. ent. soc. Lond.*, 1907 : 96 (Type- *Opisthocosmia oannes* Burr, 1900).
1907. *Rhadamanthus* Burr, *Trans. R. ent. Soc. Lond.*, 1907 : 121 (Type - *Forficula lobopharoides* Dohrn, 1865).

Key to species (based on males only)

- 1(2) General colour blackish brown; head, sides of pronotum and legs yellow; forceps remote, almost straight, incurved at apices, internally at about middle with a sharp flattened tooth directed posteriorly..... *T. brahma* (Burr)

- 2(1) General colour shining black with metallic lusture; elytra dull; forceps with branches elongated, subcontiguous at base, diverging and incurved afterwards, inner margin denticulated in basal one fourth , at the end of this, armed with an upper triangular, vertical tooth, a little beyond middle internally a small sharp tooth present..... *T. lugens* (Bormans)

57. *Timomenus brahma* (Burr)
(Figs. 179-182)

1904. *Opisthocosmia bahma* Burr, *Trans. R. ent. soc. Lond.*, 1904; 310 (M; India Borealis, Darjeeling).
1907. *Kosmetor brahma*; Burr, *Trans. R.ent. Soc. Lond.*, 1907 : 123, pl.4, fig. 12.
1975. *Timomensus brahma*; Brindle, *Ent. Basiliensia*, 1 : 57, fig. 63.

Material examined: India: Sikim, Deorali nr Gangtok, 1425m, 1 (M), genitalia mounted between two coverslips and pinned with the specimen), 1 (F), 14.4.1981, ex orchid leaves (*R.K. Varshney*); Arunachal Pradesh : Subansiri dist., Lekhabali, 50 m, 1 (F), 7.10.1966 (*S.K. Tandon* and *G.S. Arora*), Chukru, 1128m, 1 (F), 22.5.1966 (*A. N.T. Joseph*) and Siang dist., Renjing, 665 m, 1 (M) Head and pronotum missing, 19.12.1911, at light (det. by M. Burr) (*S.W. Kemp*).

Diagnostic characters: General colour blackish brown; head, one or two antepical segments of antennae; sides of pronotum and legs yellow; inner wing tip with a small yellow spot.

Pronotum about as long as broad, sides parallel, hind margin rounded; elytra and wings well developed smooth; legs long and slender, hind tarsi with 1st segment compressed and almost equal to 3rd; abdomen punctulated. Ultimate tergite and forceps and genitalia as see in figs. 181-182.

Measurements : (M), Length : body - 11.0 - 12.0 mm, forceps - 5.2 - 5.6 mm; (F), Length : body - 8.2 - 10.0 mm, forceps - 3.2 - 3.9 mm.

Distribution : India : W.B. (Darjeeling dist.); Sikkim and Arunachal Pradesh. Also recorded from Bhutan.

Remarks : Since no material was available from India : W.B., the above diagnosis is based upon the material from Sikkim and Arunachal Pradesh preserved in the Zoological Survey of India collections.

58. *Timomenus lugens* (Bormans)
(Figs. 183-185)

1904. *Opisthocosima lugens* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) 14 : 398 (M; Burma).
1905. *Opisthocosmia aesculapius* Bur, *Bol. R. Soc. Espan. Nat.*, 1905 : 230 (M), Bhutan.
1907. *Eparchus lugens*; Burr, *Trans. R. ent. Soc. Lond.*, 1907 : 121.
1910. *Timomenus lugens*; Burr, *Fauna British India, Dermaptera* : 198.
1987. *Timomenus lugens*; Srivastava, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 35 : 504, figs. 58 - 73 (Lectotype & Paralectotypes designated and figured).

Material examined : India : W.B. Darjeeling, dist., Kalimpong, 3 (M), 2 (F), 3.1.1974, ex base

of Sugar Cane leaf (*G.K. Srivastava*); 1243 m, 1 (M), 23.5.1975 (*M.S. Shishodia*).

Diagnostic characters : General colour shining black with metallic lusture, elytra dull and wing tips internally with a yellow patch.

Hind tarsi with 1st segment almost equal to 3rd; 2nd lobed. Male abdominal segments 6th to 9th on sides obtuse angled posteriorly with a faint oblique ridge and with a tubercle or tubercles; pygidium rounded, postero-laterally below with minute points. Ultimate tergite and forceps and genitalia as seen in figs. 184-185.

Measurement : (M), Length : 8.7 - 11.8 mm, forceps - 4.5 - 10.1 mm; (F), Length : body - 8.4-10.5 mm, forceps - 4.3 - 5.4 mm.

Distribution : India : *W.B.* (Darjeeling dist.); Sikkim and Arunachal Pradesh. Also recorded from Burma, China (Yunnan) and Malayasia.

Remarks : It has been noted that variations exist in general body colour, size and build and the shape of sides of abdominal segments.

Genus 31. *Eparchus* Burr

1907. *Eparchus* Burr, *Trans. R.ent. Soc. Lond.*, 1907 : 120 (Type - *Forficula insignis* Haan, 1842).
 1908. *Taipinia* Shiraki, *Trans. Sappao nat. Hist. Soc.*, 2 (1-2) : 105 (Type - *Taipinia pulla* Shiraki, 1908).
 1911. *Narberia* Burr, *Genera Insect.*, 122 : 94 (Type - *Opisthocosmia biroi* Burr, 1902).

Key to species (based on males only)

- 1(2) Sides of abdominal segments 5 or 5-8 with a conical tubercle; forceps horizontal at base with a strong rounded tubercle above, often weakly developed.....*E. insignis* (Haan)
 2(1) Sides of abdominal segments 7-9 convex or obtuse angled with an oblique serrated ridge, sometimes ridge absent; forceps undulated with a faint ridge or strong tooth above close to inner margin at basal two thirds..... *E. simplex* (Bormans)

59. *Eparchus insignis* (Haan) (Figs. 186 - 187)

1842. *Forficula insignis* Haan, *Verh. nat. Gest. nederl. Overz. Bezitt* : 243, fig. 15 not fig. 14 as mentioned in the text (M, F; Java).
 1865. *Opisthocosmia insignis*; Dohrn, *Stettin.ent. Ztg.*, 26 : 81.
 1907. *Eparchus insignis*; Burr, *Trans. R. ent. soc. Lond.*, 1907 : 121.
 1954. *Eparchus insignis* (Hann) var. *inermis* Boeseman, *Zool. Verh., Leiden*, 21:114.

Material examined : India : *W.B.*, Tindharia, 4 (M), 26.3.1979, ex under heap of garbage, 1 (M), 26.3.1978, ex carry leaf flower; Tung, 2 (F), 25.3.1978, ex grass roots; Rambli, 1 (F) 4.4.1973, ex. grass;

Mahanandi, 1 (F), 26.3.1978, ex under stones (A.R. Bhowmik); Kurseong, 1432.5-1524 m, 1 (M), 27.4.1910 (N. Annandale).

Diagnostic characters : General colour dark brownish black, often lighter, sometimes elytra yellowish brown with a yellow spot.

Elytra and wings well developed; legs long and slender, hind tarsi with 1st segment distinctly longer than the remaining two segments together. Sides of abdominal segments 6th to 8th, in males, tuberculated. Ultimate tergite and forceps and genitalia of males as seen in figs. 186-187.

Measurements : (M), Length : body - 7.8 - 10.4 mm, forceps - 3.9 - 5.6 mm; (F), Length : body - 8.2 - 10.5 mm, forceps - 2.3 - 3.4 mm.

Distribution : India : W.B. (Darjeeling dist.); Tamil nadu, Uttar Pradesh, Sikkim, Assam and Arunachal Pradesh. Also reported from Sri Lanka, Nepal, Burma, Indo-China, Sumatra, Java, Celebes and Hainan.

Remarks : The colour of elytra and wings is extremely variable; often yellow elytral spot is poorly marked. The lateral abdominal tubercles and basal vertical tooth of forceps, in males, are often obsolete.

60. *Eparchus simplex* (Bormans)
(Figs. 188-190)

1894. *Opisthocosmia simplex* Bormans, *Annali Mus. civ. Stor. nat. Giacomo doria*, (2) 14:396 (M, (F; Burma).
1910. *Hypurgus simplex*; Burr, *Fauna British India, Dermatera* : 189.
1911. *Narberia simplex*; Burr, *Genera Insect.*, 122: 95.
1912. *Eparchus oberthuri* Borelli, *Bull. Mus. Hist. nat. Paris*, 18 : 239, fig. 4 (M,F; Bhoutan anglais).
1923. *Eparchus inermis* Hebard, *Mem. Dept. Agric. India, Ent. Ser.*, 7 : 237, pl. 21, fig. 29 (M; Shilong, Khasi Hills, Assam now Meghalaya).
1959. *Eparchus panfilovi* Bey-Bienko, *Ent. Obozr.*, 38 (3) : 62 (M; China : Yunnan).
1981. *Eparchus simplex*; Srivastava *Annali Mus. civ. Stor. nat. Giacomo Doria*, 83 : 302, figs. 42 - 50 (Lectotype and Paralectotypes designated and figured).

Material examined : India : W.B., Darjeeling dist., Rescium forest, 6200 ft., 4 km from Alagarh on Lava Road, 5 (M), 2 (F), 1.1.1974 (G.K. Srivastava).

Diagnostic characters : General colour dark blackish brown; head lighter ; wings with a basal yellow spot externally and forceps reddish brown. Finely pubescent.

Legs long and slender, hind tarsi with 1st segment distinctly longer than remaining two together. Male abdominal segments on sides 7th convex, 8th & 9th obtuse angled with a serrated ridge but sometimes segments convex, not recurved and without ridge; ultimate tergite posteriorly with one or two tubercles laterally or with a sharp oblique fold only and forceps undulated with a faint ridge or short crest above close to inner margin in basal one fourth or depressed and horizontal.

Measurements : (M), Length : body - 8.7 - 12.7 mm, forceps - 3.3 - 8.1 mm; (F), Length: body - 11.0 - 11.1 mm, forceps - 5.6 - 5.8 mm.

Distribution : India : *W.B.* (Darjeeling dist.) ; Arunachal Pradesh. Also recorded from Nepal, Bhutan, Burma and China.

Genus 32 *Hypurgus* Burr

1907. *Hypurgus* Burr, *Trans. R.ent. Soc. Lond.*, 1907 : 101 (Type - *Opisthocosmia humeralis* Kirby, 1891).
 1911. *Thalperus* Burr, *Genera Insect.*, 122 : 92 (Type-*Hypurgus kuhlgatzi* Burr, 1909).
 1923. *Sadiya* Hebard, *Mem. Dep. Agric. India Ent. Ser.*, 7 (11) : 230 (Type - *Sadiya grata* Hebard, 1923).

61. *Hypurgus humeralis* (Kirby) (Figs. 191-192)

1891. *Opisthocosmia humeralis* Kirby, *J. Linn. Soc. Zool.*, 23 : 523 (F; Ceylon).
 1907. *Hypurgus humeralis*; Burr, *Trans. R.ent. soc. Lond.*, 1907 : 101.
 1911. *Hypurgus humeralis* var. *vittatus* Burr, *J. Asiat. soc. Bengal*, 7(11) : 799.

Material examined : India : *W.B.*, Jalpaiguri dist., Banarhat, 1 (M), 1 (F), 24.8.1908, flying to light between rain storm (*I.H. Burkhil*).

Diagnostic characters : General colour blackish brown; elytra with a yellow spot on humeral angle and wings yellowish in basal half and sometimes with an oval spot.

Antennae 12-segmented, 3d & 4th equal but both shorter than 5th; pronotum about as long as broad, anterior margin concave with lateral angle projecting. Elytra and wings well developed. Ultimate tergite and forceps and genitalia of males as seen in figs. 191-192.

Measurements : (M), length : body - 7.4 - 9.4 mm, forceps - 2.1 - 2.2 mm; (F), Length : body 8.1-10.6 mm, forceps - 2.0 - 2.1 mm.

Distribution : India : *W.B.* (Jalpaiguri dist.); Karnataka, Madhya Pradesh, Orissa and Assam. Also recorded from Sri Lanka, Burma, China (Yunnan) and Borneo.

EUDOHRNIINAE

Genus 33. *Pterygida* Verhoeff

1902. *Pterygida* Verhoeff, *Zool. Anz.*, 25 (665) : 197 (Partim).
 1904. *Pterygida*; Kirby, *Syn. cat. Orth.*, 1 : 44 (*Forficula Jagori* Gohrn, 1865 - designated as the Type).
 1907. *Kosmetor* Bur, *Trans. R. ent. Soc. Lond.*, 1907 : 123 (Type - *Opisthocosmia annandalai* Burr, 1907).
 1984. *Pterygida*; Srivastava, *Bull. zool. Surv. India*, 5 (2&3) : 162 (Genus redescribed and proposed synonymy of *Kosmetor* Burr, 1907).

62. *Pterygida vishnu* (Burr)
(Figs. 193-195)

1904. *Apterygida vishnu* Burr, *Trans. R.ent. Soc. Lond.*, 1904 : 319 (M), India Borealis, Darjeeling, Syntypes - Paris Mueum.
 1907. *Kosmetor vishnu*; Burr, *Trans. R. ent. soc. Lond.*, 1907:123.
 1967. *Kosmetor josephi* Kapoor, *Orient. Insects*, 1 (1-2) : 56(M), nr. Darjeeling, Rangiroon - Type at Indian Agricultural Research Institute, New Delhi, Syn.n.
 1982. *Kosmetor vishnu*; Srivastava, *Ent. Basiliensia*, 7 : 75, figs. 24-27 (additional charactes).
 1984. *Pterygida vishnu*; Srivastava, *Bull. zool. Surv. India*, 5 (1-2) : 162 (genus redescribed and proposed synonymy of *Kosmetor* Bur, 1907).

Material examined: India : W.B., Darjeeling dist., Manibhanjang, 6400 ft., 2 (F), 25.5.1975 (J.K. Jonathan); Rangiroon (nr Darjeeling), Holotype (M) of *Kosmetor josephi* Kapoor, ex under stones (Joseph Jonathan coll.); Sikkim, Gangtok, 1759 m, 2 (M), 1 (F), genitalia mounted between two coverslips and pinned with the specimen), 2 (F), 29.5.1979 (M.S. Shishodia).

Diagnostic characters: General colour dark blackish brown, sides of pronotum orange and wings with an orange spot apically close to external margin.

Head convex; antennae 12 - segmented; pronotum weakly transverse, rounded posteriorly; elytra and wings well developed smooth; legs normal with 1st segment of hind tarsi slightly longer than 3rd; abdomen punctulated. Ultimate tergite and forceps as seen in figs. 194 - 195.

Measurements: (M), Length : body - 8.5 - 11.0 mm. forceps - 4.0 - 4.1 mm; (F), Length : body - 10.0 - 10.5 mm, forceps - 1.6 - 2.5 mm.

Distribution: India : W.B. (Darjeeling dist.); Elsewhere : Sikkim.

Remarks: Holotype (male) of *Kosmetor josephi* Kapoor, available in the Division of Entomology, Indian Agricultural Research Institute, New Delhi was examined. Elytra in this species are not keeled along the costal margin whereas in the original description it is stated to be keeled.

Since *Kosmetor josephi* agrees with *Pterygida vishnu* (Bur) in most of the details it is considered as synonym of the latter.

ALLODAHLIINAE

Genus 34 *Allodahlia* Verhoeff

1902. *Allodahlia* Verhoeff, *Zool. Anz.*, 25 (665) : 194 (Type - *Forficula brachynota* Haan, 1842).

Key to species (based on males only)

- 1(2) Wings basally with a yellow spot; elytra and abdomen finely punctulated and pygidium aciculate
*A. ahrimanes* (Burr)

- 2(1) Wings unicolourous; elytra and abdomen scabrous or rugosely punctate and pygidium transverse or triangular
- 3(4) Pronotum crescent shaped with antero-lateral angles produced into spine; elytra scabrous with small tubercles and pygidium transverse, hind margin truncate with angles produced into minute sharp points.....*A. scabriuscula* (Serville)
- 4(3) Pronotum quadrate, antero-lateral angles weak; elytra rugosely punctate and pygidium transverse, postero-lateral angles with minute points, hind margin, in middle, with a small tooth or short lobe, on either side of tooth margin oblique or wavy when lobe present.....*A. coriacea* (Bormans)

63. *Allodahlia ahrimanes* (Burr)
(Figs. 196-198)

1900. *Anechura ahrimanes* Burr, *Ann. nat. Hist.*, (7) 6 : 79, pl. 6, fig.5 (M; Sikkim).
1910. *Allodahlia ahrimanes*; Burr, *Fauna British India, Dermaptera*: 154, pl. 10, fig. 98.
1992. *Allodahlia ahrimanes*; Srivastava, *Rec. zool. surv. India*, 91(1) : 82 (M, F; India : Arunachal Pradesh).

Material examined : India : W.B., Darjeeling, 1438 m, 1 M, Decm., 1906 (*Dr. H.H. Mann*).
Burma, 1829-3438 m, 1 (M), Decm., 1910 (*C.W. Beebe*); Nam Tanai, Upper Burma, 1067 m, 1 (M), 1 (F), 26-28.11.1931 (*Lord Cranbrook* - Field Museum of Natural History, Chicago, U.S.A.).

Diagnostic characters : General colour yellowish, shaded with black in parts; head red or reddish black; pronotum black; elytra reddish shaded with black laterally and posteriorly; wings black, with a yellow spot basally.

Pronotum weakly transverse, finely punctulate, antero-lateral angles weakly produced, sides and hind margin conjointly rounded; elytra and abdomen finely punctulated. Male pygidium aciculate, very long or short; forceps undulate or horizontal and genitalia as seen in fig. 198.

Measurements : (M), Length : body - 12.0 - 19.0 mm, forceps - 8.4 - 18.0 mm; (F), Length : body - 15.2 - 17.0 mm, forceps - 7.5 - 8.1 mm.

Distribution : India : W.B. (Darjeeling dist.); Arunachal Pradesh and Sikkim. Also recorded from Burma and Vietnam.

64. *Allodahlia coriacea* (Bormans)
(Figs. 199-201)

1894. *Anechura coriacea* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) 14 : 403 (M; Burma).
1879. *Forficula brachynota* Dubrony, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 14 :383 (nec Haan, 1842 and Dohrn, 1865).
1907. *Alodahlia coriacea*; Buru, *Rec. Indian Mus.*, 1 ; 190.
1959. *Allodahlia coriacea* sub. sp. *signata* Bey-Bienko, *Ent. Obozr.*, 38 : 260.

1972. *Allodahlia orchroptera* Brindle, *mon. Mag.*, 108 : 27 (Holotype male from Burma and other specimens from India ; Sikkim).
 1991. *Allodahlia coriacea*; Srivastava, *Rec. zool. Surv. India*, 91(1) : 83.

Material examined : India : W.B., Darjeeling dist., Kurseong, nr Dhobi Khola stream, 1459 m, 1 (F), 25.12.1970, det. as *Allodahlia coriacea* sub. sp. *signata* det. by Srivastava, 1972 and *Allodahlia coriacea* det. by Srivastava, 1978 (*J.M. Julka*); Kalimpong, Samsing, 1 (M) (wing of left side yellow), 21.8.1934 (*N.C. Chatterjee*); Forest Research Institute, Dehra Dun coll.).

Diagnostic characters : General colour blackish or reddish brown; wings with a patch of pale yellow internally.

Pronotum punctate, quadrate, transverse, lateral and hind margin feebly convex; elytra and wings well developed, former punctate; abdomen densely punctate. Male pygidium transverse, hind margin wavy with a compressed lobe in middle or postero-lateral angles and in middle with minute a point, margin on either side of median point lightly oblique. Ultimate tergite and forceps and genitalia of males as seen in figs. 199 - 201.

Measurements : (M), Length : body - 11.1 - 15.0 mm, forceps - 6.0 - 6.5 mm; (F), Length : body - 11.0 - 14.0 mm, forceps - 6.0 - 6.2 mm.

Distribution : India : W.B. (Darjeeling dist.); Arunachal Pradesh. It is also reported from Burma, China (Yunnan), Borneo and Sumatra.

65. *Allodahlia scabriuscula* (Serville)
(Figs. 202-204)

1839. *Forficula scabriuscula* Serville, *Histoire Naturelle des Insectes Orthopteres* : 38 (Holotype (F) 'Amerique meridionale' (locality erroneous).
 1902. *Allodahlia scabriuscula*; Verhoef, *Zool. Anz.*, 25 (665) : 194.

Material examined : India : W.B., Darjeeling dist., Samsing, 1 (M), 1 (F), 24.12.1973, ex under bark of log (*G.K. Srivastava*).

Diagnostic characters : General colour dark to light blackish brown or black. Pronotum transverse antero-lateral angles projecting strongly, sides and hind margin forming a sort of semi-circle; elytra scabrous, i.e. heavily and densely punctate with small tubercles; wings of same texture as elytra, less scabrous and abdomen punctate. Male pygidium transverse with hind margin truncate and angles produced into minute points. Ultimate tergite and forceps and genitalia of males as seen in figs 203-204.

Measurements : (M), Length: body - 11.5 - 15.5 mm, forceps - 7.0 - 12.5 mm; (F), Length : body - 10.5 mm, forceps 5.5 - 7.0 mm.

Distribution : India : W.B. (Darjeeling dist.); Arunachal Pradesh. Also recorded from Bhutan, China (south), Vietnam, Sumatra, Java, Bali, Borneo, Philippine Island and Taiwan.

ANECHURINAE

Genus 35. *Anechura* Scudder

1876. *Anechura* Scudder, *Proc. Boston Soc. nat. Hist.*, 18 : 289 (Type-*Forficula bipunctata* Fabricius, 1781).
1904. *Odontopsalis* Burr, *Trans. R.ent. soc. Lond.*, 1904 : 315 (Type - *Odontopsalis harmandi* Burr, 1904).

66. *Anechura biswasi* sp.n.
(Figs. 205-208)

Description : (Male) : General colour dark brownish black with metallic lustre; antennae with one or two ante-apical segments yellow; elytra with a faint rounded brown spot near base; wings with a yellow spot at base externally and inner wing tip yellow; legs with femora light brown in basal half and hind tarsi with 1st segment yellow. Build stout.

Head slightly longer than broad, smooth, convex, occiput weakly raised, sutures marked by deep impressed lines. Eyes prominent but less than half the length of post-ocular area. Antennae partly broken (9 segments on the right and 7 on the left side remaining), segments stout, 1st segment narrowed basally, slightly shorter than the distance between antennal bases; 2nd short; 3rd slender; 4th slightly shorter than preceding, gently expanded apically; 5th slightly longer than 3rd, narrowed basally, remaining segments gradually increasing in length and thinning.

Pronotum about as long as broad, smooth, sides straight, gently reflexed, narrowed posteriorly with hind margin rounded; prozona strongly raised and well differentiated from flat metazona. Elytra strongly striate, scabrous, meeting along the middle line and wings smooth, about 1/3 as long as elytra. Prosternum longer than broad; meso-sternum transverse, broader at base, apically projecting as narrow lobe with hind margin convex and metasternum transverse, narrowed posteriorly with hind margin broadly concave. legs long and slender, hind tarsi, with 1st segment slightly longer than 3rd and 2nd briefly lobed. Abdomen strongly convex and dilated in middle, lateral tubercles on 3rd weakly and 4th strongly developed, each tergite in basal half punctate. Penultimate sternite with posterior margin rounded. Ultimate tergite smooth, impunctate, transverse, tumid above the bases of forceps and depressed in middle with a short median sulcus, hind margin weakly trisinate, laterally oblique, postero-lateral angles projecting. Pygidium declivous, divided into two triangular lobes with their apices pointed. Forceps stout, remote at base, undulated in profile, almost straight in basal two thirds, afterwards incurved with apices pointed and hooked, at base above with a small tubercle, internally armed with a strong triangular tooth below directed ventrally at a little beyond middle and with somewhat similar but smaller tooth, a little before apex; on ventral side also with a tubercle in basal one third. Genitalia as seen in fig. 208.

(Female) : Unknown.

Measurements: Holotype (M), Length : body - 17.0 mm; forceps - 9.1 mm.

Material examined : India, W.B., Darjeeling dist., Birch Hill, alt. 6500 ft., Holotype (M), genitalia mounted between two coverslips and pinned with the specimen), 6.5.1975 (B.K. Biswas); deposited in the National Collection at the Zoological Survey of India, Calcutta.

This species is named after my colleague and the collector of the species Dr. Bijan Kumar Biswas.

Remarks : This species can be easily separated from the other known species of the genus from India adjacent countries by its general colouration, strongly striated elytra, stout build and the shape of forceps.

It has superficial resemblance with members of *Allodahlia* Verhoeff, but elytra lacks keel along the costal margin.

Genus 36. *Forficula* Linnaeus

1758. *Forficula* Linnaeus, *Syst. Nat.*, 10 : 423 (Type *Forficula auricularia* Linnaeus, 1758 designated by Laterille, 1810, *Consid. Gener. Ord. Nat.* : 443).
 1924. *Forfidula* Houlbert, *Thysan.-Derm. Orth., de France*, 1 : 246 (Type-*Forficula decipiens* Gene, 1832).
 1927. *Emiforficula* Menozzi, *Ent. Mitt.*, 16 : 239 (Type - *Forficula ornata* Bormans, 1884).

Key to species (based on males only)

- 1(2) Forceps at base above with a triangular vertical tooth close to inner margin.....
*F. cristata* Srivastava
- 2(1) Forceps at base above without a vertical tooth
- 3(8) Pronotum semicircular, sides convex and with rounded hind margin forms a sort of an arc
- 4(5) General colour uniform blackish brown with a metallic lustre; size larger (13.1 - 15.3 mm, including forceps); branches of forceps lamellate internally in a little less than basal half with its inner margin dentate, lamellation dying out gradually, afterwards unarmed except for a small ventral triangular tooth at apical one third.....*F. wittmeri* Srivastava
- 5(4) General colour smoky brown to reddish brown; pronotum on sides, elytra, wings and forceps yellowish brown; size smaller (9.5-11.0 mm., including forceps); dilated in basal half or a little less with its inner margin crenulated, afterwards branches abruptly narrow and internally unarmed
- 6(7) Forceps dilated internally in basal one third, afterwards branches strongly incurved with apices crossing.....*F. genitalia* Kapoor
- 7(6) Forceps dilated internally in basal half, afterwards branches almost straight with apices gently hooked.....*F. interrogans* (Burr)
- 8(13) Pronotum quadrate, often hind margin briefly rounded or obtuse in middle, all other margins almost straight
- 9(14) Pygidium distinct, longer than broad

- 10(13) Size larger (11.9-31.0 mm including forceps); pronotum weakly transverse; pygidium partially hidden by base of forceps, hind margin entire or notched; forceps with internal lamellation restricted to extreme base or extending up to basal half.
- 11(12) Size very large (21.0-31.0 mm, including, forceps); pygidium apically with a triangular notch in middle, dividing it into two triangular lobes; forceps internally at base lamellate, lamellation represented by two or three horizontal teeth and merging gradually with branches...*F. mogul* Burr
- 12(11) Size large (11.9-17.9 mm, including forceps); pygidium with hind margin convex; forceps deplanate in basal half or a little less, with its internal margin crenulated, afterwards abruptly attenuated, almost straight or gently curved..... *F. beelzebub* (Burr)
- 13(10) Size smaller (9.3 - 10.0 mm, including forceps); pronotum strongly transverse; pygidium fully exposed, narrowed in middle, hind margin straight, posterolateral angles with minute point and a median dorsal spine present close to hind margin; forceps near base with a faint tubercle above, not lamellate internally..... *F. beebei* Burr
- 14(9) Pygidium small, broader than long, generally obtuse or pointed apically
- 15(20) Pronotum transverse
- 16(17) Size larger (13.9-17.4 mm, including forceps); legs with femora generally darker in colour; abdominal tergites punctulate; forceps dilated internally in basal half or a little beyond.....
..... *F. tawangensis* Srivastava
- 17(16) Size smaller (7.0-10.7 mm, including forceps); legs uniformly coloured; abdominal tergites punctate; forceps dilated internally in basal one fourth to one half
- 18(19) Pronotum with posterior margin convex or obtuse in middle; elytra abbreviated, hind margin oblique; wings wanting; forceps with branches dilated internally in a little less than basal half..
.....*F. lucens* Brindle
- 19(18) Pronotum with posterior margin rounded; elytra well developed, hind margin gently oblique; wings present; forceps with branches dilated internally in basal one fourth or less.....
.....*F. planicollis* (Kirby)
- 20(15) Pronotum strongly transverse
- 21(22) Elytra and wings short; pronotum narrowed posteriorly; forceps with basal dilation crenulate along the inner margin, afterwards branches depressed, in cross-section quadrangular.....
..... *F. bhutanensis* Brindle
- 22(21) Elytra and wings longer; if elytra short, wings concealed or wanting; forceps at base with a large blunt tooth, afterwards branches cylindrical, in cross section rounded...*F. schlagintweitei* (Burr)

67. *Forficula cirstata* Srivastava
(Figs. 209-210)

1982. *Forficula cirstata* Srivastava, *Ent. Basiliensia*, 7 : 72, figs, 16 - 23 (M; India : W.B., Darjeeling dist..).

Diagnostic characters : Male, General colour dark brownish black, a few anteapical segments lighter in colour; pronotum laterally apical one fourth of tibiae, whole of hind 1st tarsal segment and extreme base of 3rd segment and tip of forceps yellow; wings with an oblong yellow spot along the external margin.

Pronotum weakly transverse; elytra and wings well developed, smooth; abdominal tergites obscurely punctate. Ultimate tergite and forceps and genitalia as seen in figs. 209-210. (F), Unknown.

Measurements : (M), Length : body - 8.9 mm, forceps - 3.5 mm.

Distribution : India : W.B. (Darjeeling dist.).

Remarks : It is known by its ;Holotype (M) only, and the above details are taken from the original description (Srivastava, 1982).

68. *Forficula wittmeri* Srivastava
(Figs. 211-214)

1982. *Forficula wittmeri* Srivastava, *Ent. Basiliensia*, 7 : 70, figs. 8-15 (M, F; India : W.B., Darjeeling dist..).

Diagnostic characters : Male, General colour dark brown with traces of black on parts; antennae clear yellow; elytra , wings and abdominal tergites with a metallic lustre.

Eyes prominent, only slightly shorter than post-ocular area; pronotum weakly transverse, sides and hind margin rounded forming a sort of semicircular arc; abdominal tergites with fine distantly placed punctulations. Ultimate tergite and forceps and genitalia as seen in figs. 213-214.

Female : Unknown.

Measurements : (M), Length : body - 9.4 - 10.2 mm, forceps - 3.7-5.1 mm.

Distribution : India : W.B. (Darjeeling dist.).

Remarks : It is known by its types only and the above description is after Srivastava (1982);

69. *Forficula genitalia* Kapoor
(Figs. 215-217)

1968. *Foficula genitalia* Kapoor, *Entomologist*, 101 : 16, pl. 4, figs. 1-3 (2 (M); India : Darjeeling.

Material examined : India : W.B., Darjeeling dist., Darjeeling, Holotype (M), ex under stones,

26.9.1966 (V.C. Kapoor); preserved at Entomology Division, Indian Agricultural Research Institute, New Delhi.

Diagnostic characters : Male, General colour fuscous (smoky brown); pronotum on sides, elytra, wings and forceps yellowish brown

Pronotum transverse, anteriorly as wide as head, side convex and posterior margin rounded, sides and hind margin forming an arc. Elytra and wings ample, smooth; abdomen gently dilated in middle; pygidium vertical, obtuse; forceps dilated in basal one third, afterwards strongly incurved, apices crossing, inner margin of dilated portion crenulated. Genitalia as seen in fig. 217.

Female : Unknown.

Measurements : (M), Length : body - 9.0 mm, forceps - 2.0 mm. Measurements copied from the original description.

Distribution : India : W.B. (Darjeeling dist.).

70. *Forficula interrogans* (Burr)
(Figs. 218-220)

1905. *Forficula interrogans* Burr, *Entomologists mon. Mag.*, (2) 184 : 85 (M, Darjeeling).

1910. *Forficula interrogans* ; Burr, *Fauna British India, Dermaptera* : 173, pl. 7, fig. 61.

Material examined : India : W.B., Darjeeling dist., Goomti, nr. Kurseong, 1300 m, 2 (M), 1 (F), genitalia mounted between two coverslips and pinned with the specimen), 1 (F), 22.4.1981 (R.K. Varshney).

Diagnostic characters : General colour dark shining reddish brown; pronotum laterally, elytra and wings yellowish brown and legs yellowish.

Pronotum weakly transverse, anterior margin straight, sides convex, hind margin rounded, sides and hind angles along with hind margin forming an arc. Abdomen convex, parallel sided, punctate. Male forceps short, internally dilated up to middle with inner margin straight and finely crenulated, afterwards abruptly tapering with apices gently curved and genitalia as seen in fig. 220.

Measurements : (M), Length : body - 6.3 - 7.8 mm, forceps - 1.5 - 3.1 mm; (F), Length : body - 6.5 - 9.1 mm, forceps - 1.5 - 1.6 mm.

Distribution : India : W.B. (Darjeeling dist.).

71. *Foficula mogul* Burr
(Figs. 221-223)

1904. *Forficula mogul* Bur, *Trans. R. ent. soc. Lond.*, 1904 : 321 (1 M, 1 F; Darjeeling).

1907. *Forficula mogul*; Burr, *Trans. R. ent. soc. Lond.*, 1907 : 111, pl.4 fig. 3 (male in dorsal view).
 1910. *Forficula mogul*; Burr, *Fauna British India, Dermaptera* : 167, fig. 55 (male in dorsal view).

Material examined : India : W.B., Darjeeling dist., Ghoom, 2490 m, 1 (M), genitalia mounted between two coverslips and pinned with the specimen) 15.10.1974; Brich Hill, 2990 m, 1 (M), 6.3.1976 (B.K. Biswas).

Diagnostic characters : General colour blackish brown; head orange; pronotum laterally yellow; legs yellow, joints slightly blackish brown; inner wing tip with trace of yellow; abdomen dark brown; pygidium and forceps reddish brown.

Head slightly longer than broad, convex, sutures distinct; antennae 12-segmented 1st stout, shorter than the distance between antennal bases; 2nd short; 3rd slender, 4th slightly stouter and a trifle shorter than preceding; 5th longer than 3rd, thinner, remaining gradually increasing in length and thinning. Pronotum weakly transverse, sides gently reflexed and lightly convex, hind margin briefly convex. Elytra and wings coriaceous. Abdomen weakly convex, smooth. Male pygidium declivous, slightly longer than broad, apical margin turned ventrally with a triangular notch in middle.

Ultimate tergite and forceps and genitalia of males and ultimate tergite and forceps of females as seen in figs. 221-223.

Measurements : (M), Length : body 16.0 - 18.0 mm., forceps - 5.0 - 13.0 mm, (F), Length : body - 18.0, forceps - 4.0-4.5 mm

Distribution : India : W.B. (Darjiling dist.).

Remarks : This species was hitherto known by its types and the record of above 1 (M), and 1 (F), after a lapse of 87 years from the type locality is of interest.

72. *Forficula beelzebub* (Burr) (Figs. 224-226)

1900. *Chelisoche beelzebub* Burr, *Annls. soc. ent. Belg.*, 44 : 51 (M; Kurseong, Bengal, India).
 1904. *Forficula beelzebub*; Burr, *Trans. R. ent. Soc. Lond.*, 1904 : 322.
 1905. *Forficula acer* Burr, *J. Asiat. Soc. Bengal*, 1 (2) : 30 (M; Mung Phu, India).
 1905. *Forficula coler* Burr, *J. Asiat. Soc. Bengal*, 1 (2) : 31 (M Khasi Hills, Assam., India).
 1909. *Forficula ignota* Burr, *Ann. Mag. nat. Hist.*, (8) 4 : 120 (M; India).

Material examined : India : W.B., Darjeeling dist., Tindharia, 856 m, 3 (M), 4.5.1976; Lava, 7200 ft, (F), 3 nymphs, 9.4.76; Mirik, 1968 m, 1 (M), 2.5.1976; Bedekhasmahal, 1 (F), 13.4.1976 (A.R. Bhowmik).

Diagnostic characters : General colour orange reddish or brownish red with shades of black in parts; head black, occasionally orange, shaded with black; antennae, pronotum, elytra wings and legs black or yellowish brown; abdomen and forceps orange or reddish, former laterally black.

Abdomen long or short, gently dilated posteriorly. Male forceps stout (forma cyclolabia) internal dilation extends from base up to middle, afterwards abruptly attenuated, straight or gently arcuate with apices often meeting; (In forma macrolabia) long and slender, internal basal dilation extends from one third to one half, inner margin of dilated portion finely crenulate and ending posteriorly in an obtuse or acute lobe, often with intermediate stages, Genitalia of male as seen in fig. 226.

Measurements : (M), Length : body - 8.7 - 12.2 mm; forceps - 3.1 - 8.8 mm; (F), Length : body - 8.2 - 12.3 mm, forceps - 2.7 - 3.4 mm.

Distribution : India : W.B. (Darjeeling dist.); *Elsewhere* : Himachal Pradesh, Uttar Pradesh Meghalaya and Arunachal Pradesh. Also reported from Nepal, Bhutan and Africa.

It occurs mainly in montane and sub-montane regions only.

Remarks : This species exhibits great variations in general colour, body size and the length of male forceps and its inner basal dilation.

73. *Forficula beebiei* Burr (Figs. 227-228)

1911. *Forficula beebiei* Bur, *J. Asiat. Soc. Bengal*, 7 : 795 (M, F; West Bengal : Darjeeling dist.).
 1923. *Forficula schalgintweiti* (nec Burr); Hebard, *Mem. Dept. Agric. India Ent. Ser.*, 7 : 225, pl. 20, fig. 21 (Anechuroid forceps).
 1983. *Forficula beebiei*; Srivastava, *Proc. Wkshp. High Alt. Ent. & Wildl. Ecol.* : 130, fig. 15.

Material examined : India : W.B., Darjeeling dist., Sandakphu, 3600 m, 1 (M), brachypteris, 20.4.1974 (R.K. Ghosh), Tonglu, 3069 m, 1 (M), macropteris, 16.5.1975 (J.K. Jonathan).

Diagnostic characters : General colour black or brownish, occasionally yellowish.

Pronotum transverse : elytra smooth, one and half times longer than the pronotum and wings generally absent, sometimes well developed. Male penultimate sternite obtusely rounded posteriorly; forceps remote at base, depressed, gently incurved in middle, attenuate apically, inner margin crenulate and at base above with small tubercle; pygidium slightly longer than broad or about as long as broad, distinct, constricted in middle laterally, postero-lateral angles with minute tubercle and in middle with a dorsal spine, in middle, close to hind margin and genitalia as seen in fig. 228.

Measurements : (M), Length : body - 6.5 - 7.8 mm, forceps - 2.8-2.9 mm; (F), Length : body - 6.1 - 7.5 mm, forceps - 1.7 - 2.0 mm.

Distribution : India : W.B. (Darjeeling dist.); Arunachal Pradesh.

Remarks : It is a high altitude species occurring generally above 3000 m in Himalaya.

74. *Forficula tawangensis* Srivastava
(Figs. 229-232)

1983. *Forficula tawangensis* Srivastava, *Proc. Wkshp. High Alt. Ent. & Wildl. Ecol.* : 133, fig. 17 a-d (M, F; India : Arunachal Pradesh, Kameng dist., Tawang, 3200 m).

Material examined : India : W.B., Dajeeling dist., Takdah, 1M (genitalia mounted between two coverslips and pinned with the specimen), 6.4.1976, Mirik, 1698 m, 1 (M) ex foliage, 2.5.1976, Lava, 7200 ft., 1 (M) genitalia mounted between two coverslips and pinned with the specimen), 1 (F), 3 nymphs, 9.4.1976 (A.R. Bhowmik).

Diagnostic characters : General colour deep black to yellowish brown with traces of black; femora darker or black; a few ante-apical segments of antennae, sides of pronotum, titibae and tarsi brown or light brown and forceps reddish brown.

Pronotum transverse, sides gently convex, hind margin rounded. Abdomen punctulate feebly enlarged in middle. Male forceps internally dilated beyond basal half, afterwards attenuate strongly incurved and genitalia as seen in fig. 232.

Measurements : (M), Length : body - 10.4 - 12.8 mm, forceps - 3.5 - 4.7 mm; (F), Length : body - 12.1-13.3 mm, forceps - 3.2-3.9 mm.

Distribution : India : W.B. (Darjeeling dist.); Arunachal Pradesh.

Remarks : In the Type series the general body colour is deep black excepting two specimens that are brownish black and femora is black.

The material from Darjeeling dist., recorded here, is blackish brown with femora dark brown. The inner dilation is extending to basal half of the forceps. The smaller males of this species come close to *Forficula lucens* Brindle, but latter differs by its smaller size; hind margin of pronotum obtusely rounded in middle and abdominal tergites punctate (vs - punctulate in *F. tawangensis*). Besides *F. lucens* possesses abbreviated elytra and concealed wings but both characters are variable to some extent.

75. *Forficula lucens* Brindle
(Figs. 233-235)

1975. *Forficula lucens* Brindle, *Ent. Basiliensia*.
1982. *Forficula lucens*; Srivastava, *Ent. Basiliensia*, 7 : 69, fig. 7, (Male genitalia) (M, F; India : W.B., Darjeeling dist., Jhepi, 1300 - 1400 m)

Material examined : India : W.B. Darjeeling dist., Jhepi, 1300-1400m, 1 (M), (genitalia mounted between two coverslips and pinned with the specimen), 1 (F), 22-23.5.1975 (W. Wittmer-Natural History Museum, Basael) - det. by G.K. Srivastava.

Diagnostic characters : General colour yellowish to blackish brown, shining; antennae dark

brown and sides of pronotum and legs yellow.

Pronotum, transverse, hind margin rounded with a convexity in middle; elytra abbreviated, hind margin obliquely truncate; wings concealed or wanting and abdominal tergites punctate, punctuation distantly placed. Male forceps dilated internally in a little less than basal half with its inner margin dentate, afterwards abruptly attenuated and incurved and genitalia as seen in fig. 235.

Measurements : (M), Length : body - 7.0 - 8.0 mm, forceps - 3.0 mm; (F), Length : body - 7.0 - 8.0 mm, forceps - 1.75 mm.

Distribution : India : W.B. (Darjeeling dist.). Also reported from Bhutan.

76. *Forficula planicollis* Kirby
(Figs. 236-238)

1891. *Forficula planicollis* Kirby, *J. Linn. soc. Zool.*, 23 : 525 (F; North India).
 1904. *Forficula planicollis*; Burr, *Trans., R. ent. Soc. Lond.*, 1904 : 320 2 (M, 1 (F; Darjeeling - male described).
 1904. *Forficula ambigua* Burr, *Trans. R. ent. Soc. Lond.*, 1904 : 321 2 (M, 3 F, Darjeeling).
 1923. *Forficula labongae* Hebard, *Mem. Dep. Agric. India, Ent. Ser.*, 7 : 226 (M; India, Darjeeling).
 1965. *Forficula bhatnagari* Gangola, *Entomologist*, 92 : 229 (M; Nainital).
 1972. *Forficula gardneri* Kapoor, Bharadwaj and Banerjee, *Bull. Ent. Delhi*, 12 (1) : 37 (M, (F; India, Darjeeling dist.).

Material examined : India : W.B. : Darjeeling dist., Lopchu, 5000 ft., 1 (M), 22.9.1929; Debrapani, 6000 ft., 1 (M), 4 (F), 15.9.1929; Rangirun, 600 ft., 1 (F), 4.9.1929 (*J.C.M. Gardner* - Forest Research Institute, Dehra Dun coll.); Tindharia, 856 m, 1 (M), 2 (F), 4.5.1976; Gorabari, Sonada, 1952 m, 2 (M), 1 (F), 13 nymphs, 13.5.1971 (*A.R. Bhowmik*); nr. Rambhi, 1 (F), 14.4.73 (*H.S. Sharma*); Tonglu, 10,070 ft., 1 (M), 16.5.75 (*J.K. Jonathan*).

Diagnostic characters : General colour shining reddish black or yellowish brown; legs yellow; elytra, wings and forceps brownish yellow.

Pronotum weakly transverse; elytra and wings well developed and abdomen dilated in middle, punctate. Male pygidium rounded or obtuse in middle with small tubercles laterally; forceps (in forma cyclolabia) stout, inner dilation extending in basal one fifth to one fourth, afterwards strongly bowed, (in forma macrolabia) branches slender, almost straight with apices gently curved and genitalia as seen in fig. 238.

Measurements : (M), Length : body - 7.1 - 9.5 mm, forceps - 2.6 - 3.0 mm; (F), Length : body - 6.4 - 10.8 mm, forceps - 1.5 - 2.8 mm.

Distribution : India : W.B. (Darjeeling dist.) ; Uttar Pradesh, Arunachal Pradesh, Sikkim and Meghalaya. Also reported from Nepal, Bhutan, Burma and China (Yunnan).

Remarks : It shows great variation in the shape of male pygidium and forceps (Srivastava, 1980).

77. *Forficula bhutanensis* Brindle
(Figs. 239-241)

1923. *Forficula schlagintweiti* (nec Burr); Hebarb, *Mem. Dept. Agric. India, Ent. Ser.*, 7 : 225 (forficuloid forceps).

1975. *Forficula bhutanensis* Brindle, *Ent. Basiliensia*, 1 : 43, fig. 46 - 51 (M, F; Bhutan).

Material examined : India : W.B., Darjeeling dist., Sandakphu, 3600m, 3 (M), 17 (F), 19.4.1974, ex under stones (R.K. Ghosh); Tonglu, 3669 m, 6 (M), 3 (F), and 1 nymph, 14-16.5.1975 (J.K. Jonathan).

Diagnostic characters : Shining black to dull blackish brown; sometimes a few abdominal tergites yellowish brown and forceps generally lighter in colour.

Pronotum quadrate, strongly transverse; elytra and wings well developed rarely wings wanting; abdominal tergites punctulate, sometimes punctulation obscure. Male forceps depressed, stout, internally lamellate in basal one fourth with its inner margin crenulated and feebly oblique, afterwads strongly bowed and genitalia as seen in fig. 241.

Measurements : (M), Length : body - 9.0-13.0 mm, forceps - 3.0-4.0 mm; (F), Length body - 8.0-12.5 mm, forceps - 2.5 - 3.5 mm.

Distribution : India : W.B. (Darjeeling dist.). Also recorded from Bhutan.

78. *Forficula schlagintweiti* (Burr)
(Figs. 242-244)

1904. *Anechua schlagintweiti* Burr, *Trans. R. ent. Soc. Lond.*, 1904 : 313 (M, F ; Tibet Lahol, Paratypes M, F; Darjeeling, N.E. India).

1910. *Forficula schlagintweiti*; Burr, *Fauna British India, Dermaptera* : 165.

1923. *Anechura stoliczkae*; Hebard, *Mem. Dept. Agric. India, Ent. Ser.*, 7 : 224 (Brachylabic condition).

Material examined : India : W.B., Darjeeling dist., Sandakphu, 3600 m, 55 (M) 68 (F) ex under stones, 9.6.1974, (R.K. Ghosh); Tonglu.; 3096 m, 10 (F), 16.5.1975, Rangiroon, on way 3 mile, 1941 m, 3 (F) 6.6.1975 (J.K. Jonathan).

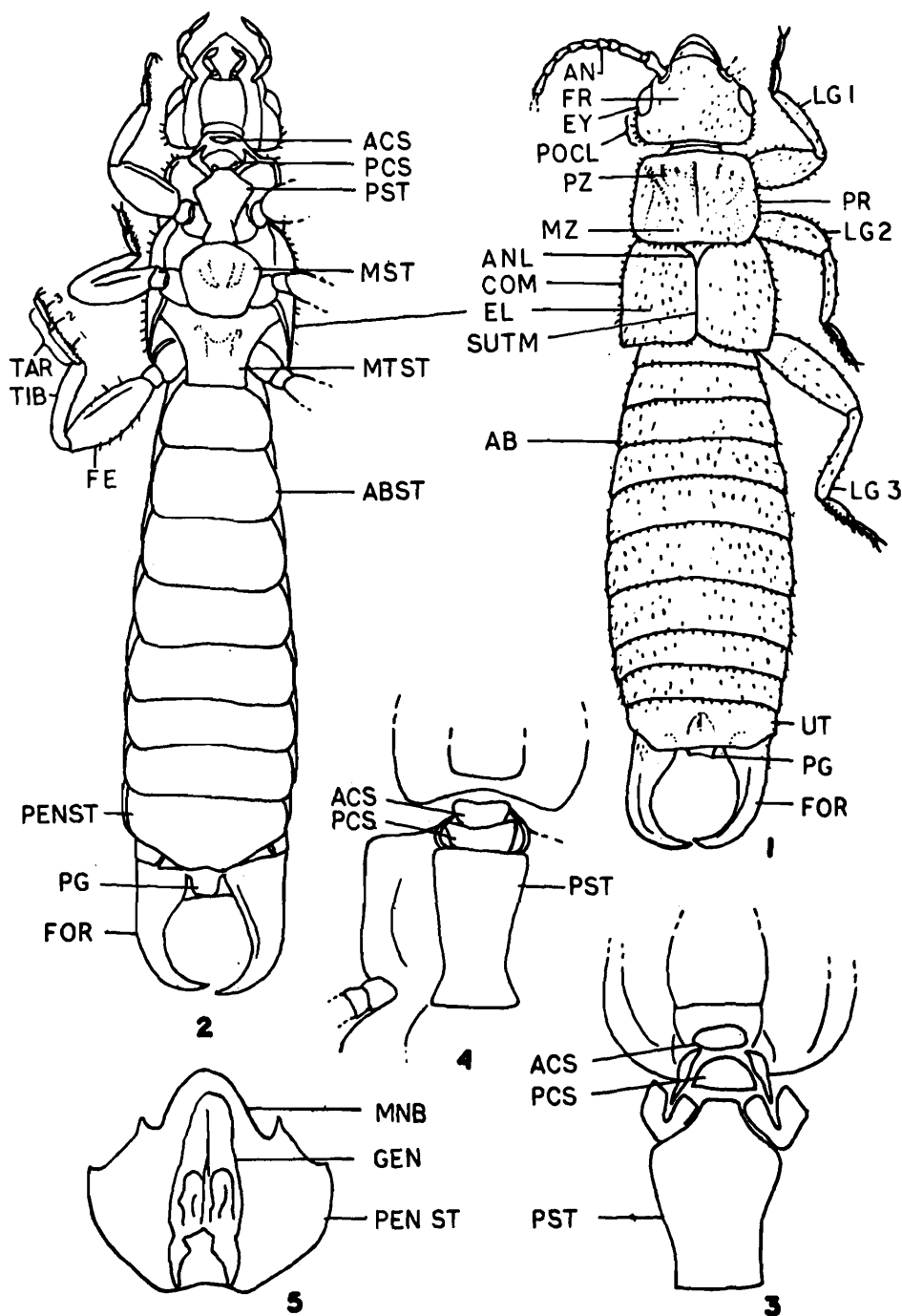
Diagnostic characters : Generally jet black, shining, occasionally brownish and rarely yellow, sometimes head reddish.

Pronotum strongly transverse; elytra and wings well developed but latter sometimes wanting; abdominal tergites enlarged in middle, smooth or sometimes obscurely punctulate. Male ultimate tergite and forceps and genitalia as seen in figs. 243 - 244.

Measurements : (M), Length : body - 10.1-12.9 mm, forceps - 3.3 - 4.1 mm; (F), Length : body - 11.7 - 15.3 mm, forceps - 4.7 - 5.7 mm.

Distribution : India : W.B. (Darjeeling dist.); *Elsewhere* : Jammu & Kashmir, Uttar Pradesh, Himachal Pradesh and Arunachal Pradesh.

Remarks : In normal males forceps are provided with a blunt tooth which may be rounded or obtuse and armed internally with fine teeth, afterward branches strongly incurved or sometimes a little elongated.



Figs. 1-5 : General external characters , male : 1 and 2 Dorsal and Ventral view of *Echinotoma* sp., 3 and 4. Cervical scleritics and pro-sternum of *Parapsalis* and *Euborellia* spp., respectively, 5. Penultimate sternite of *Echinotoma* sp. with genitalia as seen from inner side.

Abbreviations : AB-Abdomen; ABST-Abdominal sternites; ACS-Anterior cervical sclerite; An-Antennae; ; ANL-Anal angle; COM-Costal margin; EL-Elytra; EY-Eye; FE - Femur, FOR - Forceps, FR - Frons, GEN - Genitalia, LG1 - Fore Leg, LG2 - Middle leg; LG3 - Hind leg; MNB-Manubrium; MST-Meso-sternum; MTST-Meta-Sternum; MZ-Metazona; PCS-Posterior cervical sclerite; PEN ST-Penultimate sternite; PG-Pygidium; POCL-Post ocular length or genae; PR-Pronotum; PZ-Prozona; SUT M-Sutural margin; TIB-Tibia; TAR-Tarsus (1,2,3 - Tarsal segments); UT-Ultimate tergite.

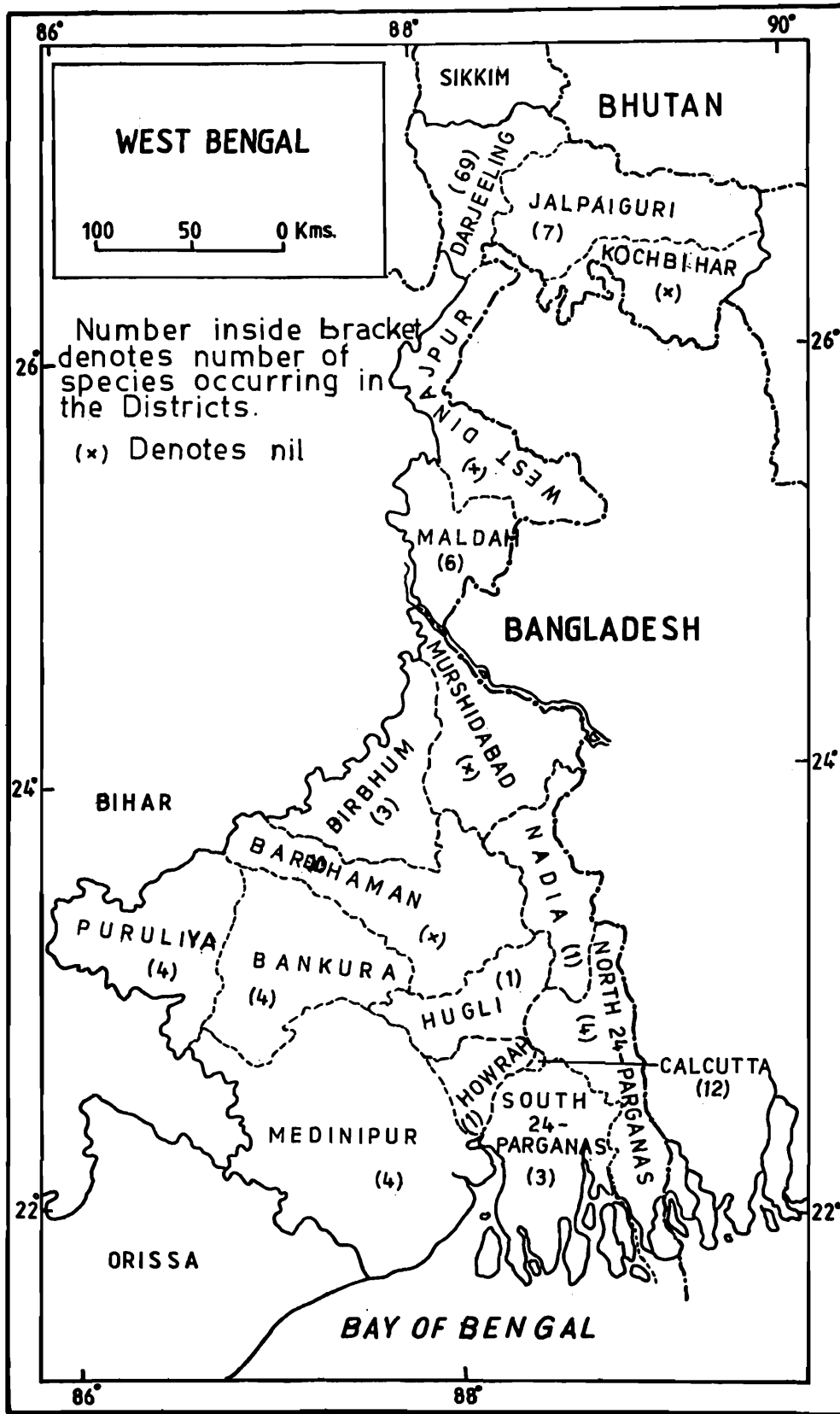
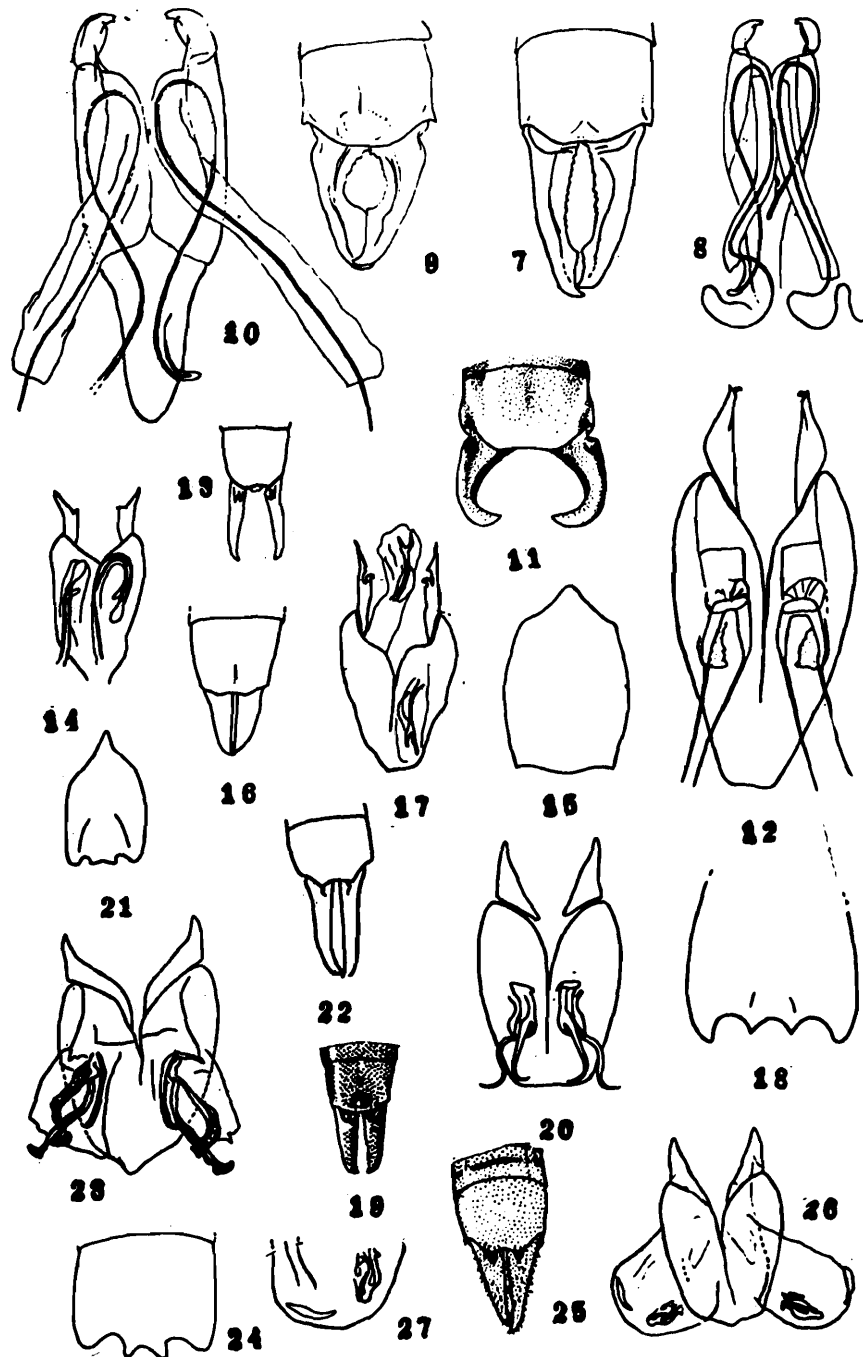
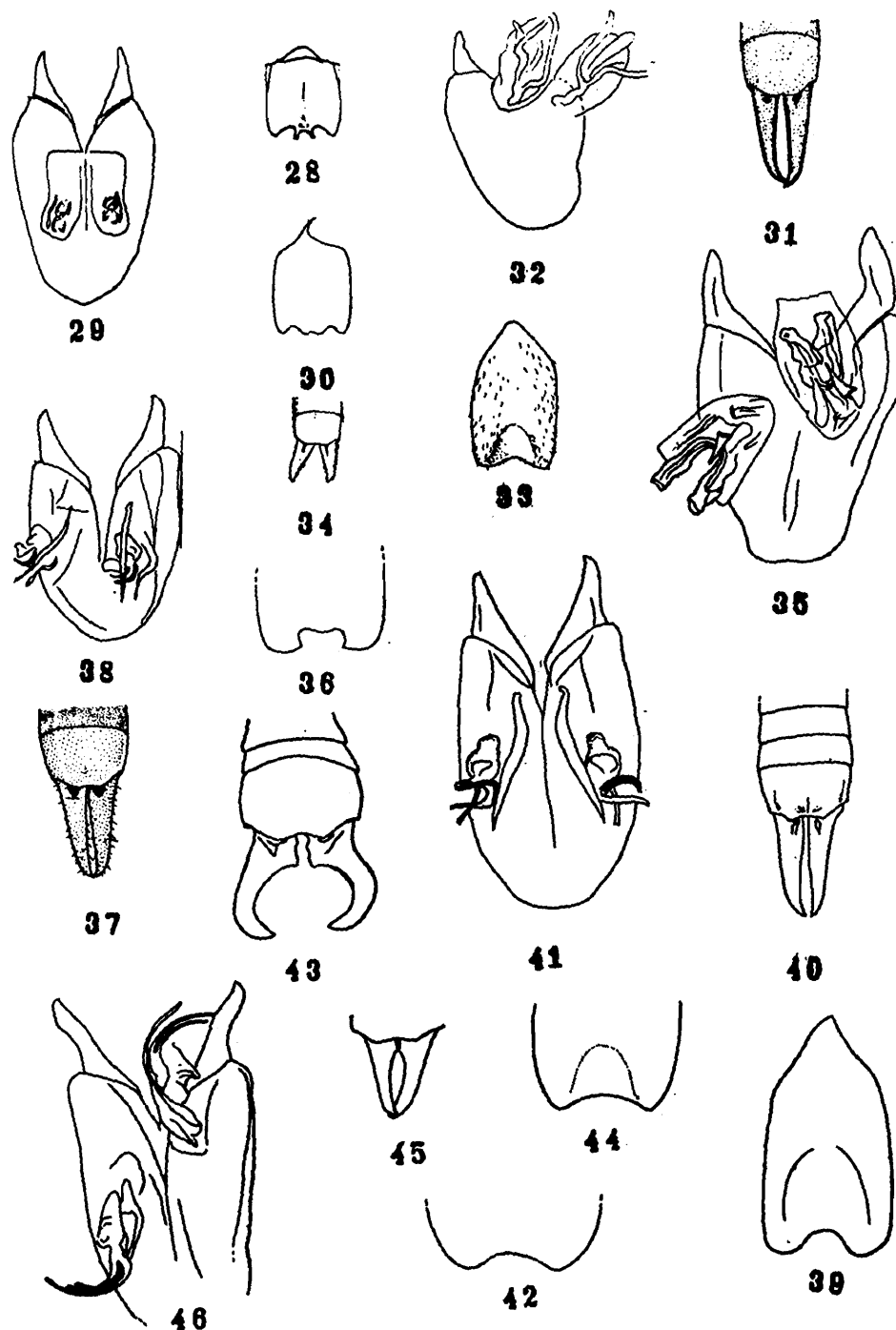


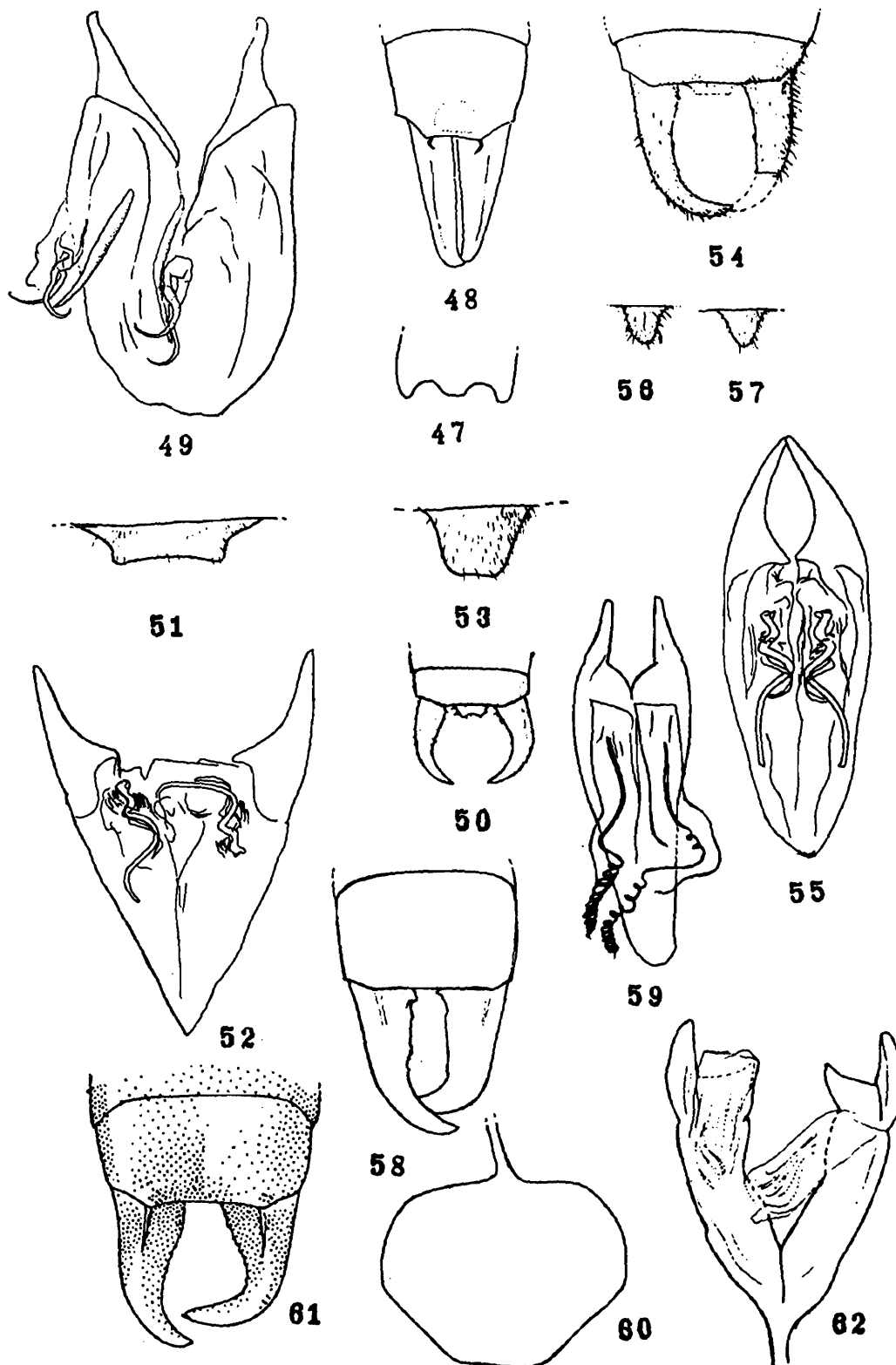
Fig.6. Map of West Bengal showing district-wise distribution of species, indicated by number inside brackets.



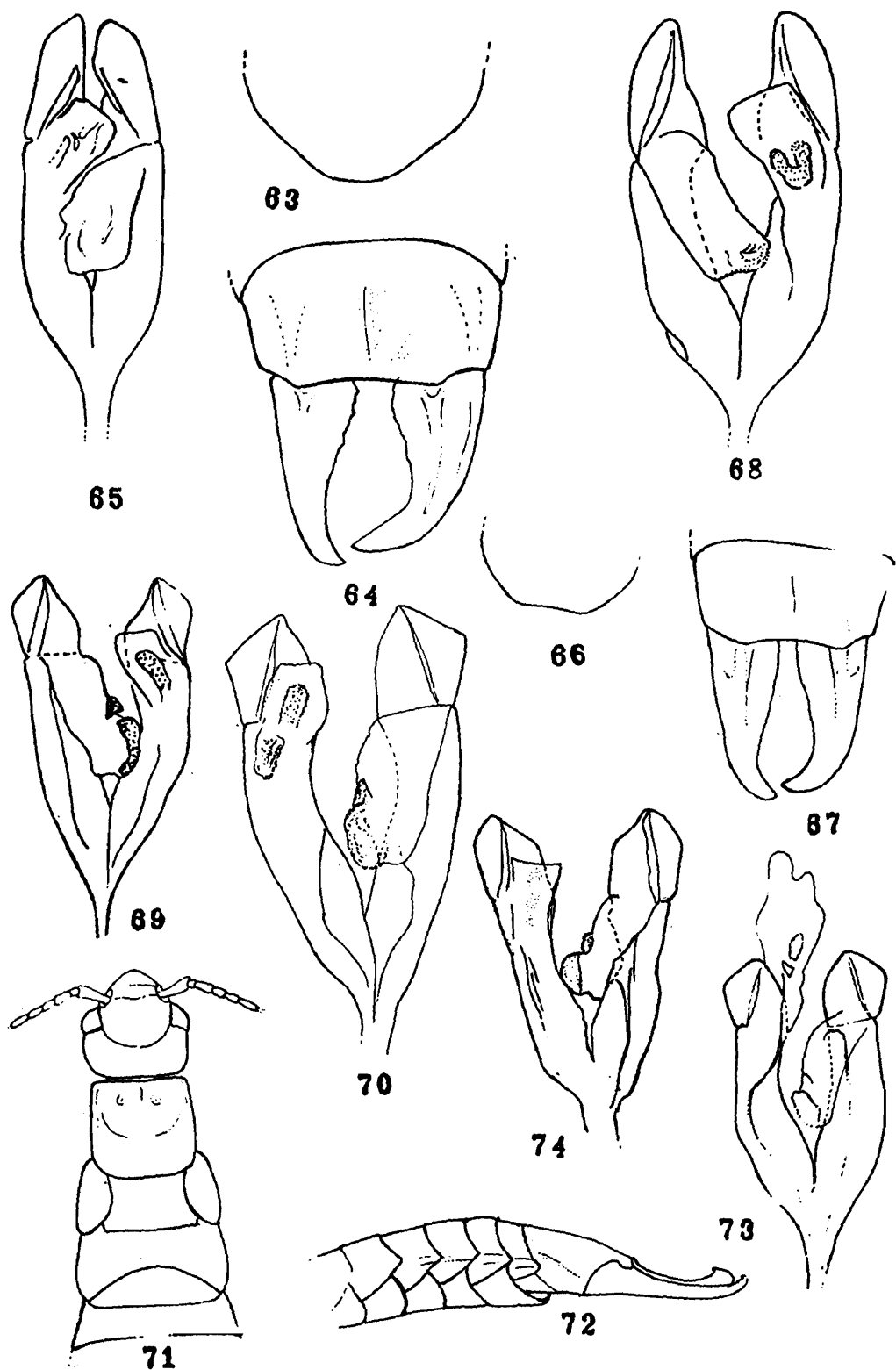
Figs. 7. - 27 : *Acrania bakeri* (Guerin-Meneville), Male, 7. Ultimate tergite and forceps, 8. Genitalia; *Acrania constricta* (Hincks), Male, 9. Ultimate tergite and forceps, 10. Genitalia; *Paradiplatys gladiator* (Burr), Male, 11. Ultimate tergite and forceps, 12. Genitalia; *Diplatys brindlei*, Steinmann, Male, 13. Ultimate tergite and forceps, 14. Genitalia, *Diplatys sinatus* Hincks, Male, 15. Penultimate sternite, 16. Ultimate tergite and forceps, 17. Genitalia; *Diplatys siva* (Burr), Male, 18. Hind margin of penultimate sternite, 19. Ultimate tergite and forceps, 20. Genitalia; *Haplodiplatys kurseongensis* Srivastava, male, 21. Penultimate sternite, 22. Ultimate tergite and forceps, 23. Genitalia; *Haplodiplatys bhowmiki* (Srivastava and Saha) male, 24. Penultimate sternite, 25. Ultimate tergite and forceps, 26. Genitalia, 27. Virga, enlarged (Figs. 13 and 14 after Steinmann, 1974).



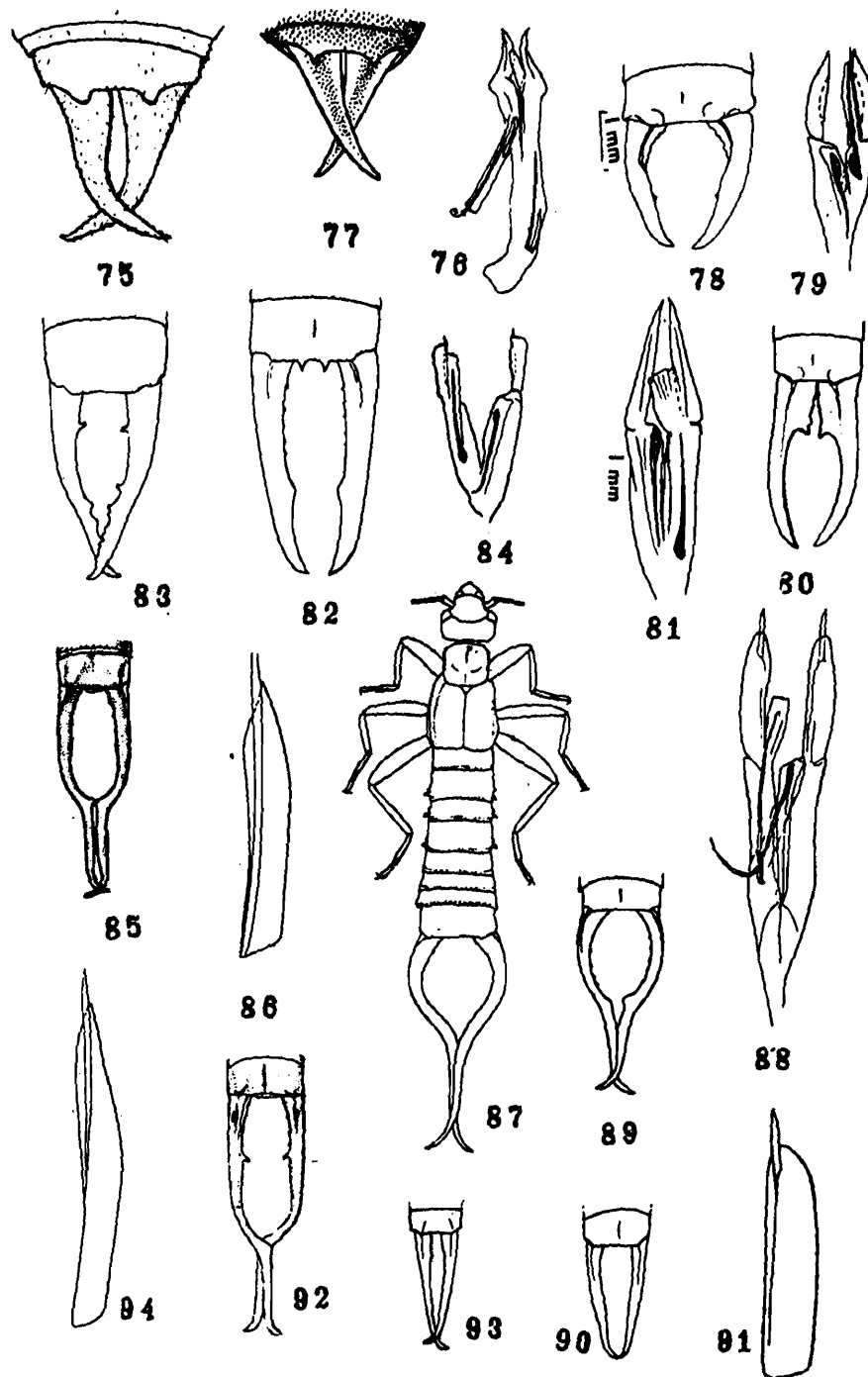
Figs. 28 - 46 : *Haplodiplatys bidentatus* (Hincks), male, 28. Penultimate sternite, 29. Genitalia; *Haplodiplatys chinensis* (Hincks), Male, 30. Penultimate sternite, 31. Ultimate tergite and forceps, 32. Genitalia; *Haplodiplatys stemmlieri* (Brindle), Male, 33. Penultimate sternite, 34. Ultimate tergite and forceps, 35. Genitalia; *Haplodiplatys rileyi* (Hincks), Male, 36. Posterior margin of penultimate sternite, 37. Ultimate tergite and forceps, 38. Genitalia; *Haplodiplatys urbanii* (Brindle), male, 39. Penultimate sternite, 40. Ultimate tergite and forceps, 41. Genitalia; *Haplodiplatys rufescens* (Kirby); Male, 42. Posterior margin of penultimate sternite (macrolabic form), 43. Ultimate tergite and forceps (macrolabic form), 44. Posterior margin of penultimate sternite (microlabic form), 45. Ultimate tergite and forceps (microlabic form), 46. Genitalia. (Figs. 28 and 29 after Hincks, 1955).



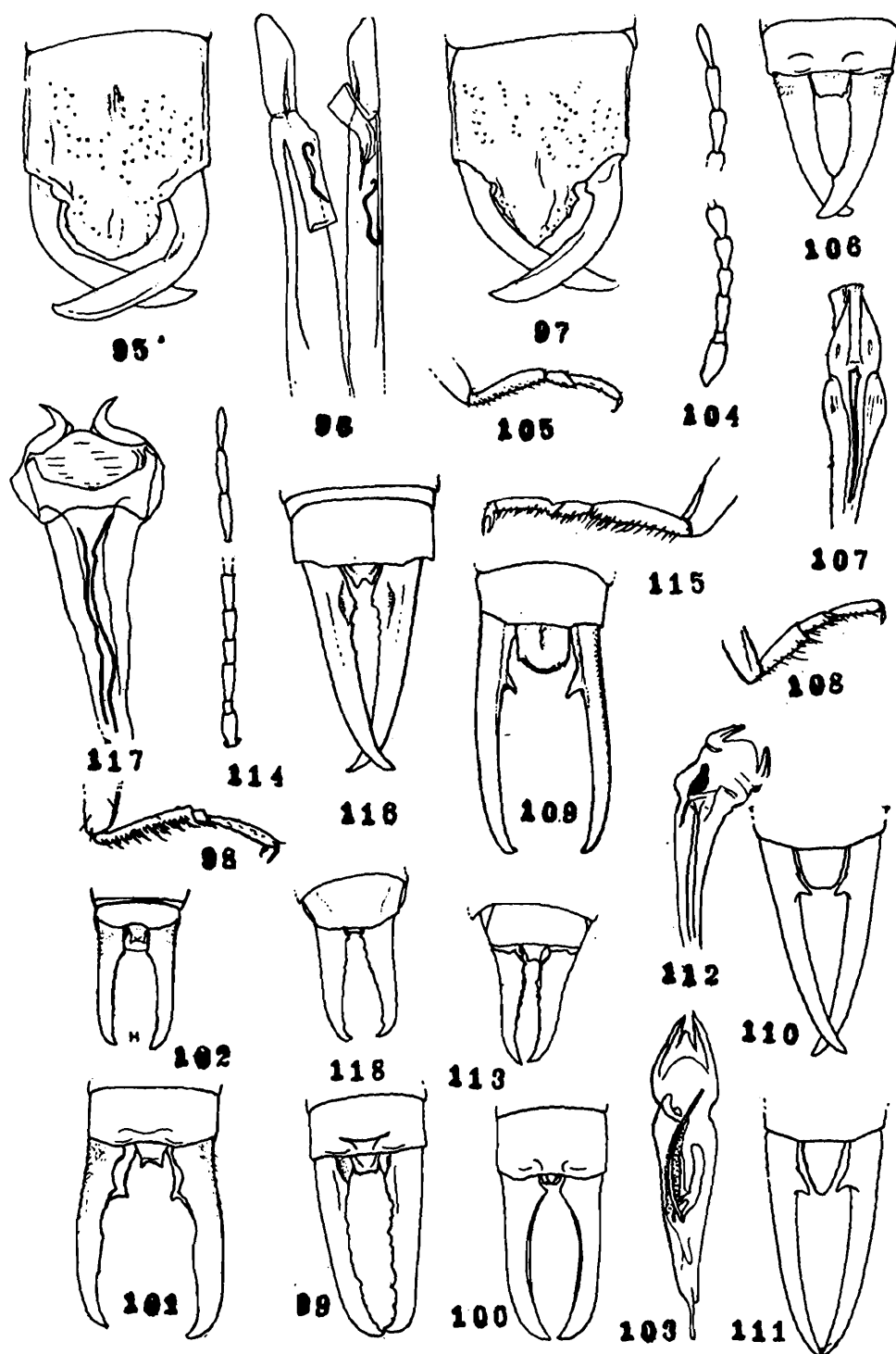
Figs. 47-62: *Haplodiplatys lobatus* (Brindle), male, 47. Posterior margin of penultimate sternite, 48. Ultimate tergite and forceps, 49. Genitalia; *Echinorama convolutum* Hincks, male, 50. Ultimate tergite and forceps, 51. Pygidium, 52. Genitalia; female, 53. Pygidium; *Echinorama dentiferum* Borelli, male, 54. Ultimate tergite and forceps, 55. Genitalia; female, 56-57. Pygidium, *Parapsalis infernalis* (Borelli), male, 58. Ultimate tergite and forceps, 59. Genitalia; *Aborolabis pervicina* (Burr), male, 60. Posterior margin of penultimate sternite, 61. Ultimate tergite and forceps, 62. Genitalia.



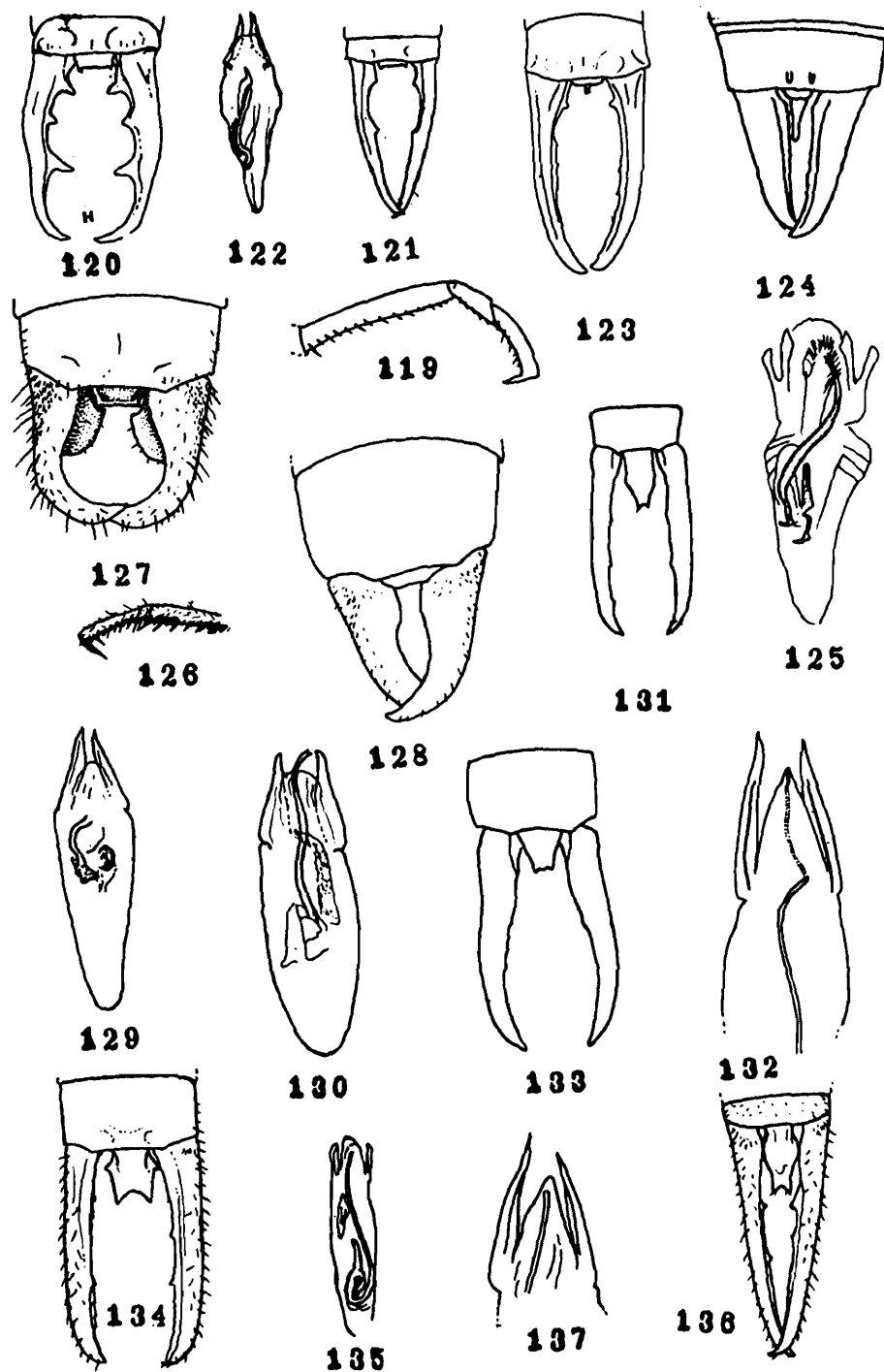
Figs. 63 - 74 : *Anisolabis deplanata* Srivastava, male, 63. Posterior margin of penultimate sternite, 64. Ultimate tergite and forceps, 65. Genitalia; *Anisolabis bhowmiki* Srivastava, male, 66. Posterior margin of penultimate sternite 67. Ultimate tergite and forceps, 68. Genitalia; *Euborellia annulipes* (Lucas), male, 69. Genitalia; *Euborellia compressa* (Borelli), male, 70. Genitalia; *Euborellia annandalei* Burr, male, 71. Anterior portion of body, 72. Sides of certain abdominal segments, 73. Genitalia; *Euborellia stali* (Dohrn), male, 74. Genitalia.



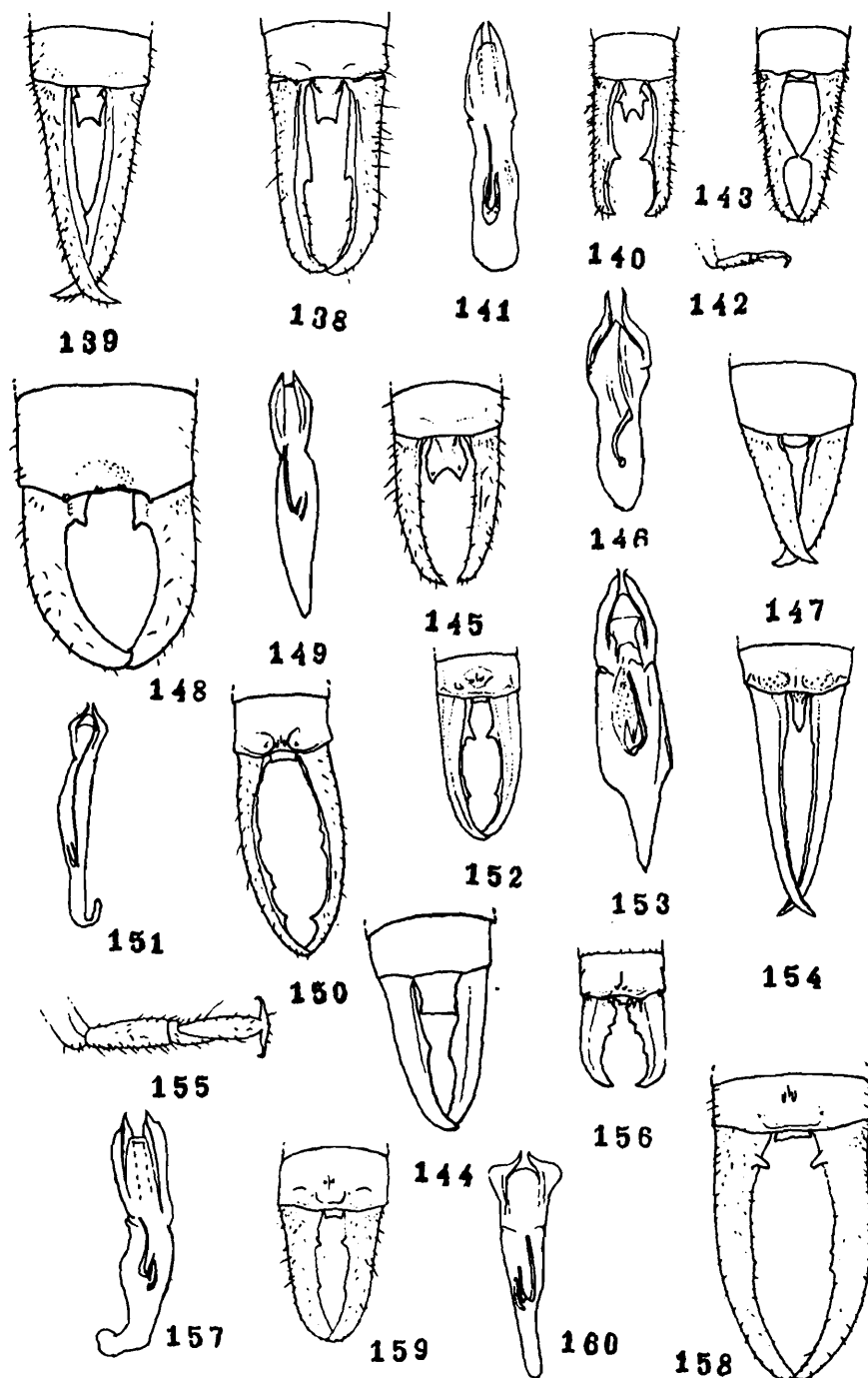
Figs. 75-94 : *Metisolabis caudelli* (Burr) male, 75. Ultimate tergite and forceps, 76. Genitalia; male, 77. Ultimate tergite and forceps; *Nala lividipes* (Dufour), male, 78. Ultimate tergite and forceps, 79. Genitalia, *Nala nepalensis* (Burr), male, 80. Ultimate tergite and forceps, 81. Genitalia; *Labidura riparia* (Pallas), male, 82-83. Ultimate tergite and forceps, 84. Genitalia; *Forcipula indica* Brindle, male, 85. Ultimate tergite and forceps, 86. Paramere, enlarged; *Forcipula abbreviata* Srivastava, male, 87. Dorsal view, 88. Genitalia; *Forcipula quadrispinosa* (Dohrn), male, 89. Ultimate tergite and forceps of normal form, 90. Ultimate tergite and forceps of minor form, 91. Genitalia; *Forcipula trispinosa* (Dohrn), male, 92. Ultimate tergite and forceps of normal form, 93. Ultimate tergite and forceps of minor form, 94. Genitalia.



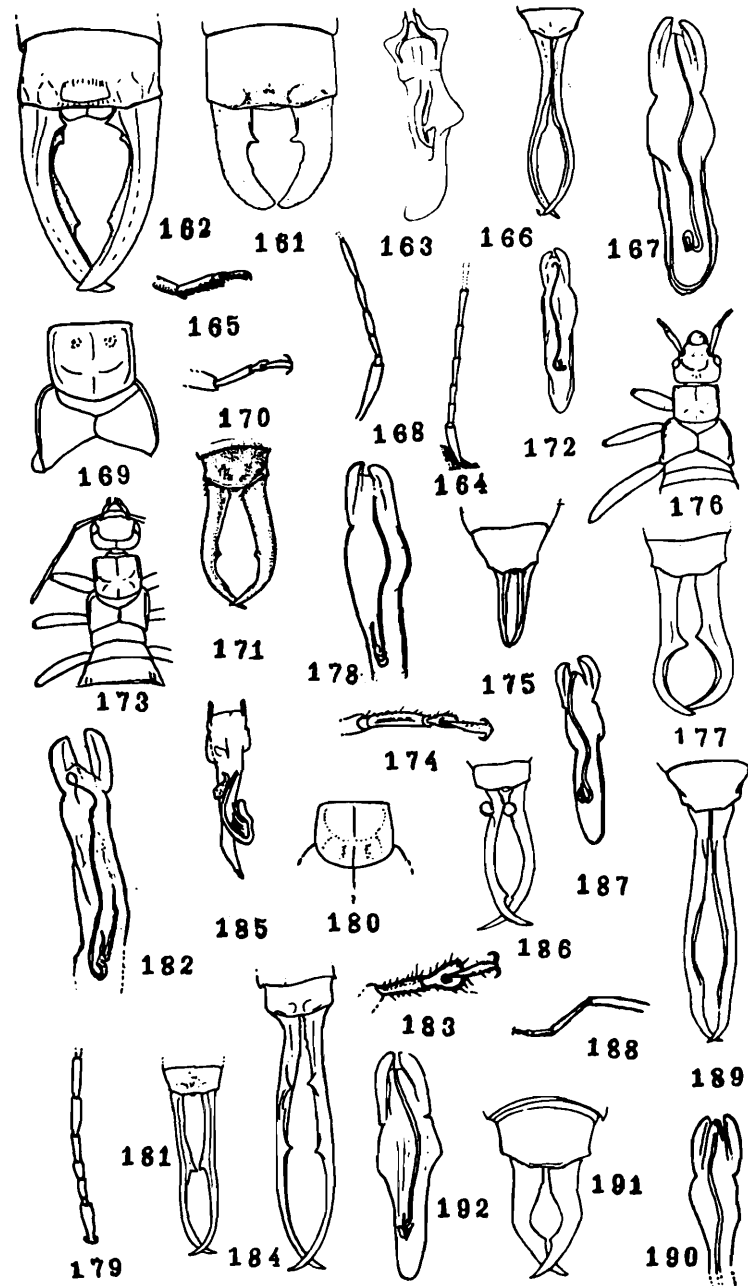
Figs. 95-118 *Apachyus feae* Bormans, male, 95. Ultimate tergite and forceps, 96. Genitalia, male, 97. Ultimate tergite and forceps; *Irdex nitidipennis* (Bormans), male, 98. Hind tarsi, 99-102. Ultimate tergite and forceps, 103. Genitalia; *Marava arachidis* (Yersin) male, 104. A few basal and apical segments of antennae, 105. Hind tarsi, 106. Ultimate tergite and forceps. 107. Genitalia, *Spongovostox mucornatus* (Stal) male, 108. Hind tarsi, 109-111. Ultimate tergite and forceps, 112. Genitalia; female, 113. Ultimate tergite and forceps; *Spongovostox semiflavus* (Bormans), male, 114. A few basal and apical segments of antennae, 115. Hind tarsi, 116. Ultimate tergite and forceps, 117. Genitalia, female, 118. Ultimate tergite and forceps (figs. 110-111 after Brindle, 1971).



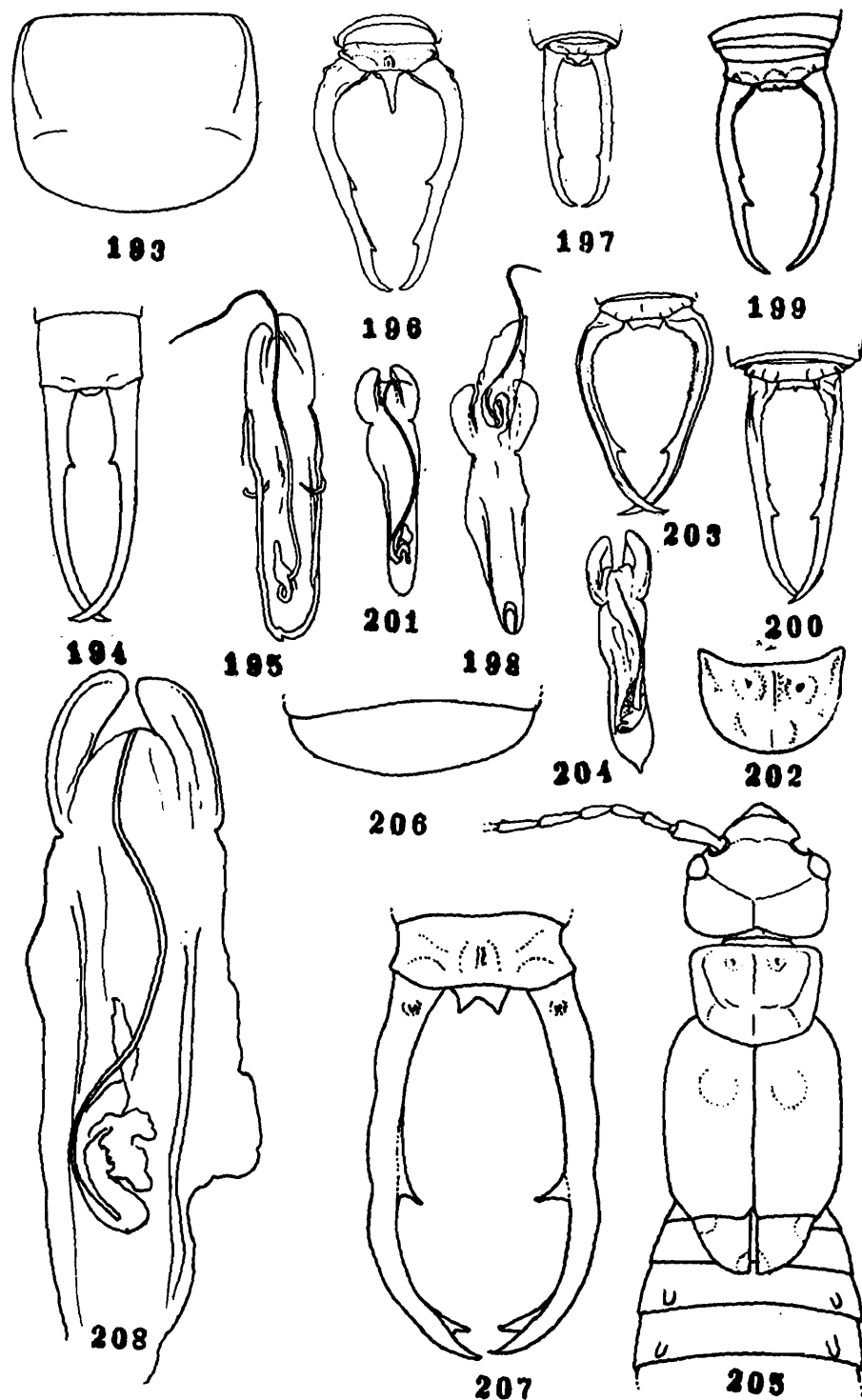
Figs. 119-137 : *Homotages feae* (Bormans), male, 119. Hind tarsi, 120. Ultimate tergite and forceps, normal form, 121. Ultimate tergite and forceps, horizontal form 122. Genitalia; *Labia minor* (Linnaeus), male, 123. Ultimate tergite and forceps, macrolabic form, 124. Ultimate tergite and forceps, cyclolabic form, 125. Genitalia; *Paralabella curvicauda* (Motschulsky), male, 126. Hind tarsi, 127-128. Ultimate tergite and forceps, 129-130. Genitalia; *Paralabella fulleri* Rammurthi, male, 131. Ultimate tergite and forceps, 132. Genitalia, female, 133. Ultimate tergite and forceps; *Apovostox stella samsingensis* Srivastava, male, 134. Ultimate tergite and forceps, 135. Genitalia; *Apovostox burri* (Srivastava) male, 136. Ultimate tergite and forceps, 137. Genitalia. (figs. 131-133 after Ramamurthi, 1963).



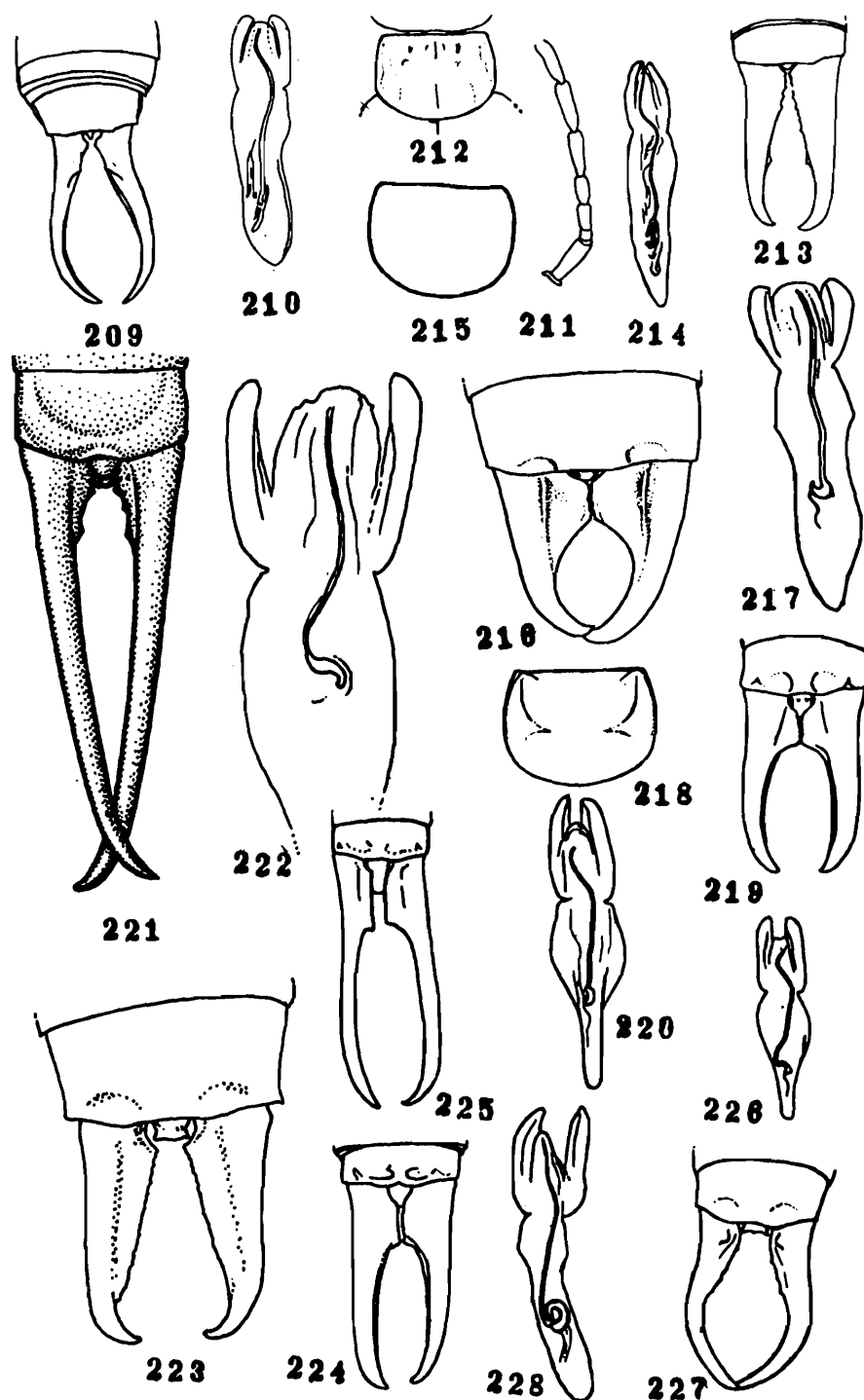
Figs. 138 - 160 : *Chaetospania feae* Bormans, male, 138 - 140. Ultimate tergite and forceps, 141. Genitalia; *Chaetospania kurseongae* Hebard, male, 142. Hind tarsi, 143. Ultimate tergite and forceps, female, 144. Ultimate tergite and forceps; *Chaetolabia bihastata* (Borg), male, 145. Ultimate tergite and forceps, 146. Genitalia, male, 147. Ultimate tergite and forceps; *Proreus tezpurensis* (Srivastava), male, 148. Ultimate tergite and forceps, 149. Genitalia; *Proreus abdominalis* Ramamurthi, male, 150. Ultimate tergite and forceps, 151. Genitalia; *Adiathetus glaucopterus* (Bormans), male, 152. Ultimate tergite and forceps, 153. Genitalia; male, 154. Ultimate tergite and forceps; *Laprophorella kervillei* (Burr), male, 155. Hind tarsi, 156. Ultimate tergite and forces, 157. Genitalia; *Hamaxas feae* (Bormans), male, 158 - 159. Ultimate tergite and forceps, 160. Genitalia.



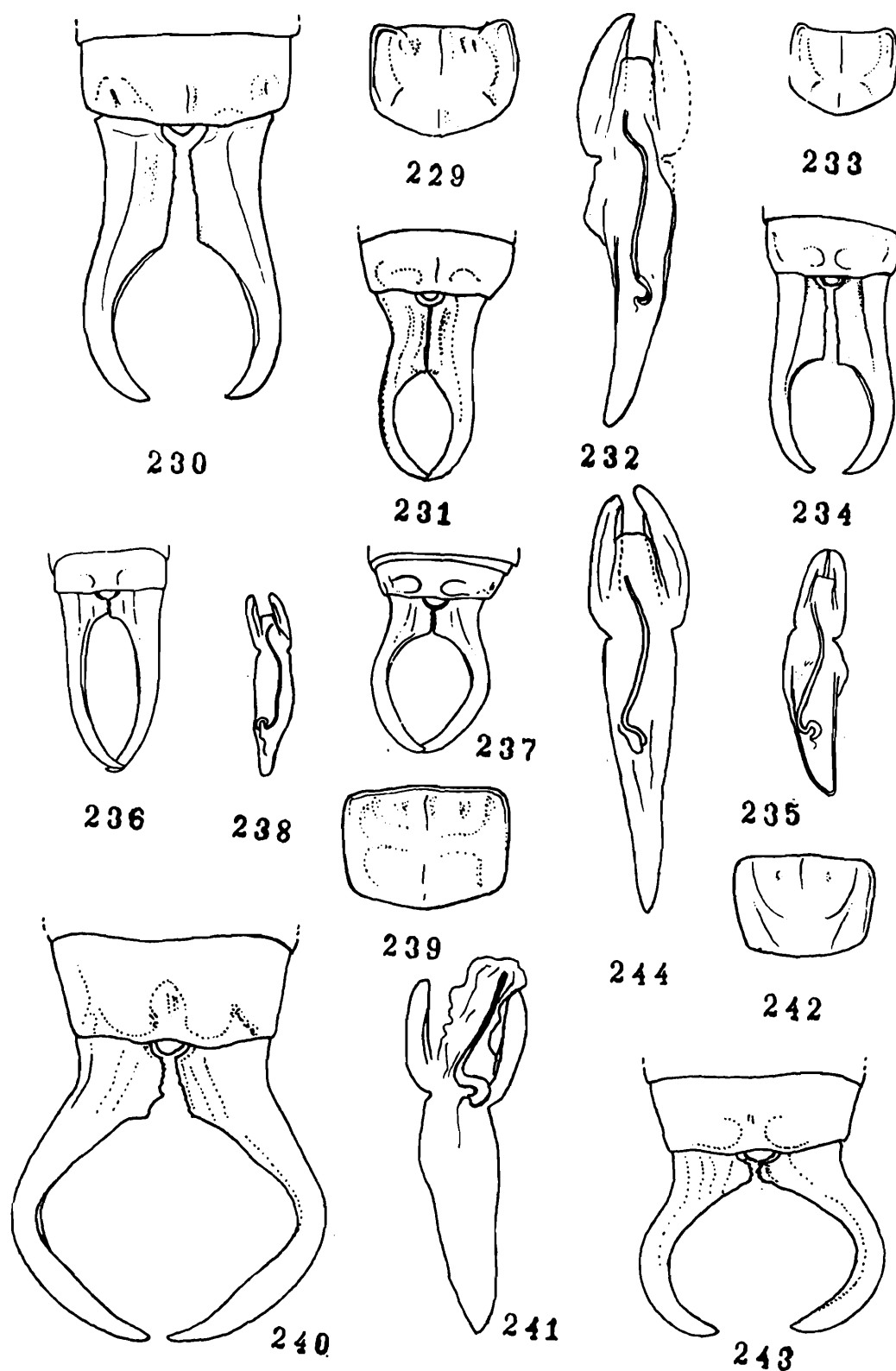
Figs. 161-192 : *Hamaxas melanocephalus* (Dohrn) male, 161-162. Ultimate tergite and forceps (cyclolabic and macrolabic forms), 163. Genitalia; *Liparura punctata* Burr, male), 164. A few basal antennal segments, 165. Hind tarsi, 166. Ultimate tergite and forceps, 167. Genitalia, *Liparura dentata* Srivastava, male, 168. A few basal antennal segments, 169. Pronotum and elytra, 170. Hind tarsi, 171. Ultimate tergite and forceps, 172. Genitalia, female, 173. Anterior portion of body, 174 Hind tarsi, 175. Ultimate tergite and forceps; *Liparura debepaniensis* Kapoor, Bharadwaj and Banerjee, male, 176. Pronotum and elytra, 177. Ultimate tergite and forceps, 178. Genitalia; *Timomenus brahma* (Burr), male, 179. A few basal antennal segments, 180. Pronotum, 181. Ultimate tergite and forceps, 182. Genitalia; *Timomenus lugens* (Bormans), male, 183. Hind tarsi, 184. Ultimate tergite and forceps, 185. Genitalia; *Eparchus insignis* (Haan), male, 186. Ultimate tergite and forceps, 187. Genitalia. *Eparchus simplex* (Bormans), male, 188. Hind tarsi, 189. Ultimate tergite and forceps, 190. Genitalia; *Hypurgus humeralis* (Kirby), male, 191. Ultimate tergite and forceps, 192. Genitalia (figs. 173-175 drawn from the Holotype male, of *Brachylabis tegminata* Steinmann)



Figs. 193-208 : *Pterygida vishnu* (Burr), male, 193. Pronotum, 194. Ultimate tergite and forceps, 195. Genitalia; *Allodhalia ahrimanes* (Burr), male, 196 - 197, Ultimate tergite and forceps, 198. Genitalia; *Allodahlia coriacea* (Bormans), male, 199 - 200. Ultimate tergite and forceps, 201. Genitalia; *Allodahlia scabriuscula* (Serville), male, 202. Pronotum, 203. Ultimate tergite and forceps, 204. Genitalia; *Anechura biswasi* sp. n., Holotype male, 205. Anterior portion of body, 206. Penultimate sternite, 207. Ultimate tergite and forceps, 208. Genitalia (Figs. 193-195 drawn from the Holotype male of *Kosmetor josephi* Kapoor).



Figs. 209 - 228 : *Forficula cristata* Srivastava, Holotype male, 209. Ultimate tergite and forceps, 210. Genitalia; *Forficula wittmeri* Srivastava, Holotype male, 211. A few basal antennal segments, 212. Pronotum, 213. Ultimate tergite and forceps, 214. Genitalia; *Forficula genitalia* Kapoor, Holotype male, 215. Pronotum, 216. Ultimate tergite and forceps, 217. Genitalia; *Forficula interrogans* (Burr), male, 218. Pronotum, 219. Ultimate tergite and forceps, 220. Genitalia; *Forficula mogul* Burr, male, 221. Ultimate tergite and forceps, 222. Genitalia, female, 223. Ultimate tergite and forceps; *Forficula beelzebub* (Burr), male, 224. Ultimate tergite and forceps (cyclolabial), 225. Ultimate tergite and forceps (macrolabial), 226. Genitalia; *Forficula beebei* (Burr), male, 227. Ultimate tergite and forceps, 228. Genitalia.



Figs. 229-244 : *Forficula tawangensis* Srivastava, male, 229. Pronotum, 230-231. Ultimate tergite and forceps, 232. Genitalia; *Forficula lucens* Brindle, male, 233. Pronotum, 234. Ultimate tergite and forceps, 235. Genitalia; *Forficula planicollis* (Kirby), male, 236-237. Ultimate tergite and forceps, 238. Genitalia; *Forficula bhutanensis* Brindle, male, 239. Pronotum, 240. Ultimate tergite and forceps, 241. Genitalia; *Forficula schlagintweiti* (Burr), male, 242. Pronotum, 243. Ultimate tergite and forceps, 244. Genitalia.

TABLE : Showing districtwise distribution of species in West Bengal

Name of the Species	Bankura	Bardhaman	Birbhum	Calcutta	Darjiling	Haora	Hugli	Jalpaiguri	Koch Bihar	Maldah	Medinipur	Murshidabad	Nadia	North 24 Parganas	Puruliya	South 24 Parganas	West Dinajpur
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PYGIDICRANIDAE																	
<i>Acrania picta</i> (Guerin-Meneville)						+									+		
<i>Acrania constricta</i> (Hincks)		+	+														
<i>Paradiplatys gladiator</i> (Burr)				+		+										+	
<i>Diplatys brindleyi</i> Steinmann			+														
<i>Diplatys sinuatus</i> Hincks																+	
<i>Haplodiplatys siva</i> (Burr)			+														
<i>Haplodiplatys kurseongensis</i> Srivastava			+														
<i>Haplodiplatys bhowmiki</i> (Srivastava and Saha)			+														
<i>Haplodiplatys bidentatus</i> (Hincks)			+														
<i>Haplodiplatys chinensis</i> (Hincks)			+														
<i>Haplodiplatys stemmleri</i> (Brindle)			+														
<i>Haplodiplatys rileyi</i> (Hincks)			+														
<i>Haplodiplatys urbanii</i> (Brindle)			+														
<i>Haplodiplatys rufescens</i> (Kirby)			+														
<i>Haplodiplatys lobatus</i> Srivastava			+														
<i>Echinosoma convolutum</i> Hincks		+	+														

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Echinosoma dentiferum</i> Borelli		+	+														
<i>Parapsalis infernalis</i> (Burr)		+	+														
ANISOLABIDIDAE																	
<i>Aborolabis pervicina</i> (Burr)			+														
<i>Anisolabis deplanata</i> Srivastava			+														
<i>Anisolabis bhowmiki</i> Srivastava			+														
<i>Euborellia annulipes</i> (Lucas)		+	+							+	+	+					+
<i>Euborellia compressa</i> (Borelli)										+	+	+					
<i>Euborellia annandalei</i> (Burr)			+														
<i>Euborelli stali</i> (Dohrn)						+				+							
<i>Metisolabis caudelli</i> (Burr)			+														
<i>Antisolabis formicoides</i> (Burr)			+														
LABIDURIDAE																	
<i>Nala lividipes</i> (Dufour)			+	+	+	+					+	+			+		+
<i>Nala nepalensis</i> (Burr)			+														
<i>Labidura riparia</i> (Pallas)				+	+	+					+	+					+
<i>Forcipula indica</i> Brindle			+														
<i>Forcipula abbreviata</i> Srivastava			+														
<i>Forcipula quadrispinosa</i> (Dohrn)			+			+											
<i>Forcipula trispinosa</i> (Dohrn)			+			+											
APACHYIDAE																	
<i>Apachyus feae</i> Bormans			+														
SPONGIPHORIDAE																	

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Irdex nitidipennis</i> (Bormans)			+														
<i>Marava arachidis</i> (Yersin)						+									+		
<i>Spongovostox mucronatus</i> (Stal)			+			.											
<i>Spongovostox semiflavus</i> (Bormans)		+	+														
<i>Homotages feae</i> (Bormans)			+														
<i>Labia minor</i> (L)			+			+	+										
<i>Paralabella curvicauda</i> (Motschulsky)			+		+											+	
<i>Paralabella fulleri</i> Ramamurthi			+														
<i>Apovostox stella samsingensis</i> Srivastava			+														.
<i>Apovostox burri</i> (Srivastava)			+														
<i>Chaetospasia kurseongae</i> Hebard			+														
<i>Chaetolabia bihastata</i> (Borg)			+														
CHELISOCHIDAE																	
<i>Proreus tezpurenensis</i> (Srivastava)													+				
<i>Poreus abdominalis</i> Rammurthi						+			+								
<i>Adiathetus glaucopterus</i> (Bormans)			+														
<i>Laprophorella kervillei</i> (Burr)			+		+	+		+									
<i>Hamaxas feae</i> (Bormans)			+														
<i>Hamaxas melanocephalus</i> (Dohrn)			+			+											
FORFICULIDAE																	
<i>Liparura punctata</i> (Burr)			+														
<i>Liparura dentata</i> Srivastava			+														
<i>Liparura debrepaniensis</i> Kapoor, Bhardwaj & Banerjee			+														
<i>Timomenus brahma</i> (Bur)			+														

SUMMARY

A total of 78 species belonging to 36 genera are treated in the present paper. It includes a new species, viz, *Anechura biswasi* besides proposing synonymy of *Brachylabis tegminata* Steinmann under *Liparura dentata* Srivastava and *Kosmetor Josephi* Kapoor under *Pteygida vishnu* (Burr). Keys for the discrimination of various species and supr-specific taxa are provided. Intra-specific variations wherever possible are discussed.

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REFERENCES

- Borelli, A. 1926. Dermatteri delle Isole Filippine, Nota VII. *Res. Biol.*, **1** (5) : 61-79, 6 figs.
- Brindle, A. 1971. The Dermaptera of the Naturhistoriska Riksmuseet, Stockholm. Part. IV. *Ent. Tidskr.*, **92**(1-2) : 1-27.
- Burr, M. 1911. Contribution to our knowledge of Indian Earwigs. *J. Asiat. soc. Bengal*. (N.S.), **7** : 771-800.
- Burr, M. 1911a. Vorlaufige Revision der Labiiden. *Dt. ent. natn. Biblthk.*, **1911** : 58-65.
- Burr, M. 1915. On the male Genital Armature of the Dermaptera. Part II. Psalidae. *J.R. micr. Soc.*, **1915** : 521 - 546 , pls. 10-12, figs. 58-64.
- Hebard, M. 1923. Studies in Indian Dermaptera. *Mem. Dept. Agric. India Ent. Ser.*, **7** : 195 - 242, pls. 19-21.
- Hincks, W.D. 1955. A Systematic Monograph of the Dermaptera of the World based upon the material in the British Museum (Natural History), Part I. Pygidicranidae, subfamily Diplatyinae, **132** pp., 167 figs., London, British Museum (Natural History).
- Mjoberg, E. 1924 Result of Dr. E. Mjoberg's Swedish Scientific Expedition to Australia, 1910-1913 (36 Dermaptera). *Ark. Zool.*, **16**:1-11.

- Kapoor, V.C. 1967. Description of two new species of Dermaptera from India. *Orient. Insects*, **1** (1-2) : 55-59.
- Ramamurthi, B.N. 1963. Notes on Indian Dermaptera. *Ann. Mag. nat. Hist.*, (13) **6** : 671-676, figs. 1-6.
- Srivastava, G.K. 1975. Notes on the Indian species of the genus *Irdex* Burr (Dermaptera : Labiidae). *Dr. B.S. Chauhan Comm. vol.*, (Ed. K.K. Tiwari & C.B. Srivastava - Zoological Society of India) : 267-278.
- Srivastava, G.K. 1976. Catalogue of Oriental Dermaptera. *Rec. zool. Surv. India, Occ. pap.*, **2** : 1-94.
- Srivastava, G.K. 1980. Species dynamics in Dermaptera. XVI Int. Congr. Ent. (*In some Guide signes on Insect Integrated Taxonomy*, ed. by S. Sakai) : 90-100, figs. 1-11.
- Srivastava, G.K. 1982. Notes on a collection of Dermaptera (Insecta) present in the Natural History Museum, Basel. *Ent. Basiliensia*, **7** : 61-76.
- Srivastava, G.K. 1985. Studies on Bormans' (= Dubrony) some material of Dermaptera (Insecta). *Annali. Mus. civ. Stor. nat. Giacomo Doria*, **85** : 201-233.
- Srivastava, G.K. 1987. Notes and illustrations on some Borelli's material of Dermaptera (Insecta). *Boll. Mus. reg. Sci. nat. Torino*, **5**(2) : 317-324.
- Srivastava, G.K. 1988. The Fauna of India and the Adjacent countries, Dermaptera Part I. Superfamily : Pygidicranoidea, XII + 268 pp. and errata. Calcutta (Zoological Survey of India).
- Steinmann, H. 1974. A new generic classification of the species group of *Diplatys* Serville (Dermaptera: Pygidicrandiae). *Acta Zool. hung.*, **20**(1-2) : 187-205.
- Steinmann, H. 1983. On Indian and Nepalese Dermaptera from the Museum d'Histoire naturelle et Geneve. *Revue suisse zool.*, **90** (3) : 543-553.
- Steinmann, H. 1987. Two new genera and species of the subfamily Labiinae (Dermaptera : Labiidae). *Acta. zool. hung.*, **33**(1-2) : 177-186.
- Steinmann, H. 1989. Dermaptera, Eudermaptera 1. *Das Tierreich*, **105** : I-XVIII + 558 pp. (Walter de Gruyter, Berlin and New York).

INSECTA : DICTYOPTERA : BLATTARIA

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INTRODUCTION

The Blattarian fauna of West Bengal is still unexplored. The present paper deals with taxonomic studies on the Blattids collected by various survey parties of the Zoological Survey of India from all the districts of West Bengal in different years. The old materials in the National Zoological collection as well as the materials of recent years have been included in this paper. The specimens have been collected from various ecological niches. It comprises altogether 474 examples belonging to 10 families, 16 genera and 23 species. All the species have been recorded for the first time from the State of West Bengal excepting the species Nos. 1, 5, 6, 7, 8, 12, 14, 19 and 21. Diagnosis and Zoogeographical distributions of all the species are also given.

SYSTEMATIC ACCOUNT

Family I. OXYHALOIDAE

1. *Nauphoeta cinerea* (Olivier)

1789. *Blatta cinerea* Olivier, *Encycl. meth. Hist. nat.*, 4 : 314.

1965. *Nauphoeta cinerea*, Princis, *Orthopterorum Catalogus*, part 7 : 289.

Material examined : *Bankura District* : 1 ex., Bankura, 11.x. 1985, coll. K.K. Roy ; 1 ex., Bishnupur, 6. iii. 1986 (At light), coll. K.P. Mukherjee. *Birbhum District* : 1 ex., Ballavpur, 15. iii. 1986, coll. K.P. Mukherjee. *Calcutta District* : 1 ex., 12. vi. 1910, coll. C. Paeva (Reg. No. 9621/16) ; 1 ex., 19. xi. 1930, coll. E.E. Dormium ; 2 exs., 24. x. 1956, coll. T.G. Vazirani ; 1 ex., Banshroni, 28.x. 1959, coll. A.R. Bhowmik and S. Ali.

Diagnosis : It is a tropical species similar to the common cockroach. Pronotum posteriorly larger which at its anterior part is smooth and livid with exterior borders much clearer. The disc of the pronotum is dotted with small ferruginous spots and bordered on each side by a longitudinal blackish band. It occurs both in the houses and in the open fields.

Distribution : India : West Bengal (Banura, Birbhum, Calcutta). A fairly well distributed species throughout the tropical region.

Family II. ECTOBIIDAE

2. *Hemithyrsocera palliata* (Fabricius)

1798. *Blatta palliata* Fabricius, *Entomologia systematica*, 2 Suppl., : 186.

1971. *Hemithyrsochera palliata*, Princis, *Orthopterorum Catalogus*, Part 14 : 1124.

Material examined : Darjeeling District : 1 ex., 1/2 km. South of Goke F.R.H., Singla, Alt. 450 m., 20.iv. 1973, coll. H.S. Sharma ; 4 exs., Tindharia, Alt. 856 m., 14.v. 1979, coll. M.S. Shishodia ; 2 exs., Kalijhara, 4. iv. 1984, coll. M. Prosad. Jalpaiguri District : 1 ex., Paltan Para forest, 2 kms. South of Rajabhatkheo, 21. iii. 1986, coll. A.K. Hazra ; 1 ex., Mechbasti, Kathambari, 10. x. 1987, coll. S.K. Tandon.

Diagnosis : It has got shining dark castaneous to black tegmina. Wings with the intercalated field slightly prominent. Subcostal vein nearly reaching the median point. Radial vein forking mesad and sending eleven to twelve branches to the anterior margin. Median and cubital vein unbrached. The whole wing has a brownish tinge, except the strongly darkened anterior field.

Distribution : India : West Bengal (Darjeeling, Jalpaiguri). A widely distributed species on the Asiatic Continent.

Family III. DEROCALYMMIDAE

3. *Trichoblatta sericea* Saussure

1863. *Perisphaeria sericea* Saussure, *Mem. Soc. Geneve*, 17 : 138.

1964. *Trichoblatta sericea*, *Orthopterorum Catalogus*, Part 6 : 208.

Material examined : Darjeeling District : 1 ex., 4 km. S.E. of Goke F.R.H., Singla, 18.iv. 1973, coll. H.S. Sharma ; 2 exs., Bhuttabari forest village, Alt. 1150 ft., 19. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 6 exs., Chunabati, 27. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 1 ex., Chunabati forest, Chunabati, 28. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 2 exs., Reyang F.R. House, 30. iii. 1973, coll. H.S. Sharma ; 1 ex., 1 km. S.W. of Reyang F.R. House, Alt. 390 m., 31. iii. 1973, coll. H.S. Sharma ; 1 ex., Sukna, Alt. 200 m., 7.1. 1976, coll. G.K. Srivastava and G.S. Arora. Jalpaiguri District : 2 exs., Rajabhatkhawa, 27. iv. 1986, coll. B.C. Das ; 1 ex., Chilapata, 16.x. 1987, coll. S.K. Tandon. Malda District : 3 exs., Golapganj, 21.vi. 1987, coll. K.P. Mukherjee ; 1 ex., Nimbari, 24.vi. 1987, coll. K.P. Mukherjee.

Diagnosis : Black species about 15-30 mm. in length ; head black with a yellow spot at base of each antenna ; antennae uniformly yellowish brown ; palpi yellow ; thorax uniformly black ; femora and tibiae dark brown, tarsal segments yellowish brown ; abdomen black, eight segmented ; cerci yellowish brown. This species is ovo-viviparous.

Distribution : India: West Bengal (Darjeeling, Jalpaiguri, Malda), Arunachal Pradesh, Meghalaya, Sikkim, Bihar, Orissa, Maharashtra, Gujarat, Tamilnadu, Karnataka and Kerala. Elsewhere : Not recorded so far from outside India.

4. *Pseudoglomeris glomeris* (Saussure)

1863. *Perisphaeria glomeris* Saussure, *Mem. Soc. Geneve*, 17 : 135.

1904. *Pseudoglomeris glomeris*, Kirby, *Syn. Cat. Orth.*, 1 : 190.

Material examined : Darjeeling District : 1 ex., Reyang F.R.H. Campus, 2. iv. 1973, coll. H.S. Sharma ; 1 ex., Chunabati, 27. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 2 exs., Rangpo, Alt. 450 m. (At light), 19. iv. 1976, coll. A.R. Bhowmik.

Diagnosis : Head darkbrown with a circular yellow spot at base of each antenna ; antennae yellow; palpi yellow with concolourous hairs ; pronotum more or less triangular in shape, black with yellowish-brown margins ; legs dark brown, tarsi comparatively lighter coloured ; tegmina exceeding apex of wings, dark brown but pale at apical half; wings dark brown, apices comparatively lighter ; abdomen dorsally yellowish, ventrally dark brown ; supra-anal plate of male much broader than long, posterior margin semicircular ; subgenital lamina exceeding supra-anal lamina hind-wards, semicircular, wider than long; the left style darkbrown, much curved, right yellowish, conical ; cerci yellow. Body length 14-20 mm.

Distribution : India : West Bengal, (Darjeeling), Orissa, Manipur, Arunachal Pradesh, Karnataka and Tamil Nadu. Elsewhere : Sri Lanka.

Family IV. PYCNOSCELIDIDAE

5. *Pycnoscelus surinamensis* (Linnaeus)

1758. *Blatta surinamensis* Linnaeus, *Syst. naturae*, 10th Ed., 1 : 424.

1964. *Pycnoscelus surinamensis*, Princis, *Orthopterorum Catalogus*, Part 6 : 264.

Material examined : *Bankura District* : 2 exs., Sonamukhi forest, 8.iii. 1986, coll. K.P. Mukherjee; 1 ex., Jhilimili, 23.ix. 1987, coll. M. Prosad. *Birbhum District* : 3 exs., Illambazar, 14. iii. 1986, coll. K.P. Mukherjee. *Calcutta District* : 1 ex., Calcutta, 29.viii. 1969, coll. M. Gupta. *Darjeeling District* : 1 ex., Pashok, E. Himalayas, 3. vi. 1930, coll. S.L. Hora ; 1 ex., Daling coat, North of Gorubathan, Alt. 1300 ft., 20.iii. 1973, coll. G.K. Srivastava and P.K. Maity ; 4 exs., Around Khamani F.R. House, Alt. 900 ft., 25. xii. 1973, coll. G.K. Srivastava and P.K. Maity ; 5 exs., Chunabati, 27. xii. 1973, coll. G.K. Srivastava and P.K. Maity ; 1 ex., Chunabati forest, 28. xii. 1973, Alt. 400 ft., coll. G.K. Srivastava and P.K. Maity ; 1 ex., Nozeok, Alt. 1000 ft., 7.i. 1974, coll. G.K. Srivastava and P.K. Maity ; 2 exs., Reang, Alt. 1250 ft., 8.i. 1974, coll. G.K. Srivastava and P.K. Maity ; 1 ex., Darjeeling, 18.iii. 1974, coll. H.K. Bhowmik ; 1 ex., 3 kms. from Bijanbari High School along Ranjit River, 19. v. 1974, coll. J.K. Jonathan ; 2 exs., Tumthangkhola, 5 kms. South of Rongpo, Alt. 300 m., 28.xii. 1975, coll. G.K. Srivastava and G.S. Arora ; 8 exs., Singla, Alt. 400 m., 2.i. 1976, coll. G.k. Srivastava and G.S. Arora ; 1 ex., Singla, Alt. 400 m., 3.i. 1976, coll. G.K. Srivastava and G.S. Arora ; 1 ex., Karmaktar, 3 kms. S.W. of Singla, Alt. 450 m., 3.i. 1976, coll. G.K. Srivastava and G.S. Arora ; 5 exs., Nayabazar - Likship Road, Alt. 400 m., 4.i. 1976, coll. G.K. Srivastava and G.S. Arora ; 2 exs., Singlabazar, Alt. 400 m., 5.i. 1976, coll. G.k. Srivastava and G.s. Arora ; 1 ex., Ghum, Alt. 2253 m., 21.7.1979, coll. M. Prosad. *Jalpaiguri District* : 1 ex., Baxa Tiger Reserve, Jointi Hill, 12.xii. 1984, coll. S. Chattopadhyay. *Malda District* : 2 exs., Tulshihata, 25.vi. 1987, coll. K.P. Mukherjee; 1 ex., Parbatidanga, 27.vi. 1987, coll. K.P. Mukherjee. *Medinipur District* : 1 ex., Sunay, around Jhargram, 15.ix. 1985, coll. S. Biswas. *Nadia District* : 1 ex., Krishnanagar, 13. viii. 1965, coll. S.P. Chakraborty and T.K. Chakraborty. *West Dinajpur District* : 2 exs., Gangarampur, 15. vi. 1987, coll. K.P. Mukherjee.

Diagnosis : The Surinam or dusty-tail roach is a robust tropical species of wide distribution. It is darkbrown or blackish in colour with pale-brown wings. The apterous young are polished with the exception of the apical portion of the abdomen which is velvety opaque, hence the common name dusty-tail. Tegmina and wings usually slightly short of or extending beyond the tip of the abdomen. The wings of the surinam cockroach are one-third the length of the body which are distinctly oval in outline. It shows much variations in shell character and measures 14 to 20 mm. in length. This species is often common in green houses, where it feeds upon growing plants.

Distribution : India : West Bengal (Birbhum, Calcutta, Darjeeling, Jalpaiguri, Malda, Medinipur,

Nadia, West Dinajpur). A fairly well distributed species throughout the Oriental Region and also in Surinam (S. America).

Family V. BLATTELLIDAE

6. *Supella (Supella) longipalpa* (Fabricius)

1798. *Blatta longipalpa* Fabricius, *Suppl. Ent. Syst.*, : 185.

1969. *Supella (Supella) longipalpa* (Fabricius), Princis, *Orthopterorum Catalogus*, Part 13 : 917.

Material examined : Bankura District : 2 exs., Pokarna, 7. iii. 1986, coll. K.P. Mukherjee. Bardhaman District : 1 ex., Dhatrigram, 12. xii. 1985, coll. B.N. Das. Jalpaiguri District : 1 ex., Dalsingpara, 31. xii. 1986, coll. M. Dutta ; 1 ex., Birpara, 21.i. 1987, coll. V.D. Srivastava. Maldah District : 2 exs., Atal, 19. vi. 1987, coll. K.P. Mukherjee ; 1 ex., Tulshihata, 25. vi. 1987, coll. K.P. Mukherjee. Murshidabad District : 1 ex., Jiyaganj, Raichandpur, 6.ii. 1986, coll. I.J. Gupta ; 1 ex., Dhulian, 17. vi. 1987, coll. K.P. Mukherjee. West Dinajpur District : 2 exs., Gangarampur, 15.vi. 1987, coll. K.P. Mukherjee.

Diagnosis : It is a small household pest, about 11m. long. Pronotum blackish brown, with broad yellowish lateral margin, tegmina yellow with a large reddish brown basal spot and also a small oblique paler band. It is winged of a brown colour with varied dark markings. General colour light brown. Sexes dissimilar. Near the apex of the anal field a broad pale coloured band crosses the tegmina. Because of this colour pattern this species is called brown banded cockroaches.

It is found in the kitchen and also inside the refrigerators. Because of its light body it flies rapidly.

Distribution : India : West Bengal (Burdhaman, Jalpaiguri, Malda, Murshedabad, West Dinajpur). A fairly well distributed species throughout the tropical region.

7. *Blattella humberiana* (Saussure)

1863. *Polyzosteria humberiana* Saussure, *Mem. Soc. Geneve*, 17 : 131.

1969. *Blattella humberiana*, Princis, *Orthopterorum Catalogus*, Part 13:842.

Material examined : Bankura District : 2 exs., Chatua, N.W. of Bankura, 10.ii. 1985, coll. K.K. Roy ; 5 exs., Jaypur forest, 6. iii. 1986, coll. K.P. mukherjee ; 10 exs., Sonamukhi forest, 8. iii. 1986, coll. K.P. Mukherjee ; 12 exs., Pokarna, 7. iii. 1986, coll. K.P. Mukherjee. Birbhum District : 8 exs., Kanchanpur forest, 10. iii. 1986, coll. K.P. Mukherjee ; 8 exs., Illambazar, 14. iii. 1986, coll. k.P. Mukherjee. Calcutta District : 1 ex., Calcutta environs, 10. xii. 1904, coll. Brunethi, 8 exs., Edengarden, 20. vii. 1966, coll. T.K. Chakraborty and K.L. Banerjee. Cooch Bihar District : 1 ex., Kaligung, 28. iii. 1984, coll. M. Prosad. Darjeeling District : 2 exs., Kumani forest, 3 kms. N. of F.R.H., 22.iii. 1973 ; 3 exs., Chunabati, 28. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 1 ex., Reang, Alt. 1250 ft., 8.i. 1974, coll. G.K. Srivastava and P.K. Maiti ; 1 ex., Rongpo, 26. xii. 1975, coll. G.k. Srivastava and G.S. Arora ; 1 ex., Tumthangkhola, 5 kms. S. of Rongpo, 28. xii. 1975, coll. G.K. Srivastava and G.S. Arora ; 2 exs., Singla, Alt. 400m., 2.i. 1976, coll. G.K. Srivastava and G.S. Arora ; 3 exs., Nayabazar, Likship Road, 4.i. 1976, coll. G.k. Srivastava and G.S. Arora ; 3 exs., Kalimpong, 23.v. 1979, Alt. 1243 m. coll. M.S. Shishodia ; 1 ex., 2 kms. S. of Rongpo, 27.v. 1979, coll. M.S. Shishodia. Hooghly District : 1 ex., Anantapur, 9. vii. 1965, coll. M.S. Shishodia

& K.L. Bhatta ; 1 ex., Baidyabati, 8.xii. 1977, coll. M.S. Shishodia. *Howrah District* : 2 exs., Botanical Garden, 19. viii. 1986, coll. S.k. Ghosh. *Jalpaiguri District* : 4 exs., Buxaduar (Santalbari), 11.i. 1987, coll. V.D. Srivastava; 2 exs., Kathambari, 11.x. 1987, coll. S.K. Tandon ; 2 exs., Buxa Tiger Reserve, Kartick Range, Rydak, 21. xii. 1984, coll. S. chattopadhyay ; 1 ex., Bijanbari forest, Rajbhatkawa, 19,iii, 1986, coll. A.k. Hazra. *Malda District* : 20 exs., Ratua, 13. vi. 1987, coll. K.P. Mukherjee ; 6 exs., Atal, 19. vi. 1987, coll. K.P. Mukherjee, 5 exs., Harishchandrapur, 22.vi. 1987, coll. K.P. Mukherjee ; 2 exs., Tulshihata, 25.vi. 1987, coll. K.P. Mukherjee ; 10 exs., Parbatidanga, 27. vi. 1987, coll. K.P. Mukherjee. *Murshidabad District* : 2 exs., Sericulture firm, Berhampur, 11.ii. 1986, coll. I.J. Gupta ; 1 ex., Jangipur, Mohammadpur, 10. ii. 1986, coll. I.J. Gupta ; 5 exs., Dhulian, 17. vi. 1987, coll. K.P. Mukherjee. *Nadia District* : 2 exs., Dhubulia, 19. xii. 1985, coll. B.N. Das. *24 Parganas District* : 2 exs., Bakkhali, 1 vi. 1978, coll. M. Prosad and S.K. Ghosh. *West Dinajpur District* : 1 ex., Raigang, Binagar, 16. xii. 1986, coll. B.C. Das ; 5 exs., Gangarampur, 15. vi. 1987, coll. K.P. Mukherjee.

Diagnosis : It is a small brown, apterous species about 10-15 mm. in length. Head yellow, frontal region yellowish-brown. Eyes yellowish-brown to dark brown. Antennal scape and pedicel yellow, rest yellowish-brown. Palpi yellow. Prothorax marked with black and light brown. Meso and metathorax unicolourous with thorax. Legs yellow. Abdomen yellowish-brown, each segment with a rectangular dark-brown spot on each side which are connected by a narrow stripe of similar colour and the stripe is projected backward in the middle upto half of each segment. Cerci yellowish-brown but dark brown at base. It is perhaps the most common field species, found among decaying vegetation and also on trees.

Distribution : India : West Bengal (widespread). Widely distributed species in the world.

8. *Blattella germanica* (linnaeus)

1767. *Blatta germanica* Linnaeus, *Syst. naturae*, 1(2) : 668.

1969. *Blattella germanica*, Princis, *Orthopterorum Catalogus*, Part 13 : 807.

Material examined : *Bankura District* : 15 exs., Pokarna, 7. iii. 1986, coll. K.P. Mukherjee ; 8 exs., Jhatipahari, 9. iii. 1986, coll. k.P. Mukherjee ; 10 exs., Jaypur forest, 6. iii. 1986, coll. K.P. Mukherjee ; 5 exs., Bankura, 11. iii. 1986, coll. k.P. Mukherjee. *Bardhaman District* : 2 exs., Dhatrigram, 12. xii. 1985, coll. B.N. Das. *Birbhum District* : 6 exs., Kanchanpur forest, 10. iii. 1986, coll. K.P. Mukherjee ; 8 exs., Illambazar, 14. iii. 1986, coll. K.P. Mukherjee ; 12 exs., Ballavpur, 15. iii. 1986, coll. K.P. Mukherjee. *Calcutta District* : 1 ex., Basdroni ghat, Tollygunge, 13.viii.1957, Coll. A. P. Kapur; 1 ex., Eden garden, Calcutta, 16.ix. 1957, coll. S. Ali ; 1 ex., Eden garden, Calcutta, 14. iv. 1959, coll. A.P. Kapur, 1 ex., Eden garden, Calcutta, 20.viii.1966, Coll. T. K. Chakraborty & K. L. Banerjee. *Darjeeling District* : 2 exs., Sonada, around forest Ranjer's Office, Alt. 1960 m., 9. v. 1971 ; 1 ex., Rongpo F.R.H., 9. ix. 1973, coll. H.S. Sharma ; 2 exs., Around Khamani F.R.H., Alt. 900 ft., 25. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 1 ex., Chunabati, 27. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 6 exs., Chunabati, 9. iii. 1974, coll. H.k. Bhowmik ; 1 ex., Mongpong, 18.iii. 1974, coll. H.K. Bhowmik ; 1 ex., 3 kms. from Bijanbari High School along Ranjit River, 19.v. 1974, coll. J.K. Jonathan ; 2 exs., Bijanban, Phulbazar, 20.v. 1974, coll. J.K. Jonathan ; 1 ex., Rongpo, on way to F.R.H., 29. v. 1974, coll. J.K. Jonathan ; 1 ex., Naya Bazar, Likship Road, Alt. 400 m., 4.i. 1976, coll. G.K.Srivastava and G.S. Arora ; 1 ex., Rongpo, Alt. 450 m. (At light), 15.iv. 1976, coll. A.R. Bhowmik; 2 exs., Thepi, 31.iii. 1978, coll. A.R. Bhowmik ; 1 ex., Darjeeling, 9.ix. 1978, coll. A.N.T. Joseph ; 1 ex., Kalimpong, 23.v. 1979, coll. M.S. Shishodia ; 1 ex.,

Rongpo, Alt. 625 m., 7. iv. 1981, coll. R.k. Varshney. *Howrah District* : 1 ex., Botanical Garden, 16.ii. 1957, coll. A.P. Kapur. *Jalpaiguri District* : 1 ex., Buxa Tiger Reserve, Jointi Hills, 12.xii. 1984, coll. S. Chattopadhyay ; 2 exs., forest near Raja Bhalkawa (At light), 20. iii. 1986, coll. A.K. Hazra; 2 exs., Mechbasti, Kathambari, 10. x. 1987 ; 1 ex., Bania forest, Chilapata, 14.x. 1987, coll. S.k. Tandon. *Malda District* : 5 exs., Chancal, 14.vi. 1987, coll. K.P. Mukherjee ; 2 exs., Nalakhokson, 18. vi. 1987, Coll. K.P. Mukherjee ; 4 exs., Atal, 19. vi. 1987, coll. K.P. Mukherjee ; 8exs., Golapganj, 21. vi. 1987, coll. K.P. Mukherjee ; 7 exs, Nimbari, 24.vi. 1987, coll. K.P. Mukherjee ; 10exs., Bhaluk Station, 26.vi.1987, Coll. K.P.Mukherjee. *Medinipur District* : 2 exs., Belpahari F.R.H., 8.ix. 1985 (At light), coll. S. Biswas. *Nadia District* : 1 ex., Bahadurpur forest, 15.xii. 1985, coll. B.N. Das ; 2 exs., Bethuaduhari Reserve Forest, 5.v. 1979, coll. A.k. Hazra. *24 Parganas District* : 1 ex., Bangaon, 7.i. 1966, coll. K. Bhattacharji ; 1 ex., Sonadanga, 6. vi. 1978, coll. M. Prosad and S.K. Ghosh. *West Dinajpur District* : 6 exs., Gangarampur, 15. vi. 1987, coll. K.P. Mukherjee ; 1 ex., Tunidighi, 26. xi. 1987, coll. T.R. Mitra.

Diagnosis : The croton bug or German roach is the smallest of the domestic varieties of roaches. It is rather slender, boat-shaped and pale-brown species, measuring 9-15 mm. in length. Pronotum provided with two parallel, longitudinal dark stripes. Margins of the pronotum, and humeral margins of the tegmina, straw yellow. The wings are fully developed and usually extend well beyond the tip of the abdomen. Legs elongated and spiny. The last ventral segment is entire in both sexes. It makes a small flat tabloid eggcase, which the female usually carries about with her for sometime projecting from the end of her body, and sometimes the eggs hatch while she is still carrying the case. This species is ovoviviparous. This troublesome roach is the principal pest of the kitchen and it prefers a warm, dark and humid environment. Due to its small size it is frequently brought into the home with groceries. Migrations from nearly infested places also occur. It is very active but rarely flies and found both in the house and in the field. Common names of this species are steambug, steamfly, crotonbug and the German cockroach. It is probably a native of Southern Asia but introduced by man to all parts of the world.

Distribution : India : West Bengal (widespred). A world-wide distributed species.

Family VI. BLABERIDAE

9. *Calolampra irrorata* (Fabricius)

1775. *Blatta irrorata* Fabricius, *Syst. Ent.*, : 272.

1963. *Calolampra irrorata*, Princis, *Orthopterorum Catalogus*, Part 4 : 149.

Material examined : *Darjeeling District* : 2 exs., Palmajue, Alt. 2250 m., 21.iv. 1958, coll. H. Khajuria. *West Dinajpur District* : 1 ex., Gangarampur, 15. vi. 1987, coll. K.P.Mukherjee.

Diagnosis : Head yellow with one transverse black stripe between the eyes and another black, longitudinal stripe from the level of antennae to palpi ; antennae filiform with pale hairs, first antennal segment brown with yellow base, second and third wholly brown ; palpi yellow, apical segment with brownish stripe ventrally ; thorax yellow ground colour with dark brown spots; legs yellow with apical tarsal segment brownish at apex ; abdomen yellow with dark brown spots all over ;cerci yellowish-brown with pale hairs. It measures 18-33 mm. in length.

Distribution : India : West Bengal, (West Dinajpur), Madhya Pradesh, Orissa and Tamilnadu. Elsewhere : Australia.

Family VII. EPILAMPRIDAE

10. *Stictolampra plicata* (Navas)

1904. *Opisthoplatia plicata* Navas, *Bol. Soc. aragon. Cienc. nat.*, 3 : 130.

1967. *Stictolampra plicata*, Princis, *Orthopterorum Catalogus*, Part 11 : 683.

Material examined : *Bankura District* : 2 exs., Sonamukhi forest, 8. iii. 1986, coll. K.P. Mukherjee; 1 ex., Jhilimili, 23. ix. 1987, coll. M. Prosad. *Birbhum District* : 1 ex., Ballavpur, 15.iii. 1986, coll. K.P. Mukherjee. *Darjeeling District* : 2 exs., Kurseong, Municipal School Campus, Alt. 1480 m., 2. v. 1971, coll. A.R. Bhowmik; 1 ex., Hima falls, Ghum, Alt. 2180 m., 27.v. 1971, coll. A.R. Bhowmik ; 2 exs., Mongpong, W. of Bagrakota, 29. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 1 ex., Sukna, Alt. 200 m., 7.i. 1976, coll. G.K. Srivastava and G.S. Arora. *Malda District* : 1 ex., Nimbari, 24.vi. 1987, coll. K.P. Mukherjee; 2 exs., Parbatidanga, 27.vi.1987, Coll. K. P. Mukherjee. *Medinipur District* : 1 ex., Digha F.R.H., 22. xii. 1985 (At light), coll. A.k. Hazra.

Diagnosis : Dark grey species about 18-19 mm. in length ; dorsum of head dark grey with yellowish-brown lateral borders, ventrally black but yellow at apex, and a round yellow spot at base of each antenna ; antennae dark brown, third segment elongated, annulated except at base ; palpi yellowish-brown, apical segment dark ; pro and mesothorax dark grey with yellowish-brown marks ; legs yellowish-brown and dark brown ; abdomen dark grey ; cerci dark brown.

Distribution : India : West Bengal, Arunachal Pradesh, Assam, Sikkim, Bihar, Orissa, Madhya Pradesh, Gujarat, Himachal Pradesh, Tamilnadu, Karnataka and Kerala. Elsewhere : Not recorded so far from outside India.

Family VIII. BLATTIDAE

11. *Hebardina concinna* (Haan)

1842. *Blatta* (*Periplaneta*) *concinna* Haan, in *Temminck, Verhand. Natuurl. Geschied. Nederl. Overz. Bezüt.* 16 (Zool. No. 6) : 50.

1966. *Hebardina concinna*, Princis, *Orthopterorum Catalogus*, Part 8 : 466.

Material examined : Howrah District : 4 exs., Botanical Garden, Sibpur, 23.i. 1979, coll. K.P. Mukherjee. *Jalpaiguri District* : 2 exs., Mechbasti, Kathambari, 10.x. 1987, coll. S.K. Tandon.

Diagnosis : Head black ; eyes brownish-yellow ; palpi yellow with concolourous hairs, all segments equal in length, apical segment spoon-shaped; antenna yellowish-brown; pronotum dark brown, posterior margin one and half times broader than anterior margin; meso and metanotum lighter coloured; legs yellow to brownish-yellow, all femora ventrally with two rows of spines ; all tibiae with four rows of spines – two ventrally and two dorsally ; basitarsus equal to the remaining segments ; first three abdominal segments more or less uniformly brownish-yellow, fourth and fifth segments brownish-yellow in the middle and dark brown on both sides, remaining segments dark brown.

Distribution : India : West Bengal (Howrah & Jalpaiguri), Arunachal Pradesh, Meghalaya, Sikkim,

Madhya Pradesh, Gujarat and Kerala. Elsewhere : Hongkong, Vietnam, Burma, Malakka, Sumatra, Java (Indonesia) and Borneo.

12. *Periplaneta americana* (Linnaeus)

1758. *Blatta americana* Linnaeus, Syst. naturae, 10th Ed., 1 : 424.

1965. *Periplaneta americana* Keven, Ent., Rec., 77 : 39.

Material examined : Bankura District : 1 ex., Sonamukhi forest, 8.iii. 1986, coll. K.P. Mukherjee; 1 ex., Pokarna, 7. iii. 1986, coll. K.P. Mukherjee. Birbhum District : 2 exs., Illambazar, 14.iii. 1986, coll. K.P. Mukherjee. Calcutta District : 3 exs., Calcutta, 26. iv. 1932, coll. R.S.W.; 1 ex., Calcutta, 11.v. 1940, coll. M. Joseph ; 1 ex., Calcutta, 7. xii. 1955, coll. Shaukat Ali ; 1 ex., Calcutta, 24.v. 1957, coll. Calcutta University ; 3 exs., Calcutta, 6. iv. & 7. iv. 1959, coll. B. Das ; 1 ex., Jabakusum House, Calcutta, 27. viii. 1965, coll. K.D. Chatterjee ; 1 ex., Jabakusum House, Calcutta, 11.xi. 1965, coll. R.R. Bhattacharjee. Darjeeling District : 1 ex., Goke, F.R.H. Camp, Singla, 19. iv. 1973, coll. H.S. Sharma. Jalpaiguri District : 1 ex., Buxa Tiger Reserve, Jointi Hills, 10. xii. 1984, coll. S. Chattopadhyay. Malda District : 1 ex., Nimbari, 24. vi. 1987, coll. K.P. Mukherjee ; 2 exs., Bhaluk Station, 26. vi. 1987, coll. K.P. Mukherjee ; 1 ex., Parbatidanga, 27. vi. 1987, coll. K.P. Mukherjee. Murshidabad District : 1 ex., Sericulture firm, Berhampur, 11.ii. 1986, coll. I.J. Gupta ; 2 exs., Dhulian, 17.vi. 1987, coll. K.P. Mukherjee. South 24 Parganas District : 1 ex., Ramdharia, 2 kms. S.E. of Baraipur, coll. B.N. Das.

Diagnosis : A large common household pest. Males 35-40 mm., females 25-37 mm. in total length. Reddish-brown in colour. Wings fully developed, in the males slightly overlapping the end of the abdomen. Pronotum with indistinct pale margins ; femora armed with strong spines ; keel like ovipositor valves in the female pronounced ; cerci well developed and style very distinct. Females lays eggs in an ootheca which is flat and about 9-11 mm. long. It is omnivorous and thermophilous. This species is nocturnal in habit, remaining hidden during the daytime in cracks and crevices, under boxes and other neglected articles, and coming out at night for feeding purposes. Common names of this species are Ship cockroach, Bombay Canary, American cockroach, etc.

Distribution : India : West Bengal (widrespread). Although the pest is world-wide, it thrives better in the tropical and subtropical climates.

13. *Periplaneta australasiae* (Fabricius)

1775. *Blatta australasiae* Fabricius, Syst. Ent., : 271.

1966. *Periplaneta australasiae*, Princis, *Orthopterorum Catalogus*, Part 8 : 447.

Material examined : Bardhaman District : 1 ex., Ambika-kalna, 14.xii. 1985, coll. B.N. Das. Calcutta District : 1 ex., Calcutta, 11. xii. 1910, coll. F.H. Gravely. Jalpaiguri District : 1 ex., Binaguri Tea State, 21.iii. 1986, coll. A.K. Hazra ; 1 ex., Hansimara, torsa, 15.x. 1987, coll. S.K. Tandon. Malda District : 2 exs., Tulshihata, 25. vi. 1987, coll. K.P. Mukherjee. Murshidabad District : 1 ex., Kadampur, Jiaganj, 1. iii. 1986, coll. S.K. Mitra ; 1 ex., Dhulian, 17. vi. 1987, coll. K.P. Mukherjee.

Diagnosis : The Australian Cockroach has a somewhat similar appearance to the American Cockroach but slightly smaller in size, 20-32 mm. long. It is pale reddish-brown species with a conspicuous

humeral stripe at the base of each tegmen and a yellow area around the margin of the pronotum which forms a double dark blotch on the dorsum. Tegmina and wings elongated, extend beyond the abdomen. Anterior dorsal surface of the abdomen coloured alternately pale yellow and darkbrown. Posterior segments of the abdomen darkbrown. It prefers warmer placed indoors and unlike *P. americana* (Linn.) does not inhabit sewers. Although called the Australian roach, it is not a native of that continent but is probably indigenous to Malaysia. It has, however, become cosmopolitan and is one of the commonest species on ships.

Distribution: India : West Bengal (Bardhaman, Calcutta, Jalpaiguri, Malda, Murshidabad). A cosmopolitan species in distribution.

14. *Neostylopyga rhombifolia* (Stoll)

1813. *Blatta rhombifolia* Stoll, *Repre's exact. Colore'e d'apres nature d. spectres etc.*, 2 : 5, 14.

1966. *Neostylopyga rhombifolia*, Princis, *Orthopterorum Catalogus*, Part 8 ; 534.

Material examined : Bankura District : 1 ex., Jhatipahari, 9. iii. 1986, coll. K.P. Mukherjee. Calcutta District : 1 ex., Calcutta Museum, 1. xi. 1925, coll. R.B. Swell ; 1 ex., Salt Lake, v. 1926, coll. R.B. Swell ; 1 ex., Jabakusum House, 22. iii. 1956, coll. Saukat Ali. Darjeeling District : 1 ex., Reyang F.R. House, 29. iii. 1973, coll. H.S. Sharma ; 2 exs., Around Khumani forest Rest House, Alt. 900 ft., 25. xii. 1973, coll. G.K. Srivastava and P.K. Maiti ; 1 ex., Bijanbari, Hariyana Bhawan (At light), Alt. 900 ft., 21.v. 1974, coll. J.K. Jonathan ; 1 ex., Singla, 2. i. 1976, coll. G.K. Srivastava and G.S. Arora. Malda District : 2 exs., Ratua, 13. vi. 1987, coll. K.P. Mukherjee ; 1 ex., Nimbari, 24. vi. 1987, coll. K.P. Mukherjee. Murshidabad District : 1 ex., C.S.R.S. Campus, Berhampur, 31. xi. 1974, coll. A.K. Hazra ; 1 ex., Dhulian, 17. vi. 1987, coll. K.P. Mukherjee.

Diagnosis : Head ventrally brownish-yellow and dorsally yellow, with a transverse stripe between eyes, a semi-circular stripe at level of antennae and a transverse stripe above epistome ; antennae dark brown with pale hairs ; first and second palpal joints pale yellow, third joint yellow with a dark brown stripe, terminal segment dark brown ; prothorax yellow, with one black stripe along borders, being curved inside at posterior border, two black marks and a median black longitudinal stripe connecting both marks with posterior border ; mesothorax also with a black stripe along border curving inside both anteriorly and posteriorly ; abdomen black, each segment with a yellow spot on each side except last two segments ; legs yellowish-brown and black. It measures 15-30 mm. in length.

Distribution : India : West Bengal, Tripura, Bihar, Orissa, Madhya Pradesh, Himachal Pradesh, Rajasthan, Gujarat, Karnataka and Andaman & Nicobar Islands. Elsewhere : Sri Lanka, Burma and Africa.

15. *Neostylopyga sexpustulata* (Walker)

1871. *Polyzosteria sexpustulata* Walker, *Cat. Derm. Salt Brit. Mus.*, 5 *Suppl. Blatt.*, : 36.

1966. *Neostylopyga sexpustulata*, Princis, *Orthopterorum Catalogus*, Part 8 : 537.

Material examined : Bankura District : 1 ex., Sonamukhi forest, 8.iii. 1986, Coll. K. P. Mukherjee., Maldah District : 1ex., Parbatidanga, 27. vi. 1987, coll. K.P. Mukherjee. West Dinajpur District : 1 ex., Gangarampur, 15. vi. 1987, coll. K.P. Mukherjee.

Diagnosis : Brown to dark brown species attaining a length of 14-25 mm.; head reddish-brown ;

antennae and palpi unicolourous with head except lighter basal segments of antennae ; prothorax reddish-brown ; mesothorax dark-brown with a pair of yellow spots ; metathorax uniformly dark-brown ; legs dark brown, forefemur with a comb of spines ; mid and hind femora with two rows of spines ; tibiae and tarsi with sparse spines and hairs ; abdomen dark brown, segments two and six with a pair of yellow marks laterally ; cerci dark brown ; supra-anal lamina distinctly exceeding subgenital lamina, tip triangularly incised; subgenital lamina very broad, conical behind ; styli equal to Supra anal lamina. This species is wingless from with six brown spot on the body.

Distribution: India : West Bengal (Bankura, Malda, West Dinajpur), Bihar, Orissa, Andhra Pradesh, Uttar Pradesh and Karnataka. Elsewhere : Java (Indonesia).

16. *Blatta (Shelfordella) lateralis* (Walker)

1868. *Periplaneta lateralis* Walker, *Cat. Blatt. Brit. Mus.*, : 136.

1966. *Blatta (Shelfordella) lateralis*, Princis, *Orthopterorum Catalogus* Part 8 : 507.

Material examined: Darjeeling District : 2 exs., Reyang, F.R.H. Compound (At light), 31.iii. 1973, coll. H.S. Sharma ; 2 exs., Goke, F.R.H. Compound, Singla (At light), 19.iv. 1973, coll. H.S. Sharma.

Diagnosis : It is a shining flattened black insect, about 30 mm. in length, with its head bowed downwards, so that it is almost covered by the pronotum from above. There are long slender antennae which are used as tactile organs. The head, body and the legs are so arranged as to enable it to pass through tiny cracks and holes. The pest are most active during the hot and humid season. The females lay cigar-shaped eggs in a bean shaped dark-brown capsule which resembles a bulging purse.

Distribution : India : West Bengal (Darjeeling), Assam, Uttar Pradesh, Kashmir. Elsewhere : Russia, Iran, Iraq, Plastine and Sudan.

Family IX. HOMOEOGAMIIDAE

17. *Eucorydia westwoodi* (Gerstaecker)

1861. *Corydia westwoodi* Gerstaecker, *Arch. Naturgesch.*, 27(1) : 114.

1962. *Eucorydia westwoodi*, Princis, *Orthopterorum Catalogus*, Part 3 : 83.

Material examined : West Dinajpur District : 1 ex., Gangarampur, 15, vi. 1987, coll. K.P. Mukherjee.

Diagnosis : Head black with concolourous hairs ; face black, epistome yellowish, palpi dark brown; antenna black ; pronotum black with dark brown hairs all over, mesonotum black except yellowish posterior border, metanotum more or less golden yellow ; legs dark brown, all femora with yellowish-brown hairs ; all tibiae bear spines dorsally and hairs ventrally ; abdomen golden yellow except black tip, style and cerci black with black hairs ; wing golden yellow coloured with the following dark brown markings on apex, along anterior border from base to almost half the length of wing which turns down at its apex, one semicircular spot on posterior border near base.

Distribution : West Bengal (West Dinajpur), Sikkim, Assam. Elsewhere : Malakka, Sumatra, Borneo and Africa.

Family X. PANESTHIIDAE

18. *Panesthia angustipennis* (Illiger)

1801. *Blatta angustipennis* Illiger, *Mag. Insektenkde*, 1 : 185.

1965. *Panesthia angustipennis*, Princis, *Orthopterorum Catalogus* Part 7 : 310.

Material examined : Darjeeling District : 1 ex., Mongpu, 13. ii. 1885, coll. E.T. Atkinson (Reg. No. 5820/12).

Diagnosis : A robust black species. Head black, eyes yellowish brown with a round yellow spot at its anterior margin. Antennae black with brown apical region. Pronotum black, wider than long, punctate, anterior margin curved inside and posterior margin convex. Tegmina broadly rounded at apex, basally dark brown and gradually becomes lighter towards apex. Wings subtruncate at apex, anterior margin dark brown, rest lighter coloured. Abdomen dorsally black, ventrally reddish-brown ; supraanal lamina of the female extending the subgenital lamina, posterior margin being semicircular and serrate ; subgenital lamina semicircular. Legs black except yellowish trochanter, anteroventral margin of fore-femur with spines, absent in posterior pairs, posteroventral margin of all femora with a comb of long hairs, sasilars of mid and hind legs equal in length.

Distribution : India: West Bengal (Darjeeling), Sikkim, Arunachal Pradesh, Assam, Tripura, and Andaman & Nicobar Islands. Elsewhere : China, Burma, Indonesia, Malakka, Philippines, Vietnam, Africa and Australia.

19. *Panesthia stellata* Saussure

1895. *Panesthia stellata* Saussure, *Revue suisse Zool.* 3 : 307, 313.

1965. *Panesthia stellata*, Princis, *Orthopterorum Catalogus*, Part 7 : 313.

Material examined : Darjeeling District : 2 exs., Sureil, Darjeeling, iv. 1905, coll. Lt. Col. A. Alcock ; 1 ex., 1 km. South of Reang F.R.H., Alt. 900 m., 28. iii. 1973, coll. H. S. Sharma ; 5 exs., Daling Coate, 3 kms. North of Gorubathan, Alt. 1300 ft., 20. xii. 1973, coll. G.K. Srivastava and P.K. Maiti.

Distribution : India : West Bengal (Darjeeling), Sikkim, Arunachal Pradesh and Assam. Elsewhere : Burma.

20. *Panesthia laevicollis* Saussure

1873. *Panesthia laevicollis* Saussure, *Mem. Soc. Geneve*, 23 : 151.

1965. *Panesthia laevicollis*, Princis, *Orthopterorum Catalogus*, Part 7 ; 313.

Material examined : Darjeeling District : 1 ex., Mongpu, coll. E.T. Atkinson (Reg. No. 8707/8); 1 ex., Dou hill, Kurseong, 13.v. 1979, coll. M.S. Shishodia.

Distribution : India : West Bengal (Darjeeling), Sikkim, Arunachal Pradesh and Assam. Elsewhere: Australia.

21. *Panesthia regalis* Walker

1868. *Panesthia regalis* Walker, *Cat. Blatt. Brit. Mus.*, : 21.
 1965. *Panesthia regalis*, Princis, *Orthopterorum Catalogus*, Part 7 : 316.

Material examined : Darjeeling District : 2 exs., Darjeeling (Reg. Nos. 5937/14 & 5938/14); 1 ex., Darjeeling, E. Himalayas, coll. Mandelli (Reg. No. 580/H5); 1 ex., Kalijhora, 12. iv. 1978, coll. A.R. Bhowmik.

Diagnosis : Black, roughly punctured. Head thinly and minutely punctured ; vertex smooth, excavated in the middle. Antennae with a reflexed on each side, reflexed and truncated in front ; disk in front much excavated, bordered on each side and behind with large tubercles ; lateral angles much rounded ; hind border hardly sinuated. Mesothorax and metathorax thinly punctured. Abdominal segments successively more thickly and roughly punctured from the first to the last. Soles of the tarsal joints from the first to the fourth tawny. Forewings with a very large luteous patch extending to the base in front and to the costa, and nearly extending to the hind border except the base. Anal. area of the hind wings blackish.

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

22. *Salganea morio* (Burmeister)

1838. *Panesthia morio* Burmeister, *Handb. Ent.* 2(2) : 513.
 1965. *Salganea morio*, Princis, *Orthopterorum Catalogus*, Part 7 : 320.

Material examined : Darjeeling District : 1 ex., Darjeeling, E. Himalayas, 1912, coll. Major Bannethi (Reg. No. 525/H5) ; 1 ex., Sureil, Mongpu, 4.v. 1917, coll. S.W. Kemp (Reg. No. 526/H5) ; 1 ex., Reyang F.R. House, 30. iii. 1973, coll. H.S. Sharma; 3 exs., 4 kms. South East of Goke F.R.H., Singla, 18.iv. 1973, coll. H.S. Sharma ; 1 ex., Goke F.R.H. Campus, Singla, 19. iv. 1973, coll. H.S. Sharma ; 1 ex., Singla bazar, Alt. 400m., 5.i. 1976, coll. G.K. Srivastava & G.S. Arora ; 1 ex., Kurseong, Alt. 1880 m., 13.v. 1979, coll. M.S. Shishodia ; 2 exs., Kalimpong, Lobha, Alt. 700 ft., 20. iv. 1981, coll. R.K. Ghosh; 1 ex., Kalimpong, Neora Valley, Alt. 1000 ft., 27. iv. 1981, coll. R.K. Ghosh ; 1 ex., Kalimpong, 28. iv. 1981, coll. R.K. Ghosh.

Diagnosis : Head yellowish-brown with a pale area adjacent to antennae ; antennae brown ; palpi yellowish-brown ; pronotum yellowish-brown but darker laterally, slightly broader than long ; meso and metanotum of similar colour like pronotum ; legs brown, tarsi darker ; abdomen uniformly brown except dark brown apical three segments ; supra anal lamina semicircular, serrate, slightly produced behind the subgenital lamina ; subgenital lamina semicircular, slightly invaginated at apex.

Distribution : India : West Bengal (Darjeeling), Sikkim, Arunachal Pradesh, Assam, Tripura, and Andaman & Nicobar Islands. Elsewhere : New Guinea, Indonesia, Burma and Bangladesh.

23. *Salganea biglumis* (Saussure)

1895. *Panesthia biglumis* Saussure, *Rev. Suisse Zool.* 3 : 308, 319.
 1965. *Salganea biglumis*, Princis, *Orthopterorum Catalogus*, Part 7 : 324.

Material examined : Darjeeling District : 4 exs., Sureil, Darjeeling, coll. Major A. Alcock (Reg. Nos. 8793/14 to 8796/14) ; 1 ex., Around Ghombhanjang, Alt. 2050 m., 16.iii. 1973, coll. P.K. Maiti ; 4 exs., Near Barbatia busti, 3 kms. N.W. of Bhanjang young Hotel, Alt. 1900 m., 18.iii. 1973, coll. P. K. Maiti; 3 exs., Balwone busti from 3 kms. East of Supsiapokri, Alt. 1300 m., 19.iii. 1973, coll. P.K. Maiti;

1 ex., Ghoom and environs, 20. iii. 1973, coll. P.K. Maiti ; 1 ex., Hill forest, Darjeeling, Alt. 2150 m., 21. iii. 1973, coll. P.K. Maiti ; 2 exs., 2 1/2 kms. of Takdah F.R.H., Alt. 1500 m., 26.iii. 1973, coll. H.S. Sharma; 2 exs., Reyang F.R. House Campus, 29. iii. 1973, coll. H.S. Sharma ; 1 ex., 3 kms. South of Rambi F.R. House, Alt. 2150 m., 12.iv. 1973, coll. H.S. Sharma ; 2 exs., Lopchu, 19 kms. from Ghombhangang, Alt. 1607 m., 1. v. 1976, coll. A.R. Bhowmik ; 1 ex., Ghombhang, 22. vi. 1979, coll. S.S. Saha ; 2 exs., Kalimpong, Alt. 700 ft., 20. iv. 1980, coll. R.K. Ghosh.

Diagnosis: It is an apterous species. Head darkbrown with a pale area adjacent to antenna. Antenna and palpus yellowish-brown. Pronotum darkbrown, anterior margin invaginated in the middle with two horny projections. Meso and metanotum unicolourous with pronotum. Legs darkbrown, fore femur bears pale hairs anteroventrally in other two posterior pairs ; femora generally unarmed in this genus but one example possess a spine at apex ventrally ; tip of tarsal segments yellowish-brown. Abdomen darkbrown, apical segment serrate.

Distribution : India : West Bengal (Darjeeling), Sikkim, and Tripura. Elsewhere : China.

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REFERENCES

- Caudell, A.N. 1944. Malayan and East Indian Blattidae *Philip. J. Sci.*, 24 (6) : 661-664.
- Kirby, W.F. 1904. *Syn.Cat.Orth.*, London, 1 : 61-205.
- Metcalf, C.L. and Flint, W.P., 1939. Destructive and useful Insects, their habits and Control (2nd ed.) : xvi +1-981, London (MC Graw-Hills Book Co.)
- MJukherjee, K.P. and Tandon, S.KI. 1975. On some Blattaria (Insecta) from Kameng District of Arunachal Pradesh. *Newsl. Zool. Surv. India*, Calcutta, 1 (2) : 19-20.
- Mukherjee, K.P. and Hazra, A.K. 1985. Insecta : Dictyoptera : Blattaria. Fauna of Namdapha : Arunachal Pradesh. *Rec. Zool. Surv. India*, 82(1-4) :9-14.
- Mukherjee, K.P. 1989, Insecta :Dictyoptera : Blattaria. Fauna of Orissa : State Fauna Series 1(2) : 171-179. (Publ. Zool. Surv. India).
- Mukherjee, K.P. and Hazra, A.K. On a collection of Blattids (Insecta : Dictyoptera : Blattaria) from Laksha Dweep, India, with new distributional records. *Rec. Zool. Surv. India*, (In Press).
- Princis, K. 1951-1971. *Orthopterorum Catalogus*, Part 3 : 1-74 ; Part 4 : 75-172 ; Part 6 : 173-281 ; Part 7 : 282-400 ; Part 8 : 401-614 ; Part 11 : 615-710 ; Part 13 : 711-1040 ; Part 14 : 1041-1224.

INSECTA : MANTODEA

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INTRODUCTION

Praying mantids are carnivorous insects showing peculiar habits of prey-capture, camouflage and reproduction. They are well known as agent of biological control of pest insects. These insects are found in warm moist tropical rainforest, particularly after monsoon in Eastern India.

The different altitudes, temperatures and vegetation of West Bengal from northern to southern parts almost are so varied that they provided unique habitat for these insects. Mantids occur in all the districts of West Bengal from plains to hills ranging in altitude of more than 7000 ft. These insects generally prefer an altitude of about 3500 to 4000 ft. As mantids are mostly weak fliers, they are generally found in herbs and shrubs. But bigger forms are usually found on trees. They are mostly found during early part of the day on leaves or open areas of plant where other insects often visit. They are also attracted to light. During day the mantids can be collected by hand-picking or by hand net and by other general methods in use.

In India very little information is available on state wise mantid fauna, except the works of Mukherjee and Hazra (1983, '85), respectively from Maharashtra and Kerala.

The present work was initiated to provide a consolidated systematic report of Mantodea of West Bengal with special reference to its distribution under a scheme of ZSI of state fauna series. The present paper deals with 35 species distributed over 24 genera, and four families and also provides key to the families, genera and species. The species which are recorded for the first time from West Bengal, are marked by one asterisk(*). All the measurements are in mm.

In West Bengal, mature forms are mostly found in September to February. Nymphs appear in nature from March onwards. Nymphs are mostly ant-mimic; adults take various forms for their protection and both defensive and offensive behaviours are exhibited by them.

Cannibalism is very frequent among them, particularly during a successful mating. Territoriality is also exhibited by exposure of marks on body or by making sound.

Mantids were previously considered to belong to Order Dictyoptera. But Burmeister (1838) considered them under Order Mantodea for their distinctive features. They are close to Isoptera (Imms, 1977) and are recorded as early as the Oligocene period.

A natural suprageneric classification of mantid is difficult due to lack of adequate morphological characters. Karny (1921) divided the order into eight subfamilies. Giglio-Tos (1927) started from family status for mantids and divided it into thirty two sub-families. However, most authors now accepted Beier's

(1964) classification which is also followed here. According to his classification a super order Blattopteroidea into orders and mantids belong to order Mantodea. A total of 160 species under 67 genera are so far known from India (Mukherjee, 1990). The present study is further divided reveals that about 21% of mantid fauna occurs in West Bengal. There are 6 families of mantids are known from India of which four occur in West Bengal.

SYSTEMATIC ACCOUNT
Order MANTODEA

- 1. Antennae combed..... Empusidae
- Antennae normal..... 2
- 2. Pronotum almost squarish. Anterior tibia without ventral rows of spines..... Amorphoscelidae
- Pronotum distinctly longer than width. Anterior tibia with normal rows of spines.....2
- 3. External spines of anterior tibia numerous and very close beet. Forewing with eye-like spiral marks
..... Hymenopodidae
- External spines of anterior tibia straight, well separated and less in number. Forewing without eye-like spiral marks Mantidae

Family AMORPHOSCELIDAE
Subfamily AMORPHOSCELINAE

1. *Amorphoscelis annulicornis* Stal 1871
(Fig. 1a, 1b)

1871. *Amorphoscelis annulicornis* Stal, *Oefv. Ak. Forh.*, 28 : 401
1915. *Amorphoscelis indica* : Giglio-Tos, *Bull. Soc. ent. Ital.*, 46:33.
1956. *Amorphoscelis keiseri* : Beier, *Verh. naturf. Ges. Basel*, 67:33.

Material examined : Medinipur dist . : 2 (F), Jhargram, vi. 1985, coll. T. Mukherjee. Nadia dist. : 2 (M), Ranaghat, iv. 1984, coll. T. Mukherjee.

Diagnosis : Head wider than pronotum. Eyes distinct rounded. Frontal sclerite transverse, narrow, arched and superior edge sinuated. Juxtocular lobes tubercular. Pronotum short, nearly as long as width; lateral edges curved; prominent craina on metazona; a transverse ridge near supra-coxal groove; anterior and posterior borders of pronotum bituberculated near middle. In anterior leg, coxa smooth; femur spineless at both edges, discoidal spine single; tibia triangular. Cerci flattened at distal segment.

Measurements : Body (M) 15.0, (F) 16.0; pronotum (M) 3.0, (F) 3.5; fore wing (M) 13.0 (F) 14.0.

Distribution : India : West Bengal (Medinipur, Nadia), Assam, Bihar, Daman & Diu, Himachal

Pradesh, Kerala, Meghalaya, Tamil Nadu. Elsewhere : Sri Lanka.

Remarks : A very common species in West Bengal and is generally found from late May to end of November.

Family HYMENOPODIDAE

Key to subfamilies

- Frontal sclerite with tubercles or longitudinal ridges, but no wing-like carinae; disc simple. Eye is within circumference of head.....Acromantinae
- Frontal sclerite with two lateral wing-like expansions; disc depressed. Eye is bulging and extends beyond the circumference of head.....Hymenopodinae

Subfamily ACROMANTINAE

Key to genera

1. Vertex without protuberance; middle and hind femora with narrow or wide expansion.....5
- Vertex with or without protuberance. Middle and hind femora without expansions.....2
2. Superior edge of anterior femur arched and little expanded..... 3
- Superior edge of anterior femur simple..... 4
3. Disc of frontal sclerite smooth. External edge of anterior femur smooth.....*Hestiasula*
- Disc of frontal sclerite with obtuse tubercular carinae. External edge of anterior femur finely denticulated..... *Ephestiasula*
4. Pronotum slender, a little longer than anterior coxa.....*Anaxarcha*
- Frontal sclerite with arched upper edge. Pronotum shorter than anterior coxa; margins are parallel..... *Euantissa*
5. Disc of pronotum with prominent granules..... *Ambivia*
- Disc of pronotum smooth. Vertex below the eyes without tubercles. Internal apical lobes of anterior coxa contiguous..... *Heliomantis*

2. *Ambivia popa* Stål 1877
(Fig. 2a, 2b, 2c)

1877. *Ambivia popa* Stål, *Bih. K. Svenska Vetensk Akad. Handl.* 4 (10):88

Material examined : North 24-Parganas dist. : 1 (F), Barasat, 16.v. 1984, coll. T. Mukherjee.

Diagnosis : Pronotum with denticulated border. In anterior leg, coxa internally brick-red, apex black, with 6-7 small spines, femur with a black patch in front of claw groove, Pre-apical lobes of middle femora more prominent than those of hind femora. Middle and hind tibiae without any lobes. Fore wings long and wide, more or less pointed at tips and with two clear and colourless transverse bands.

Measurements : Body 47.0; Pronotum 16.0; anterior coxa 11.0, femur 16.0, tibia 7.5; forewing 39.0.

Distribution : India : West Bengal (North 24-Parganas), Sikkim. Elsewhere : Borneo; Burma; Sri Lanka; Sumatra.

Remarks : The studies on collections from other states of India shows that variations in form and colourations are very poor. The genus is so far known from a single species in India.

3. *Anaxarcha acuta* Beier 1963
(Fig. 3a, 3b)

1963. *Anaxarcha acuta* Beier, *Stuttg. Beiter. Naturkd.*, 106 : 9.

Material examined : Darjeeling dist. : 1 (Female), Takdah, 1650 mtrs., 1.viii. 1958, coll. H. Khajuria.

Diagnosis : Bright green body. Transverse frontal sclerite with a granule at each corner; upper margin angular containing a pointed projection. Pronotum slightly constricted in middle, divergent posteriorly; metazona carinated. In anterior legs, longer internal spines of femur black with black dot at their apices; claw groove bears a black dot at anterior margin. Forewings densely reticulated, semi-hyaline. Hind wings hyaline, costal area and apices brownish-green.

Measurement : Body 34.0; pronotum 10.5, width 3.1; fore wing 23.5.

Distribution : India : West Bengal (Darjeeling), Meghalaya, Sikkim.

Remarks : Some more specimens (Male, Female) have been examined from Meghalaya are smaller than this specimen.

* 4. *Ephestiasula amoena* (Bolivar) 1897

1897. *Pachymantis amoena* Bolivar, *Ann. Soc. ent. Fr.* 66:314. (male).

1915. *Ephestiasula amoena* : Giglio-Tos, *Bull. Soc. ent. Ital*, 46: 101.

Material examined ; Nadia dist. : 1 (F), Bethuadahri Reserve Forest, 30.ii. 1981, coll. T. Mukherjee.

Diagnosis : (Female nymphs : Ventex with a prominent small tubercle in the middle; juxtocular lobes cone-shaped; ridges are blackish. Tip of prozona with two parallel black lines, with a black spot at the mid-posterior end of pronotum. In anterior femur, a blackish patch is widely distributed in the lower half of femur which again continues widely in the upper half; lower half with two black spots on ground colour (yellow); internal spines entirely blackish event at their bases.

Measurements : (F) Body 8.5; Pronotum 2.1.

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

Remarks ; According to Loxton (1979) the colouration of anterior femur is confusing. The descriptions given by Giglio-Tos does not agree in all case. It is probable that the three black spots are actually transverse patches which do not enclose the paler ground colour of inner side of femur. However, the wide black patch in this species is in contrast to narrow line in the same place of other Indian species.

5. *Euantissa pulchra* (Fabricius) 1787

1787. *Mantis pulchra* Fabricius, *Mant. Ins.* 34 : 229.

1927. *Euantisa pulchra* : Giglio-Tos, *Das Tierreich*, 50 : 540.

Material examined ; Medinipur dist. : 1 (M), Arabari Forest, 26.xi.1974, coll. A.K. Hazra. Nadia dist. : 1 (F), Ranighat, v. 1978, T. Mukherjee.

Diagnosis ; Green body. Frontal sclerite with two lateral grooves below the widely arched superior border. Metazona of pronotum with almost parallel margin. Costal area of forewing yellow, rest are as green; radius and media two branched. Posterior border of hind wing deep brownish.

Measurements : Body (M) 15.0, (F) 23.0, pronotum (male) 4.0, (female) 5.5, fore wing (male) 11.0, (female) 14.0.

Distribution : India : West Bengal (Medinipur, Nadia), North-Eastern and Southern India. Elsewhere : Sri Lanka.

Remarks : It is a common bush dwelling small species. It forms oothecae well before monsoon and the first instar nymphs are ant-like.

6. *Heliomantis elegans* (Navas) 1904

1904. *Polyspilota elegans* Navas, *Bol. Soc. Aragon*, 3(5-6) : 132.

1915. *Heliomantis elegans* : Giglio-Tos, *Boll. Mus. Torino*, 30(702) : 2.

Material examined : Darjeeling dist. : 1 (F), Governor House, vi.1912, 1 (M) Governor House, v. 1912, coll. N.A.

Diagnosis : Pale green body. Juxtocular lobes of vertex prominent. Dialation of pronotum round, borders in (female denticulated. In anterior leg, coxa with 7 smaller spines which in female are 9-10 and longer tubercular; internally coxa with a black band at distal end; claw groove proximally placed, with a square black spot in front of it.

Measurements : Body (male) 34.0, (female) 47.0, pronotum (male) 11.0, (female) 16.0, width of pronotum (male) 3.8, (female) 5.5.; fore wing (male) 37.0 (female) 48.0.

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

Remarks : The black spot on claw groove is unique in this species.

* 7. *Hestiasula inermis* (Wood-Mason) 1879

1879. *Hestias inermis* Wood-Mason, *Proc. Asiat. soc. Bengal* : 258

1904. *Pachymantis inermis* : Kirby, *Cat. Orth. Brit. Mus.*, 1 : 288.

Material examined ; Darjeeling, 1 (male), Rhenoch, Regd. No. 3383/H5, 6.ix.1959, coll. B.K. Tikader.

Diagnosis : Vertex without protubercence and distinctly 4 grooved. Frontal sclerite angular at upper border; disc with a median groove and two lateral carinae; with two distinct tubercles and two less distinct tubercles above former two. Eye ovoid, antero-dorsally projecting. In anterior leg, coxa smooth and entirely black; internal apical lobes divergent; femur flat, ovoid, both surfaces pitted irregularly at upper halves; inner face with a black patch along superior border from base upto 1st discoidal spine, femoral spines black internally; tibiae and tarsi black internally. Metazona of pronotum slightly longer than prozona; coxal joint laterally obtuse angular. Fore wings transparent, brown, longer than abdomen; costal area brownish, discoidal area spotted brown along longer veins. Hind wings transparent, pale brown along costal area and anal margin.

Measurements : (M) 22.0; Pronotum 4.0, fore wing 24.5.

Distribution : India : West Bengal (Darjeeling); Assam; Sikkim.

Subfamily HYMENOPODINAE

Genus *Creoborter* Audinet-Serville

1838. *Harpax (Creobroter)* Audinet-Serville, *Hist. nat. Ins. Orth.*, : 160.

Key to species

Eye spot on forewing is in the middle of the length.....*apicalis*

Eye spot on fore wing appears a little proximally placed.....*laevicollis*

* 8. *Creobroter apicalis* (Saussure) 1869
(Fig. 4a, 4b)

1869. *Creobotra apicalis* Saussure, *Mitt. Schweiz. Entomol. Ges.*, 3:73

1927. *Creobroter apicalis* : Giglio-Tos, *Das Tierreich*, 50 : 558.

Material examined : Calcutta, 2 (M), N.Z.C., dt. & coll. N.A.

Diagnosis : Vertex with a spine. Borders of pronotum almost smooth. Fore wing with yellow band bordered by two black semi-circular rings (like an eye spot); latter is in the middle, rarely a little in front of middle, contains 2 black dots, base of fore wing with a round yellow spot; anal area blackish with blackish veinules. Hind wing pink at base; costal area yellowish, discoidal and anal areas brownish with hyaline veinules excepting at border.

Measurements : Body 27.0; Pronotum 8.0; anterior coxa 8.5, femur 11.0, tibia 5.0; fore wing 24.0.

Distribution : India : West Bengal (Calcutta); Assam; Karnataka; Orissa, Manipur, Meghalaya, Sikkim.

* 9. *Creobroter laevicollis* (Saussure) 1870
(Fig. 5a, 5b)

1870. *Creobotra laevicollis* Saussure, *Mitt. Schweiz. Entomol. Ges.* 3:242

1904. *Creobroter laevicollis* : Kirby, *Cat. Orth. Brit. Mus.*, 1:291.

Material examined : Calcutta dist. : 2 (male) (female), N.Z.C. Regd. No. 9587/6, 9598/6, dt. N.A., coll. L. de Immanuelle; 2 (F), N.Z.C. Regd. No. 776/6, 9608/6, dt. & coll. N.A. Howrah dist. : 1 (F), Serampur, N.Z.C., Regd. No. 6611/1 dt. N.A. coll. C.M. Mainwanz. Maldah dist. : 1 (F) N.Z.C., Regd. No. 9588/6, dt. N.A. coll. Ivine.

Diagnosis : Vertex with a spine. Prozona of pronotum denticulated, metazona almost smooth. In anterior leg, coxa in (female) with 6-8 spines, in (male) with 5 spines. Fore wing with a small yellow spot latero-basally; eye-spot placed a little in front of middle and contains one black dot; anal membrane blackish in male, colourless in female. Hind wing pink at base and sometimes at costal area; smoky patch in the centre of wing is round, prominent and does not spread out from centre; this is much less prominent in male.

Measurements : Body (male) 31.0, (female) 33.0, pronotum (male) 7.0, (female) 8.8; anterior coxa

(male) 8.3, (female) 9.0, femur (male) 10.5, (female) 10.9, tibia (male) 5.7, (female) 5.9,; fore wing (male) 32.0, (female) 30.0.

Distribution : India : West Bengal (Calcutta), Andhra Pradesh, Assam, Sikkim. Elsewhere : Java.

Family MANTIDAE

In West Bengal 8 subfamilies are known.

Key to subfamilies

1. Anterior femur with a furrow between 1st and 2nd external spines. Eyes flat..... Caliridinae
- Anterior femur without furrow..... 2
2. Pronotum depressed, more or less parallel sided or a little widened at anterior end. Supra-coxal widening very little marked. anterior tibia more or less compressed..... Tarachodinae
- Anterior end of pronotum not wide than base, Supra-coxal dilation distinct. Anterior tibia not compressed 3
3. Anterior femur with 5 external spines. Supra anal plate never prolonged..... Toxoderinae
- Anterior femur with 4 external spines. Supra anal plate often prolonged..... 4
4. Median apical lobes of anterior coxa simple. Anterior femur with 3 discoidal spines. antenna setaceous. Anterior tibia with normal spines..... 5
- Median apical lobes of anterior coxa simple. Anterior femur simple with 4 discoidal spines..... 6
5. Small sized insect with slender antenna, ovoid or round eyes..... Iridopteryginae
- Large, slender, stick-like insect. Antenna thick and eyes elongated conically... Schizocephalinae
6. Eyes dorso laterally projecting and with spine..... Oxyothespinae
- Eyes rounded and spineless..... 7
7. Antenna and anterior border of fore wing setaceous in male..... Amelinae
- Antenna and anterior border of fore wing not setaceous in male..... Mantinae.

Subfamily TARACHODINAE

10. *Dysaules longicollis* Stål 1877

1877. *Dysaules longicollis* Stål, *Bih. K. Svenska VetenskAkad. Handl.* 4(10) : 18.

1882. *Dysaules longicollis* var *brevipennis* Wood-Mason, *J. Asiat. Soc. Bengal*, 51 : 25.

During the present study of this species no material from West Bengal was found, however it has been reported earlier from West Bengal by Stal.

Distribution : India : West Bengal, Karnataka.

Subfamily CALIRIDINAE

Genus *Leptomantis* Giglio-Tos

1915. *Leptomantis* Giglio-Tos, *Bull. Soc. ent. Ital.* 46: 87

Key to species

Frontal sclerite less arched. A distinct black line on borders of pronotum.....*indica*

- Frontal sclerite very arched. Black line on borders of pronotum less distinct..... *montana*

* 11. *Leptomantis indica* Giglio-Tos 1915

1915. *Leptomantis indica* Giglio-Tos, *Bull. soc. ent. Ital.* 46 : 88.

Material examined : Darjeeling dist. : 1 (M) Teesta, N.Z.C., 24.v.1979, coll. M.S. Shishodia.

Diagnosis : Frontal sclerite wider and superior border less arched in the middle compared to nearest species *lactea*. Pronotum with black line along lateral borders of metazona. Prozona with distinct black oblique patches or dots. In anterior leg, coxa without spot, trochanter with deep brown or black spot; femur with superior border straight and may bear a black spot at external proximity.

Measurement : Body 29.0; pronotum 8.0; fore wing 21.5.

Distribution : India : West Bengal (Darjeeling), Assam, Himachal Pradesh, Tamil Nadu.

Remarks : Variation in the presence or absence of colour may be observed in both sexes. This species is a new record from West Bengal.

* 12. *Leptomantis montana* Beier 1941

1941. *Leptomantis montana* Beier, *Ann. Naturf. Mus. Wien.*, 52 : 139

Material examined : Darjeeling dist.: 1 (male), Garubathan, 1000 ft., N.Z.C., 29.i. 1981, coll. R.K. Ghosh. Other locality, 1 (M), N.Z.C., Regd. No. 5109/9, dt. & coll. N.A.

Diagnosis : Superior edge of frontal sclerite very arched. Ocelli prominent. Prozona of pronotum

with two oblique backish patches, metazona less dotted black laterally; two black spots on the outer side of anterior coxa; trochanter spotless. Costal area of fore wing opaque along anterior two-third width, rest areas hyaline; veinules of discoidal area incomplete. Hind wing colourless.

Measurement : Body 26.0, pronotum 8.5, fore wing 17.5.

Distribution : India : West Bengal (Darjeeling), Assam.

Remarks : According to Beier (1941), the species has some affinities with *L. sumatrana* and *L. lactea*. This species is a new record from West Bengal.

Subfamily OXYOTHESPINAE

13. *Heterochaetula tricolor* (Wood-Mason) 1876

1876. *Heterochaeta tricolor* Wood-Mason, *Ann. Nat. Hist.*, 18(4) : 441.

1889. *Heterochaetula tricolor* : Wood-Mason, 1889, *J. Asiat. Soc. Bengal*, 58 : 309.

Material examined : Calcutta dist. : type (female), N.Z.C., dt. & coll. N.A.

Diagnosis : Body pale grey and delicate. Head depressed, pentagonal; vertex five lobed, inner three lobes more prominent. Eyes dorso-ventrally a little compressed, laterally projecting and with a short simple spine. Frontal sclerite very flat, superior edge straight. Pronotum elongated, laterally finely denticulated; metazona with distinct linear carina, disc granular. In anterior leg, coxa with internal apical lobes conical, divergent; femur with a little sinuated upper edge, 2nd external spine longest discoidal spine 4 in number; tibia with 9 external spines. Fore wing extends a little beyond 3rd abdominal segment. Hind wings transparent; a violet oval patch near base of anal area and this is followed by 10-11 concentric rings of yellow-brown and hyaline.

Measurements : Body 50.0; Pronotum 14-5; fore wing 23.5.

Distribution : India : West Bengal (Calcutta), Bihar, Maharashtra.

Subfamily SCHIZOCEPHALINAE

14. *Schizocephala bicornis* (Linnaeus) 1758 (Fig. 6a, 6b)

1758. *Gryllus (Mantis) bicornis* Linnaeus, *Syst. Nat.* 1(10) : 426.

Material examined : Nadia dist. : 1 (M) Bethuadahri, N.Z.C., viii. 1985, coll. T. Mukherjee.

Diagnosis : Body colour green. Base of antenna thick. Spines of anterior leg black at tips only; femur with 6 external spines, 5th one strong built. Middle and hind tibiae ventrally spinous. Fore wing well developed, shorter than abdomen, pale green, very narrow with opaque costal area and transparent

discoidal area. Hind wings transparent.

Measurement : Body 87.0, pronotum 33.0, forewing 31.0

Distribution : India : West Bengal (Nadia), Madhya Pradesh, Maharashtra, Uttar Pradesh. Elsewhere : Sri Lanka.

Remarks : These are common in grass fields. They show sidewise rocking movement.

Subfamily IRIDOPTERYGINAE
Tribe IRIDOPTERYGINI

In West Bengal two tribes are known.

Key to tribes

Metazona with very thin linear carina..... Iridipterygini

Metazona with distinctly raised carina..... Tropidomantini

Tribe IRIDOPTERYGINI

15. *Parananomantis brevis* Mukherjee (under publication)

Material examined : Medinipur dist. : Jhargram, holotype (male) N.Z.C., 6.ix. 1986, T. Mukherjee.

Diagnosis : Vertex brown; upper margin straight and situated above eyes; juxtocular lobes prominent. Frontal sclerite transverse, upper margin arched. Pronotum pale brown; supra coxal dialation distinct, margins setaceous; metazona shorter than anterior coxa; carina fine, In anterior leg, coxa simple, smooth; femur with straight upper edge, with 4 external spines (black at tips); a small pit is present on the inner side of 1st and 2nd external spines and 3rd discoidal spine; tibia with 7 external spines. Fore wing hyaline, a little longer than abdomen; anterior border ciliated; stigma transparent, oblique. Supra anal plate broad, triangular and rounded at end and briefly carinated near its base.

Measurements : Body 24.0, pronotum 5.5, metazona 3.5, anterior coxa 4.2, femur 5.0, tibia 2.5, fore wing 17.0.

Distribution : India : West Bengal (Medinipur), Assam, Himachal Pradesh, Jammu, Karnataka, Manipur.

Remarks : In comparison, the present genus comes closer to genus *Nanomantis* Saussure, 1871, but differs from latter by the formation of tibial armature, metazona, and supra anal plate. This species has been sent for publication as a new genus and new species in the journal *Entomon* and expected to be published in the year 1992.

Tribe TROPIDOMANTINI

16. *Eomantis guttatipennis* (Stål) 1877

1877. *Tropidomantis guttatipennis* Stal, *Bih. K. Svenska VetenskAkad Handl.* 4(10) : 51.

1915. *Eomantis guttatipennis* : Giglio-Tos, *Bull. Soc. ent. Ital.*; 46:47.

During the present study no material of this species was collected. However, it has been reported earlier from West Bengal (? Himalaya, Stal).

Subfamily AMELINAE

Tribe AMELINI

Genus *Amantis* Giglio-Tos 1915

1915. *Amantis* Giglio-Tos, *Bull. Soc. ent. Ital.* 46 : 151.

In West Bengal, 3 species are known

Key to species

1. Anterior femora black or with black bands..... *subirina*
- Anterior femora brownish..... 2
2. The 1st segment of anterior tarsus black..... *biroi*
- The 1st segment of anterior tarsus brown..... *bolivarii*

* 17. *Amantis subirina* Giglio-Tos 1915

1915. *Amantis subirina* Giglio-Tos, *Bull. Soc. ent. Ital.*, 46 : 151.

Material examined : Darjeeling dist. : 1 (M), Rangiroom, 1700 mts. N.Z.C., 3.x. 1978, Coll. A.N.T. Joseph.

Diagnosis : Vertex without any blackish spot. Frontal sclerite without any dark median stripe. Pronotum with a median black stripe and few blackish spots on its either sides. In anterior leg. coxa brownish; femur black in the form of 3 indistinct bands; tibia and first two tarsal segments black. Forewing semi-opaque; hind wing smoky.

Measurements : Body 16.0; pronotum 3.6; forewing 14.0.

Distribution : India : West Bengal (Darjeeling), Assam.

18. *Amantis biroi* Giglio-Tos 1915

1892. *Gonypeta irina* Brunner, *Ann. Mus. Genova*, 33 : 66
 1915. *Amantis biroi* Giglio-Tos, 1915, *Bull. Soc. ent. Ital.*, 46:153.

Material examined : South 24-Parganas, 1 (M), Kalikapur N.Z.C. 9.ix. 1978, coll. T. Mukherjee.

Diagnosis : Frontal sclerite with a black spot at upper middle part. Pronotum almost entirely blackish, often with discontinuous median blackish stripe. Anterior legs brown, but 1st segment of tarsi black. Fore wing blackish, transparent, veins blackish. Stigma without black spot.

Measurements : Body 14.0, pronotum 2.9, forewing 13.5.

Distribution : India : West Bengal (South 24-Parganas), Andhra Pradesh.

19. *Amantis bolivarii* Giglio-Tos 1915

1892. *Iridopteryx reticulata* Brunner, *Ann. Mus. Genova*, 33 : 65.
 1915. *Amantis bolivarii* Giglio-Tos, *Bull. soc. ent. Ital.*, 46 : 153.

During the present study no material of this species was collected, however it was reported earlier from West Bengal (Himalaya, Brunner)

Genus *Cimantis* Giglio-Tos

1915. *Cimantis* Giglio-Tos, *Bull. Soc. ent. Ital.*, 46 : 154.

2 species are known from West Bengal

Key to species

Body brick-red or brown. Carina of frontal sclerite in the form of two groups of tubercles.....
*testacea*

- Body blackish. Carina continuous..... *fumosa*

20. *Cimantis fumosa* Giglio-Tos 1915

1915. *Cimantis fumosa* Giglio-Tos, *Bull. Soc. ent. Ital.*, 46 : 155.

During the present study no material of this species was collected, however, it was reported earlier by Giglio-Tos from Darjeeling.

21. *Cimantis testacea* Werner 1931

1931. *Cimantis testacea* Werner, *Proc. Zool. Soc. London* : 1330

During the present study no material of this species was collected, however, it was reported earlier by Werner from Darjeeling.

* 22. *Gonypetyllis semuncialis* Wood-Mason 1891

1891. *Gonypetyllis semuncialis* Wood-Mason, *Cat. Mant.* pl. 2, f.5, 5a, 5b.

1930. *Haldwania liliputana* Beier, *Ann. Mag. nat. Hist. London*, (10) 6 : 441.

Material examined ; 1 (M), Medinipur dist. : (male) Regd. No. 10046/45, N.Z.C., vi. 1982., coll. T. Mukherjee.

Diagnosis : Body pale brownish, Vertex with longitudinal brown stripes. Eyes big, rounded. Pronotum about one and half times as long as broad; lateral margins thin and finely serrated; surface almost smooth, excepting two flat and rounded tubercles. In anterior leg, coxa with an elongated patch of light brown colour on anterior external surface; rest areas black; inner margin with 5-6 fine teeth and few fine hairs; internal surface with dull yellow patch; femur with 3 longitudinal light yellow strips on the inner side, two dorsal and one ventral (near the spines) and rest portion black; external surface dark tan coloured. Proximal two external spines closely beset; internal spines 12 in number; tibia deep brown with 8 internal and 10 external spines; first 3 anterior tarsal segments totally black. The posterior metatarsus not brown, longer than rest segments taken together. All thoracic sternites black. Fore and hind wings clear and longer than abdomen; anterior margin of fore wing with few cilia; stigma hyaline, hind wings with brown spots.

Measurements ; Body 11.0, pronotum 2.1, forewing 8.0, hind wing 6.7.

Distribution : India : West Bengal (Medinipur), Gujarat, Uttar Pradesh.

Subfamily MANTINAE

Tribe MANTINI

Mantids belonging to this tribe have 4 discoidal and 4 external spines and the latter edge is mostly smooth, rarely serrated and in this case 3 discoidal spines are present.

In West Bengal so far 5 genera are known and all with 4 discoidal spines and hind wing without any transverse colour bands.

Key to the genera

1. Posterior femur with an apical spine..... 2
- Posterior femur without any apical spine..... 3
2. Frontal sclerite at least twice wider than high.....*Tenodera*
- Frontal sclerite higher than width. Anterior border of forewing not crenulated.....*Hierodula*

3. Eyes a little conical..... *Mesopteryx*
 - Eyes rounded..... .4
4. Claw groove of anterior femur distally placed.....*Statilia*
 - Claw groove of anterior femur medially placed..... *mantis*

Genus *Hierodula*

Key to subgenera

- Dialation of pronotum does not extend upto base.....*Hierodula (Hierodula)*
 - Dialation of pronotum extends upto its base.....*Hierodula (Rhombodera)*

Genus *Hierodula (Hierodula)*

Key to species

- Anterior coxa with whitish patches at bases of smaller spines.....*bipapilla*
 - Anterior coxa without whitish patches at base of smaller spines.....*unimaculata*

23. *Hierodula (Hierodula) bipapilla* Serville-Audinet 1839

1839. *Mantis bipapilla* Serville-Audinet, *Hist. Ins. Orth.*, : 188
 1904. *Hierodula bipapilla* : Kirby, *Cat. Orth. Brit. Mus.*, 1 : 245.

Material examined ; Birbhum dist. : 1 (F), N.Z.C., vii. 1985, coll. A. Bhattacharya.

Diagnosis ; Frontal sclerite bicarinate. Pronotum short, little narrowed posteriorly; metazona of prosternum with 2 less distinct blackish bands. In anterior leg, coxa with 2-3 verrucose, triangular flat whitish spines, often with few spinules among them; first 3 discoidal and larger internal spines of femur black. Fore hind wings longer than abdomen.

Measurements : Body 57.0; pronotum 18.0, metazona 12.5; fore wing 45.0.

Distribution : India : West Bengal (Birbhum), Himachal Pradesh, Bihar, Uttar Pradesh. Elsewhere: Java; Formosa; China; Japan.

* 24. *Hierodula (Hierodula) unimaculata* (Olivier) 1892.

1792. *Mantis unimaculata* Olivier, *Encyclope, die Methodique*. 7:640.

1902. *Hierodula unimaculata* : Krauss, *Denk. Ges. Jena*, 8 : 747.

Material examined : Calcutta dist. : 1 (F), Regd. No. 9691/6, N.Z.C., dt. N.A. coll. Wood-Mason.

Diagnosis : Frontal sclerite pentagonal, bicarinate. Pronotum slender, dialation oval; metazona gradually narrowed and then a little wider at base; prozona about one third of metazona. In anterior leg, coxa with 5-6 sharp, small, tubercular premarginal spines, often with spinules among them; all spines of femur black at apices; internal tips of tarsi black.

Measurements : Body 65.0, pronotum 22.5, metazona 17.5, fore wing 48.0.

Distribution : India : West Bengal (Calcutta), Karnataka. Elsewhere : China, Java, Sri Lanka.

Remarks : The carina of frontal sclerite discontinuous near the middle. Prosternum with two pairs of faint blackish dots. This species has similarity with *Hierodula (Hierodula) doveri* Chopard; the absence of median blackish strip on prostrnum seems doubtful and may be seen in the species. This species is a new record from West Bengal.

* 25. *Hierodula (Rhoderia) butleri* Wood-Mason 1878

1878. *Hierodula butleri* Wood-Mason, *Proc. Zool. Soc. London*, 580.

Material examined : Darjeeling dist. : 1 (F), Singla, N.Z.C., 450 m., 3.i.1976, coll. G.K. Srivastava.

Diagnosis : Frontal sclerite spineless, Lateral borders of pronotum a little constricted behind supra-coxal joint, with few spines in the middle of lateral borders; metazona of prosternum with 2 black dots and blackish band behind them. In anterior leg, femur internally with 3 brown bands; the first 3 discoidal and larger internal spines entirely black, the latter often with black spots at bases. Stigma of forewing bounded on either end by large black patch.

Measurements : Body 64.0; pronotum 17.5, metazona 11.5, anterior coxa 16.0, femur 17.5, tibia 10.5, fore wing 55.0.

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

Genus *Tenodera* Burmeister, 1838

2 species are known in West Bengal

Key to species

- Hind wing with a blackish or redish brown patch at base..... *aridifolia*
 - Above patch absent. The 3rd discoidal spine black at apex only; anterior coxa not spinous and claw groove without any black spot..... *fasciata*

* 26. *Tenodera aridifolia* (Stal) 18131813. *Mantis aridifolia* Stl, *Represen., Spectres*, 651869. *Tenodera aridifolia* : Saussure, *Mitt. Schweiz. Entomol. Ges.* 3 : 69.

Material examined : Darjeeling dist. : 2 (M, F) Tukvar Tea Estate, 30.ix. 90 coll. T. Mukherjee; 2 (Male), Kursong Regd. Nos. 1584/14, 1587/14, N.Z.C., dt. & coll. N.A.

Diagnosis : Frontal sclerite twice wider than high, bi-carinate, with a faint groove between latter. Pronotum in (female) well built, carinated, in (male) slender and not craniated; metazona longer than anterior coxa, lateral borders denticulated in (female) smooth in (male). In anterior leg, coxa strongly spinous in (female), less in (male); discoidal spines of femur usually black at tips, often entirely or partly blackish in female less in male. Costal area of forewing green, discoidal area semiopaque in female partly transparent in male. Hind wing transparent, a deep reddish brown patch near base of discoidal area; anal area smoky brown with hyaline fenestrae.

Measurement : Body (M) 74.0, (F) 76.0; pronotum (M) 25.5, (F) 28.5, metazona (M) 19.0, (F) 21.5; anterior coxa (M) 12.0, (F) 16.0, femur (M) 15.5 (F) 21.5; tibia (M) 7.0, (F) 8.5, forewing (M) 51.0, (female) 51.0.

Distribution : India : West Bengal (Darjeeling), Arunachal Pradesh, Assam, Himachal Pradesh, Sikkim, Uttar Pradesh. Elsewhere : China, Formosa, Lombok.

Remarks : This species is a new record from West Bengal.

* 27. *Tenodera fasciata* (Olivier) 1792.1792. *Mantis fasciata* Olivier, 1792, *Encyclope die methodique*, 7 : 640.1912. *Tenodera fasciata*. Giglio-Tos, 1912, *Bull. Soc., ent. Ital.* 43 : 45.

Material examined : Calcutta dist. : 1(F), Regd, No. 9656/6, dt. & coll. N.A. Nadia dist : 2 (M) (F), Bedhuadohri, N.Z.C., ix. 1982, coll. T. Mukherjee. North 24-Parganas dist. : 1 (F) Khardah, N.Z.C., 9.xi. 1966, T. Mukherjee.

Diagnosis : Frontal sclerite more than twice wider than high, bicarinate; superior margin angular in middle and a little sinuated on both sided. Pronotum less dialated, metazona carinated in (female), indistinctly in (male); lateral borders finely serrated in female, smooth in male metazona of prosternum with a pair of whitish spot and a pair of tuberular whitish spots. In anterior leg, coxa with fine serrations in female_ smooth, spines of femur black at tips. Costal area of fore wing opaque, anterior half of discoidal area densely reticulated in (female) rest of discoidal area sub-opaque in female, transparent in male. Hind wing transparent, colourless; costal area slightly opaque with deep reddish or blood red coloured transverse veinules; base of wing not coloured.

Measurements : Body (M), 84.0, (F) 86.0, pronotum (M) 31.5, (F) 32.5, metazona (M) 25.0, (F) 26.8, anterior coxa (M) 14.0, (F) 16.0, femur (M), 17.8, (F) 19.3, tibia (M) 7.3, (F) 8.0; fore wing (M) 55.0, (F) 56.0.

Distribution : India : West Bengal (Calcutta, Nadia, North 24-Parganas), Assam, Manipur. Elsewhere : China.

Remarks : This species is a new record from West Bengal.

* 28. *Mesopteryx platycephala* (Stål) 1877

1877. *Tenodera platycephala* Stål, *Bih. K. Svenska VetenskAkad Handl.* 4 (10) : 56.

1882. *Mesopteryx platycephala* : Wood-Mason, *J. Asiat. Soc. Bengal*, 51 : 34.

Material examined ; Darjeling (?), 1 (F) (Himalayas), Asiatic societies colln. (Wood-Mason), Dt. & coll. N.A.

Diagnosis ; Frontal sclerite with two apically obtuse carinae, with a groove of black between them and blackish sides. Pronotum with serrated margins, prosternum with 4 ridges in; prozona; lamellar portion with oblique, transverse, parallel black elongated dots as rays which are dot-like dorsally and they in ventral aspect may not extend half the width of lamellar part. In anterior leg, coxa externally with scattered blackish patches; discoidal spines of femur externally blackish, internally black.

Measurements : Body 110.0; pronotum 42.5, metazona 33.5, anterior coxa 20.0, femur 23.0, tibia 9.0, wing 42.0.

Distribution : India : West Bengal (?), Assam, Sikkim. Elsewhere : Burma.

Remarks : This species is much related to *Mesopteryx alata* Saussure and is a new record from India.

Genus *Mantis* Linnaeus

Key to species

Anterior coxa and femur with spots..... *nobilis*

- Anterior coxa and femur without spots.....*religiosa*

* 29. *Mantis religiosa* Linnaeus 1758

1758. *Gryllus (mantis) religiosa* Linnaeus, *Syst. Nat.*, 10 : 426

1767. *Mantis religiosa* : Linnaeus, *Syst. Nat.*, 12(2) : 690.

Material examined : Bardhaman dist. : 1 (F) N.Z.C., viii. 1979, coll. T. Mukherjee. South 24-Parganas dist. : 1 (M), Narendrapur, N.Z.C., x. 1979, coll. T.. Mukherjee.

Diagnosis : Superior margin of frontal sclerite angular with flat carinae. metazona carinated;

prosternum bears two small rounded tubercles near base. In anterior leg, coxa with divergent internal apical lobes, internally with callous spots, a black spot at base which often encloses an oval yellow spot; anterior edge with 6-8 spines and few spinules between them; claw groove of femur yellow, larger internal spines entirely black. Fore wing sub-transparent in (female) stigma marked with an elongated, cream coloured spot. In (male) both wings are little shorter than body; Anterior border of hind wing blackish opaque near apex.

Measurements: Body (M) 56.0, (F) 68.0; pronotum (M) 14.0, (F) 20.0, metazona (M) 11.0, (F) 13.5; fore wing (male) 36.0, (female) 48.0.

Distribution: India : West Bengal (Bardhaman, South 24-Parganas), Karnataka, Madhya Pradesh, Uttar Pradesh. Elsewhere : Asia; Europe, Africa, Australia.

Remarks: This species is common in Oriental region. This is a new record from West Bengal.

* 30. *Mantis nobilis* Brunner 1892

1892. *Mantis nobilis* Brunner, *Ann. Mus. Genova*, 33 : 70.

Material examined: south 24-Parganas dist. : 1 (M), Bantala, lot No. 118/72, N.Z.C., 22.xi. 1964, coll. B. Biswas.

Diagnosis: (male) Frontal sclerite transverse, upper margin angular. Pronotum partly blackish dorsally; prozona distinctly and metazona sparsely denticulated at edges; prosternum near base blackish. In anterior leg, coxa with 6 spines and few spinules among them; internal apical lobes contiguous; femur internally with a big shining black patch extending upto base of 2nd discoidal spine, with a pale yellow patch in the claw groove area; latter bounded anteriorly by a black line at the base of 1st larger internal spine, larger internal spine black and the colour extends as parallel lines; rest spines black at tips only. Fore wing longer than abdomen transverse veinules yellow: lower half entirely transparent. Hind wing transparent; costal area and a portion of anterior apical area brownish.

Measurements: Body 55.0, pronotum 16.5; metazona 12.0; fore wing 41.0.

Distribution: India : West Bengal (South 24-Parganas), Himachal Pradesh, Manipur. Elsewhere: Burma.

Genus *Stalilia* Stål

In West Bengal, 3 species are known

Key to species

1. Prosternum with a black patch at coxal joint area..... *maculata*

- Above patch absent.....2
2. Prostenum black at base.....*apicalis*
- Prostenum at base not black.....*nemopalis*

* 31. *Statilia nemoralis* (Saussure) 1870

1870. *Pseudomantis nemoralis* Saussure, *Mitt. Schweiz. Entomol. Ges.*, 3 : 229.
1877. *Statilia nemoralis* : Stal, *Bih. K. Svenska VetenskAkad. Handl.* 4 (10) : 55.

Material examined ; South 24-Parganas dist. : 2 (male), Narendrapur, x. 1979, coll. T. Mukherjee.

Diagnosis : Body green. Superior border of frontal sclerite sinuated on either sides. Prosternum without any black or blackish patch. In anterior leg, coxa with 5-6 white spines; claw groove of femur shining yellow and a black patch in front of it; larger internal spines blackish and marked at base by a black spot. Fore wing a little longer than abdomen; stigma without black spot. Hind wing colourless, clear.

Measurements : Body 50.0; pronotum 16.5, metazona 12.0; forewing 31.0.

Distribution : India ; West Bengal (south 24-Parganas), Arunachal Pradesh, Tamil Nadu. Elsewhere: Eastern Asia.

Remarks : This is the only known green species of this genus in India. This species is new record from West Bengal.

* 32. *Statilia maculata* (Thunberg) 1784

1784. *Mantis maculata* Thunberg, *Nov. Ins. Spec.*, 3 : 61.
1897. *Statilia maculata* : Bolivar, *Ann. Soc. ent. France*, 66 : 309.

Material examined : South 24 Parganas dist. : 1 (F), Sonarpur, N.Z.C., 21.xi. 1979, coll. T. Mukherjee.

Diagnosis : Vertex with blackish mark on dorsal surface. Prosternum near coxal joint with black patch. In anterior leg, coxa with 6-7 triangular whitish spines and few spinules and also with internal black patch; femur with shining, pale yellow patch, often bordered anteriorly by a black line; larger internal spines entirely black. Costal area of forewing opaque, discoidal area semi opaque.

Measurements : Body 42.0; pronotum 14.0, metazona 10.5; Fore wing 32.0.

Distribution : India ; West Bengal (south 24-Parganas), Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Sikkim, Uttar Pradesh. Elsewhere : Eastern Asia.

Remarks : This species is new record from West Bengal.

* 33. *Statilia apicalis* (Saussure) 1871

1871. *Mantis apicalis* Saussure, *Mem. Soc. Geneve*, 21:291.

1877. *Statilia apicalis* : Stål, *Bih. K. Svenska VetenskAkad. Handl.* 4(10):55.

Material examined : South 24-Parganas dist.: 2 (M) (F), Narendrapur, N.Z.C., 29.viii. 1975, coll. T. Mukherjee.

Diagnosis : Vertex widely blackish, Frontal sclerite arched at superior margin. In anterior leg, coxa basally black, armed with 6 triangular spines along with few spinules; femur with a shining yellow patch on claw groove; black dots at base of larger internal spines; all spines black at tips only. Fore wing long, costal area dirty green; stigma clear and colourless with black patch on inner side. Wings clear, colourless, apex pale brown.

Measurements : Body (M)35.0, (F) 54.0; pronotum (M) 11.5 (F) 18.5, metazona (M) 8.0 (F) 14.5; fore wing (M) 26.0, (F) 39.0.

Distribution : India : West Bengal (south 24-Parganas), Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Uttar Pradesh. Elsewhere : Australia.

Subfamily TOXODERINAE

Tribe TOXODERINI

34. *Aethalochroa ashmoliana* (WestWood) 1841

1841. *Vates ashmoliana* WestWood, *Ann. nat. Hist.*, 8 : 272.

1877. *Aethalochroa ashmoliana* : Wood-Mason, *Ann. nat. Hist.*, 19(4) : 308.

Material examined : Baharampur, 1 (M), Regd. No. 6556/1. N.Z.C., dt. N.A., coll. C.W. Marshal.

Diagnosis : Body brown. Eyes big, round, with a very minute dorsal tubercle. In middle and hind legs femora with one dorso-apical lobe and two ventro-apical lobes, all triangular shaped, tibiae with round lobe extending ventro-basally and with lamellar carinae. Forewing short, reaches 4-5 abdominal segments, clear and transparent; costal area blackish near base; a big black band near base of discoidal area, longitudinal veins black; hind wing transparent, clear, anterior border blackish, anal area with a big patch. Distal segment of cerci wide, round at apex and longer than width.

Measurements : Body 103.0; pronotum 32.0, metazona 24.0; Anterior coxa 14.0, femur 16.0, tibia 11.0; forewing 46.0.

Distribution : India : West Bengal (Baharampur), Maharashtra.

Family EMPUSIDAE

Subfamily EMPUSINAE

35. *Empusa* sp.

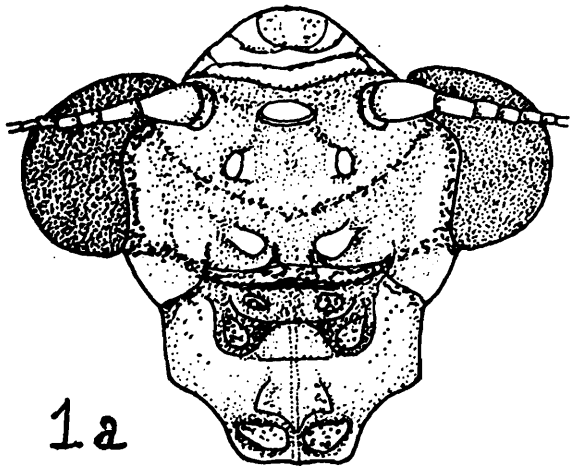
Material examined ; Puruliya : 1 (M), Puruliya, N.Z.C., 9.xi.1991., coll. D. Sengupta.

Diagnosis : Brown body. Tip of superior edge of frontal sclerite ends in a curved minute spine. Vertex produced into a protuberance ending into bifid points; at about middle of protuberance, there are lateral steps or cones; entire protuberance with an inferior carina. Eyes laterally rounded. Pronotum narrow, elongated, margins entirely smooth, with small flap at prozona extending upto 1/3 of coxal metazona; lateral angles of this flat spiniform. In anterior leg, coxa black in the form of 3 bands, distalmost point with lateral black spine; in femur superior edge with elongated flap like area; disocidal spine 4, external spine 6, of which outer 2 spines smaller, femur with 3 feeble blackish bands; tibia almost entirely brown. In middle leg, coxa with quite a small dorsal elongated flap; femur at distal end with a ventral oblong flap and 2 spines; In posterior leg, coxal flap reduced than that of middle one; femur similar to that of middle one..

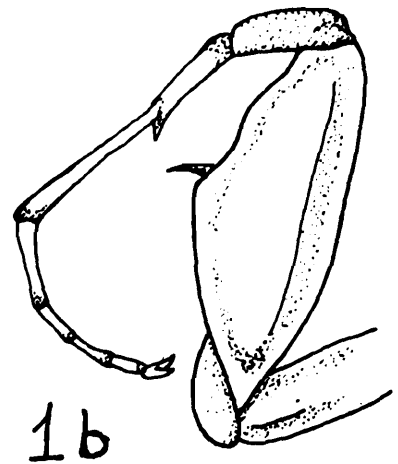
Fore wing brownish, well extended behind the tip of abdomen; stigma with black patch at corners. Abdomen flattened at middle; ventro-median points spiniform; supra anal plate small, broadly triangular. Cerci short.

Measurements : Total length between tips of protuberance and fore wing 98.5; protuberance 6.5; anterior coxa 17.0, femur 17.0, tibia 8.5 . Pronotum 34, prozona 4.0, maximum width of pronotum (with flap) 8.0. Fore wing 56.0, hind wing 51.0.

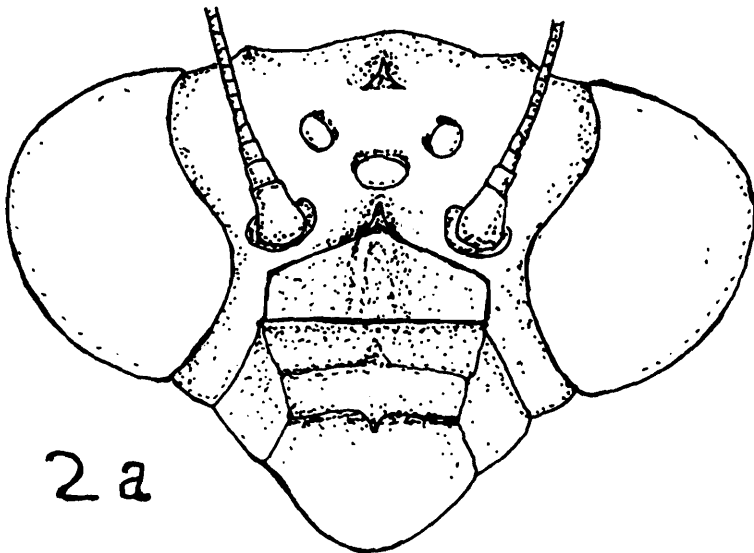
Distribution : India : West Bengal (Puruliya).



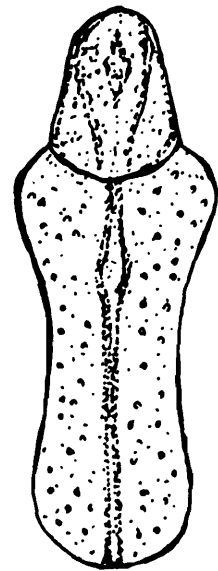
1a



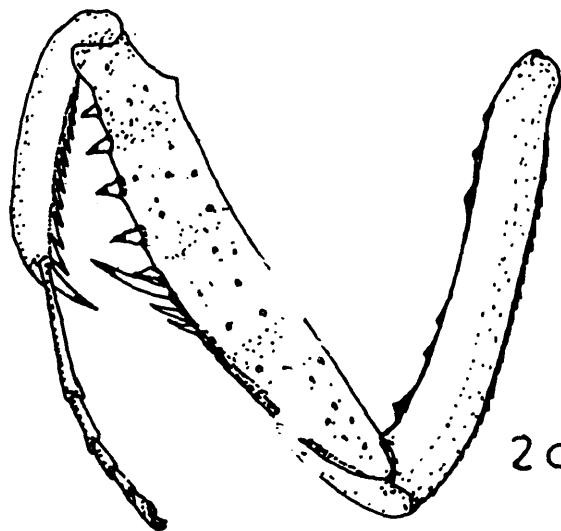
1b



2a

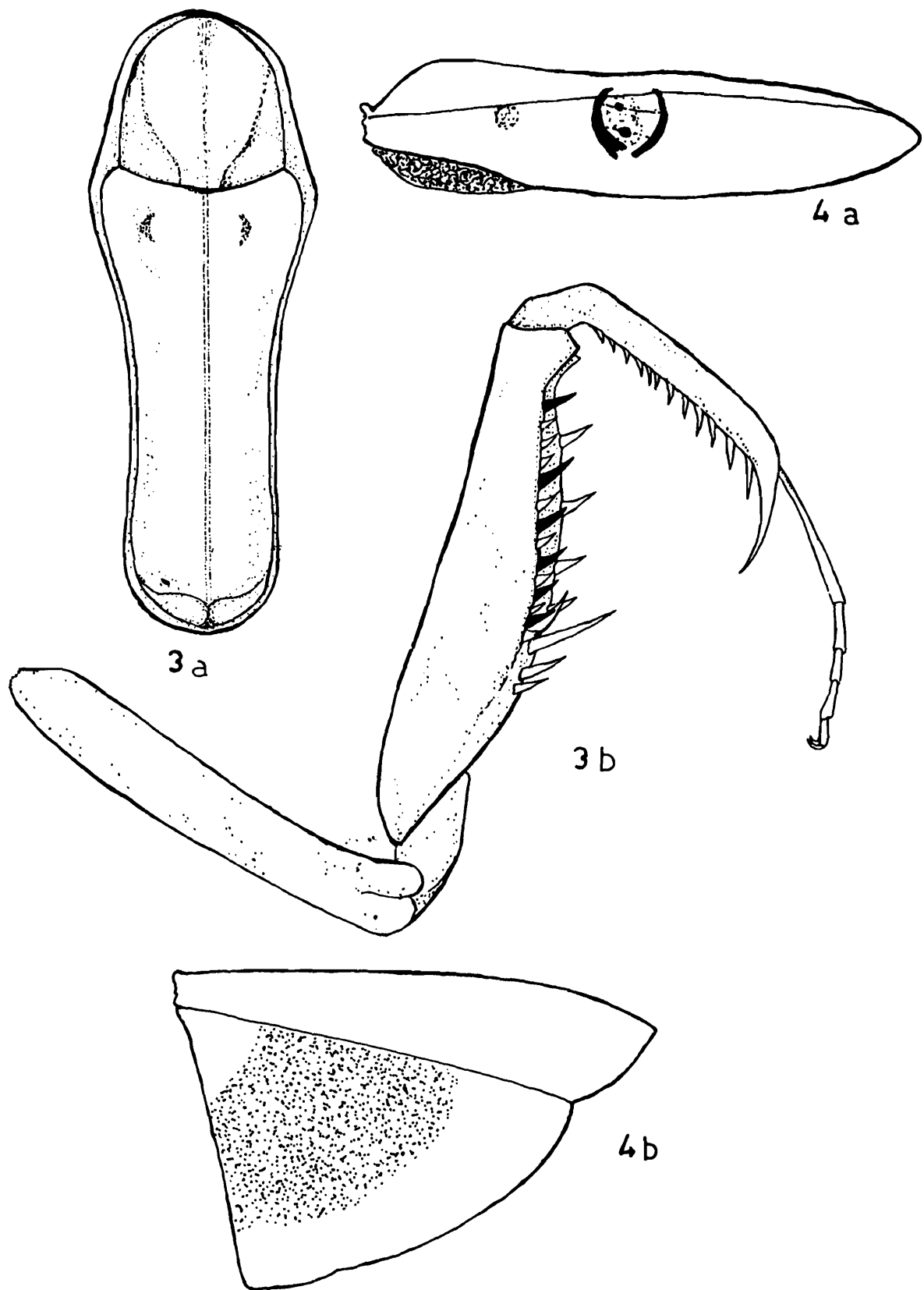


2b

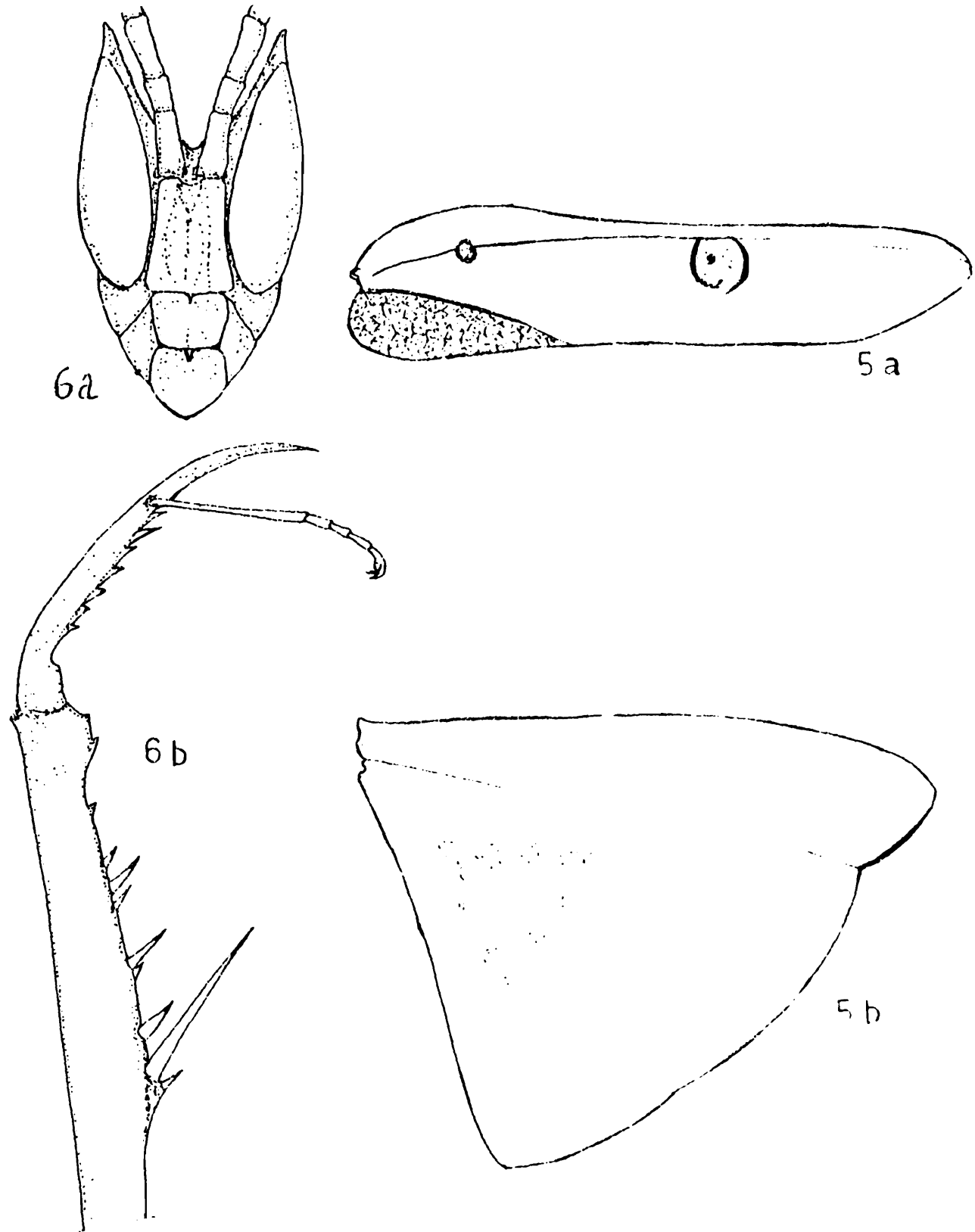


2c

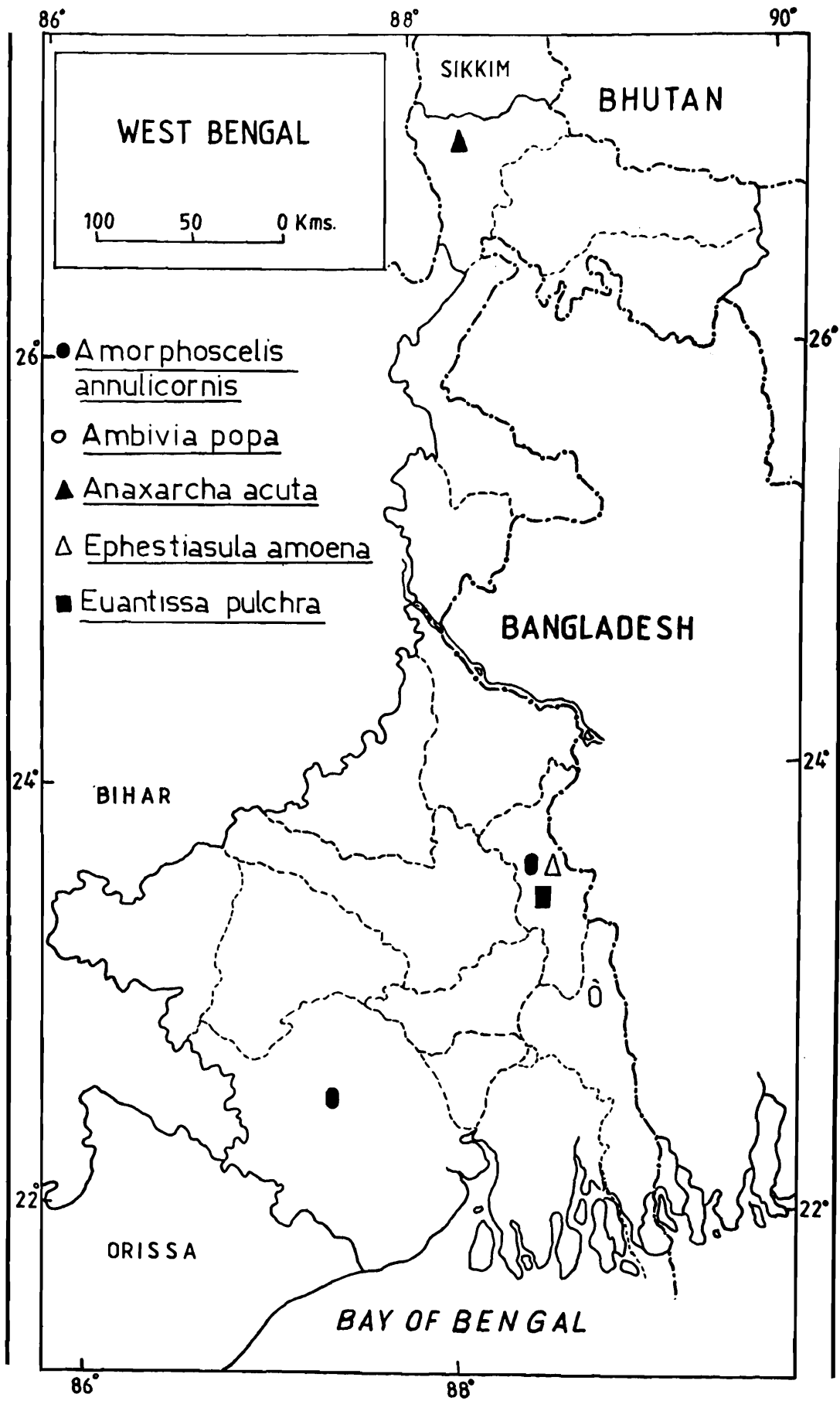
Amorphocelis annulicornis Stål, 1811 male. 1a. Head and pronotum x 8.5; 1b. Left foreleg x 8.5.
Ambivia popa Stål, 1877 male. 2a. Head x 20. 2b. Pronotum x 5.20. 2c. Left foreleg x 5.



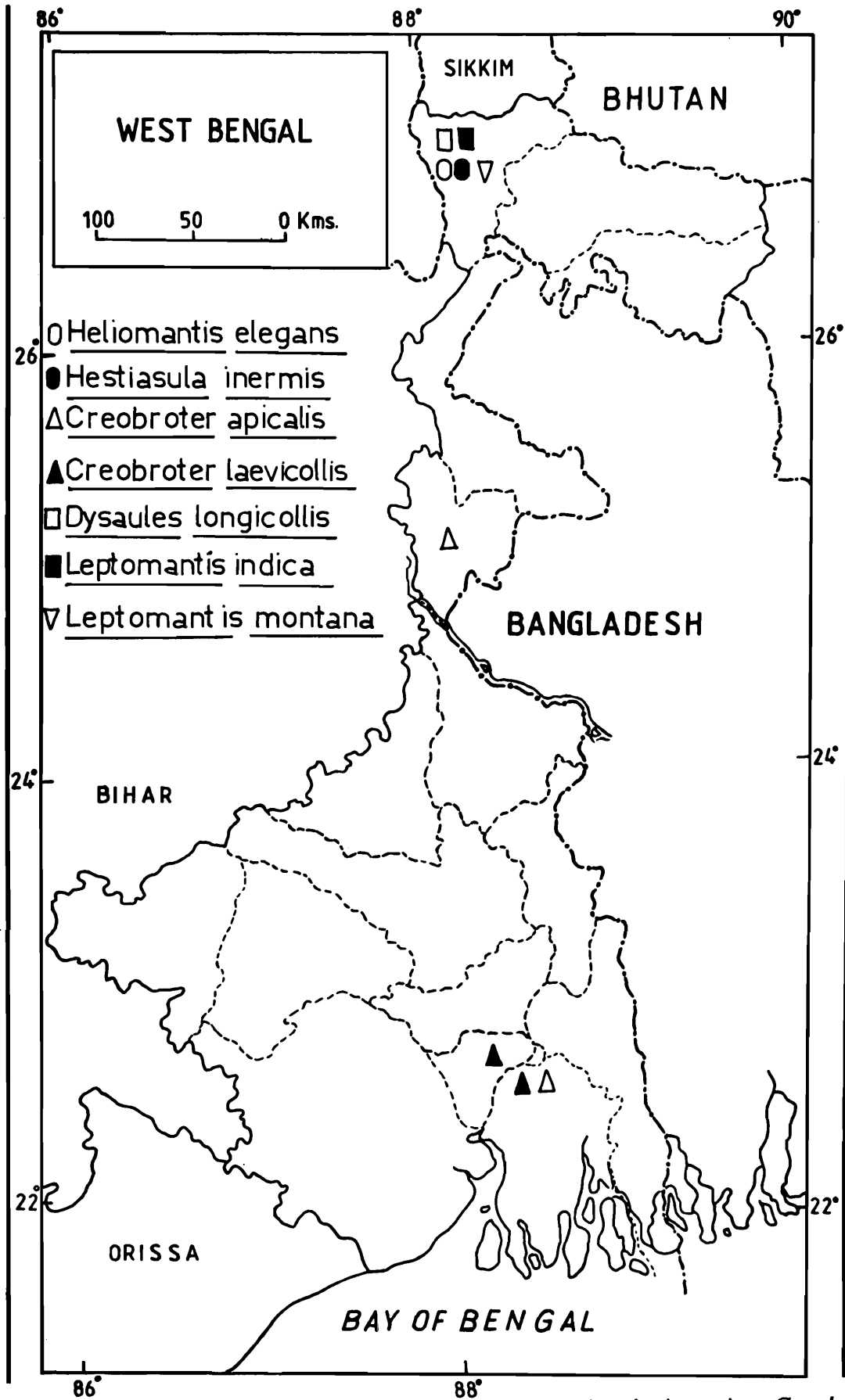
Anaxarcha acuta Beier, 1963 female. 3a. Pronotum x 10. 3b. Left foreleg x 10.
Creobroter apicalis (Saussure) 1869 female. 4a. Elytra x 4. 4b. Wing x 4.



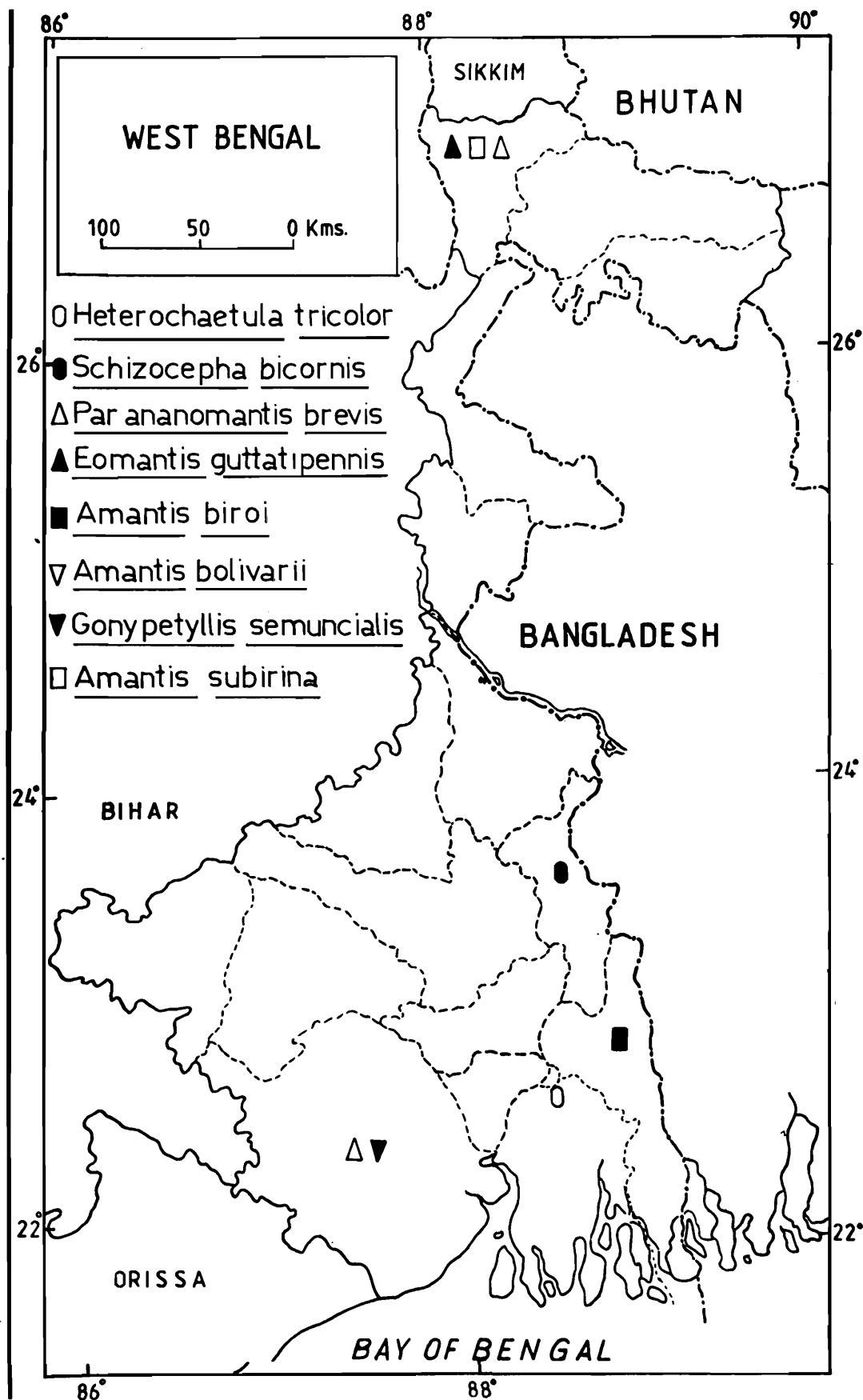
Creobroter laevicollis (Saussure), 1870 male. 5a. Elytra x 4. 5b. Wing x 4.
Schizocephala bicornis (L.) 1758 male. 6a. Ventral view of head x 11.5. 6b. Right foreleg x 14.



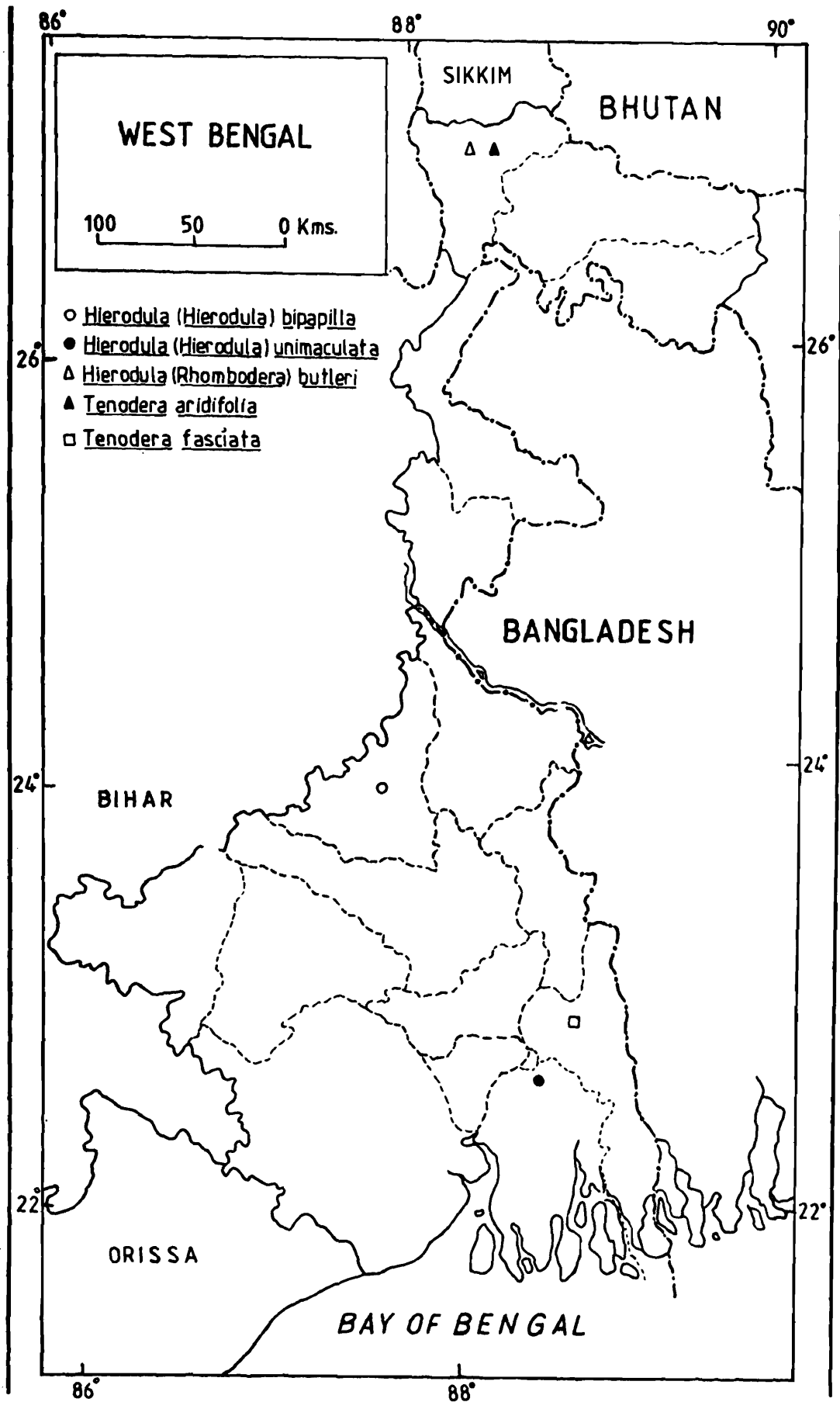
Map I. Showing distributions of : *Amorphoscelis annulicornis* ; *Ambivia popa* ; *Anaxarcha acuta*; *Ephestiasula amoena* ; *Euantissa pulchra*



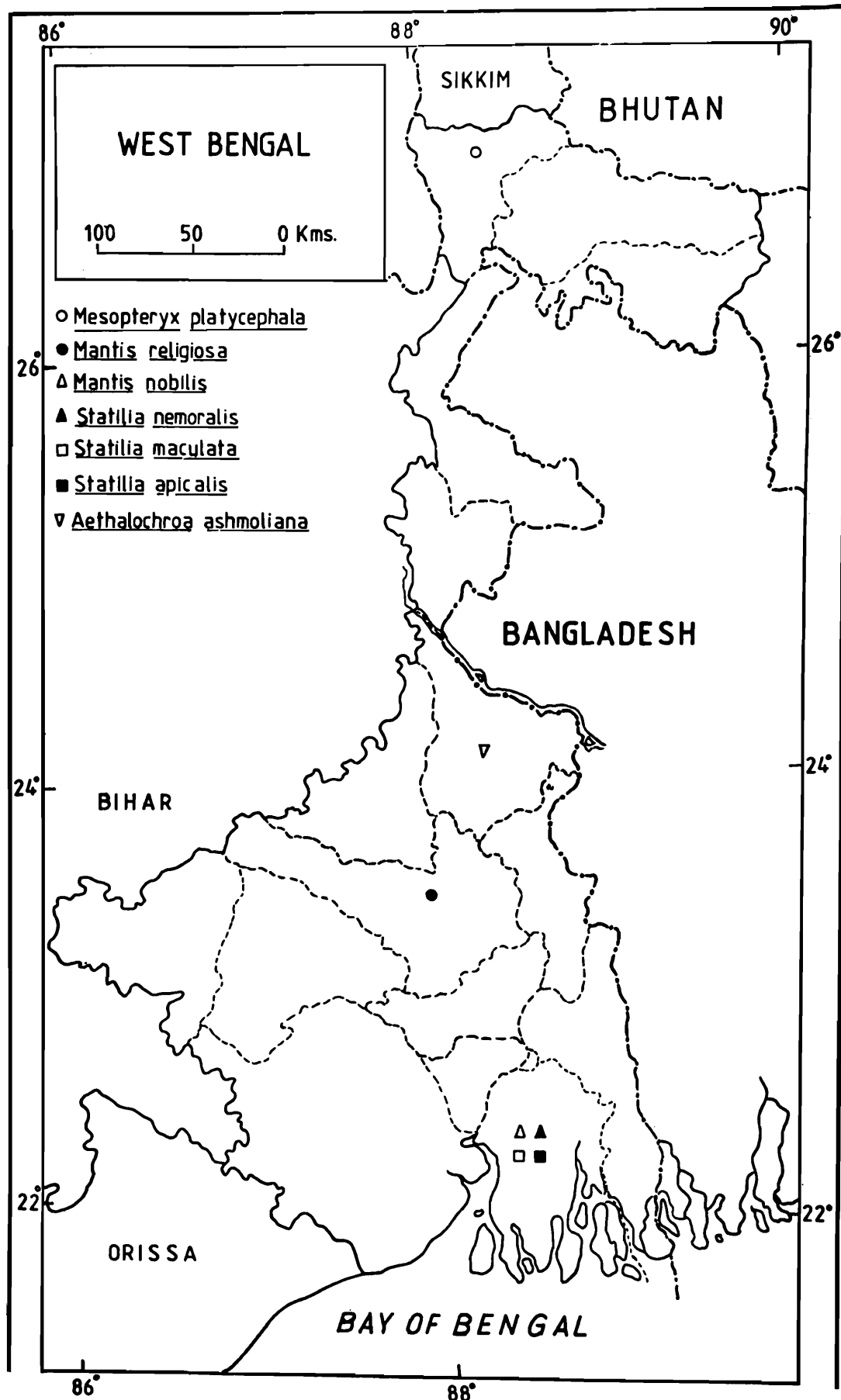
Map II. Showing distribution of : *Heliomantis elegans* ; *Hestiasula inermis* ; *Creobroter apicalis*; *Creobroter laevicollis* ; *Dysaules longicollis* ; *Leptomantis indica* ; *Leptomantis montana*



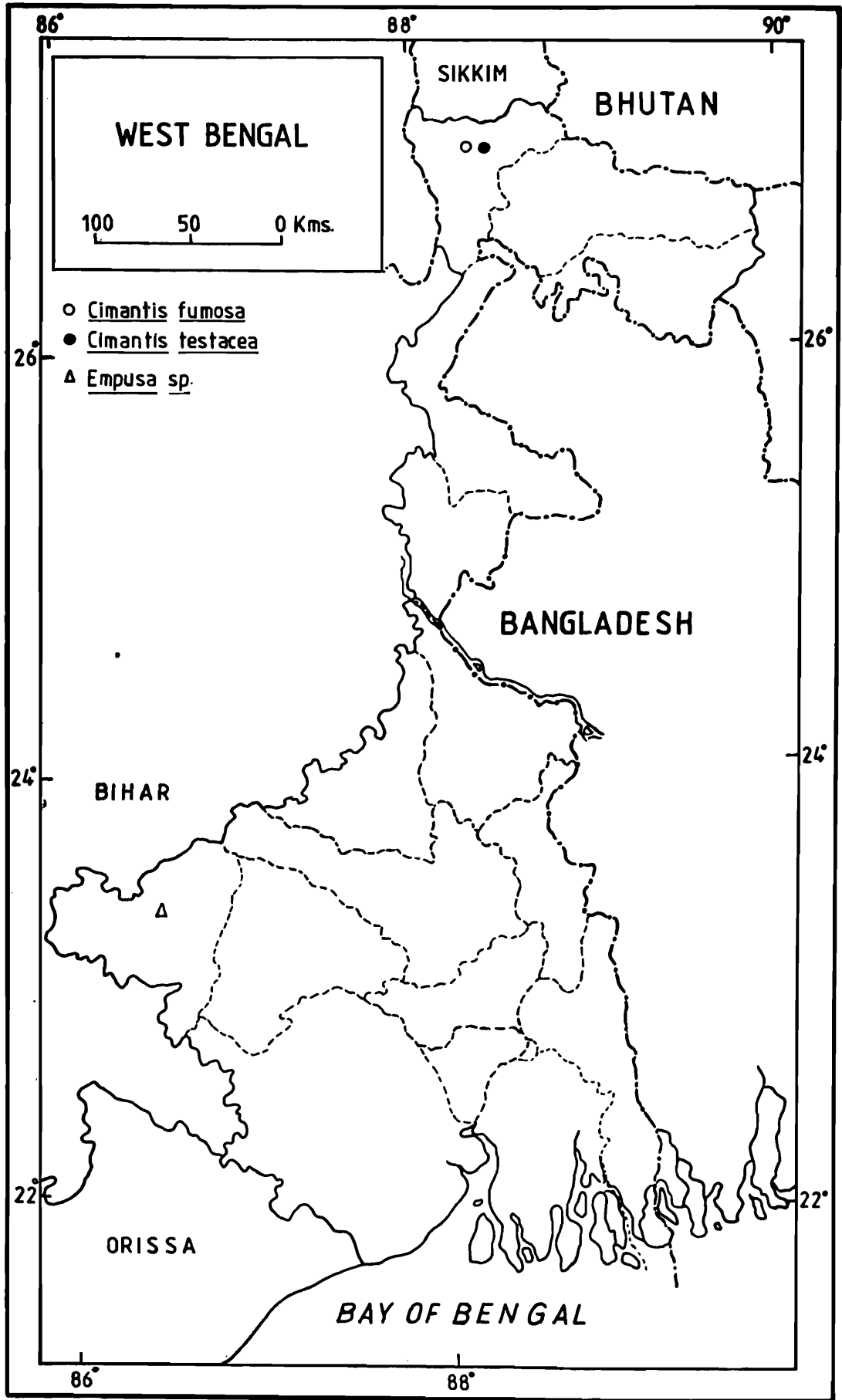
Map III. Showing distributions of : *Heterochaetula tricolor* ; *Schizocephala bicornis* ; *Parananomantis brevis* ; *Eomantis guttatipennis* ; *Amantis subirina* ; *Amantis biroi* ; *Amantis bolivarii* ; *Gonypetyllis semuncialis*



Map.IV. Showing distributions of : *Hierodula (Hierodula) bipapilla*; *Hierodula (Hierodula) unimaculata*; *Hierodula (Rhombodera) butleri*; *Tenodera aridifolia*; *Tenodera fasciata*



Map. V. Showing distributions of : *Mesopteryx platycephala* ; *Mantis religiosa* ; *Mantis nobilis*; *Statilia nemoralis* ; *Statilia maculata* ; *Statilia apicalis* ; *Aethalochroa ashmoliana*



Map. VI. Showing distributions of : *Cimantis fumosa* ; *Cimantis testacea* ; *Empusa sp.*

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
Family : AMORPHOSCELIDAE																	
1. <i>Amorphoscelis annulicornis</i>	-			-	-	-	-		-	-	+	-	+		-	-	-
Family : HYMENOPODIDAE																	
Subfamily : ACROMANTINAE																	
Tribe : ACROMANTINI																	
2. <i>Ambivia popa</i>	-	-	-	-	-	-	-	-	-		-	-	-	-	+	-	-
3. <i>Anaxarcha acuta</i>	-		-	-	+	-	-		-	-	-	-	-	-	-	-	-
4. <i>Ephestiasula amoena</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
5. <i>Euantissa pulchra</i>	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
6. <i>Heliomantis elegans</i>		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
7. <i>Hestiasula inermis</i>	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
8. <i>Creobroter apicalis</i>	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
9. <i>Creobroter laevicollis</i>	-	-	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Family : MANTIDAE																	
Subfamily : TARACHODINAE																	
10. <i>Dysaules longicollis</i>	-	-	-		+	-	-		-		-	-	-	-	-	-	-
11. <i>Leptomantis indica</i>	-	-		-	+		-	-				-	-	-	-	-	-
12. <i>Leptomantis montana</i>	-	-	-	-	+	-	-		-				-	-	-	-	-
Subfamily : OXYOTHESPINAE																	
13. <i>Heterochaetula tricolor</i>	-			+		-				-	-	-	-	-	-	-	-
Subfamily : SCHIZOCEPHALINAE																	
14. <i>Schizocephala bicornis</i>	-			-					-			-	+		-		-
Subfamily : IRIDOPTERYGINAE																	
15. <i>Parananomantis brevis</i>				-	-						+			-	-		
16. <i>Eomantis guttatipennis</i>					+									-			
Subfamily : AMELINAE																	
17. <i>Amantis subirina</i>					+												
18. <i>Amantis biroi</i>																+	
19. <i>Amantis bolivarii</i>					+												
20. <i>Cimantis fumosa</i>					+												
21. <i>Cimantis testucea</i>					+												
22. <i>Gonypetyllis semuncialis</i>										-	+						

Name of the Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Subfamily : MANTINAE																	
23. <i>Hierodula (Hierodula) bipapilla</i>			+														
24. <i>Hierodula (Hierodula) unimaculata</i>				+				-				-					
25. <i>Hierodula (Rhombodera) butleri</i>					+												
26. <i>Tenodera ardifolia</i>					+												
27. <i>Tenodera fasciata</i>															+		
28. <i>Mesopteryx platycephala</i>					+												
29. <i>Mantis religiosa</i>		+															
30. <i>Mantis nobilis</i>																	+
31. <i>Statilia nemoralis</i>													-				+
32. <i>Statilia maculata</i>																	+
33. <i>Statilia apicalis</i>													-	-			+
Subfamily : TOXODERINAE																	
Tribe : TOXODERINI																	
34. <i>Aethalochroa ashmoliana</i>	-	-						-	-		-	+	-	-	-	-	-
Family : EMPUSIDAE																	
Subfamily : EMPUSINAE																	
35. <i>Empusa sp.</i>	-	-		-	-	-	-	-	-	-	-	-	-	+	-	-	-

SUMMARY

This paper deals with 35 species under 24 genera. These species cover 4 families out of 6 known families of India mantids. A total of 18 species and 12 genera are new record from West Bengal. Most of the species are discussed with diagnostic characters. Distribution maps are also provided.

BIBLIOGRAPHY

- Beier, M. (1930). New and rare mantodea (Orthoptera) in the British Museum *Ann. Mag. Nat. Hist.* (10) 6: 432-460.
- Beier, M. (1941). New and seltene Mantodeen aus deutschen Muscen. *Ann. Naturf. Mus. Wien*, 52 : 126-154.
- Beier, M. (1963). New and bemerkenswerte mantiden Verschiedener Herkunft. *Stuttg. Beitr. Naturkd.* 106: 1-11.
- Beier, M. (1964). Blattopteroidea. Ordnung mantodea. *Bronn's Kl. Ordn. Tierreich* (5) (3) 6 : 849-970.
- Bolivar, I. (1897). Les Orthopteres de st. Joseph's College. a' Trichinopoly. *Ann. Soc. ent. France*, 66 : 303-316.
- Burmeister, H. (1838). Handbuch der Entomologic, Vol. 2 (Berlin).
- Giglio-Tos, E. (1912). (volume date 1911). Mantidi Esotici. *Boll. soc. Entomol. Ital.* 43 : 1-167.
- Giglio-Tos, E. (1915). (volume date 1914). Mantidi Esotici. *Boll. Soc. entomol. Ital.*, 46 : 31-108.
- Giglio-Tos, E. (1927). Mantidae. *Das Tierreich*, 50 Lief. (Berlin).
- Kirby, W.F. (1904) 'A synonymic : Catalogue of Orthoptera', Vol. I (London).
- Linnaeus, C. (1758). 'Systema naturae vol. 10. pt.I.
- Olivier, G.A. (1792). 'Encyclope, die methodique vol. 7 (Paris)
- Saussure, H. de (1869). Essai d'un systema des mantides. *Mitt. Schweiz. Entomol. Ges.*, 3 : 49-73.
- Saussure, H. de (1870). Additions au systeme des Mantides. *Mitt. Schweiz, Entomol. Ges.*, 3 : 221-244.
- Saussure, H. de (1871). Melanges Orthopterologiques. Fasc. 3 *Mem. Soc. Phys. Hist. Nat. Geneve*, 21 : 1-214.
- Serville, J.G. Audinet (1838 : title page date 1839), Histoire Naturelle des Insects'. Orthopteres. (Paris).

- Stål, C. (1871). Orthoptera quaedam africana, *Ofvers. K. VetenskAkad, Forh.*, 3 : 375-401.
- Stål, C. (1877). Systema Mantodeorum *Bih. K. Svenska VetnskAkad. Handl.* 4(10) : 1-91.
- Stål, C. (1813). 'Representation Exactment des Blattes' (Amsterdam).
- Thunberg, C.P. (1784). *Novae Insectorum Species. Dissertationes entomologicae.* vol. 3. (Upsaliae).
- Werner, F. (1931). Further notes on Indian Mantids or praying insects. *Proc. Zool. Soc. London*, 1329-1334.
- Wood-Mason, J. (1877). On a small collection of Orthopterous insect ... four new species. *Ann. Mag. Nat. Hist.* 20 : 74-77.
- Wood-Mason, J. (1878). On new and little known mantidae. *Proc. Zool. Soc. London.* 38:580-587.
- Wood-Mason, J. (1882). On new and little known Mantidae. *J. Asiat. Soc. Bengal.*, 51:21-36.
- Wood-Mason, J. (1889). A Catalogue of Mantodea with description ... Indian Museum, Calcutta. No. I (Calcutta).
- Wood-Mason, J. (1891): A Catalogue of Mantodea Indian Museum, Calcutta. No. 2 (Calcutta.).

INSECTA : ISOPTERA

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INTRODUCTION

The first ever record of termites from West Bengal dates back to 1915, when Assmuth reported for the first time the occurrence of only two species from Calcutta. Since then upto the year 1979, 26 species were either described or reported from the State by different authors (Holmgren and Holmgren, 1917; Snyder, 1933, '34; Margabandhu, 1934; Dover and Mathur, 1934; Roonwal and Pant, 1953; Banerjee, 1956; Roonwal and Sen-Sarma, 1956, '60; Sen-Sarma and Mathur, 1957; Mathur and Sen-Sarma, 1961; Mathur and Chhotani, 1962; and Maiti, 1975, ;76, '79). As such, 28 species were known altogether from the study area.

Very recently, Maiti (1983) contributed a valublae contribution mainly based on his excellent collections from throughout the State which was further augmented by some other collections as well. He studied 47 species in details with regard to their taxonomic treatment, range of variations and distribution, field biology and ecology including zoogeographical analysis.

The present study has resulted into addition of four species to bring a total of 51 species altogether from the State. For the easy identity, species keys have been formulated specially for those represented by more than one species in each genus based only on the characters of sold in view of the imagoes mostly being absent in the large majority of species. However, keys for the identity of family and genera are based on characters of both imagoes and soldiers.

SYSTEMATIC ACCOUNT

I. List of species so far recorded from West Bengal (Author's name and year against each species in paranthesis indicate its first record from the State).

Family I. KALOTERMITIDAE

1. *Neotermes bosei* Snyder (Roonwal and Sen-Sarma, 1960)
2. *N. buxensis* Roonwal and Sen-Sarma (Roonwal and Sen-Sarma, 1960)
3. *N. kalimpongensis* Maiti (Maiti, 1975)
4. *N. mangiferae* Roonwal and Sen sarma (Roonwal and Sen Sarma, 1960)
5. *Glyptotermes sensarmai* Maiti (Maiti, 1976)

6. *G. teknaensis* Akter (Maiti, 1983 as *G. caudomunitus* Kemner)
7. *G. ukhiaensis* Akter (Maiti, 1983 as *G. caudomunitus* Kemner)
8. *Cryptotermes bengalensis* Snyder (Snyder, 1934)
9. *C. dudleyi* Banks (Sen sarma and Mathur, 1957)

Family II. RHINOTERMITIDAE

10. *Heterotermes indicola* (Wasmann) (Assmuth, 1915)
11. *Reticulitermes assamensis* Gardner (Roonwal and Pant, 1953)
12. *Coptotermes heimi* (Wasmann) (Assmuth, 1915)
13. *C. kishori* Roonwal and Chhotani (Roonwal and Chhotani, 1962)
14. *C. travians* (Haviland) (Roonwal and Pant, 1953)
15. *Parrhinotermes khasii* Roonwal and Sen-Sarma (Maiti, 1983)

Family III. STYLOTERMITIDAE

16. *Stylotermes bengalensis* Mathur and Chhotani (Mathur and Chhotani, 1959)
17. *S. parabengalensis* Maiti (Maiti, 1975)

Family IV. TERMITIDAE

18. *Eurytermes buddha* Bose and Maiti (Maiti, 1983)
- 19.* *Speculitermes cyclops* Wasmann
20. *S. deccanensis paivai* Roonwal and Chhotani (Roonwal and Chhotani, 1962)
21. *S. roonwali* Maiti (Maiti, 1983)
22. *Euhamitermes chhotani* Maiti (Maiti, 1983)
23. *Synhamitermes quadriceps* (Wasmann) (Maiti, 1983)
24. *Microcerotermes beelsoni* Snyder (Maiti, 1983)
25. *M. cameroni* Snyder (Maiti, 1983)
26. *Angulitermes longiformis* Maiti (Maiti, 1983)

27. *Dicuspiditermes incola* (Wasmann) (Maiti, 1983)
28. *Pericapritermes ceylonicus* (Holmgren) (Maiti, 1983)
29. *P. dunensis* (Roonwal and Sen-Sarma) (Maiti, 1983)
30. *P. tetraphilus* (Silvestri) (Maiti, 1983)
31. *Macrotermes estherae* (Desneux) (Roonwal and Pant, 1953)
32. *M. gilvus* (Hagen) (Roonwal and Pant, 1953)
33. *M. khajuriae* Roonwal and Chhotani (Maiti, 1983)
34. *Odontotermes assmuthi* Holmgren (Maiti, 1983)
- 35.* *O. bellahunisensis* (Holmgren and Holmgren)
- 36.* *O. boveni* Thakur
37. *O. distans* Holmgren and Holmgren (Mathur and Sen-Sarma, 1958 as *O. parvidens* Holmgren and Holmgren)
38. *O. feae* (Wasmann) (Roonwal and Pant, 1953)
39. *O. gurdaspurensis* Holmgren and Holmgren (Maiti, 1983)
40. *O. horni* (Wasmann) (Banerjee, 1956)
- 41.* *O. obesus* (Rambur)
42. *O. redemanni* (Wasmann) (Banerjee, 1956)
43. *Hypotermes obscuriceps* (Wasmann) (Banerjee, 1956)
44. *H. xenotermitis* (Wasmann) (Maiti, 1983)
45. *Microtermes obesi* Holmgren (Banerjee, 1956)
46. *Nasutitermes gardneri* Snyder (Roonwal and Pant, 1953)
47. *N. garoensis* Roonwal and Chhotani (Maiti, 1983)
48. *N. jalpaiguiensis* Prashad and Sen-Sarma (Prashad and Sen-Sarma, 1959)
49. *N. suknessis* Prashad and Sen-Sarma (Prashad and Sen-Sarma, 1959)
50. *Bulbitermes emersoni* Maiti (Maiti, 1977)
51. *Trinervitermes biformis* (Wasmann) (Mathur and Sen-Sarma, 1961).

* Species recorded for first time from the State as per present study.

II. Key to different taxa :

Key to families

Based on Imagoes :

1. Tarsi 3-segmented..... Stylotermitidae
- Tarsi 4-segmented..... 2
2. Fontanelle absent, anterior wing scale large and over-lapping posterior wing-scale..... Kalotermitidae
- Fontanelle present; anterior wing scale not so large and not over-lapping posterior wing-scale.....3
3. Left mandible with one-two marginal teeth; wings slightly reticulate, wing membrane and wing margin densely hairy..... Rhinotermitidae
- Left mandible with one-two marginal teeth; wings not reticulate, wing membrane and wing margin sparsely hairy.....Termitidae

Based on Soldiers :

1. Tarsi 3-segmented..... Stylotermitidae
- Tarsi 4-segmented..... 2
2. Fontanelle absent.....Kalotermitidae
- Fontanelle present..... 3
3. Pronotum flat, without anterior lobe..... Rhinotermitidae
- Pronotum not flat, but saddle-shaped with up lifted anterior lobe..... Termitidae

Key to genera of the family Kalotermitidae

Based on Imagoes :

1. Left mandible with anterior margin of 2nd marginal tooth twice as long as posterior margin of 1st marginal tooth.....*Cryptotermes* Banks
- Left mandible with anterior margin of 2nd marginal tooth subequal to posterior margin of 1st marginal tooth.....2

- 2. Radial sector with branches; anterior margin of forewing scale convex; eyes generally large, diameter 0.46-0.78 mm.....*Neotermes* Holmgren
- Radial sector without branches; anterior margin of forewing scale almost straight; eyes generally small, diameter 0.29-0.48 mm.....*Glyptotermes* Froggatt

Based on Soldiers :

- 1. Head truncate in front and phrogmotic; mandibles short and stunted.....*Cryptotermes* Banks
- Head generally not truncate, elongate and gradually sloping in front; mandibles usually long....2
- 2. Frons bilobed and with a pair of antero-lateral prominences at base; head sometimes phragmotic*Glyptotermes* Froggatt
- Frons not bilobe, weakly sloping in front and with indistinct anterolateral prominences; mandibles relatively long; larger species.....*Neotermes* Holmgren

Key to species of *Cryptotermes*

Larger species, head-length 1.40-1.49, head-width 1.23-1.30 mm; frontal ridge pushed back and with a median cleft; mandible longer and narrower; left mandible with three marginal teeth*C. dudleyi* Banks

Smaller species, head-length 1.12-1.25, head-width 1.03-1.25 mm; frontal ridge lying in front and without a median cleft; mandible shorter and broader at base; left mandible with only one marginal tooth.....*C. bengalensis* Snyder

Key to the species of *Glyptotermes*

- 1. Larger species; head-length 1.23-1.55, head-width 0.85-1.20 mm; 10th tergite highly sclerotised and brownish in colour.....2
- 2. Head with prominent anterolateral corners; head-length 1.23-1.25, head-width 0.85-0.87 mm; mandibles shorter than half the head-length, head mandibular length index 0.41-0.42.....*G. ukhiaensis* Akhtar
- Head with weakly projecting out anterolateral corners; head-length 1.34-1.55, head-width 0.94-.120 mm; mandibles almost half of the head-length, head-mandibular indx 0.41-0.42.....*G. sensarmai* Maiti

Key to the species of *Neotermes*

- 1. Head larger; head-length 3.80-4.20, head-width 2.49-2.80 mm; head-capsule clongate, diverging anteriorly; pronotum as wide as or wider than head-capsule, pronotum-head width index (i.e.

- pronotum-width/head-width) 1.00-1.15..... 2
- Head smaller; head-length 2.97-3.68, head-width 2.28-2.52 mm; head-capsule subsquarish; pronotum narrower than head-capsule, pronotum-head width index 0.84 - 1.00.....3
 - 2. Head-capsule elongately rectangular, head-index (width/length) 0.59-0.65; Y-suture indistinct.
.....*N. buxensis* Roonwal and Sen-Sarma
 - Head-capsule broadly rectangular, head index 0.64-0.75; Y-suture prominent
.....*N. kalimpongensis* Maiti
 - 3. Left mandible with a deep notch in between 1st and 2nd marginal teeth; anterior margin of labrum substraight; lateral margins of pronotum rounded.....*N. bosei* Snyder
 - Left mandible with a deep notch in between 1st and 2nd marginal teeth; anterior margin of labrum somewhat pointed; lateral margins of pronotum substraight.....
.....*N. mangifera* Roonwal and Sen-Sarma

Key to genera of the family Rhinotermitidae

Based on Imagoes :

1. Second marginal tooth of left mandible as long as first.....*Reticulitermes* Holmgren
- Second marginal tooth of left mandible distinctly longer than first..... 2
2. Head parallel sided, ocelli dot like.....*Heterotermes* Froggatt
- Head subcircular or broadly oval; ocelli large.....3
3. Clypeus not greatly enlarged, apical tooth of left mandible much longer than first marginal
.....*Coptotermes* Wasmann
- Clypeus considerably enlarged, apical tooth of the left mandible distinctly shorter than first marginal.....*Parrhinotermes* Holmgren

Based on soldiers :

1. Head subrectangular, parallel-sided; fontanelle small, circular and lying a little in front of middle of head-dorsum..... 2
- Head oval, narrowing in front; fontanelle either large or small, placed far in front.....3
2. Labrum tongue-shaped with a long needle-like hyaline tip.....*Heterotermes* Froggatt

- Labrum tongue-shaped with a short hyaline (not needle-like) tip.....*Reticulitermes* (Holmgren)
- 3. Frontanelle large, labrum with a small pointed hyaline tip; mandibles without distinct teeth
.....*Coptotermes* Wasmann
- Frontanelle small, labrum without a hyaline tip; mandibles with distinct teeth
.....*Parrhinotermes* Holmgren

Key to the species of *Coptotermes*

- 1. Smaller species, head-length 1.15-1.19, head-width 0.96-1.10 mm; waist of post-mentum lying below the middle of the line connecting the level of maximum width and the hind margin
.....*C. kishori* Roonwal and Chhotani
- Large species, head-length 1.20-1.37, head-width 1.00-1.27 mm; waist of postmentum lying in middle of the line connecting the level of maximum width and the hind margin..... 2
- 2. Minimum width of postmentum greater (0.24-0.33 mm).....*C. heimi* (Wasmann)
- Minimum width of postmentum smaller (0.22-0.24 mm).....*C. travians* Haviland

Key to genera of the family Termitidae

Based on Imagoes :

- 1. Posterior margin of the second marginal tooth of right mandible concave (except) in *Synhamitermes* and *Microcerotermes*)..... 2
- Posterior margin of the second marginal tooth of right mandible always straight..... 6
- 2. Right mandible with a deep cut in between 1st and 2nd marginal teeth..... 3
- Right mandible with a shallow concave cut in between 1st and 2nd marginal teeth..... 5
- 3. Head with a large mid-dorsal spot; left mandible with sharp deep cut margin between 1st and 2nd marginal teeth; right mandible with posterior edges of 2nd marginal tooth distinctly concave
.....*Speculitermes* Wasmann
- Head without mid-dorsal spot; left mandible with concave cut between 1st and 2nd marginal teeth; right mandible with posterior edge of 2nd marginal teeth substraight..... 4
- 4. Left mandible with apical tooth distinctly longer than 1st marginal tooth, angle between them wide; antennae with 15 segments.....*Synhamitermes* Holmgren
- Left mandible with apical tooth smaller than 1st marginal tooth, angle between them narrow;

- antennae with 13-14 segments..... *Microcerotermes* Silvestri
5. Fontanelle usually long, narrow and slit like, short diameter 0.05 mm... *Dicuspiditermes* Krishna
- Fontanelle large and oval, short diameter 0.05 - 0.10 mm..... *Pericapritermes* Silvestri
6. Left mandible with a concave margin between 1st and 2nd marginal teeth..... 7
- Left mandible with a concave margin between 1st and 2nd marginal teeth..... 10
7. Right mandible with a small subsidiary tooth at base of anterior cutting edge of 1st marginal tooth; larger species..... *Macrotermes* Holmgren
- Right mandible without any subsidiary tooth; smaller species..... 8
8. Wings moderately long; antennae with 19-20 segments..... 9
- Wing unusually long; antennae with 15-18 segments..... *Microtermes* Wasmann
9. Left mandible with a deep cut between 2nd marginal tooth and molar plate; fontanelle raised.....
..... *Odontotermes* Holmgren
- Left mandible with shallow cut between 2nd marginal tooth and molar plate; fontanelle not raised..... *Hypotermes* Holmgren
10. Postclypeus much lighter in colour than frons; fontanelle oval..... *Nasutitermes* Dudley
- Postclypeus slightly lighter in colour than frons; fontanelle wide..... 11
11. Postclypeus appreciably swollen and only slightly shorter than to nearly half of its width
..... *Trinervitermes* Holmgren
- Postclypeus not so swollen and almost half of its width..... *Bulbitermes* Emerson

Key to genera of family Termitidae

Based on Soldiers :

1. Mandibles degenerate, non-functional; frons produced into a nasus..... 2
- Mandible strong, well developed and functional; frons not produced into a nasus..... 4
2. Head distinctly constricted behind the antennae; apical spine-like lateral process of mandibles sometimes with a minute tooth (absent in *B. emersoni* Maiti)..... *Bulbitermes* Emerson

- Head weakly or not at all constricted behind the antennae; apical spine-like lateral procs of mandibles, if present, neither specially developed nor denate.....3
- 3. Soldier monorphic.....*Nasutitermes* Dudley
- Soldier dimorphic.....*Trinervitermes* Holmgren
- 4. Head subquarish to subrectangular; postmentum narrow, not strongly arched at the middle.....5
- Head broadly to rectangularly oval, narrowed anteriorly; postmentum broad, strongly arched at the middle..... 11
- 5. Mandibles sabre-shaped, more or less symmetrically curved at tips and used for biting, each with a tooth or scation..... 6
- Mandibles either slender rod-like or asymmetrical and usdd for snapping or for both or serration 9
- 6. Mandibles serrated, without any definite dentition.....*Microcerotermes* Silvestri
- Mandibles with a teeth on inner margin..... 7
- 7. Mndibular tooth directed at right angle to the inner margin of mandibles*Synhamitermes* Holmgren
- Mandbular teeth directed anteriorly, at an angle less than right angle..... 8
- 8. Mandibles very broad at base with a large broad tooth on each.....*Euhamitermes* Holmgren
- Mandibles not very broad at base, with a small tooth on each.....*Eurytermes* Wasmann
- 9. Head with a frontal projection, mandibles long, slender, rod-like; labrum deeply cut*Angulitermes* Sjosstedt
- Head without any frontal projection; mandibles distinctly asymmetrical, left one twisted, right one substraight..... 10
- 10. Anterolateral corners of head with pointed projections; labrum deeply cut anteriorly with lateral corners produced into long needle-like projections.....*Dicuspiditermes* Krishna
- Anterolaaterl corners of head without any pointed projection; labrum substraight or weakly concave anteriorly.....*Pericapritermes* Silvestri
- 11. Mandibles without teeth, basal half of left mandible crenulate..... 13

- Left mandibles with or without teeth, basal half of left mandible not crenulate..... 13
- 12. Large species; labrum with a hyaline tip; meso-and meta-notum prominently expanded laterally; soldier dimorphic.....*Macrotermes* Holmgren
- Small species; labrum without a hyaline tip; meso-and meta-notum not expanded laterally; soldier monomorphic.....*Hypotermes* Holmgren
- 13. Small species (soldier much smaller than workers); mandibles thin, with or without denticles; basal outer margin of mandibles strongly concave.....*Microtermes* Wasmann
- Large species; mandibles stout with a prominent tooth on left mandibles; basal outer margin of mandibles not strongly concave.....*Odontotermes* Holmgren

Key to species of *Pericapritermes*

- 1. Labrum weakly concave anteriorly Head-length 2.32-2.55, head-width 1.32-1.40 mm*P. dunensis* (Roonwal & Sen-Sarma)
- Labrum almost straight anteriorly.....2
- 2. Smaller species; head almost twice as long as wide, head-length 2.00-2.26, head-width 1.19-1.32 mm.....*P. tetraphilus* (Silvestri)

Key to species of *Macrotermes*

Based on Soldiers (Major) :

- 1. Lateral sides of meso-and meta-nota broadly rounded. Head-length 1.76, head-width 1.57 mm.....*M. gilvus* (Hagen)
- Lateral sides of meso-and meta-nota angularly rounded2
- 2. Larger species; head-length 4.45-4.51, head-width 3.90-4.06 mm; postmentum slightly wider in the middle than at the anterior end.....*M. estherae* (Desneux)
- Smaller species; head-length 3.70, head-width 3.00 mm..... *M. khajuriai* Roonwal & Chhotani

Key to species of *Hypotermes*

- Larger species; head-length 1.38-1.42, head-width 1.20-1.23 mm; labrum broadly rounded apically; pronotum distinctly emarginate anteriorly.....*H. xenotermis* (Wasmann)
- Smaller species; head-length 1.15-1.20, head-width 0.95-1.05 mm; labrum oval; pronotum indistinctly emarginate anteriorly.....*H. obscuriceps* (Wasmann)

Key to species of *Odontotermes*

1. Distal segments of antennae distinctly darker than proximal segments..... 2
 - Distal segments of antennae not darker than the proximal segments, rather uniform in colour 5
2. Head capsule subrectangular in shape..... 3
 - Head capsule oval in shape, distinctly narrowed anteriorly..... 4
3. Small species, head-length 1.10-1.35, head width 0.95-1.15 mm; mandibles short and stout with strongly incurved apices..... *O. bellahunisensis* Holmgren and Holmgren
 - Large species, head-length 1.45-1.60, head width, 1.20-1.40mm; mandibles large, sabre-shaped and with weakly incurved apices.....*O. gurdaspurensis* Holmgren and Holmgren
4. Mandibles long; outer margin strongly bent near the basal third; labrum longish; head-mandibular index 0.69-0.79.....*O. redemanni* (Wasmann)
 - Mandibles short, slender and with weakly curved outer margin; labrum short and broadly rounded anteriorly; head mandibular index 0.59-0.67.....*O. obesus* (Rambur)
5. Tooth on the left mandible placed on the distal half..... 6
 - Tooth on the left mandible placed on the basal half..... 7
6. Postmentum swollen and extraordinarily wide with convex lateral sides; head-capsule broadly oval in shape; inner margin anterior to tooth not out-curved.....*O. boveni* Thakur
 - Postmentum not so swollen, sub-rectangular with parallel lateral sides; head-capsule sub-rectangular; inner margin anterior to tooth out-curved.....*O. assmuthi* Holmgren
7. Tooth on left mandible very minute and placed near basal third.....
 -*O. distans* Holmgren and Holmgren
 - Tooth on left mandible distinct and placed on or below the middle..... 8
8. Head capsule distinctly narrowed anteriorly; tooth on left mandible somewhat acute*O. feae* (Wasmann)
 - Head not so narrowed anteriorly; tooth on left mandible not so acute.....*O. horni* (Wasmann)

Key to species of *Microcerotermes*

- Head pale-brown; pronotum with an indistinct median notch; mandible weakly hooked at apex....
..... *M. beelsoni* Snyder
- Head dark-brown; pronotum with a distinct median notch; mandible comparatively strongly hooked at apex.....*M. cameroni* Snyder

Key to species of *Naustitermes*

1. Mandibles without any spine-like lateral process; rostrum darker than head-capsule; head-dorsum in profile, with a distinct but shallow concavity behind the rostrum; rostral-hump weak but prominent; 3rd antennal segment one and a half to two times as long as 2nd...*N. gardneri* Snyder
- Mandible with a spine-like lateral process..... 2
2. Head without any marked constriction behind the antennae; rostral hump absent; spine-like process of mandibles long.....*N. garoensis* Roonwal & Chhotani
- Head with a shallow constriction behind the antennae; rostral-hump weak but prominent; spine-like process of mandibles short.....3
3. Head with a minute projection on either side of the base of rostrum; antennae with 12 segments
..... *N. jalpaiguriensis* Prashad and Sen-Sarma
- Head without projection at the base of rostrum; antennae with 13 segments
.....*N. sukhnensis* Prashad & Sen-Sarma

Family STYLOTERMITIDAE (contains single genus)

Key to species of *Stylotermites*

1. Larger species, head-length 2.60-2.70, head-width 1.75-1.80; mandibles longer in relation to head-length, head-mandibular length index 0.65-0.69; anterior margin of pronotum weakly notched medially.....*S. bengalensis* Mathur
- Small species, head-length 1.92-2.23, head-width 1.19-1.34 mm; mandibles shorter in relation to head-length, head-mandibular length index 0.55-0.59; anterior margin of pronotum deeply notched medially.....*S. parabengalensis* Maiti

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REFERENCES

- Ahmad, M. 1958. Key to the Indo-Malayan termites. *Biologia*, Lahore, 4(1-2), pp. 33-198.
- Akhtar, M.S. 1975. Taxonomy and Zoogeography of the termites (Isoptera) of Bangladesh. - *Bull. Dep. Zool. Panjab Univ (N.S.)*, Lahore, 7, pp. 1-199.
- Assmuth, J. 1915. Indian wood estroying white ants (Second contribution). *J. Bombay nat. Hist. Soc., Bombay*, 23, pp. 690-694.
- Banerjee, B. 1956. Some common termites of Calcutta. - *J. Bombay nat. Hist. Soc., Bombay*, 54(1), pp. 204-206.
- Holmgren, K. and Holmgren N. 1917. Report on a collection of termites from India. - *Mem. Dept. agric. India*, Calcutta, 5(3), pp. 138-171.
- Maiti, P.K. 1983. Termite fauna (Isoptera) of West Bengal, India, - their recognition, biology and ecology. - *Rec. zool. Surv. India, Occ. Paper*No. 42, pp. 1-152.
- Prashad, B. and Sen-Sarma, P.K. 1959. Revision of the termite genus *Nasutitermes* Banks (Isoptera : Termitidae) from the Indian Region. - *Indian Counc. agric. Res., Ent. Monogr.*, New Delhi, CodeNo. 10.23, pp.1-66.
- Roonwal, M.L. and Chhotani, O.B. 1962. Termite fauna of Assam region, eastern India. - *Proc. natnl. Inst. Sci. India*, New Delhi.(B) 28(4), pp. 281-406.
- Roonwal, M.L. and Pant, G.D. 1953. A systematic catalogue of the main identified entomological collection at the Forest Research Institute, Dehra Dun, Pt. 9. Order Isoptera. *Indian Forest Leaflet. (Ent.)*, Delhi, No. 121(3), pp. 40-60.
- Roonwal, M.L. and Sen-Sarma, P.K. 1956. Systematic of Oriental termites. (Isoptera). No. 3. Zoological Survey of India Collections from India and Burma, with new termites of the genera *Parrhinotermes*, *Macrotermes*, *Hypotermes* and *Hospitalitermes*. - *Indian J. agric. Sci.*, Delhi, 26(1), pp. 1-37.
- Sen-Sarma, P.K. *et. al* 1975. Studies on wood-destroying termites in relation to natural termite resistance of timber. - *Final Tech. Rep.*, P.L. 480 Project No. A/7-F5-58 (Grant No. FC-IN-377), pp. 1-187.
- Snyder, T.E. 1949. Catalog of the termites (Isoptera) of the world. - *Smiths. misc. Coll.*, Washington, 112, 1+490 pp.
- Thakur, M.L. 1981. Revision of the termite genus *Odontotermes* Holmgren (Macrotermitinae) from India. - *Indian Forest Rec. (N.S.)*, 14 (2) : 1-1183.

PSOCOPTERA : INSECTA

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INTRODUCTION

Psocopteran insects are commonly known as booklice and have much of economic importance. They are minute in size, sub-globular in shape, whitish to brownish in colour, and damage our valuable books, manuscripts, dry preserved specimens of insects and plants. These, sometimes, disseminate plant diseases by feeding pathogenic fungi. They are generally found among old books, journals, leaf-litter, straws, in foliage and under bark.

Perusal of literature reveals that these insects are represented in India by over 85 species (Enderlein-1903; Menon-1938, 1942, Pearman-1942 ; Datta-1963, 1965, 1966, 1969, Thornton & Wong-1966 ; Ray-1979 and Badonnel-1981) and from the world by over 2,500 species, whereas the representation in West Bengal is only by 39 species, till date.

A detailed account of the species, material of which were collected from the districts of West Bengal or deposited in Zoological Survey of India Collection, Calcutta or recorded from the literature to have a comprehensive faunal account, is furnished, with synonymy, key, diagnostic characters, illustrations and distribution and also with a distribution-map of the species, collected from West Bengal.

MATERIAL AND METHOD

These small insects (psocids) can be collected from old books (domestic) and in the field from foliage, bushes and straws, specially from semi-dry and dry leaves by beating them with a stick and by placing a white enamel tray beneath.

The collected insects can then be put inside the glass tubes, (filled with alcohol), by a fine brush, soaked in alcohol, for preservation. The preserved specimens can then be observed under microscope as such or stained or in dissected forms for study and drawing. The sclerotised parts can be dissected from musculature by KOH solution and then by dehydration in alcoholic strength.

The measurements of the specimens studied, were all in mm. (in alcohol).

MORPHOLOGY AND TERMINOLOGY

General Morphology

The psocids generally have a subglobular body with two pairs of thin, membranous wings (The bigger forewings normally with pterostigma and the smaller hindwings). The wings possess veins in most of the

cases, a few may be apterous (where hind femora of the leg is swollen). Head is small with long, filliform antennae ; legs are mostly median-sized, in few cases, these may be longer than bodylength ; thorax is proportionate to the body and abdomen is generally sub-globular, in few cases it may be oblong also. The genital armature lodged at the last abdominal segment (VII to IX), is well-sclerotised, both in male and in female, and is furnished with gonapophyses, Hypandrium, subgenital plate, epiproct and paraprot..

Terms and explanation used in Key and Text

- Pterostigma - The black or opaque spot, present in subcostal region of fore wing.
- Ctenidiobothria - These structures are found in tarsal segment of the leg.
- Gonapophyses - These are the modified sclerotised rod-like processes associated with the 7th and 8th abdominal sternites in female specimen.
- Subgenital plate - The modified sclerotised forms in female genitalic armature, which bears lobes and setae.
- Hypandrium - This is formed by 9th sternite in male specimen, in shape of claspers and separates the penis from rest of the genitalic contents.
- Epiproct - The sclerotised structure with short spurs or hooks found both in male and female genital armature.
- Paraprot - The modified and sclerotised bulbous form found both in male and female genitalic contents, possessing trichobothria.
- Radula - Strongly sclerotised organ of penis frame.
- Spur-Vein - A thick seta, attached to the mid-region of pterostigma.
- AP - Areola Postica of forewing.

DIAGRAM WITH LABELLING
(Appended separately at the end)

SYSTEMATIC ACCOUNT

Systematic list of the species of Psocoptera known from W. Bengal

Family TROGIIDAE

1. *Liponotus indicus* Badonnel

Family PSYLLIPSOCIDAE

2. *Granthakita cuttackae* Behura & Dash

Family LIPOSCELIDAE

3. *Liposcelis transvaalensis* (Enderlein)
4. *Liposcelis paetus* Pearman
5. *Liposcelis bengalensis* Badonnel

Family PACHYTROCTIDAE

6. *Tapinella fasciata* Thornton & Wong
7. *Tapinella formosana* Enderlein
8. *Pschytoctes georgii* (Menon)
9. *Peritroctes bengalensis* Thornton & Wong

Family CAECILIIDAE

10. *Caecilius muggenburgi* Enderlein
11. *Caecilius himalayanus* Enderlein
12. *Caecilius pictifrons* Thornton & Wong
13. *Caecilius bengalensis* Badonnel
14. *Caecilius persimularis* (Thornton & Wong)
15. *Dypsocus fucosus* Thornton & Wong

Family STENOPSOCIDAE

16. *Stenopsocus pallidus* Thornton & Wong

Family AMPHIPSOCIDAE

17. *Amphipsocus heterothrix* Thornton & Wong
18. *Dasypsocus solox* (Enderlein)

Family LACHESILLIDAE

19. *Lachesilla pedicularia* (Linnaeus)

Family ECTOPSOCIDAE

20. *Ectopsocus ramburi* Data

21. *Ectopsocus bengalensis* Datta
 22. *Ectopsocus cinctus* Thornton
 Family PERIPSOCIDAE
 23. *Peripsocus sinensis* Datta
 24. *Peripsocus anoplus* Thornton & Wong
 25. *Peripsocus sclerotus* Thornton & Wong
 26. *Peripsocus bhaktiae* Badonnel
 27. *Peripsocus quercicola* Thornton
 Family HEMIPSOCIDAE
 28. *Hemipsocus chloroticus* (Hagen)
 29. *Hemipsocus ornatus* Datta
 Family PSEUDOCAECILIIDAE
 30. *Pseudocaecilius citricola* (Ashmed)
 31. *Pseudocacilius fletcheri* Datta
 32. *Heterocaecilius fuscipalpus* Lee & Thornton
 33. *Allocaecilius heterothorax* Lee & Thornton
 34. *Scytopsocopsis hirtipenna* Lee & Thornton
 Family ARCHIPSOCIDAE
 35. *Archipsocus recens* Enderlein
 36. *Amphigerontia nubila* Enderlein
 Family PSOCIDAE
 37. *Psococerastis asiatica* Datta
 38. *Trichadenotecnum apertum* Thornton
 Family MYPSOCIDAE
 39. *Myopsocus pattoni* Datta.

Key to the families

1. Winged forms2

	Non-winged forms	3
2.	Antenna more than 20 segmented	4
	Antenna less than 20-segmented	5
3.	Hind femora of leg swollen	Lipselidae
	Hind femora of leg normal	Archipsocidae
4.	Tarsal joint 3-segmented	6
	Tarsal joint 2-segmented	7
5.	AP absent in forewing	8
	AP present in forewing	9
6.	Wing venation variable	Psyllipocidae
	Wing venation normal	Trogiidae
7.	Fore-wing : veins with one row of setae	Caeciliidae
	Fore-wing : veins with more than one row of setae	10
8.	Claws without subapical tooth	Stenopsocidae
	Claws with or without subapical tooth	Pseudocaeciliidae
9.	AP Joined with M	Hemipsocidae
	AP free	Lachesillidae
10.	Compound eyes, markedly large	Pachytroctidae
	Compound eyes, moderately large	11
11.	Pterostigma, with spurvein	12
	Pterostigma, without spurvein	13
12.	Female subgenital plate, simple	Amphipsocidae
	Female subgenital plate, complex	14
13.	Male epiproct unornamented	Peripsocidae
	Male epiproct, normally ornamented	Ectopocidae
14.	Male hypandrium, symmetrical	Mycopsocidae
	Male hypandrium, asymmetrical	Psocidae

I. Family TROGIIDAE

1. Genus *Liponorua* Heyden

1850. *Liponotus* Heyden, *Stettin ent. ztg.*, 11 : 84.
 1967. *Liponotus* Heyden : Smithers, *Austr. Zool.*, 14(1) : 11.

1. *Liponotus indicus* Badonnel

1981. *Liponotus indicus* Badonnel, *Rev. Suisse Zool.*, 88 (2) : 382-384.

Distribution : India : West Bengal (Darjilling).

II. Family PSYLLIPSOCIDAE

2. Genus *Granthakita* Behura & Dash

1968. *Granthakita* Behura & Dash, *Prak. Utkal Univ. & (Sci.)*, 5(2) : 47.

2. *Granthakita cuttackae* Behura & Dash

1968. *Granthakita cuttackae* Behura & Dash, *Prak, Utkal Univ. J. (Sci.)* 5(2) : 47-51.

Material : 2 (Males), 3 (Females), Haldia, Medniipur, Coll. K.K. Ray, 2.iii.1984; body length, (M)-1.2 mm., (F) 1.3 mm.

Diagnosis : The veins of the wings are variable.

Distribution : India : West Bengal (Medinipur) new record; Orissa (Cuttack)

Remarks : This species is very comon in human habitations.

III. Family LIPOSCELIDAE

3. Genus *Liposcelis* Motschulsky

1776. *Terms* Muller, *Zool. Danicae prod.*, p. 184.
 1967. *Liposcelis* Motschulsky: Smithers, *Austr. Zool.* 14(1) : 24.

Key to the species of *Liposcelis* Motschulsky

1. Size of specimen, varies from 0.98 mm to 1.2 mm.*L. paetus* pearman
 Size of specimen, varies from 1.2 mm to 1.39 mm2

2. Sternal setae, varies from 5-10 *L. transvaalensis* Enderlein
 Sternal setae, varies from 17-19 *L. bengalensis* Badonnel

3. *Liposcelis transvaalensis* Enderlein

1909. *Troctes transvaalensis* Enderlein, *Stettin ent. Ztg.*, 70:27.

1967. *Liposcelis transvaalensis* (Enderlein) : Smithers, *Austr. Zool.*, 14(1) : 28.

Material : 4 Females (apterous forms), central Calcutta, Coll. K.K. Ray 10.viii.1975; body length, 1.2mm.

Diagnosis : The number of sternal setae varies between 9-10.

Distribution : India : West Bengal (Calcutta, new record); Maharastra (Bombay). Elsewhere : South Africa (Transvaal).

Remarks : This particular apterous psocid species damage our books.

4. *Liposcelis paetus* Pearman

1942. *Liposcelis paetus* pearman, *Ent. month. Mag*; 78:289-290.

1967. *Liposcelis paetus* Pearman : Smithers, *Austr. Zool*; 14(1):26.

Distribution : India : West Bengal (Calcutta).

5. *Liposcelis bengalensis* Badonnel

1981. *Liposcelis bengalensis* Badonnel, *Rev. Suisse Zool.*, 88(2):384-386.

Distribution : India : West Bengal (Darjiling).

IV. Family PACHYTROCTIDE

Key to the genera of Pachytroctidae

1. Body subglobular *Peritroctes* Ribaga
 Body oblong 2
2. Hind wing with R1, female subgenital plate without T-Sclerite
 *Pachytroctes* Enderlein
 Hind wing without R1 (F) subgenital plate with T-sclerite *Tapinella* Enderlein

4. Genus *Tainella* Enderlein

1908. *Tapinella* Enderlein, *Zool. Anz.*, 33:772.
 1967. *Tapinella* Enderlein : Smithers, *Austr. Zool.*, 14 (1) : 28.

Key to the species of *Tapinella* Enderlein

- Lateral stripes of abdomen, present *T. fasciata* Thornton & Wong
 Lateral stripes of abdomen, absent *T. formosana* Enderlein

6. *Tapinella fasciata* Thornton & Wong

1966. *Tapinella fasciata* Thornton & Wong, *Trans. R. ent. soc. Lond.*, 118(1) : 1-4.
 1979. *Tapinella fasciata* Thornton & Wong, Ray: *Rec. zool. surv. India*, 75 : 354.

Material : 2(M), 2(F) (alate forms), Susunia, Hill, Bankura, Coll. K.K. Ray, 9.x.1985; body length (M) 1.2 mm, (F) 1.3 mm.

Diagnosis : Lateral stripes running down the body, are the characteristic feature of the species.

Distribution : India : West Bengal (Bankura - New record)

7. *Tapinella formosana* Enderlein

1908. *Tapinella formosana* Enderlein, *Zool. Anz.*, 33:774.
 1979. *Tapinella formosana* Enderlein, Ray : *Rec. zool. Surv. India*, 75:354.

Material : 1 (F) (alate form), Botanical Garden, Haora, Coll. K.K. Ray 7.ix.1974; body length, 1.3 mm.

Diagnosis : The body is devoid of any lateral stripe.

Distribution : India : West Bengal (Haora - new record); Maharashtra, (Bombay). Elsewhere : Taiwan.

5. Genus *Pachytroctes* Enderlein

1905. *Pachytroctes* Enderlein, *Rev. Swed. Exped. Egypt*, 18:46.
 1976. *Pachytroctes* Enderlein, Smithers: *Austr. Zool.*, 14(1):29.

8. *Pachytroctes georgi* (Menon)

1938. *Psacadium georgi* Menon, *Proc. Ind. Acad. Sci.*, (B) 8(4):280-283.
 1967. *Pachytroctes georgi* Menon : Smithers, *Austr. Zool.* 14(1):30.

Material : 2(F), (apterous forms), Botanical Garden, Haora, Coll. K.K. Ray, 17.i.1975; body length, 1.5 mm.

Diagnostics : Antennae of the specimens are very long and thin in relation to body.

Distribution : India : West Bengal (Haora new record); Maharastra (Bombay).

6. Genus *Peritroctes* Ribaga

- 1911. *Peritroctes* Ribaga, *Redia*, 7:162.
- 1967. *Peritroctes* Ribaga : Smithers, *Austr. Zool.*, 14(1):29.

9. *Peritroctes bengalensis* Thornton & Wong

- 1966. *Peritroctes bengalensis* Thornton & Wong, *Tr. R. ent. Soc. Lond.*, 118(1):4.
- 1979. *Peritroctes bengalensis* Thornton & Wong : Ray, *Rec. zool. Surv. India*, 75:355.

Material : 1(F) apterous form), Barasat (North 24-Parganas), Coll. K.K. Ray, 27.viii.1975; body length, 1.0 mm.

Diagnosis : The specimen possesses horns on vertex of head.

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

V. Family CAECILIIDAE

Key to the genera of family Caeciliidae

- Apical region of forewing, not tapered and shortened *Caecilius* Curtis and Shortened.
- Apical region of forewing, tapered and shortened *Dypsocus* Hagen

7. Genus *Caecilius* Curtis

- 1837. *Caecilius* Curtis, *Brit. Ent.*, 14:648.
- 1967. *Caecilius* Curtis : Smithers, *Austr. Zool.*, 14(1):37.

Key to the species of *Caecilius* Curtis

- 1. Thorax, Chestnut-brown *C. bengalensis* Badonnel
- Thorax brown 2
- 2. Pterostigma of forewing, with a spur-vein *C. persimularis* (Thornton & Wong)
- Pterstigma of forewing, without a spur-vein 3
- 3. Arcola postica, with a small hyaline stripe at base *C. pictifrons* Thorston Wong

Areola postica, without a small hyaline stripe at base4

4. Abdomen, blackish-brown *C. himalayanus* Enderlein

Abdomen, brownish-yellow *C. muggenburgi* Enderlein

10. *Caecilius muggenburgi* Enderlein

1903. *Caecilius muggenburgi* Enderlein, *Ann. hist. nat. Mus. Hung.* 1:269.

1979. *Caecilius muggenburgi* Enderlein : Ray , *Rec.. zool. Surv. India*, 75:355.

Material : 10 (F) Tollygunge, South Calcutta, Coll. K.K. Ray, 10.x.1975; body length, 1.4 mm.

Diagnosis : Trochanters and femurs of the legs are bright yellowish brown.

Distribution : India : West Bengal (Calcutta-new record). Elsewhere : Singapore, Java, Taiwan, Philippines.

11. *Caecilius himalayanus* Enderlein

1903. *Caecilius himalayanus* Enderlein *Ann. hist. nat. Hung.* 1:268.

1979. *Caecilius himalayanus* Enderlein : Smithers, *Austr. Zool.*, 14(1):42.

Distribution : India : West Bengal (Darjiling).

12. *Caecilius pictifrons* Thornton & Wong

1966. *Caecilius pictifrons* Thornton & Wong, *Tr. R. ent. Soc. Lond.*, 118(1):7-10.

Distribution : India ; West Bengal (Darjiling).

13. *Caecilius bengalensis* Badonnel

1981. *Caecilius bengalensis* Badonnel, *Rev. Suisse Zool.*, 88(2):125-128.

Distribution : India : West Bengal (Darjiling).

14. *Caecilius persimularis* (Thornton & Wong)

1966. *Fulleborniella persimularis* Thornton & Wong, *Pacif. Ins. Mon.*, 19:9-16.

1981. *Caecilius persimularis* (Thornton & Wong) : Badonnel, *Et. Basel*, 6:125.

Distribution : India ; West Bengal (Darjiling).

8. Genus *Dypsocus* Hagen

1866. *Dypsocus* Hagn, *Verh. Zool. bot Ges. Wien*, 16:207.
 1967. *Dypsocus* Hagen : Smithers, *Austr. Zool.* 14(1):36.

15. *Dypsocus fucosus* Thornton & Wong

1966. *Dypsocus fucosus* Thornton & Wong, *Tr. Rent. Soc. Lond.*, 18(1) : 10-13.

Distribution : India : West Bengal (Darjiling).

VI. Family STENOPSOCIDAE

9. Genus *Stenopsocus* Hagen

1886. *Stenopsocus* Hagen : *Verh. Zool. bot. Ges. Wien*, 16;203.
 1967. *Stenopsocus* Hagen, Smithers, *Austr. Zool.*, 14(1):53.

16. *Stenopsocus pallidus* Thornton & Wong

1966. *Stenopsocus pallidus* Thornton & Wong. *Tr. R. ent. Soc. Lond.* 118 (1) : 13.

Distribution : India : West Bengal (Darjiling).

VII. Family AMPHIPSOCIDAE

Key to the genera of *Amphipsocidae*

- Forewing with pterostigmal spur-vein*Amphipsocus* Mclachlan
 Forewing without pterostigmal spur -vein*Dasypsocus* Enderlein.

10. Genus *Amphipsocus* Mclachlan

1872. *Amphipsocus* Mclachlan, *Ent. month. Mag.*, 9:77.
 1967. *Amphipsocus* Mclachlan : Smithers, *Aust. Zool.*, 14(1):55.

17. *Amphipsocus heterothrix* Thornton & Wong.

1966. *Amphipsocus heterothrix* Thornton & Wong, *Tr. R.ent. Soc. Lond.*, 118(1) :13-16.

Distribution : India : West Bengal (Darjiling).

11. Genus *Dasypsocus* Enderlein

1906. *Dasypsocus* Enderlein, *Zool. Jb. Abt. Syst.*, 23:250.
 1967. *Dasypsocus* Enderlein : Smithers, *Austr. Zool.*, 14(1):57.

18. *Dasypsocus solox* (Enderlein)

1903. *Kolbea solox* Enderlein, *Ann. hist. nat. Mus., Hung.*, 1:278.
 1967. *Dasypsocus solox* (Enderlein): Smithers, *Austr. Zool.*, 14(1):57.

Material : 10(F), Sheorahuli, Hugli, Coll. K.K. Ray, 24.x.1975; body length 2.5 mm.

Diagnosis ; 'AP' of forewing not angular rather semilunar.

Distribution : India : West Bengal (Hugli, new record). Elsewhere : Singapore.

VIII. Family LACHESILLIDAE

12. Genus *Lachesilla* Westwood

1840. *Lachesilla* Westwood, *Syn.gen. Brit. Ins.*, p. 47.
 1967. *Lachesilla* Westwood : Smithers, *Austr. Zool.*, 14(1):59.

19. *Lachesilla pedicularia* (Linnaeus)

1746. *Hemerobius flavicans* Linnaeus, *Fauna. suecica*, p. 223.
 1967. *Lachesilla pedicularia* (Linnaeus) : Smithers, *Austr. Zool.*, 14(1):62.

Material : 1 (M), 3 (F), Baruipur, South 24-Parganas, Coll. K.K. Ray, 25.xi.1975; body length (M) - 1.4 mm., (F)-1.5 mm.

Diagnosis : Apical margin of the forewing is roundish.

Distribution : India : West Bengal (South 24-Parganas - new record). Elsewhere : Nepal, East Africa, Europe, North America, Argentina, Japan.

IX. Family ECTOPSOCIDAE

13. Genus *Ectopsocus* Mclachlan

1899. *Ectopsocus* Mclachlan. *Ent. month Mag.*, 35:277.
 1967. *Ectopsocus* Mclachlan : Smithers, *Austr. Zool.*, 14(1) : 64.

Key to the species of *Ectopsocus* Mclachlan

1. The specimen with conspicuous hairy wings *E. ramburi* Datta
- The specimen without such wings 2
2. Apical region of subgenital plate with 8 setae *E. bengalensis* Datta

Apical region of subgenital plate with only one setae *E. cinctus* Thornton

20. *Ectopsocus ramburi* Datta

1965. *Ectopsocus ramburi* Datta, *J. Beng. nat. Hist. Soc.*, 34(1) : 56-58.

Material : 1 (M), 1 (F), Calcutta, F.H. Gravely, August, 1914; body length (M)-2.10 mm., (F) - 2.21 mm.

Diagnosis : The specimens have conspicuous hairy wings.

Distribution : India : West Bengal (Calcutta).

21. *Ectopsocus bengalensis* Datta

1965. *Ectopsocus bengalensis* Datta, *H. Beng. nat. Hist. Soc.*, 34(1) : 58-60.

1979. *Ectopsocus bengalensis* Datta : Ray, *Rec. zool. Surv. India*, 75:356.

Material : 1(M), 1 (F), South Calcutta, Coll. K.K. Ray, 18.ix.1979; body length (M) - 1.5 mm., (F) 1.9 mm.

Diagnosis : Apical region of subgenital plate with 8 setae in (F) and in (M) penis frame with a pair of sagittal plate anteriorly.

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

22. *Ectopsocus cinctus* Thornton

1962. *Ectopsocus cinctus* Thornton, *Tr. Ent. Soc. Lond.*, 114:305.

1979. *Ectopsocus cinctus* Thornton : Ray, *Rec. zool. Surv. India*, 75:356.

Material : 4 (M), 3 (F), Durgapur, Bardhaman, Coll. K.K. Ray, 3.ix.1986; body length (M) -1.5 mm., (F) - 1.3 mm.

Diagnosis : The 9th tergite of male has a median arc forming inverted Y and female has a seta in place of apical spine on subgenital plate..

Distribution : India : West Bengal (Bardhaman - new record, and Darjiling).

X. Family PERIPSOCIDAE

14. Genus *Peripsocus* Hagen

1866. *Peripsocus* Hagen, *Verh Zool. bot. Ges. Wien*, 16 : 203.

1967. *Peripsocus* Hagen, Smithers : *Austr. Zool.*, 14(1) : 68.

Key to the species of *Peripsocus* Hagen

1. Ctenidopbothria on tarsl segment varies from 9-12.....2
 Ctenidiobothria on tarsal segment is more than 12.....3
2. Each paraproct is frunished with 21 trichobothria*P. sclerotus* Thornton Wong
 Each paraproct is furnished with more than 21 trichobothria*P. snenis* Datta
3. Subgenital plate with lesser number of setae in mid-region*P. quercicola* Enderlein
 Subgenital plate with more number of setae in mid-region4
4. Radula of penis-frame, dagger-shaped*P. bhaktae* Badonnel
 Radula of penis-frame, square-shaped*P. anoplus* Thornton & Wong.

23. *Peripsocus sinensis* Datta.

1963. *Peripsocus sinensis* Datta, *Proc. nat. acad. Sci. Ind.*, (B) 33(4) : 606-610.

Material : 2 (M), 5 (F) Dooars, Coll. B. Datta, June, 1960; body length (M) - 1.78 mm., (F) 2.00 mm.

Diagnosis : Number of paraproct in female 21 and in male - 33.

Distribution : India : West Bengal (Jalpaiguri).

24. *Peripsocus anoplus* Thornton & Wong

1968. *Peripsocus anoplus* Thornton & Wong, *Pacifi. Ins. Monogr.*, 19:33-34.

1979. *Peripsocus anoplus* Thornton & Wong, : Ray, *Rec. zool. Surv. India* , 75 : 356.

Material : 2 (M), 3 (F), Dankuni, Hooghly Coll. K.K. Ray, 22.i.1976; body-length (M) 1.9 mm., (F) 2.00 mm.

Diagnosis : The specimens are lacking, pigmentation on pterostigmal apex.

Distribution : India ; West Bengal (Hooghly-new record, and Jalpaiguri).

25. *Peripsocus sclerotus* Thornton & Wong

1966. *Peripsocus sclerotus* Thornton & Wong, *Tr. R. ent. Soc. Lond.*, 118 (1) : 16-18.

1979. *Peripsocus sclerotus* Thornton & Wong : Ray, *Rec. Zool. Surv. India*, 75 : 356.

Material : 1 (F), South Calcutta, Coll. K.K. Ray, 21.viii.1975; body length 1.5 mm.

Diagnosis : The specimen does not bear hyaline spot beyond the apical end of pterostigma in forewing.

Distribution : India : West Bengal (Calcutta).

26. *Peripsocus bhaktae* Badonnel

1981. *Peripsocus bhaktae* Badonnel, *Ent. Basel*, 6:131-133.

Distribution : India : West Bengal (Darjiling).

27. *Peripsocus quercicola* Enderlein

1906. *Pripsocus quercicola* Enderlein, *Stett. ent. Ztg.*, 67:316.

1966. *Peripsocus quercicola* Enderlein : Thornton, Wong, *Tr. R. ent. Soc. Lond.*, 118(1) : 18.

Distribution : India : West Bengal (Darjiling). Elsewhere : Hongkong, Taiwan, Malaya, Japan.

XI. Family HEMIPSOCIDAE

15. Genus *Hemipsocus* Selys - Longchamps

1872. *Hemipsocus* Selys-Longchamps, *Ent. month, Mag.*, 9 :146.

1967. *Hemipsocus* Selys-Longchamps : Smithers, *Austr. Zool.*, 14(1):72.

Key to the species of *Hemipsocus* Selys-Longchamps

Veins of forewing, furnished with pigmented setae*H. ornatus* Selys-Longchamps

Veins of forewing, not furnished with pigmented setae*H. chloroticus* (Hagen)

28. *Hemipsocus chloroticus* (Hagen)

1858. *Psocus chloroticus* Hagen, *Verh. Zool. bot. Ges Wien*, 8:474.

1967. *Hemipsocus chloroticus* (Hagen) : Smithers, *Austr. Zool.*, 14(1) : 72.

Material : 3 (M), Sheoraphuli, Hooghly, Coll. K.K. Ray, 24.x.1975; body length, 2.3 mm - 2.9 mm.

Diagnosis : Head and thorax covered with stiff blackish hairs; claw-joints of legs are brownish.

Distribution : India : West Bengal (Hooghly-new record). Elsewhere : Sri Lanka; Singapore, Sumatra; Jabva; Sarawak; Philippines; Taiwan; Japan.

29. *Hemipsocus ornatus* Datta

1969. *Hemipsocus ornatus* Datta, *Zool. Anz.*, 182 (3/4) : 288-290.
 1984. *Hemipsocus ornatus* Datta : Ray, *Rec. zool. Surv. India*, 81(3&4) : 130.

Material : 1 (M), Barrackpore, North 24-Parganas, Coll. B. Datta, 1969; body length, 2.72 mm.

Diagnosis : The beautiful pigmentation of forewings, is a characteristic feature of the species.

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

XII. Family PSEUDOCAECILIIDAE

Key to the genera of Pseudocaeciliidae

1. Forewing with Rs stem straight at base 2
 Forewing with Rs stem sinuous at base *Allocaecilius* Lee & Thornton
2. Forewing with Rs stem, long as R 4+5 *Heterocaecilius* Lee & Thornton.
 Forewing with Rs stem longer than R 4+5 3
3. Forewing with Rs stem slightly longer than R 4+5 *Scytopsocopsis* Lee & Thornton
 Forewing with Rs stem much longer than R 4+5 *Pseudocaecilius* Enderlein

16. Genus *Pseudocaecilius* Enderlein

1903. *Pseudocaecilius* Enderlein, *Ann. hist. nat. Mus. Hung.*, 1:260.
 1967. *Pseudocaecilius* Enderlein : Smithers, *Austr. Zool.*, 14(1):73.

Key to the species of *Pseudocaecilius* Enderlein

- Each apical lobe of subgenital plate possesses a long stout setae *Ps. fletcheri* Datta
 Each apical lobe of subgenital plate possesses a small feeble seta *Ps. citricola* (Ashmead)

30. *Pseudocaecilius fletcheri* Datta

1965. *Pseudocaecilius fletcheri* Datta, *J. Bng. nat. Hist. Soc.*, 34(1) : 64-66.

Material : 1(F), Barrackpore (North 24-Parganas), Coll. B. Datta, November, 1963; body length 2.64 mm.

Diagnosis : Subgenital plate of the specimen apically bilobed and each lobe has a terminal long seta.

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

31. *Pseudocaecilius citricola* (Ashmead)

1903. *Pseudocaecilius elutus* Enderlein, *Ann. hist. nat. Mus. Hung.*, 1:261.

1976. *Pseudocaecilius citricola* (Ashmead) : Turner, *Syst. Ent*, 1:212.

Material : 2 (F), Botanical Garden, Howrah Coll, K.K. Ray, 19.xi.1974; body length, 1.8 mm.

Diagnosis : Gonapophyses with an undivided ventral valve and outer triangular valve.

Distribution : India : West Bengal. Elsewhere : (Howrah - new record). Elsewhere : Java; Singapore, Madagascar; South Africa; Mosambique; Congo; Porto Rica, North America.

Remarks : It is a widely distributed species.

17. Genus *Heterocaecilius* Lee & Thornton

1967. *Heterocaecilius* Lee & Thornton, *Pacif. Ins. Mon.* 16:13-14.

32. *Heterocaecilius fuscipalpus* Lee & Thornton

1967. *Heterocaecilius fuscipalpus* Lee & Thornton, *Pacif. Ins. Mon.*, 16:15-16.

Distribution : India : West Bengal (Darjiling).

18. Genus *Allocaecilius* Lee & Thornton

1967. *Allocaecilius* Lee & Thornton, *Pacif. Ins. Mon.*, 16: 12.

33. *Allocaecilius heterothorax* Lee & Thornton

1967. *Allocaecilius heterothrix* Lee & Thornton, *Pacif. Ins. Mon.*, 16:17-20.

Distribution : India : West Bengal (Darjiling).

19. Genus *Scytopsocopsis* Lee & Thornton

1967. *Scytopsocopsis* Lee & Thornton, *Pacif. Ins. Mon.*, 16:11-12.

34. *Scytopsocopsis hirtipenna* Lee & Thornton

1967. *Scytopsocopsis hirtipenna* Lee & Thornton, *Pacif. Ins. Mon.*, 16:20-22.

Distribution : India : West Bengal (Darjiling).

XIII. Family ARCHIPSOCIDAE

20. Genus *Archipsocus* Hagen

1882. *Archipsocus* Hagen, *Stettin. ent. ztg.*, 43:225.

1967. *Archipsocus* Hagen : Smithers, *Austr. Zool.*, 14(1):77.

35. *Archipsocus recens* Enderlein

1903. *Archipsocus recens* Enderlein, *Ann. hist. nat. Mus. Hung.*, 1 : 286.

1979. *Archipsocus recens* Enderlein : Ray, *Rec. zool. Surv. India*, 75 : 357.

Material : 2 (F), South Calcutta, Coll. K.K. Ray, 4.vii.1974; body length, 1.5 mm.

Diagnosis : Setae of genital paraproct, varies from 8-10.

Distribution : India : West Bengal (Calcutta - new record).

XIV. Family PSOCIDAE

Key to the genera of family Psocidae

1. Forewings thickly patterned *Trichadenotecnum*
- Forewings simple 2
2. Antenna, about twice the length of forewing *Psococerastis* Pearman
- Antenna, relatively short than the length of forewing. *Amphigerontia* Kolbe

21. Genus *Amphigerontia* Kolbe

1880. *Amphigerontia* Kolbe, *Jber, Westf. Prov. Ver Wiss. Kunst*, 8:104.

1967. *Amphigerontia* Kolbe : Smithers, *Austr. Zool.*, 14(1) : 90.

36. *Amphigerontia nubila* Enderlein

1906. *Amphigerontia nubila* Enderlein, *Zool. Jb. abt. Syst.*, 23:247.

1969. *Amphigerontia nubila* Enderlein : Datta, *Zool. Anz.*, 182 (3/4):291.

Material : 10 (F), North Bengal, Coll. B. Datta, 1960; body length 6.00 mm.

Diagnosis : Large specimen with pictured forewings and light brown pterostigma.

Distribution : India : West Bengal (North Bengal); Manipur. Elsewhere : Japan.

22. Genus *Psococerastis* Pearman

1932. *Psococerastis* Pearman, *Ent. month. Mag.*, 68:202.
 1967. *Psococerastis* Pearman : Smithers, *Austr. Zool.*, 14(1) : 98.

37. *Psococerastis asiatica* Datta

1966. *Psococerastis asiatica* Datta, *J. Beng. nat. Hist. soc.* 35(1):20-24.

Material : 2 (M), 2 (F), Indian Museum, Calcutta, Coll. September, 1917; body length (M) 4.3 mm.; (F) 4-5 mm.

Diagnosis ; Male hypandrium medially with a long, stout sharply pointed structure, along with a short spines, and the female subgenital plate with a round median and setse median lobe.

Distribution : India : West Bengal (Calcutta).

23. Genus *Trichadenotecnum* Enderlein

1909. *Trichadenotecnum* Enderlein, *Boll. Lab. Zool. Portical*, 3:329.
 1967. *Trichadenotecnum* Enderlein : Smithers, *Austr. Zool.*, 14(1) : 114.

38. *Trichadenotecnum apertum* Thornton

1961. *Trichadenotecnum apertum* Thornton, *Trans. R. ent Soc. Lond.*, 113:7.
 1979. *Trichadenotecnum apertum* Thornton : Ray, *Rec. zool. Surv. India*, 75 : 357-358.

Material : 1 (M), Botanical garden, Howrah, Coll. K.K. Ray, 19.xi.1974; body length 2.3 mm.

Diagnosis : The species is readily recognised by its pictured wings and with the number of ctenidiobothria on proximal hind tarsal segment.

Distribution : India : West Bengal (Haorah - new record). Elsewhere : Hongkong.

XV. Family MYOPSOCIDAE

24. Genus *Myopsocus* Hagen

1866. *Myopsocus* Hagen, *Verh. Zool. bot Ges. Wien*, 16:203,210.
 1967. *Myopsocus* Hagen : Smithers, *Austr. Zool.*, 14(1):121.

39. *Myopsocus pattoni* Datta

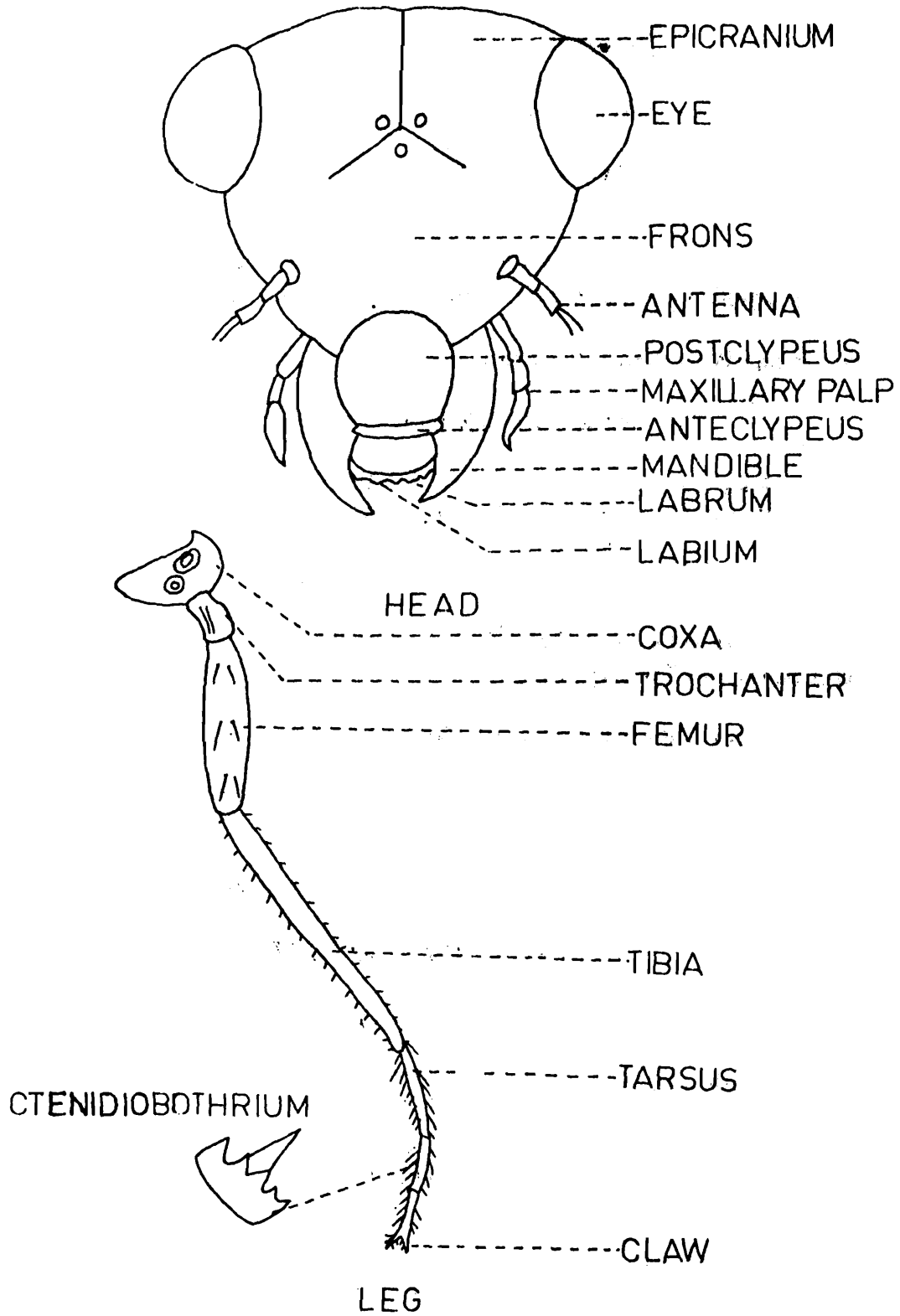
1966. *Myopsocus pattoni* Datta, *J. Beng. nat. Hist. Soc.*, 35(1) : 12-16.

Material : 1 (M), Kurseong, Coll. N. Annandale, 29.iv.1910; body length 2.5 mm.

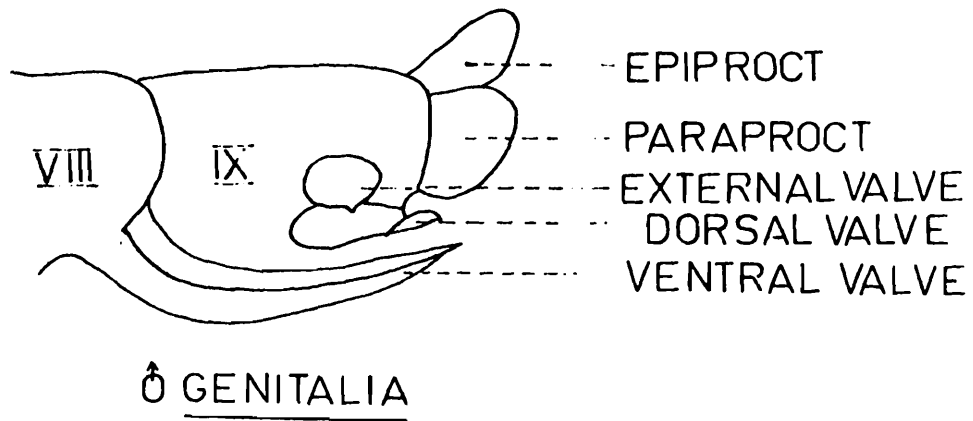
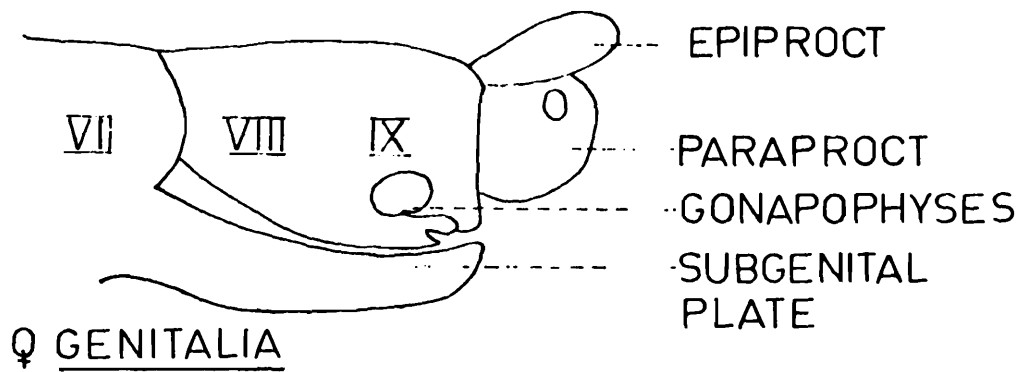
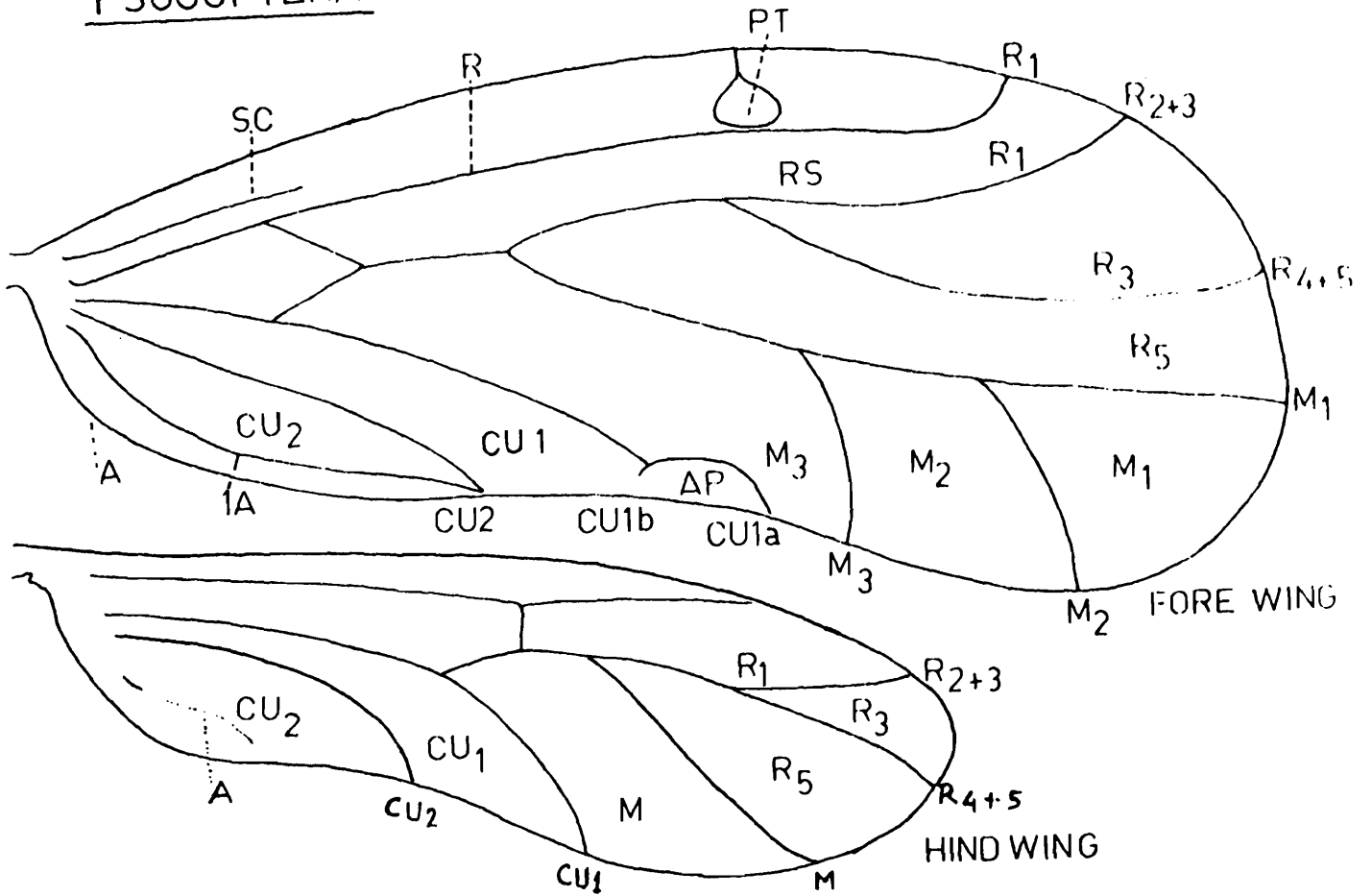
Diagnosis : Hypandrium of the specimen is tongue-shaped and well-sclerotised.

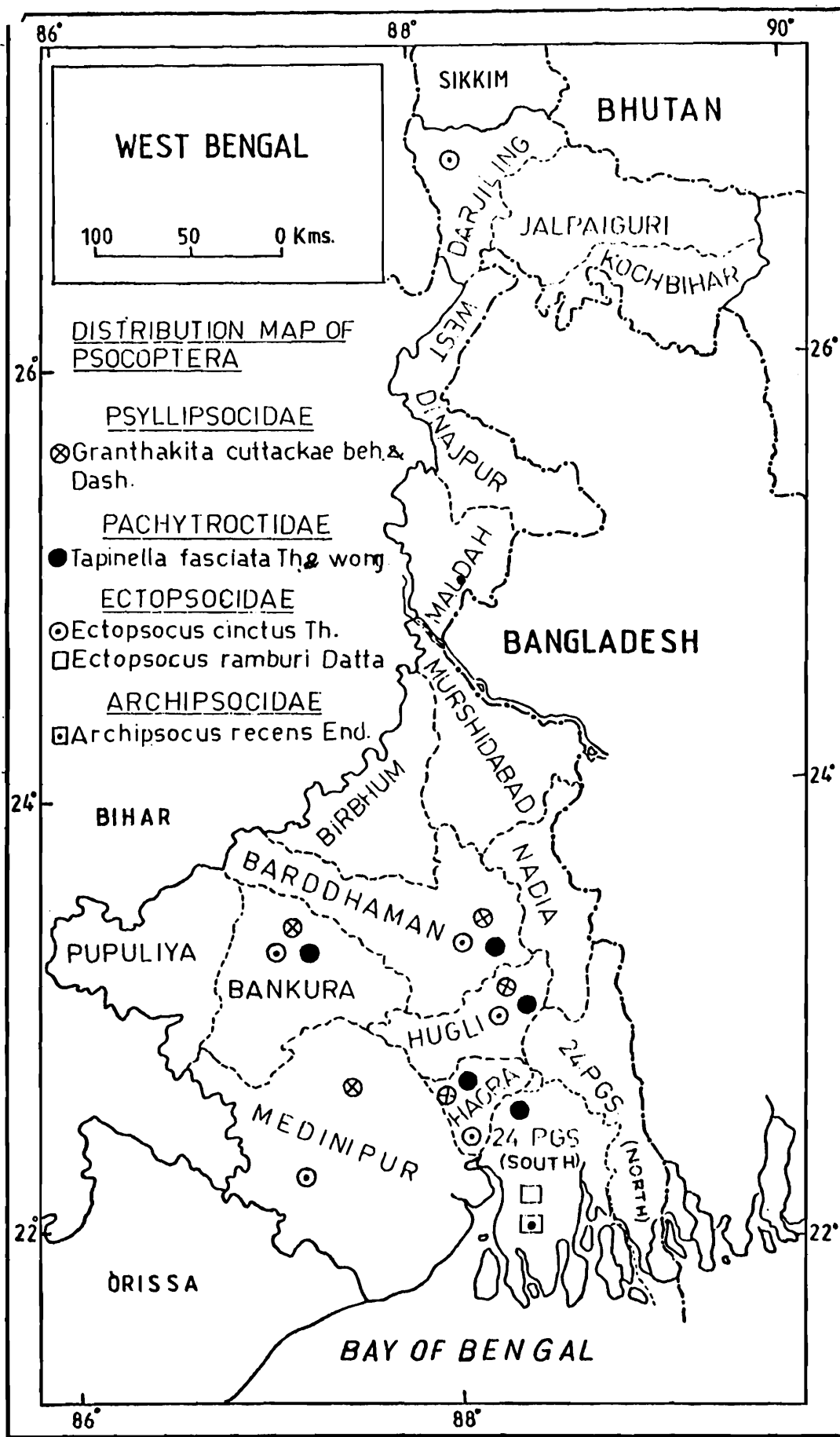
Distribution : India : West Bengal (Darjiling).

PSOCOPTERA



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SUMMARY

The paper deals with 39 species of Psocoptera belonging to 24 genera and 15 families recorded from West Bengal. 14 species are new records from West Bengal. All the species documented, are furnished with synonymy (after Smithers, - 1967), salient taxonomic characters, Keys, (modified after, New 1977) and distribution.

Studies were made either from the specimens collected by senior author or from the specimens deposited in the Zoological Survey of India, Calcutta, or from the available literature of the group.

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REFERENCES

- Badonnel, A. 1981. Psocopteres du nord de l'Inde et du Pakistan. - *Ent. Basel*, 6 : 120-149.
- Badonnel, A. 1981. Psocopteres (Insecta : Psocoptera) de Inde- *Rev. Suisse Zool.*, 88(2) : 381-411.
- Datta, B. 1963. A new Indian species of *Peripsocus* Hagen 1866 (Psocoptera : Peripsocidae). *Proc. nat. acad. Sci. India*, (B) 33 (4) : 606-610.
- Datta, B., 1965. New Psocids (Psocoptera) from India - *J. Beng. nat. Hist. Soc.*, 34(1) : 56-72.
- Datta, B. 1966. Four new species of Psocids (Psocoptera) from India - *J. Bombay nat. Hist. Soc.*, 35(1):12-31.
- Datta, B. 1969. Indian Psocoptera. *Zool. Anz.*, 182 (3/4) : 288-292.
- Enderlein, G. 1903. Die copeognathen des Indo-Australischen faunengebiets. *Ann. hist. Nat. Mus. Hung.*, 1 : 179-344.
- Menon, R. 1938. Two new species of Pachytroctidae (Copeognatha) with a note on the family. *Proc. Ind. acad. Sci.* 8(4) : 280-287.
- Menon, R. 1942. Studies on Indian Copeognatha (Psocoptera) II. Nanopsocetidae and Psocatripidae. - *Ind. J. Ent.*, 4(1) : 23-42.
- New, T.R. 1977. Psocoptera of Oriental region : a review. - *Or. Ins. Supl. No.* 6 : 1-83.
- Pearman, J.V. 1942. Third note of Psocoptera from warehouses. - *Et. month. Mag.* 78 : 289-290.

- Ray, K.. 1979. Psocoptera of Calcutta and Environs (West Bengal : India), *Rec. Zool. Surv. India*, **75**: 353-359.
- Smithers, C.N. 1967. A catalogue of the Psocoptera of the world. - *Austr. Zool.*, **14**(1) 1 - 145.
- Thronton, I.W.B. & Wong, S.K. 1966. Some Psocoptera from West Bengal, India.- *Tr. Rent. soc. Lond.*, **118**(1): 1-21.