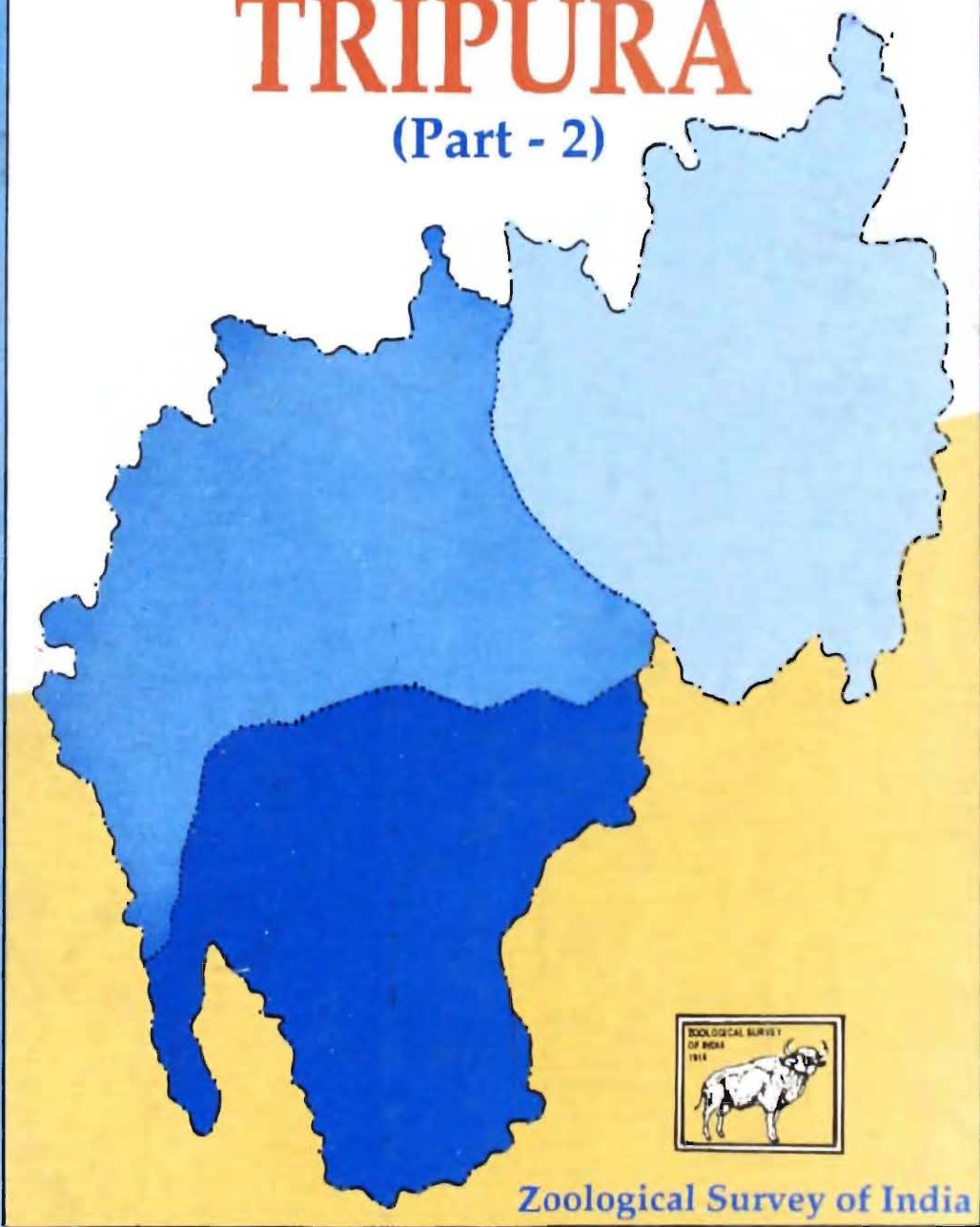
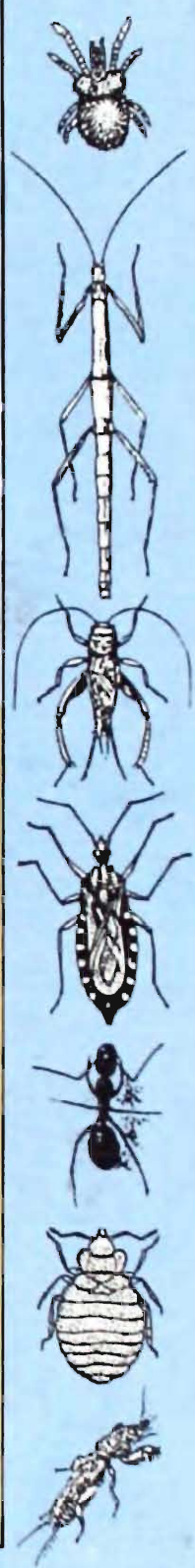


State Fauna Series - 7

FAUNA OF TRIPURA

(Part - 2)



Zoological Survey of India



State Fauna Series 7

FAUNA OF TRIPURA

PART-2
(INSECTS)

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IXODID TICKS (ACARI : IXODIDAE)

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INTRODUCTION

Among the disease causing arthropods, the ixodid or hard bodied ticks are commonly occurring throughout the world. These ticks live as ectoparasite on the bodies of domestic and wild animals and in vegetation.

Linnaeus (1758-1767) described two species of ticks viz., *Acarus elephantius* and *Acarus indus* from India. Later Neumann (1897-1911), Stiles and Hassall (1901), Nuttall and Warburton (1908, 1911, 1915), Nuttall (1912, 1913, 1916) and Robinson (1926) described many species from India and published several monographs on Indian ixodid ticks. Sharif (1928) made an extensive and comprehensive study of Indian ixodids.

Later several acarologists studied the ixodid ticks of different states of India (Sanyal and De, 1991).

Though extensive studies on ixodid ticks of several states of India were done but no attempt was so far made to study this group of ticks from the state of Tripura.

The present study is based on collection of ixodid ticks done from Tripura by one of the author and the specimens collected by one other survey party of the Zoological Survey of India, which are available in National Zoological Collection.

An account of the survey undertaken for the study and collection from other survey is given below :

1. Tripura Survey—Dr. V. C. Agrawal (January-February, 1971).

2. Tripura Survey—Sri S. K. De (October, 1990).

The paper includes a total of 3 species and 3 genera of ixodid ticks hitherto known from Tripura. The original and recent references, diagnostic features, hosts of tick species in Tripura, distribution of each species in India and key to the identification of species known from Tripura have been incorporated. The specimens studied for this work are deposited in the National Zoological Collection.

SYSTEMATIC ACCOUNT

Material and Methods : Depending on the nature of host and habitat, the ixodid ticks were collected by the following methods.

1. **Hand picking method :** This method was employed for collection of ectoparasitic ticks from the bodies of domestic and wild animals. Both the adult and immature stages were first searched and then removed by hand using a forcep or a brush.

2. **Flag-dragging method :** A flag made of about one meter square of lint cloth attached to a stick was dragged on grassland, humus and forest vegetation for collecting questing ticks. After dragging for sometimes the flag was examined and tick specimens were collected.

The ticks obtained were preserved in glass vials containing 70% alcohol.

General morphology and terminology : The external morphological features of ixodid ticks which are considered as of taxonomic importance

consist of capitulum or 'false head' dorsum and venter.

Capitulum : It is situated in a depression known as camerostome. The capitulum is made of basis capituli, pedipalps, chelicera of mandibles, hypostome and a tongue or 'stylet of Sen'

Dorsum : The dorsum contains features of taxonomic importance. All the features may not be present in all the species of ticks. Scutum, pseudoscutum, scapulae, eyes, foveae, fields, spots and stripes, punctations, festoons and caudal processes are the important features found on the dorsum.

Venter : The venter shows the characters like genital aperture, anus, grooves, shields and plaques and legs.

All the features mentioned above are discussed in details in Sanyal and De (1992).

LIST OF TAXA KNOWN FROM TRIPURA

Family IXODIDAE

1. Genus *Boophilus* Curtice

1. *B. microplus* (Canestrini)

2. Genus *Dermacentor* Koch

2. *D. auratus* Supino

3. Genus *Haemaphysalis* Koch

3. *H. bispinosa* Neumann

SYSTEMATIC ACCOUNT

Key to the genera of ixodid ticks from Tripura

1. Eyes absent; capitulum short, with lateral salience on palpal article II
.....*Haemaphysalis* Koch
- Eyes present; capitulum short with short broad palps 2
2. Basis-capituli rectangular dorsally, lateral saliences present; scutum ornate; no ventral shield in male; coxa IV much longer than others; festoons and groove present; spiracle suboval or comma-shaped
.....*Dermacentor* Koch
- Basis-capituli hexagonal dorsally; lateral saliences present; scutum usually inornate, made with four ventral shields; coxae similar

in length; festoons and groove faint or obsolete; spiracle oval*Boophilus* Curtice

1. Genus *Boophilus* Curtice

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

1. *Boophilus microplus* (Canestrini)

1887. *Haemaphysalis micropla* Canestrini, *Atti. Soc. Veneto. Trent. Sci. Nat.*, **11** : 104.
1890. *Rhipicephalus micropla* Canestrini, *Padova*, **4** : 493.
1899. *Rhipicephalus australis* Fuller, *Qd. Agric. J.*, **4**(5) : 389-394.
1901. *Boophilus australis* Stiles and Hassall, *Bur. Anim. Ind. U.S. Dept. Agric.*, Washington, D. C. Circ. No. **34** : 2-3.
1928. *Boophilus australis*, Sharif, *Rec. Indian Mus.*, **30**(3) : 284-289.
1943. *Boophilus microplus*, Fairchild, *Am. J. Trop. Med.*, **23**(6) : 586.
1950. *Boophilus microplus*, Anastos, *Ent. Amer.*, **30**(1-4) : 71-72.
1956. *Boophilus microplus*, Hoogstraal, *African Ixodoidea*, **1** : 295-296, 319-320.
1960. *Boophilus microplus*, Arthur, *Ticks, Mongr. Ixodoidea*, pt. 5 (Cambridge Univ. Press) : 207.
1967. *Boophilus microplus*, Hoogstraal and Rack, *J. Med. Ent.*, **4** : 286.

Material examined : North tripura : 1 female, 2 males, 4 nymphs, Teliamura, from cattle; 31. i. 1971, coll. V. C. Agrawal; 6 females, 1 male, Ambassa, from calf, 9. ii. 1971, coll. V. C. Agrawal, 21 females; Ambassa, Bidhannagar colony, from cattle, 20. xii. 1991, coll. unknown; 19 females, 1 male, Manu, Bejoygarh Dewan Wari, from cattle, 22. xii. 1991, coll. unknown. West Tripura; 15 females, 15 males, 15 nymphs, Bishalgarh, from cattle, 12. x. 1990, coll. S. K. De; 7 females, 21 males, Sepahizola forest, from cattle, 20. xi. 1990, coll. S. K. De. South Tripura : 16 females, 3 males, Shantirbazar, from cattle, 16. x. 1990, coll. S. K. De.

Diagnosis : Male—Scutum quite hirsute; caudal appendages short, tapering; dentition 4/4; inner margin of basal palpal segment ventrally concave.

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

Hosts : Cattle, *Cervus unicolor*.

Distribution : Tripura (North Tripura, West Tripura, South Tripura), Arunachal Pradesh, Andaman and Nicobar Islands, Assam, Bihar, Gujarat, Himachal Pradesh, Maharashtra, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal.

Remarks : It is a common cattle infesting tick throughout India. The species is recorded here for the first time from the state of Tripura.

2. Genus *Dermacentor* Koch

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

2. *Dermacentor auratus* Supino

11897. *Dermacentor auratus* Supino, *Atti. Soc. Veneto. Trent. Sci. Nat.*, 3(2) : 235.

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

Material examined : North Tripura : 4 nymphs, Ambassa, from squirrel, 4. ii. 1971, coll. V. C. Agrawal; 2 nymphs, Ambassa, from barking deer, 5. ii. 1971, coll. V. C. Agrawal.

Diagnosis : Male—Rectangular capitulum, dorsally ornate; palpi large, longer than basis; ventral ridge distinct; dentition 3/3; scutum with variable brown base colour markings in the form of lines; variable brown smaller patches in lateral field; cervical grooves deep, short; all festoons ornate.

Female—Rectangular capitulum, dorsally weakly ornate; palpi longer in comparison to male, palpal article I bears three long curved palpal setae; dentition 3/3; scutum with brown markings arranged as longitudinal median strip; cervical grooves deep; thick white hairs arise from some large punctations.

Hosts : Barking deer, cattle, man, squirrel.

Distribution : Tripura (North Tripura), Andaman Islands, Arunachal Pradesh, Assam,

Bihar, Karnataka, Meghalaya, Orissa, Uttar Pradesh.

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

3. Genus *Haemaphysalis* Koch

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

3. *Haemaphysalis bispinosa* Neumann

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

1917. *Haemaphysalis bispinosa*, Nuttall and Warburton, *Ticks*, Part 3 : 426.

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

1966. *Haemaphysalis (Kaiseriona) bispinosa*, Hoogstraal and Trapido, *J. Parasit.*, 52 : 1188.

Material examined : North Tripura : 1 female, 2 males, 6 nymphs, Ampa, from civet cat, 17. i. 1971, coll. V. C. Agrawal; 17 females, 37 males, 10 nymphs, Ambassa, from barking deer, 5. ii. 1971, coll. V. C. Agrawal; 4 females, 2 males, 15 nymphs, Kanchanpur, from goat, 16. ii. 1971, coll. V. C. Agrawal. West Tripura : 4 females, 3 males, 40 nymphs, Bishalgarh, from goat, 12. x. 1990, coll. S. K. De; 27 females, 21 males, Sonamura, from cattle, 17. x. 1990, coll. S. K. De; 5 females, 1 male, Sepahizola forest, from sambar, 20. x. 1990, coll. S. K. De; 7 females, 21 males, Sepahizola forest, from cattle, 20. x. 1990, coll. S. K. De; 13 females, 4 males, Charilam, Aralia village, from cattle, 21. xi. 1990, coll. S. K. De; 24 females, 24 males, Charilam, Aralia village, from goat, 21. x. 1990, coll. S. K. De. South Tripura : 5 females, 3 males, Shantirbazar, from dog, 16. x. 1990, coll. S. K. De.

Diagnosis : Male—Scutum elongate-oval in shape; cervical groove with convergent depressions; lateral grooves long, well marked, ending behind spiracles; festoons twice as long as broad; palps slightly salient, segment 2 and 3 subequal, segment 3 bluntly conical and bears a prominent dorsal retrograde spur in the mid-dorsal line and a similar but larger ventral

spur; dentition 4/4; a moderate sharp spur on coxa I; a very slight protubérance on coxae II and IV.

Female—Scutum sub cordiform, punctation little larger than male; basis capituli broader; cornua short; porose areas oval; palpi as in male.

Hosts : Barking deer, cattle, civet cat, dog, sambar, tiger, vegetation.

Distribution : Tripura (North Tripura, West Tripura, South Tripura) and most of the states in India.

Remarks : This is first record of the species from Tripura.

DISCUSSION

The first account of ixodid tick fauna from Tripura indicates that the ixodid fauna of Tripura was not extensively explored and studied. The scientists of the faunistic survey parties made attempts to collect ixodid ticks from all possible hosts and habitats but failed to check wild animals for collection of these ticks. However, the domestic animals and a few wild animals were examined from which only 3 species under 3 genera were recovered. Of the three species *Boophilus microplus* and *Haemaphysalis bispinosa* may be considered as the common and abundant species in the state. *Dermacentor auratus* may be considered as a rare tick species in Tripura.

SUMMARY

The paper deals with the ixodid tick fauna of Tripura. 3 species under 3 genera hitherto know from the state have been recorded. This is the first record of ixodid ticks from the state. The first and important references, diagnostic features and hosts of the tick species in Tripura, distribution of the species in India and key to the identification of genera have been presented in the paper.

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Table 1. Distribution of Ixodid ticks in different districts of Tripura

Name of the Species	South Tripura	West Tripura	North Tripura
<i>Boophilus microplus</i>	+	+	+
<i>Dermacentor auratus</i>	—	—	+
<i>Haemaphysalis bispinosa</i>	+	+	+

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ARACHNIDA : ACARI : PROSTIGMATA, ASTIGMATA AND MESOTIGMATA

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INTRODUCTION

Tripura, a picturesque state in north-eastern India, is bounded on the north-east and south-east by international boundary of Bangladesh, in the east it has a common boundary with Mizoram and Assam and has an area of 10,500 sq kms. The northern side has a hilly range of Atharamura, Longithera, Sakhun and Jampui; the southern side has Buramura-Deotomura and Gazalia while the western side has Buramura, Atharamura, Sakhun and Longithera. The major rivers are Manu, Deo, Dhalai and Langai in the North district, Gumti, Makari, Feni in the South district and Khowai, Haora and Gumti in the West district.

The information on plant mite fauna of Tripura is scanty as is evident from the fact that Prasad (1974) in his catalogue of Indian mites reported nothing from Tripura while Gupta (1985) in his Handbook of plant mites of India reported only 10 species which were known through the works of Gupta (1978) and Ray & Gupta (1981). Incidentally, all these species belonged to Phytoseiidae. Hence, in order to explore the plant mite fauna of Tripura and present a consolidated account, intensive surveys were conducted during 1983 and 1993 in different districts of Tripura and the present paper is largely based upon the results of those surveys. In addition, other material collected from that region and present in the department were also taken into consideration. A total of 83 species belonging to 30 genera and 15 families under 3 orders of Acari are included here, of those 3 form new records from India while 70 form new reports from Tripura. Most of

the collection was made by the author himself. The material is deposited in the National Zoological Collection.

MATERIAL AND METHODS

The collection made by the author from different districts of Tripura during 1983 and 1993 as well as the material available in the department were examined and studied and that formed the basis of this paper. The collection, preservation and study techniques followed here were same as in Gupta (1985). Most of the collection was made in the field itself. Wherever necessary, the plant samples were got identified by the specialists.

SYSTEMATIC ACCOUNT

A total of 83 species belonging to 30 genera and 15 families under 3 orders of Acari are included in this paper. Among these, 3 form new records from India while 70 form new records for the state. Apart from providing important synonymies, collection data, distribution in India and abroad, a list giving districtwise distribution of the species and keys to all relevant taxonomic categories are also given.

Key to orders of plant mites known from Tripura

1. Pedipalpal apotele represented by a tined seta situated near the inner basal angle of

- the tarsus; stigma situated dorsal to coxae II-IV and usually with elongated peritremes; tritosternum usually with lacinia or laciniae; tectum roofs gnathosoma.....
.....Order MESOSTIGMATA
- Apotele completely absent on pedipalp; stigma never situated dorsal to coxae II-IV 2
2. Ambulacrum of legs comprising a median claw with a prominent tarsus or an associated membranous pad or a stalked sucker-like organ; chelicera invariably chelate; trichobothria never present on idiosoma; stigma and trachae absent
.....Order ASTIGMATA
- Ambulacrum of the legs not as above; chelicera rarely chelate or variously modified into piercing stylets or hook-like organs; pedipalp sometimes modified into thumb claw complex; idiosoma often with trichobothria, a respiratory system usually present and trachea often opens through paired stigma situated between the chelicerae or on to the dorsal surface of the propodosoma; often with associated peritremes; usually weakly sclerotized
.....Order PROSTIGMATA
- Order PROSTIGMATA
- Key to the families of Prostigmatid plant mites known from Tripura*
1. Body worm-like ERIOPHYIDAE
- Body rounded, not worm-like 2
2. Gnathosoma with minute palpi lying closely appressed laterally, chelae tiny and stylet-like, with 4 pairs of legs; stigma of female opening behind gnathosoma on propodosoma; leg IV of female ending in terminal and subterminal whip-like setae...
.....TARSONEMIDAE
- Terminal claw of leg IV of male rounded to small tubercle
.....*Polyphagotarsonemus latus*
- Gnathosoma usually conspicuous with large chelicerae; palpi usually well-developed, rarely without 4 pairs of legs; stigma opens at base of chelicerae 3
3. Without a palpal thumb-claw complex
.....4
- With a palpal thumb-claw complex 8
4. Rod-like solenidion on tarsus I usually lying flush with tarsus in specialized membranous depression (rhagidial organ); anteriorly the propodosoma with a tubercle bearing one pair of setae; soft bodied without projection over gnathosoma; free living
.....EUPODIDAE
- Dorsal body setae of characteristic shape having swelling at the middle and gradually narrows down both basally and terminally*Eupodes sigmodensis*
- Rod-like solenidion on tarsus I erect, arising from a small circular membranous base
.....5
5. Cheliceral bases fused, or if not fused, not capable of lateral scissors-like motion over gnathosoma 6
- Chelicerae free, attached at base and free to move scissors-like laterally across gnathosoma 7
6. Chelicerae long, recurved and whip-like; female genital opening transverse; tarsal claws with tenent hairs; palpi simple
.....TENUIPALPIDAE
- Chelicerae short, needle-like, genital opening not transverse, without genital suckers.....
.....TYDEIDAE
7. With 2 pairs of genital suckers, the relatively long palpi turned inward, distal segment usually claw-like with distal setae
.....CUNAXIDAE
- With 3 pairs of genital suckers; the relatively long palpi are elbow-like with distal setae
.....BDELLIDAE
8. Cheliceral bases closely fused with gnathosoma and without indication of suture;

- peritreme usually M-shaped, may be present on gnathosoma CHEYLETIDAE
- Cheliceral bases fused with each other but not with gnathosoma with conspicuous suture; peritreme usually present on anterior portion of propodosoma 9
9. Movable chelae forming a long whip-like stylet curving within the body; cheliceral bases fused to form a stylophore; tarsi I and II with specialised duplex setae TETRANYCHIDAE
- Movable chelae straight, stiff and relatively short, no stylophore 10
10. Dorsal plating absent or feebly developed; cheliceral bases fused to form stylophore, which dorsally may bear the sinuous, chambered peritremes or else the peritremes reaching into chelicerae CALIGONELLIDAE
- Dorsal plating variable; peritremes not reaching into chelicera bases, independent or forming a stylophore STIGMAEIDAE
- Fam. 1. TETRANYCHIDAE Donnadieu
- Key to the tribes, genera and species of Tetranychidae known from Tripura :*
1. Tarsus I dorsally with a single pair of usually associated duplex setae; if 2 pairs of closely associated duplex setae present then tarsus II with still without closely associated duplex setae; empodium claw-like and rudimentary Tribe EURYTETRANYCHINI, 2
- Tarsus I dorsally with 2 pairs of closely associated duplex setae and tarsus II with 1 pair of duplex setae; empodium claw-like or splits distally Tribe TETRANYCHINI, 3
2. With 2 pairs of anal setae Gen. *Eutetranychus*
- Dorsal setae set on tubercles, slightly spatulate, dorsal striae on propodosoma parallel and lobed*Eutetranychus orientalis*
- With 1 pair of anal setae Gen. *Aponychus*
- Body dorsoventrally compressed, dorsal integument wrinkled, dorsal idiosomal setae serrate, long, spatulate*Aponychus corpuzae*
3. With 2 pairs of preanal setae 5
- With 1 pair of preanal setae 4
4. Empodium claw-like with proximoventral hairs; distal setae on tarsus distal and approximate Gen. *Oligonychus*, 7
- Empodium splits distally into a pair of hairs, duplex setae on tarsus I well developed Gen. *Tetranychus*, 11
5. Empodium claw-like Gen. *Eotetranychus*, 14
- Empodium ending into tuft of hairs or splits dorsally 6
6. Empodium a single claw-like structure Gen. *Panonychus*
- 5th pair of dorsocentrals and 4th pair of dorsolaterals equal in length*Panonychus citri*
- Empodium splits into 2 claw-like structures, usually with appended hairs Gen. *Schizotetranychus*, 15.
7. Aedeagus bent ventrad, tarsus I with not more than single tactile seta on venter just distad of duplex setae 8
- Aedeagus bent dorsal, although the distal end may be directed ventrad, tarsus I with tactile setae on venter just distad of duplex setae 9
8. Bent portion of aedeagus forming acute angle with shaft*Oligonychus mangiferus*
- Bent portion of aedeagus with tip directed ventrad*Oligonychus coffeae*
9. Tarsus I with proximoventral empodial appendages forming a pair of empodial spur; on monocot 10

- Tarsus I with 3 pairs of proximoventral hairs on empodium, on other hosts
.....*Oligonychus biharens*
- 10. Bent portion of aedeagus longer
.....*Oligonychus isilemae*
- Bent portion of aedeagus shorter
.....*Oligonychus oryzae*
- 11. Proximal duplex setae on tarsus I of female placed distal to tactile setae 12
- Proximal duplex setae on tarsus I of female more or less in line with tactile setae
.....*Tetranychus ludeni*
- 12. Aedeagus with tiny knob
.....*Tetranychus hypogaeae*
- Aedeagus with distinct knob 13
- 13. Upper surface of aedeagus knob straight or rounded with some kind of projection, anterior and posterior projections of aedeagal knob similar*Tetranychus urticae*
- Upper surface of aedeagus knob concave with anterior and posterior rounded projections like berry shaped
.....*Tetranychus neocaledonicus*
- 14. Dorsal idiosomal setae serrate, aedeagus greatly tapering and forming a broad ventral bent*Eotetranychus kankitus*
- Dorsal idiosomal setae not serrate, aedeagus bends dorsal with upturned portion slender, tapering and sigmoid
.....*Eotetranychus hirsti*
- 15. Dorsal idiosomal setae longer than distance between their longitudinal intervals 16
- Dorsal idiosomal setae as long as the interval between their longitudinal bases
.....*Schizotetranychus baltazari*
- 16. Dorsal idiosomal setae serrate
.....*Schizotetranychus cajani*
- Dorsal idiosomal setae not serrate
.....*S. andropogoni*

1. *Aponychus corpuzae* Rimando

- 1966. *Aponychus corpuzae* Rimando, *Philip. Agr.*, **50** : 107.
- 1976. *Aponychus corpuzae*, Gupta, *Oriental Ins.*, **10** : 332-333.
- 1985. *Aponychus corpuzae*, Gupta, *Handbk. Plant mites of India*, pp. 59.

Material examined : 1 Female, Dist. North Tripura, Chakmaghat, ex bamboo, 6. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), Andaman Nicobar Isls., Meghalaya, West Bengal, Uttar Pradesh. Elsewhere : Japan, Philippines, Thailand.

2. *Eotetranychus hirsti* Pritchard & Baker

- 1926. *Tetranychus fici* Hirst, *Proc. Zool. Soc. Lond.*, P. 838.
- 1955. *Eotetranychus hirsti* Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.*, **2** : 200.
- 1985. *Eotetranychus hirsti*, Gupta, *Handbk. Plant mites of India*, pp. 73-74.

Material examined : 3 Females, 1 male, Dist. West Tripura, Agartala, ex *Ficus cunea*, 4. 12. 1983.

Distribution : India : Tripura (Dist. West Tripura), West Bengal, Bihar, Meghalaya, Delhi, Punjab, Haryana, Tamil Nadu, Andhra Pradesh, Karnataka, Uttar Pradesh.

Remarks : This mite though known to infest fig tree quite extensively throughout India but in the present case the population was never at an alarming stage. The damage to plants was insignificant.

3. *Eotetranychus kankitus* Ehara

- 1955. *Eotetranychus kankitus* Ehara, *Annot. zool. Jap.*, **28** : 178.
- 1974. *Eotetranychus kankitus*, Prasad, *A catalogue of mites of India*, pp. 113.
- 1985. *Eotetranychus kankitus*, Gupta, *Handbk. Plant mites of India*, pp. 75.

Material examined : 1 female, Dist. West Tripura, Bagalpur, ex citrus, 2. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Meghalaya. Elsewhere : Japan.

4. *Eotetranychus* Sp.

Material examined : 4 females, Dist. West Tripura, Agartala, ex *Citrus medica*, 14. 12. 1983.

Remarks : The absence of male specimen prevented its specific identity.

5. *Eutetranychus orientalis* (Klein)

1936. *Anychus orientalis* Klein, 1936. *Bull. agric. Res. Stn. Rehovoth*, 21 : 3.

1940. *Anychus ricini* Rahman & Sapra, *Proc. Indian Acad. Sci.*, 11 : 194.

1974. *Eutetranychus orientalis*, Prasad, *A catalogue of mites of India*, pp. 114-115.

1985. *Eutetranychus orientalis*, Gupta, *Handbk. Plant mites of India*, pp. 66-67.

Material examined : 3 females, Dist. West Tripura, Agartala, ex *Calotropis procera*, 16. 7. 1974; 4 females, Agartala, ex *Citrus medica*, 17. 7. 1974.

Distribution : India : Tripura (West Tripura Dist.), Assam, Meghalaya, West Bengal, Andaman Isls., Delhi, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Haryana, Rajasthan, Himachal Pradesh, Tamil Nadu. Elsewhere : Afghanistan, Cyprus, Iran, Israel, Jordan, Palestine, Sudan, South Africa.

Remarks : This mite is a serious pest of citrus specially in hotter region but in Tripura it was never seen in pest form during the period under observation.

6. *Oligonychus biharensis* (Hirst)

1925. *Paratetranychus biharensis* Hirst, *Proc. zool. Soc. Lond.* p. 69.

1955. *Oligonychus biharensis*, Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.*, 2 : 364-365.

1974. *Oligonychus biharensis*, Prasad, *A catalogue of mites of India*, pp. 116.

1985. *Oligonychus biharensis*, Gupta, *Handbk. Plant mites of India*, pp. 81-82.

Material examined : 2 females, Dist. West Tripura, Gamaibari, ex undet. plant, 5. 12. 1993; 2 females, Dist. North Tripura, Kailashahar, ex *Shorea* sp., 18. 12. 1993; 1 female, 1 male, Dist. South Tripura, Maharani, ex *Ficus religiosa*, 11. 12. 1993.

Distribution : India : Tripura (Dists : West Tripura, South Tripura, North Tripura), Andaman & Nicobar Isls., Bihar, Gujarat, Karnataka, Kerala, Tamil Nadu, West Bengal. Elsewhere : Antigua, Brazil, Hawaii. Mauritius, Philippines, Thailand.

7. *Oligonychus coffeae* (Nietner)

1866. *Acarus coffeae* Nietner, *Observ. Enem. Coffee Tree Ceylon*, P. 31.

1955. *Oligonychus coffeae*, Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.*, 2 : 315-316.

1974. *Oligonychus coffeae*, Prasad, *A catalogue of mites of India*, pp. 116-117.

1985. *Oligonychus coffeae*, Gupta, *Handbk. Plant mites of India*, pp. 83-84.

Material examined : 2 females, Dist. North Tripura, Kailashar, Sonamukhi Tea Estate, ex tea, 19. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), Assam, Meghalaya, West Bengal, Himachal Pradesh, Tamil Nadu. Elsewhere : Indonesia, Australia, Hawaii, Japan, Philippines, Sri Lanka, Taiwan, U. S. A. South & East Africa, Russia, Zaire, Mauritius, Middle East, Egypt.

Remarks : This mite is known to be one of the most serious pests of tea specially in northeast India but during the present investigation the infestation was found to be very poor.

8. *Oligonychus gossypii* (Zacher)

1921. *Paratetranychus gossypii* Zacher, *Z. angew Ent.*, 7 : 181-187.

1955. *Oligonychus gossypii*, Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.* 2 : 359.

1987. *Oligonychus gossypii*, Smith-Meyer, *Ent. Mem. Dept. Agril. & Wat. Suppl., Repub. S. Afr.* No. 69 : 152.

Material examined : India : Tripura (Dist. West Tripura, Malanchabas, ex mango, 2. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura). Elsewhere : Africa (Togo, Senegal, Sierra, Leone, Nigeria, Cameroon, Zaire, Angola).

Remarks : The record of this species from India was earlier unknown.

9. *Oligonychus iseilemae* (Hirst)

1924. *Paratetranychus iseilemae* Hirst, *Ann. Mag. nat. Hist.*, (9) **14** : 524.
 1955. *Oligonychus iseilemae*, Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.* **2** : 358.
 1974. *Oligonychus iseilemae*, Prasad, *A catalogue of mites of India*, pp. 118.
 1985. *Oligonychus iseilemae*, Gupta, *Handbk. Plant mites of India*, pp. 86-87.

Material examined : 1 male, Dist. South Tripura, Maharani, ex *Saccharum* sp., 11. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), Andaman & Nicobar Isls., Andhra Pradesh, Tamil Nadu.

10. *Oligonychus mangiferus* (Hirst)

1940. *Paratetranychus mangiferus* Rahman & Sapra, *Proc. Indian Acad. Sci.*, **11 B** : 192.
 1955. *Oligonychus mangiferus*, Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.*, **2** : 330.
 1974. *Oligonychus mangiferus*, Prasad, *A catalogue of mites of India*, pp. 118-119.
 1985. *Oligonychus mangiferus*, Gupta, *Handbk. Plant mites of India*, pp. 87.

Material examined : 3 females, Dist. West Tripura, Agartala, ex *Litchi chinensis*, 15. 7. 1974.

Distribution : India : Tripura (Dist. West Tripura), Meghalaya, West Bengal, Bihar, Haryana, Himachal Pradesh, Punjab, Karnataka. Elsewhere : Mauritius, South Africa.

11. *Oligonychus oryzae* (Hirst)

1926. *Paratetranychus oryzae* Hirst, *Proc. zool. Soc. Lond.*, p. 830.
 1955. *Oligonychus oryzae*, Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.*, **2** : 357.
 1974. *Oligonychus oryzae*, Prasad, *A catalogue of mites of India*, pp. 119.

1985. *Oligonychus oryzae*, Gupta, *Handbk. Plant mites of India*, pp. 88-89.

Material examined : 3 females, Dist. West Tripura, Agartala, ex paddy, 4. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Andaman & Nicobar Isls., Orissa, Tamil Nadu. Elsewhere : Thailand.

12. *Panonychus citri* (McGregor)

1916. *Tetranychus citri* McGregor, *Ann. ent. Soc. Amer.*, **9** : 284.
 1961. *Panonychus citri*, Bindra, *Punjab Hort.*, **6** : 111.
 1974. *Panonychus citri*, Prasad, *A catalogue of mites of India*, pp. 119-120.
 1985. *Panonychus citri*, Gupta, *Handbk. Plant mites of India*, pp. 92.

Material examined : 53 females, 5 males, Dist. West Tripura, Teliamura, ex papaya, 4. 12. 1993; 6 females, Ambassa, ex an undet. plant, 7. 12. 1993; 2 females, Dist. South Tripura, Udaipur, Gokulpur, ex banana, 9. 12. 1993; 2 females, Maharani, ex fig, 11. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura) Meghalaya, West Bengal, Punjab, Uttar Pradesh. Elsewhere : South America, U. S. A., Central America, China, Japan, Middle East, New Zealand, South Africa, Thailand.

13. *Schizotetranychus andropogoni* (Hirst)

1926. *Tetranychus (Schizotetranychus) andropogoni* Hirst, *Proc. zool. Soc. Lond.*, p. 829.
 1955. *Schizotetranychus andropogoni*, Pritchard & Baker, *Pacific Coast Ent. Soc. Mem. Ser.*, **2** : 248-249.
 1974. *Schizotetranychus andropogoni*, Prasad, *A catalogue of mites of India*, pp. 121.
 1985. *Schizotetranychus andropogoni*, Gupta, *Handbk. Plant mites of India*, pp. 96-97.

Material examined : 5 females, Dist. West Tripura, Agartala, ex paddy, 2. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), West Bengal, Meghalaya, Bihar, Orissa, Dehli, Punjab, Karnataka, Tamil Nadu, Haryana, Uttar Pradesh, Kerala. Elsewhere : Pakistan, Thailand, Mexico.

14. *Schizotetranychus baltazari* Rimando

1962. *Schizotetranychus baltazari* Rimando, *Philip. Agri.*, **45** : 534-535.
1963. *Schizotetranychus baltazari*, Manson, *Acarologia*, **5** : 360-362.
1974. *Schizotetranychus baltazari*, Prasad, *A catalogue of mites of India*, pp. 122.
1985. *Schizotetranychus baltazari*, Gupta, *Handbk. Plant mites of India*, pp. 97.

Material examined : 1 female, 1 male, Dist. South Tripura, Lebachara, ex bamboo, 4. 12. 1993; 2 females, West Tripura Dist., Khowai, ex citrus, 7. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura), Assam, Karnataka. Elsewhere : Myanmar, Thailand, Taiwan, Hongkong.

15. *Schizotetranychus cajani* Gupta

1976. *Schizotetranychus cajani* Gupta, *Oriental Ins.*, **10** : 336-337.
1985. *Schizotetranychus cajani*, Gupta, *Handbk. Plant mites of India*, pp. 98-99.

Material examined : 1 female, 1 male, Dist. West Tripura, Bagalpur, ex pigeonpea, 3. 12. 1993; 1 female, 2 males, Dist. South Tripura, Udaipur, ex pigeonpea, 9. 12. 1993; 1 male, Teliamura, ex arecanut, 11. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura), Bihar, West Bengal, Andhra Pradesh, Gujarat, Punjab, Haryana.

16. *Tetranychus hypogaeae* Gupta

1976. *Tetranychus hypogaeae* Gupta, *Oriental Ins.*, **10** : 347-348.
1985. *Tetranychus hypogaeae*, Gupta, *Handbk. Plant mites of India*, pp. 112-113.

Material examined : 10 females, 1 male, Dist. West Tripura, Bagalpur, ex an undet. plant, 3. 12. 1993; 15 females, 1 male, South Tripura Dist., Jatanbari, ex tapioca, 13. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura), West Bengal.

17. *Tetranychus ludeni* Zacher

1913. *Tetranychus ludeni* Zacher, *Mitt. Kais. Biol. Ans. Land. U. Forstu.*, **14** : 40.
1959. *Tetranychus ludeni*, Puttarudriah & Channa Basavanna, *Proc. 1st All India Congr. Zoology*, p. 530.
1974. *Tetranychus ludeni*, Prasad, *A catalogue of mites of India*, p. 125.
1985. *Tetranychus ludeni*, Gupta, *Handbk. Plant mites of India*, pp. 110-112.

Material examined : 5 females, 1 male, Dist. South Tripura, Dumboor Lake, ex *Rosa indica*, 15. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), Assam, Meghalaya, West Bengal, Bihar, Haryana, Uttar Pradesh, Punjab, Gujarat, Tamil Nadu, Kerala, Andhra Pradesh, Orissa.

Remarks : This mite was seen infesting rose turning the leaves to yellowish brown. A *Scymnus* beetle was seen associated with it.

18. *Tetranychus neocaledonicus* Andre

1933. *Tetranychus neocaledonicus* Andre, *Bull. Mus. Natn. Hist. nat. Paris*, (2) **5** : 302.
1940. *Tetranychus cucurbitae* Rahman & Sapra, *Proc. Indian Acad. Sci.*, **11B** : 179.
1974. *Tetranychus ludeni*, Prasad, *A catalogue of mites of India*, p. 125-126.
1985. *Tetranychus neocaledonicus*, Gupta, *Handbk. Plant mites of India*, pp. 113-115.

Material examined : 3 females, 1 male, Dist. West Tripura, Agartala, ex cucumber, 4. 12. 1993.

Distribution : India (throughout the country, Tripura—Dist. West Tripura). Elsewhere : Cosmopolitan.

19. *Tetranychus urticae* Koch

1836. *Tetranychus urticae* Koch, *Deu Crust. Myr. Arach. Fasc.*, **1** : 10.
1974. *Tetranychus cinnabarinus*, Prasad, *A catalogue of mites of India*, pp. 122-124.
1985. *Tetranychus urticae*, Gupta, *Handbk. Plant mites of India*, pp. 115.

1985. *Tetranychus cinnabarinus*, Gupta, *ibid.* pp. 106-108.

Material examined : 5 females, 1 male, Dist. West Tripura, Agartala, ex *Nyctanthes arbortristis*, 3. 12. 1993; 5 females, 1 male, Agartala, ex *Rosa indica*, 3. 12. 1993; 3 females, Dist. North Tripura, Kailashahar, ex *Rosa indica*, 18. 12. 1993; 1 female, 1 male, Dist. South Tripura, Jatanbari, ex jackfruit, 13. 12. 1993.

Distribution : India : throughout the country, Tripura (West Tripura, South Tripura, North Tripura). Elsewhere : Cosmopolitan.

20. *Tetranychus* sp.

Material examined : 2 females, Dist. North Tripura, Kailashahar, ex guava, 18. 12. 1993.

Remarks : Because of the nonavailability of male specimen the specific identity was not possible.

Fam. 2 TENUIPALPIDAE Berlese

Key to the genera and species of Tenuipalpidae known to occur on plants from Tripura :

1. Hysterosoma normally with penultimate pair of dorsolateral setae flagelliform
..... Gen. *Tenuipalpus*, 3
- Hysterosoma normally with penultimate pair of dorsolateral setae of normal length
..... Gen. *Brevipalpus*, 2
2. Tarsus II with a single sensory rod
..... *Brevipalpus phoenicis*
- Tarsus II with 2 sensory rods
..... *Brevipalpus deleoni*
3. Hysterosoma with 3 pairs of non-flagellate caudal setae *Tenuipalpus punjabensis*
- Hysterosoma with 4 pairs of non-flagellate caudal setae *Tenuipalpus micheli*

21. *Brevipalpus deleoni* Pritchard & Baker

1958. *Brevipalpus deleoni* Pritchard & Baker, *Univ. Calif. Pub. Ent.*, 14 (3) : 234-235.

1970. *Brevipalpus deleoni*, Gupta, *Sci. & Cult.*, 36 : 99.

1974. *Brevipalpus deleoni*, Prasad, *A catalogue of mites of India*, pp. 108.

1985. *Brevipalpus deleoni*, Gupta, *Handbk. Plant mites of India*, pp. 127-128.

Material examined : 1 female, Dist. South Tripura, Damboor Lake, ex *Rosa indica*, 15. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), West Bengal, Punjab. Elsewhere : U. S. A.

22. *Brevipalpus phoenicis* (Geijskes)

1939. *Tenuipalpus phoenicis* Geijskes, *Meded. Land. Hoogesch. Wageningen*, 42 : 230.

1961. *Brevipalpus phoenicis*, Das, *Two Bud.* 8 : 3-4.

1974. *Brevipalpus phoenicis*, Prasad, *A catalogue of mites of India*, pp. 110-111.

1985. *Brevipalpus phoenicis*, Gupta, *Handbk. Plant mites of India*, pp. 130-131.

Material examined : 9 females, Dist. North Tripura, Kailashahar, Sonamukhi Tea Estate, ex tea, 19. 12. 1993; 1 female, South Tripura Dist. Damboor Lake, ex undet. weed, 19. 12. 1993; 2 females, South Tripura Dist. Gokulpur, ex undet. plant, 9.12.1993; 2 females West Tripura, Teliamura, ex pigeonpea, 5. 12. 1993.

Distribution : India : Tripura (West Tripura, South Tripura, North Tripura), Assam, Meghalaya, Bihar, Orissa, Himachal Pradesh, Delhi, Punjab, Maharashtra, Tamil Nadu, Karnataka. Elsewhere : Hawaii, Columbia, California, Texas, Florida, Trinidad, Argentina, Brazil, Venezuela, Holland, Spain, Portugal, Syria, Sicily, Italy, Kenya, Tanganyika, Ethiopia, Mauritius, Malaysia, Taiwan, Okinawa Isl., Philippines, Australia.

23. *Tenuipalpus micheli* Lawrence

1940. *Tenuipalpus micheli* Lawrence, *J. Ent. Soc. S. Afr.*, 3 : 111.

1974. *Tenuipalpus micheli*, Nageshchandra & Channa Basavanna, *Abstr. IV Inter. Congr. Acarology*, Austria.

1985. *Tenuipalpus micheli*, Gupta, *Handbk. Plant mites of India*, pp. 146.

Material examined : 2 females, Dist. North Tripura, Kailashahar, ex bomboo, 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), Andaman Isl., Karnataka. Elsewhere : Natal.

24. *Tenuipalpus punjabensis* (Maninder & Ghai)

1978. *Colopalpus punjabensis* Maninder & Ghai, *Oriental Ins.*, 12 : 111-113.

1985. *Tenuipalpus punjabensis*, Gupta, *Handbk. Plant mites of India*, pp. 150.

Material examined : 1 female, Dist. West Tripura, Gamaibari, ex bitter gourd, 5. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Punjab, Meghalaya.

Fam. 3 TARSONEMIDAE Kramer

25. *Polyphagotarsonemus latus* (Banks)

1904. *Tarsonemus latus* Banks, *Proc. U. S. Nat. Mus.*, 32 (1553) : 615.

1958. *Hemitarsonemus latus*, Dütt. *Ind. Farm.*, 8 : 10-12.

1985. *Polyphagotarsonemus latus*, Gupta, *Handbk. Plant mites of India*, pp. 292-294.

Material examined : 3 females, 1 male, Dist. South Tripura, Lebachara, ex chilli, 14. 12. 1993; 1 male, 1 female, Dist. West Tripura, Chakmaghat, ex *Dolichos* sp., 6. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), throughout the country. Elsewhere : Well distributed in most parts of the world.

Remarks : The infestation on chilli as usually caused crinkling of leaves which later dried up.

Fam. 4 ERIOPHYIDAE Nalepa

Key to the species of Eriophyidae known from Tripura

1. Body worm-like, thanosomal ring subequal dorsoventrally, at least on anterior 1/2 or 2/3; shield typically lacking anterior lobes or with slight projection over rostrum base; if anterior shield projection present over rostrum, then this extension narrow, basally flexible and

combined with narrow thanosomal rings
.....Sub fam. ERIOPHYINAE

Dorsal shield seta situated on tubercles on rear shield pointing backward over rostrum
.....Gen *Aceria*, 2

—Body fusiform and fitted for exterior living; shield usually broad based and rigid anterior lobe over rostrum; thanosome typically divided laterally into broad and heavy dorsal tergites and narrow and soft sternites; if no anterior lobe present or only a slight one, then some form of tergal, sternal differentiation discernible at least in longer dorsal microtubercles; if no dorsoventral contrast present, then broad shield lobe present
.....Sub fam. PHYLLOCOPTINAE

First setiferous coxal tubercles absent
.....Gen. *Acaphylla*, *Acaphylla theae*

2. Coxae sparsely granulated*Aceria ficus*
—Coxae strongly tuberculated
.....*Aceria litchii*

26. *Aceria ficus* (Cotte)

1920. *Eriophyes ficus* Cotte, *Bull. Soc. Path. Veg.*, 7 : 26.

1966. *Aceria ficus*, ChannaBasavanna, *Univ. Agri. Sci., Bangalore, Bull.*, pp. 71-72.

1985. *Aceria ficus*, Gupta, *Handbk. Plant mites of India*, pp. 193-194.

Material examined : 2 females, Dist. South Tripura, Maharani, ex fig. 11. 12. 1993.

Distribution : India : Tripura (Dist., South Tripura), Delhi, Himachal Pradesh.

27. *Aceria litchii* (Keifer)

1943. *Eriophyes litchii* Keifer, *Bull. Calif. Dep. Agr.*, 32 : 212.

1966. *Aceria litchii*, ChannaBasavanna, *Univ. Agri. Sci. Bull.*, p. 72.

1985. *Aceria litchii*, Gupta, *Handbk. Plant mites of India*, pp. 193-194.

Material examined : 5 females, Dist. South Tripura, Jatanbari, ex litchi, 13. 12. 1993; 2 females, Dist. West Tripura, Agartala, ex litchi, 2. 12. 1993.

Distribution : India : Tripura (Dists. South Tripura, West Tripura), West Bengal, Bihar, Karnataka. Elsewhere : Pakistan, Hawaii.

Remarks : The usual damage symptoms caused by this mite was seen on the leaves from where these mites could be recovered.

28. *Acaphylla theae* (Watt)

1898. *Phytoptus theae* Watt, *Pests & blights of tea plants*, pp. 400-408.

1958. *Phytoptus theae*, Das, & Sengupta, *J. zool. Soc. India*, **10** : 38-39.

1985. *Acaphylla theae*, Gupta, *Handbk. Plant mites of India*, pp. 196-197.

Material examined : 2 females, Dist. North Tripura, Kailashahar, ex tea, 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), Assam, Tamil Nadu. Elsewhere : Southern Asia and East Indies.

Fam 5. EUPODIDAE Koch

29. *Eupodes sigmodensis* Strandtmann & Goff

Material examined : 2 females, Dist. North Tripura, Kailashahar, ex coconut, 18. 12. 1993; 2 females, Dist. West Tripura, Malanchabas, ex weed, 2 12. 1993; 1 female, Khowai, ex citrus, 7. 12. 1993; 1 female, Gamaibari, ex undet. plant, 5. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura, North Tripura). Elsewhere : U. S. A.

Family 6. CUNAXIDAE Thor

Key to the genera and species of Cunaxidae known to occur on plants from Tripura

1. Palpus 3 segmented Gen. *Neocunaxoides*
Mushroom-shaped seta present on palptarsus *Neocunaxoides andrei*
— Palpus 5 segmented Gen. *Cunaxa*, 2
2. Propodosoma with anterior pair of sensory setae short, stalky and thick
..... *Cunaxa anacardae*
— Not like above 3

3. Palp tarsus with a strong mesal spine on telofemur *Cunaxa setirostris*
— Palp tarsus not like above 4
4. Chelicera longer than tibiotarsus 5
— Chelicera shorter than tibiotarsus
..... *Cunaxa cynodona*
5. Telofemur with 2 setae
..... *Cunaxa bambusae*
— Telofemur with 1 seta
..... *Cunaxa mangiferae*

30. *Cunaxa anacardae* Gupta

1992. *Cunaxa anacardae* Gupta, In : *State Fauna Ser. 3. Fauna of West Bengal*, pp. 138-139.

Material examined : 1 female, Dist. North Tripura, Kailashahar, ex mango, 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), West Bengal.

31. *Cunaxa cynodona* Gupta & Ghosh

1980. *Cunaxa cynodona* Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 196-198.

1985. *Cunaxa cynodona*, Gupta, *Handbk. Plant mites of India*, pp. 316.

Material examined : 1 female, Dist. South Tripura, Maharani, ex an undet. plant, 11. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), West Bengal, Andaman & Nicobar Isls.

32. *Cunaxa bambusae* Gupta & Ghosh

1980. *Cunaxa bambusae* Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 196-198.

1985. *Cunaxa bambusae*, Gupta, *Handbk. Plant mites of India*, pp. 315.

Material examined : 1 female, Dist. South Tripura, Lebachara, ex wood apple, 14. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), West Bengal, Andaman & Nicobar Isls.

33. *Cunaxa mangiferae* Gupta

1992. *Cunaxa mangiferae* Gupta, In : *State Fauna Ser. 3. Fauna of West Bengal*, pp. 136-137.

Material examined : 2 females, Dist. North Tripura, Sonamukhi Tea Estate, ex tea, 19. 1. 1993.

Distribution : India : Tripura (Dist. North Tripura), West Bengal.

34. *Cunaxa setirostris* (Hermann)

1804. *Scirus setirostris* Hermann, *Mem. Aptelologie*, p. 60-62.
1971. *Cunaxa setirostris*, Singh & Mukherjee, *Oriental Ins.*, 5 : 488.
1985. *Cunaxa setirostris*, Gupta, *Handbk. Plant mites of India*, pp. 316.

Material examined : 1 female, Dist. West Tripura, Chakmaghat, ex bamboo, 6. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Meghalaya, West Bengal. Elsewhere : Cosmopolitan.

35. *Neocunaxoides andrei* (Baker & Hoffmann)

1948. *Cunaxoides andrei* Baker & Hoffmann, *An. Esc. Nac. Cienc. Biol. Max.*, 5 : 249-250.
1975. *Neocunaxoides andrei*, Smiley, *Ann. Ent. Soc. Amer.*, 68 : 237.

Material examined : 1 female, Dist. West Tripura, Khowai, ex citrus, 7. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Elsewhere : U. S. A.

Family 7. CHEYLETIDAE Leach**Key to the genera and species of Cheyletidae known from Tripura**

1. All tarsi with paired claws
.....Gen. *Cheletomimus*
- One pair of plates partially covering metapodosomal area of adult female; median dorsal setae of idiosoma similar to laterals in

form and size; eyes present.....
.....*Cheletomimus* sp.

1st tarsi without claws
.....Gen. *Cheletogenes*

Palp claw with about 15 teeth, outer comb with about 20 teeth, inner comb with 25 teeth. Dorsal body with 15 pairs of setae besides humerals; each seta with cycloid blade having about 10 closely barbed ribs
.....*Cheletogenes ornatus*

36. *Cheletogenes ornatus* (Canestrini & Fanzago)

1876. *Cheyletus ornatus* Canestrini & Fanzago, *Att. Soc. Veneto. Trentina*, p. 106.
1905. *Cheletogenes ornatus*, Oudemans, *Ent. Ber. Nederl. Ver.*, 1 (21) : 208.
1960. *Cheletogenes ornatus*, Narayanan, Kaur & Ghai, *Proc. nat. Inst. Sci.*, 26 : 390.
1985. *Cheletogenes ornatus*, Gupta, *Handbk. Plant mites of India*, pp. 300.

Material examined : 1 female, Dist. West Tripura, Agartala, ex *Abutilon indicum*, 27. 7. 1979.

Distribution : India : Tripura (Dist. West Tripura), Punjab. Elsewhere : U. S. A., Galapagos Isl., Italy, China, Hawaii, West Indies, Australia.

37. *Cheletomimus* sp.

Material examined : 1 female, Dist. South Tripura, Lebachara, ex bamboo, 14. 12. 1993.

Remarks : The inadequate literature in the group made it difficult to reach upto species level. However, from the available literature it appeared to be an undescribed species.

Family 8. STIGMAEIDAE Oudemans**Key to the species of Stigmaeidae known from Tripura**

1. One pair of paragenital setae
.....*Agistemus fleschneri*
- Two pairs of paragenital setae 2

2. Setae $ae/ae-ae = 1.0$; be not longer than distance between be-ce *Agistemus terminalis*

— Setae $ae/ae-ae = 1.8$ to 2.0 , be much longer than distance between be-ce.....
.....*Agistemus unquiparvus*

38. *Agistemus fleschneri* Summers

1960. *Agistemus fleschneri* Summers, *Proc. Ent. Soc. Wash.*, **62** : 237-240.

1971. *Agistemus fleschneri*, Gupta, *Sci. & Cult.*, **37** : 296-299.

1985. *Agistemus fleschneri*, Gupta, *Handbk. Plant mites of India*, pp. 304-305.

Material examined : 1 female, Dist. West Tripura, Agartala, ex *Lantana*, 12. 12. 1983; 1 female, Dist. South Tripura, Lebachara, ex wood apple, 14. 12. 1993.

Distribution : India : Tripura (Dists: South Tripura, West Tripura), Assam, Meghalaya, West Bengal, Bihar, Punjab, Haryana, Karnataka, Gujarat. Elsewhere : U. S. A., Mexico, Chile.

39. *Agistemus terminalis* (Quayle)

1912. *Caligonius terminalis* Quayle, *Univ. Calif. Agr. Exp. Stn., Bull.* No. 234, pp. 499.

1946. *Mediolata terminalis*, Nesbitt, *Can. Ent.*, **78** : 15.

1960. *Agistemus terminalis*, Summers, *Proc. Ent. Soc. Wash.*, **62** :

Material examined : 1 female, Dist. West Tripura, Bagalpur, ex betel vine, 3. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), West Bengal. Elsewhere : Japan, Cyprus, U. S. A., Guatemala.

Remarks : This is the first report of this species from Tripura.

40. *Agistemus unquiparvus* Summers

1965. *Agistemus unquiparvus* Summers, *Univ. Calif. Pub. Ent.*, **41** : 43.

Material examined : 2 females, Dist. South Tripura, Lebachara, ex citrus, 14. 12. 1993.

Distribution : India : Tripura (Dist. south Tripura). Elsewhere : Mozambique.

Remarks : This is the first report of this species from India.

41. *Agistemus* sp.

Material examined : 2 nymphs, Dist. South Tripura, Jatanbari, ex jackfruit, 13. 12. 1993.

Remarks : Due to immature condition of the specimens, the specific identity was not possible.

Fam. 9. TYDEIDAE Kramer

Key to the genera and species of Tydeidae known from Tripura

1. Hysterosomal setae L_2 in normal lateral position 2

— Hysterosomal seta L_2 in dorsal position
.....Gen. *Pronematus*

Distal segment of palpus 2 times as long as penultimate segment; solenidion on tarsus I long, distally placed and surpassing the end of the segment*Pronematus fleschneri*

2. Striae transverse or reticulate between second pair of hysterosomal-dorsocentral setae
.....Gen. *Tydeus*

All propodosomal setae thick, propodosomal striae longitudinal and also it is so between sensory setae; striation more or less oblique and circular in lateral propodosomal region

.....*Tydeus cumini*

— Striae longitudinal between second pair of hysterosomal dorsocentral setae
.....Gen. *Paralorryia*

Setae P_1 - P_3 and S almost of similar length, all the hysterosomal setae of similar length and appear to be slightly broadened at tip
.....*Paralorryia fodderi*

43. *Pronematus fleschneri* Baker

1968. *Pronematus fleschneri* Baker, *Ann. Ent. Soc. Amer.*, **61** : 1092.

1974. *Pronematus fleschneri*, Gupta & Dhooria, *Proc. Indian Sci. Congr.*, 61 : 69.

1985. *Pronematus fleschneri*, Gupta, *Handbk. Plant mites of India*, pp. 308.

Material examined : 1 female, Dist. West Tripura, Teliamura, ex citrus, 4. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Bihar, Delhi, Punjab. Elsewhere : Belgian Congo.

Remarks : This forms the first record from Tripura.

43. *Paralorryia fodderi* Gupta

1992. *Paralorryia fodderi* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal*, pp. 128.

Material examined : 2 females, Dist. West Tripura, Malanchabas, ex jackfruit, 2. 12. 1993.

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

Remarks : This is the first report of this species from Tripura.

44. *Tydeus cumini* Gupta

1992. *Tydeus cumini* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal*, pp. 134.

Material examined : 2 females, Dist. North Tripura, Kailashahar, ex bamboo, 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), West Bengal.

45. *Tydeus* Sp.

Material examined : 2 females, Dist. West Tripura, Agartala, ex *Mallotus philippensis*, September, 1974. (Coll. Y N. Gupta).

Family 10. BDELLIDAE Duges

46. *Bdellodes (Hoploscirus) affinis* Atyeo

1963. *Bdellodes (Hoploscirus) affinis* Atyeo, 1963, *Bull. Univ. Nebraska Sta. Mus.*, 4 (8) : 185-187.

1980. *Bdellodes (Hoploscirus) affinis*, Gupta & Ghosh, *Rec. zool. Surv. India*, 77 : 201.

1985. *Bdellodes (Hoploscirus) affinis*, Gupta, *Handbk. Plant Mites of India*, pp. 313.

Material examined : 1 female, Dist. West Tripura, Gokulpur, ex an undet. plant, 7. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Andaman & Nicobar Isls. Elsewhere : Australia.

Family 11. CALIGONELLIDAE Grandjean

47. *Molothrognathus leptostylus* Chaudhri, Akbar & Rasool

1974. *Molothrognathus leptostylus* Chaudhri, Akbar & Rasool, *Univ. Agr. Sci. Lyallpur, Pakistan*, p. 184.

Material examined : 1 female, Dist. West Tripura, Agartala, ex bamboo, 27. 12. 1983.

Distribution : India : Tripura (Dist. West Tripura), Elsewhere : Pakistan.

Remarks : This is the first report of this species from India.

Order MESOSTIGMATA

Key to the families of Mesostigmata known to occur on plants in Tripura

1. Normally with fewer than 20 pairs of dorsal setae except in Gnoriminae where there are upto 23 pairs of setae
.....Family PHYTOSEIIDAE

— Always with more than 20 pairs of dorsal setae Family ASCIDAE

Family 12. ASCIDAE Voigts & Oudemans

48. *Lasioseius* sp.

Material examined : 1 male, Dist. West Tripura, Chakmaghat, ex *Dolichos lablab*, 6. 12. 1993; 1 female, Dist. South Tripura, Maharani, ex Miscellaneous plants, 11. 12. 1993.

Remarks : The specific identity of these specimens are pending subject to procurement of some more literature essential to arrive at a conclusion.

Family 13. PHYTOSEIIDAE Berlese

Key to the subfamilies, genera, subgenera and species of *Phytoseiidae* known to occur on plants in Tripura

1. Prolateral setae 4 pairs, in all 6-9 pairs of lateral setae, preanal setae 3 pairs Subfamily AMBLYSEIINAE, 2
- Prolateral setae 5 or more pairs, in all 9-12 pairs of lateral setae; preanal setae 2-4 pairs Subfamily PHYTOSEIINAE, 24
2. Ventrianal shield absent or indistinctly demarcated, only preanal setae distinctly present Genus. *Indoseiulus*, *Indoseiulus ricini* Ventrianal shield distinctly present 3
3. Sublateral seta II (R_1) absent Gen. *Platyseiella*, *Platyseiella mumai*
- Sublateral setae II (R_1) present 4
4. Lateral integument sclerotized so that R_3 and R_1 though no usual lateral position appear to be on lateroventral extension of dorsal shield Gen. *Iphiseius*, *Iphiseius andamanicus*
- Lateral integument not sclerotized as above Gen. *Amblyseius*, 5
5. Dorsal shield with 5 pairs of postlateral setae 6
- Dorsal shield with 3 pairs of postlateral setae, lateral setae specially J_3 , Z_5 , S_4 , Z_4 being long, thick, serrate Subgenus *Paraphytoseius* *A. (Paraphytoseius) multidentatus*
6. Ventrianal shield massive covering major portion of posteroventral portion Subgenus *Phytoscutella*
- Ventrianal shield not like above 7
7. Setae Z_5 , Z_4 , S_4 long and whip-like longer than distance between their bases, leg IV with macrosetae on genu and erect seta on tarsus Subgenus *Amblyseius*, 8
- Seta Z_5 shorter, at most as long as distance between their bases; leg I with no macroseta or only one on genu, no erect seta on tarsus 9
8. Cervix of spermatheca elongated and of parallel diameter *A. (A.) largoensis*
- Cervix of spermatheca fundibuliform *A. (A.) herbicolus*
9. Sternal shield distinct and straight or concave posteriorly; ventrianal shield approximately shield-shaped or pentagonal 10
- Sternal shield indistinct, may be trilobate posteriorly; ventrianal shield elongate, vase-shaped or concave laterally 11
10. Z_4 and Z_5 distinctly serrate, sternal shield as wide as or wider than long, macroseta may be present on genu I and also on genu II and III Subgenus *Typhlodromips*, 12
- Z_4 and Z_5 mostly smooth, sternal shield longer than wide, genu I, II and III without macroseta Subgenus *Neoseiulus*, 16
11. Peritreme extends anteriorly upto J_3 , anterior pair of preanal setae adjacent to anterior margin of ventrianal shield Subgenus *Typhlodromalus*, *A. (Typhlodromalus) kalimpongensis*
- Peritreme not extends upto J_3 , anterior pair of preanal setae removed from anterior margin of ventrianal shield Subgenus *Euseius*, 17
12. Besides Z_5 and Z_4 other setae being subequal 13
- Besides Z_5 and Z_4 there are other long setae *A. (Typhlodromips) crotalariae*
13. Z_4 quite long at least 3 times as long as S_4 14
- Z_4 not so long 15
14. Cervix of spermatheca saucer-shaped *A. (Typhlodromips) syzygii*
- Cervix of spermatheca elongated, flask-shaped *A. (Typhlodromips) suknaensis*

15. Spermatheca with bell-shaped cervix
.....*A. (Typhlodromips) polyantheae*
- Spermatheca with funnel-shaped cervix
.....*A. (Typhlodromips) officinaria*
16. All setae on dorsal shield very long except S_5 which is minute
.....*A. (Neoseiulus) longispinosus*
- All setae on dorsal shield of uniform length
.....*A. (Neoseiulus) fallacis*
17. All setae on dorsal shield minute except J_1 and Z_5 18
- Besides Z_5 and J_1 some other setae also long 19
18. S_2 - S_5 equal*A. (Euseius) ovalis*
- S_2 - S_5 unequal
.....*A. (Euseius) rhododendronis*
19. J_1 and J_3 either equal or J_3 longer than J_1 20
- J_1 longer than J_3 22
20. J_3 longer than J_1 *A. (Euseius) alstoniae*
- J_3 as long as J_1 21
21. Spermatheca tubular
.....*A. (Euseius) coccosocius*
- Spermatheca fundibuliform
.....*A. (Euseius) coccineae*
22. J_3 and z_2 almost equal
.....*A. (Euseius) bambusae*
- J_3 noticeably longer than z_2 23
23. Spermatheca and spermatophoral process as in figs 1 & 2*A. (Euseius) pruni*
- Spermatheca and spermatophoral process as in figs 3 & 4
.....*A. (Euseius) finlandicus*
24. R_3 on dorsal shield, genu II with 7 setae, genu III with 6 setae
.....Gen. *Phytoseius*, 25
- R_3 on lateral integument, genu II with 7 or 8 setae, genu III with 6 or 7 setae
.....Gen. *Typhlodromus*, 30
25. Seta R_1 present
.....Subgenus *Pennaseius*, *Phytoseius* (*Pennaseius*) *kapuri*
- Seta R_1 absent. Subgenus *Phytoseius*, 26
26. Macroseta absent on leg IV
.....*P. (Phytoseius) intermedius*
- Macroseta present on leg IV 27
27. Genu IV without macroseta
.....*P. (Phytoseius) roseus*
- Genu IV with macroseta 28
28. J_3 only slightly longer than z_2 29
- J_3 much longer than z_2
.....*P. (Phytoseius) indicus*
29. Posterior margin of sternal shield lobed
.....*P. (Phytoseius) brevicrinis*
- Posterior margin of sternal shield straight
.....*P. (Phytoseius) meyeriae*
30. Seta Z_5 knobbed and serrate 31
- Seta Z_5 not knobbed but may be serrate
.....*Typhlodromus*(*Amblydromella*) *gopali*
31. Spermatheca corniform
.....*T. (Amblydromella) darjeelingensis*
- Spermatheca saculiform
.....*T. (Amblydromella) bambusicolus*
49. *Amblyseius* (*Amblyseius*) *herbicolus* (Chant)
1959. *Typhlodromus* (*Amblyseius*) *herbicolus* Chant, *Can. Ent.*, 91 : 84-85.
1986. *Amblyseius* (*Amblyseius*) *herbicolus*, Gupta, *Fauna of India* (Acari : Mesostigmata) Family Phytoseiidae. pp. 45-47.
1987. *Amblyseius* (*Amblyseius*) *herbicolus*, Gupta, *Rec. zool. Surv. India, Occ. Pap.*, No. 95 : 9.
- Material examined* : 3 females, 1 male, Dist. West Tripura, Agartala, ex *Achras sapota*, 3. 12. 1993; 3 females, Dist. North Tripura, Kumarghat, ex *Aegle marmelos*, 3. 12. 1993; 1 female, Dist. South Tripura, Jatanbari, ex jackfruit, 13. 12. 1994; 1 female, Dist. North Tripura, Kailashahar,

ex paddy, 18. 12. 1993; 2 females, 1 male, Kailashahar, ex mango, 18. 12. 1993; 1 female, Dist. South Tripura, Damboor Lake, ex undet. plant, 15. 12. 1993; 2 females, Dist. West Tripura, Chakmaghat, ex banana, 9. 12. 1993; 1 female, Khowai, ex *Tagetes erecta*, 7. 12. 1993; 1 female, Khowai, ex cinnamom, 7. 12. 1993; 1 female, Khowai, ex *Citrus* sp., 7. 12. 1993; 2 females, Khowai, ex coconut, 7. 12. 1993; 2 females, 1 male, Dist. West Tripura, Malanchabas, ex an undet. weed, 2. 12. 1993; 2 females, Teliamura, ex banana, 4. 12. 1993; 1 female, Dist. South Tripura, Sonamura, ex an undet. plant, 10. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, North Tripura, South Tripura), Meghalaya, West Bengal, Bihar, Arunachal Pradesh, Punjab, Haryana, Gujarat. Elsewhere : Taiwan, Thailand, Japan, Madagascar, U. S. A., South America, Mexico, Brazil, British West Indies.

50. *Amblyseius (Amblyseius) largoensis* (Muma)

1955. *Amblyseiopsis largoensis* Muma, *Ann. Ent. Soc. Amer.*, **48** : 266.
1959. *Amblyseius largoensis*, Ehara, *Acarologia*, **1** : 293-294.
1986. *Amblyseius (Amblyseius) largoensis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 51-55.
1987. *Amblyseius (Amblyseius) largoensis*, Gupta, *Rec. zool. Surv. India, Occ. Pap.*, No. 95 : 10-11.

Material examined : 3 females, 1 male, Dist. West Tripura, Agartala, ex *Jasminum sambac*, 2 12. 1993; 1 female Agartala, ex *Bougainvillea spectabilis*, 2. 12. 1993; 2 females, 1 male, Agartala, ex *Mallotus* sp., 2. 12. 1993; 1 female, Agartala; ex *Capsicum annuum*, 3. 12. 1993; 2 females, Agartala, ex *Alstonia scholaris* ; 3 females, Dist. North Tripura, Kumarghat, ex an undet. plant. 18. 12. 1993; 1 female, Dist. South Tripura Udaipur, ex *Anona squamosa*, 9. 12. 1993.

Distribution : India : Tripura (Dists. : West Tripura, South Tripura, North Tripura), Andaman & Nicobar Isls., Arunachal Pradesh, Assam, Andhra Pradesh, West Bengal, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Manipur, Meghalaya, Nagaland, Orissa, Pondicherry, Punjab, Tamil Nadu, Uttar Pradesh. Elsewhere ; Philippines, Thailand, Taiwan, Hongkong, Israel, Iran, Japan, New Zealand, South Africa, Kenya, U. S. A., Brazil, Costa Rica, Guatemala, Honduras, Jamaica, Mexico, Puerto Rico, Trinidad.

Remarks : This mite though recorded elsewhere as effective predator but in the present investigation it was not found to be so.

51. *Amblyseius (Euseius) alstoniae* Gupta

1975. *Amblyseius alstoniae* Gupta, *Internat. J. Acarol.*, **1** (2) : 31-32.
1986. *Amblyseius (Euseius) alstoniae*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 80-83.
1987. *Amblyseius (Euseius) alstoniae*, Gupta, *Rec. zool. Surv. India, Occ. Pap.* No. 95 : 21.

Material examined : 1 female, Dist. West Tripura, Agartala, ex *Cassia occidentalis*, 3. 12. 1993; 5 females, Agartala, ex *Magnolia grandiflora*, 2. 12. 1993; 2 females, Dist. South Tripura, Lebachara, ex *Calotropis procera*, 14. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura), Meghalaya, Bihar, Jammu & Kashmir, Madhya Pradesh, Punjab, Bihar, Orissa, Rajasthan, Tamil Nadu.

Remarks : This species was earlier unknown from Tripura.

52. *Amblyseius (Euseius) cocosocius* Ghai & Menon

1967. *Amblyseius cocosocius* Ghai, & Menon, *Oriental Ins.*, **1** : 67-68.
1986. *Amblyseius (Euseius) cocosocius*, Gupta, *Fauna of India, (Acari : Mesostigmata) Family Phytoseiidae*, pp. 80-83.

1987. *Amblyseius (Euseius) coccocius*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 23.

Material examined : 1 female, Dist. North Tripura, Kailashahar, ex an undet. plant. 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), West Bengal, Andhra Pradesh, Karnataka, Kerala, Pondicherry, Tamil Nadu, Punjab.

53. *Amblyseius (Euseius) coccineae* Gupta

1975. *Amblyseius coccineae* Gupta, *Internat. J. Acarol.*, 1 (2) : 33.
1986. *Amblyseius (Euseius) coccineae*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 80.
1987. *Amblyseius (Euseius) coccineae*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 22.

Material examined : 8 females, Dist. South Tripura, Sonamura, ex *Schima wallachii*, 10. 12. 1993; 1 female, Udaipur, ex *Psidium guajava*, 8. 12. 1993; 4 females, Dist. West Tripura, Agartala, ex an undet. plant, 2. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura), Andhra Pradesh, Gujarat, Bihar, Tamil Nadu, Jammu & Kashmir, Madhya Pradesh, Meghalaya, Orissa, Pondicherry, Tamil Nadu, Uttar Pradesh.

54. *Amblyseius (Euseius) bambusae* Ghai & Menon

1966. *Amblyseius bambusae* Ghai & Menon, *Oriental Ins.*, 1 : 66-67.
1986. *Amblyseius (Euseius) bambusae*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 76-78.
1987. *Amblyseius (Euseius) bambusae*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 22.

Material examined : 1 female, Dist. South Tripura, Sonamura, ex bamboo, 10. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), West Bengal, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu.

Remarks : This forms a new record from Tripura.

55. *Amblyseius (Euseius) finlandicus* (Oudemans)

1915. *Seiulus finlandicus* Oudemans, *Ent. Ber.*, 4 : 183.
1986. *Amblyseius (Euseius) finlandicus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 88.
1987. *Amblyseius (Euseius) finlandicus*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 24-25.

Material examined : 2 females, Dist. North Tripura, Kailashahar, ex an undet. plant, 17. 12. 1993; 5 females, S. Tripura, Damboor Lake, ex *Ipomoea*, sp 15. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura, South Tripura), West Bengal, Bihar, Himachal Pradesh, Jammu & Kashmir, Karnataka, Punjab, Meghalaya, Uttar Pradesh. Elsewhere : Pakistan, Japan, Greece, Italy, Netherlands, Scandinavian countries, Russia, Africa, Mexico, South America, North America.

56. *Amblyseius (Euseius) ovalis* (Evans)

1953. *Typhlodromus ovalis* Evans, *Ann. Mag. Nat. Hist.*, 6 : 458-461.
1986. *Amblyseius (Euseius) ovalis*, Gupta, *Fauna of India (Acari. Mesostigmata) Family Phytoseiidae*, pp. 158.
1987. *Amblyseius (Euseius) ovalis*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : pp. 27-28.

Material examined : 2 females, Dist. West Tripura, Agartala, ex *Luffa acutangula*, 2. 12. 1993; 2 females, Teliamura, ex banana, 5. 12. 1993; 1 female, Dist. South Tripura, Jatanbari, ex *Ficus religiosa*, 13. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura), Andaman & Nicobar Isls., Bihar, Gujarat, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Pondicherry, Tamil Nadu. Elsewhere : Philippines, Taiwan, Malaysia, Indonesia, Japan, Hong Kong, Mauritius, New Zealand, Hawaii, Mexico.

57. *Amblyseius (Euseius) pruni* Gupta

1975. *Amblyseius pruni* Gupta, *Internat. J. Acarol.*, 1(2) : 43-44.
1986. *Amblyseius (Euseius) pruni*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 94-96.
1987. *Amblyseius (Euseius) pruni*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 28-29.

Material examined : 2 females, Dist. West Tripura, Agartala, ex *Carica papaya*, 2. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Assam, Meghalaya, West Bengal, Himachal Pradesh, Jammu & Kashmir.

58. *Amblyseius (Euseius) rhododendronis* Gupta

1970. *Amblyseius rhododendronis* Gupta, *Oriental Ins.*, 4 : 187-188.
1986. *Amblyseius (Euseius) rhododendronis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 96-98.
1987. *Amblyseius (Euseius) rhododendronis*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 29.

Material examined : 1 female, Dist. West Tripura, Agartala, ex an undet. plant, 10. 12. 1993.

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

59. *Amblyseius (Euseius)* sp.

Material examined : 1 female, Dist. South Tripura, Damboor Lake, ex cashew, 15. 12. 1993.

Remarks : This species is likely to be an undescribed species because of the fact that the seta Z_4 much longer than S_4 and S_5 . The final decision regarding novelty of the species will be taken later after more intensive study.

60. *Amblyseius (Neoseiulus) longispinosus* (Evans)

1952. *Typhlodromus longispinosus* Evans, *Ann. Mag. Nat. Hist.*, (12) 5 : 413-416.

1986. *Amblyseius (Neoseiulus) longispinosus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 116-117.

1987. *Amblyseius (Neoseiulus) longispinosus*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 39-40.

Material examined : 1 female, Dist. West Tripura, Agartala, ex *Luffa acutangula*, 3. 12. 1993; 1 female, Dist. North Tripura, Kailashahar, ex grass, 19. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, North Tripura), West Bengal, Andaman & Nicobar Isls., Bihar, Karnataka, Punjab, Orissa, Pondicherry, Tamil Nadu, Uttar Pradesh. Elsewhere : Philippines, Taiwan, Indonesia, Malaysia, Japan, Hong Kong, New Zealand, Jamaica, Hawaii, South Africa.

Remarks : This mite was found actively feeding upon all stages of *Tetranychus* spp. indicating its potential value in biological control. Due to nonavailability of male specimens, the *Tetranychus* spp. could not be identified. This was found to be one of the most active and important predatory mites.

61. *Amblyseius (Neoseiulus) fallacis* (Garman)

1948. *Iphidulus fallacis* Garman, *Bull. Conn. Agr. Exp. Stn.*, 520 : 13.

1986. *Amblyseius (Neoseiulus) fallacis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 109.

1987. *Amblyseius (Neoseiulus) fallacis*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 37.

Material examined : 1 female, Dist. West Tripura, Agartala, ex grass, 2. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), West Bengal, Assam, Meghalaya, Bihar, Haryana, Punjab, Tamil Nadu. Elsewhere : Algeria, Australia, North & Central America, Canada, Caribbean Isls.

Remarks : This mite was seen in association with a *Schizotetranychus* sp. infesting grass. However, its feeding was not observed.

**62. *Amblyseius (Paraphytoseius) multidentatus*
(Swirski & Shechter)**

1960. *Typhlodromus (Amblyseius) orientalis* Narayanan, Kaur & Ghai, *Proc. natn. Ins. Sci.*, **26B** : 394.
1986. *Amblyseius (Paraphytoseius) multidentatus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 123-126.
1987. *Amblyseius (Paraphytoseius) multidentatus*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 46-47.

Material examined : 3 females, Dist. West Tripura, Agartala, ex *Albizia lucida*, 3. 12. 1993; 2 females, Agartala, ex *Eupatorium* sp., 4. 12. 1993; 4 females, Teliamura, ex arecanut, 11. 12. 1993; 1 female, Teliamura, ex *Dolichos lablab*, 4. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), West Bengal, Andaman & Nicobar Isls., Andhra Pradesh, Assam, Bihar, Karnataka, Maharashtra, Meghalaya, Tamil Nadu, Uttar Pradesh. Elsewhere Pakistan, Thailand, Philippines, Malaysia, Nigeria, Madagascar, Honkkong.

**63. *Amblyseius (Phytoscutella) salebrosus*
(Chant)**

1960. *Typhlodromus (Amblyseius) salebrosus* Chant, *Can. Ent.*, **92** : 58-60.
1986. *Amblyseius (Phytoscutella) salebrosus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 128-130.
1987. *Amblyseius (Phytoscutella) salebrosus*, Gupta, *Rec. zool. Surv. India, Occ. Pap., No. 95* : 48.

Material examined : 3 females, 2 males, Dist. West Tripura, Agartala, ex *Colocasia* sp., 3. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura), Meghalaya, Assam. Elsewhere : Thailand, Taiwan.

**64. *Amblyseius (Typhlodromalus) kalimpongensis*
Gupta**

1969. *Amblyseius kalimpongensis* Gupta, *Bull. Ent. Soc. India*, **10** : 128-129.

1986. *Amblyseius (Typhlodromalus) kalimpongensis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 150-152.

1987. *Amblyseius (Typhlodromalus) kalimpongensis*, Gupta, *Rec. zool. Surv. India, Occ. Pap., No. 95* : 53.

Material examined : 2 females, Dist. North Tripura, Kailashahar, ex an undet. plant, 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), West Bengal, Assam, Meghalaya, Bihar, Orissa, Gujarat, Karnataka, Tamil Nadu, Uttar Pradesh.

**65. *Amblyseius (Typhlodromips) crotalariae*
Gupta**

1977. *Amblyseius crotalariae* Gupta, *Entomologists. Mon. Mag.*, **112** : 53-55.
1986. *Amblyseius (Typhlodromips) crotalariae*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 176-177.
1987. *Amblyseius (Typhlodromips) crotalariae*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 65.

Material examined : 1 female, Dist. North Tripura, Kailashahar, ex paddy, 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), West Bengal, Assam, Meghalaya.

**66. *Amblyseius (Typhlodromips) officinaria*
Gupta**

1975. *Amblyseius officinaria* Gupta, *Internat. J. Acarol.*, **1(2)** : 39.
1986. *Amblyseius (Typhlodromips) officinaria*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 176-177.
1987. *Amblyseius (Typhlodromips) officinaria*, Gupta, *Rec. zool. Surv. India, Occ. Pap., No. 95* : 65.

Material examined : 2 females, Dist. West Tripura, Bisalgarh, ex an undet. plant, 7. 12. 1993.

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

**67. *Amblyseius (Typhlodromips) polyantheae*
Gupta**

1975. *Amblyseius polyantheae* Gupta, *Internat. J. Acarol.*, **1(2)** : 42-43.

1986. *Amblyseius (Typhlodromips) polyantheae*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 178.

1987. *Amblyseius (Typhlodromips) polyantheae*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 65-66.

Material examined : 1 female, Dist. West Tripura, Teliamura, ex pigeonpea, 5. 12. 1993.

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

68. *Amblyseius (Typhlodromips) suknaensis* Gupta

1970. *Amblyseius suknaensis*, Gupta, *Oriental Ins.*, 4 : 185-186.

1986. *Amblyseius (Typhlodromips) suknaensis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 185-188.

1987. *Amblyseius (Typhlodromips) suknaensis*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 67.

Material examined : 1 female, Dist. South Tripura, Sonamura, ex bamboo, 10. 12. 1993; 2 females, Dist. West Tripura, Chakmaghat, ex citrus, 6. 12. 1993; 1 female, Dist. South Tripura, Jatanbari, ex *Dolichos lablab*, 5. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura), Assam, Meghalaya, West Bengal, Andaman & Nicobar Isl., Kerala.

69. *Amblyseius (Typhlodromips) syzygii* Gupta

1975. *Amblyseius syzygii* Gupta, *Internat. J. Acarol.*, 1(2) : 44-45.

1986. *Amblyseius (Typhlodromips) syzygii*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 188-190.

1987. *Amblyseius (Typhlodromips) syzygii*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 68.

Material examined : 3 females, Dist. North Tripura, Kailashahar, Sonamukhi Tea Estate, ex tea, 19. 12. 1993; 2 females, Kailashahar, ex bamboo, 18. 12. 1993; 2 females, Dist. South Tripura, Damboor Lake, ex an undet. plant, 15. 12. 1993; 1 female, Maharani, ex an undet. plant,

11. 12. 1993; 2 females, Dist. West Tripura, Agartala, ex *Dolichos lablab*, 6. 12. 1993; 5 females, Dist. South Tripura, Jatanbari, ex mango, 13. 12. 1993; 1 female, Gamaibari, ex jackfruit, 13. 12. 1993.

Distribution : India : Tripura (Dists. West Tripura, South Tripura, North Tripura), West Bengal, Meghalaya, Orissa, Bihar, Uttar Pradesh. Elsewhere : Thailand.

70. *Indoseiulus ricini* (Ghai & Menon)

1969. *Indoseiulus ricini* Ghai & Menon, *Oriental Ins.*, 3 : 348.

1982. *Indoseiulus ricini*, Ehara, *Appl. Ent. zool.* 18 : 42-43.

1986. *Indoseiulus ricini*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 195-197.

1987. *Indoseiulus ricini*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 71-72.

Loc. : Dist. West Tripura, Agartala.

Habitat : *Ricinus communis*.

Distribution : India : Tripura (Dist. West Tripura), West Bengal, Arunachal Pradesh, Bihar, Delhi, Gujarat, Himachal Pradesh, Tamil Nadu, Uttar Pradesh.

71. *Platyseiella mumai* Ray & Gupta

1981. *Platyseiella mumai* Ray & Gupta, *Bull. zool. Surv. India*, 4 : 277-279.

1986. *Platyseiella mumai*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 208-210.

1987. *Platyseiella mumai*, Gupta, *Rec. zool. Surv. India, Occ. pap. No. 95* : 75-76.

Loc. : Dist. West Tripura, Agartala.

Habitat : Undet. plant.

Distribution : India : Dist. West Tripura.

72. *Iphiseius andamanicus* Gupta

1980. *Iphiseius andamanicus* Gupta, *Entomologists. Mon. Mag.*, 115 : 213-214.

1986. *Iphiseius andamanicus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 198-200.

1987. *Iphiseius andamanicus*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 73.

Material examined : 2 females, 1 male, Dist. West Tripura, Teliamura, ex banana, 4. 12. 1993; 1 female, Bagalpur, ex undet. plant, 3. 12. 1993.

Distribution : India : Tripura (Dist. West Tripura). West Bengal, Andaman & Nicobar Isls., Karnataka.

73. *Phytoseius (Pennaseius) kapuri* Gupta

1969. *Phytoseius (Phytoseius) kapuri* Gupta, *Israel J. agric. Res.*, **19** : 115-117.
1986. *Phytoseius (Pennaseius) kapuri*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 221-223.
1987. *Phytoseius (Pennaseius) kapuri*, Gupta, *Rec. zool. Surv. India. Occ. Pap. No. 95* : 81-82.

Loc. : Dist. West Tripura (Agartala), North Tripura (Kumarghat).

Habitat : *Psidium guajava*, *Clerodendron* sp.

Distribution : India : Tripura (Dists. West Tripura, North Tripura), West Bengal Bihar, Andaman & Nicobar Isls., Bihar, Orissa, Punjab, Rajasthan, Tamil Nadu, Gujarat, Jammu & Kashmir, Meghalaya, Uttar Pradesh.

74. *Phytoseius (Phytoseius) brevicrinis* Swirski & Shechter

1961. *Phytoseius (Dubininellus) brevicrinis* Swirski & Shechter, *Israel J. agric. Res.*, **11** : 106-108.
1987. *Phytoseius (Phytoseius) brevicrinis*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 86.

Loc. : Dist. North Tripura.

Habitat : *Bambusa* sp.

Distribution : India : Tripura (Dist. North Tripura).

75. *Phytoseius (Phytoseius) indicus* Bhattacharyya

1969. *Phytoseius (Dubininellus) indicus* Bhattacharyya, *J. Bom. Nat. Hist. Soc.*, **65** (3) : 679-680.

1986. *Phytoseius (Phytoseius) indicus*, Gupta *Fauna of India, (Acari : Mesostigmata) Family Phytoseiidae*, pp. 234-236.

1987. *Phytoseius (Phytoseius) indicus*, Gupta, *Rec. zool. Surv. India. Occ. Pap. No. 95* : 92-93.

Loc : Dist. West Tripura (Agartala).

Habitat : *Dolichos lablab*, *Zizyphus mauritiana*.

Distribution : India : Tripura (Dist. West Tripura), West Bengal, Punjab. Himachal Pradesh.

76. *Phytoseius (Phytoseius) intermedius* Evans & Macfarlane

1962. *Phytoseius (Dubininellus) intermedius* Evans & Macfarlane, *Ann. Mag. nat. Hist.*, (13) **4** : 587-588.
1986. *Phytoseius (Phytoseius) intermedius*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 236-238.
1987. *Phytoseius (Phytoseius) intermedius*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 89.

Loc : Dist. West Tripura (Agartala).

Habitat : *Calotropis procera*.

Distribution : India : Tripura (Dist. West Tripura), West Bengal., Andaman Isls., Uttar Pradesh, Elsewhere : Pakistan, Central Africa, South Rhodesia, Belgian Congo, Madagascar, Japan.

77. *Phytoseius (Phytoseius) meyeræ* Gupta

1977. *Phytoseius (Dubininellus) meyeræ* Gupta, *Indian J. Acar.*, **2** : 7.
1986. *Phytoseius (Phytoseius) meyeræ*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 244.
1987. *Phytoseius (Phytoseius) meyeræ*, Gupta, *Rec. zool. Surv. India, Occ. Pap., No. 95* : 91-92.

Material examined : 2 females, Dist. South Tripura, Lebachara, ex bamboo, 14. 12. 1993; 1 female, Gokulpur, ex bamboo, 9. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), Assam, Meghalaya.

78. *Phytoseius (Phytoseius) roseus* Gupta

1969. *Phytoseius (Dubininellus) roseus* Gupta, *Israel J. agric. Res.*, **19** : 119-120.
1986. *Phytoseius (Phytoseius) roseus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 255-257.
1987. *Phytoseius (Phytoseius) roseus*, Gupta, *Rec. zool. Surv. India, Occ. Pap.*, No. 95 : 96.

Lac. : Dist. West Tripura (Agartala).

Habitat : *Psidium guajava*.

Distribution : India : Tripura (Dist. West Tripura), Punjab, Gujarat, Tamil Nadu, Jammu & Kashmir, West Bengal, Uttar Pradesh. Elsewhere : Pakistan.

79. *Typhlodromus (Amblydromella) darjeelingensis* Gupta

1978. *Typhlodromus eharai* Gupta, *Bull. zool. Surv. India* **1** : 54.
1986. *Typhlodromus (Amblydromella) darjeelingensis* Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 270-272.
1987. *Typhlodromus (Amblydromella) darjeelingensis*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 105-106.

Loc. : Dist. West Tripura (Agartala).

Habitat: Undet. plant.

Distribution : India : Tripura (Dist. West Tripura), West Bengal, Karnataka, Tamil Nadu, Uttar Pradesh, Meghalaya.

80. *Typhlodromus (Amblydromella) gopali* Gupta

1969. *Typhlodromus gopali* Gupta, *Sci. & Cult.*, **35** : 277.
1986. *Typhlodromus (Amblydromella) gopali*, Gupta *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 274-275.
1987. *Typhlodromus (Amblydromella) gopali*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 108.

Material examined : 1 female, Dist. North Tripura, Kailashahar, ex banana, 18. 12. 1993.

Distribution : India : Tripura (Dist : North Tripura), West Bengal, Rajasthan, Punjab. Himachal Pradesh.

81. *Typhlodromus (Amblydromella) bambusicolus* Gupta

1977. *Typhlodromus bambusicolus* Gupta, *Indian J. Acar.*, **2** : 2-4.
1986. *Typhlodromus (Amblydromella) bambusicolus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, pp. 267.
1987. *Typhlodromus (Amblydromella) bambusicolus*, Gupta, *Rec. zool. Surv. India, Occ. Pap. No. 95* : 103.

Material examined : 1 female, Dist. South Tripura, Lebachara, ex bamboo, 14. 12. 1993.

Distribution : India : Tripura (Dist. South Tripura), Assam.

Suborder ASTIGMATA

Key to the families of Astigmata known to occur on plants in Tripura

1. With a dorsal transverse groove dividing the propodosoma from the hysterosoma, claw attached to the end of the tarsus by paired sclerites surrounded by a short, cushion-like pretarsus. If the pretarsus is elongated, then the claw is bifid in the female.....
.....Fam. ACARIDAE

On genu I, sigma₁ is more than 3 times longer than sigma₂, claws of female never bifid; femur of male enlarged and bearing ventrally a conical process Gen. *Acarus*

Omega₁ with sides expanding gradually from base, then narrowing to a indistinct neck before expanding into terminal head, width of widest part of head equal to width of widest part of stem.....
.....*Acarus farris*

—Without a dorsal transverse groove dividing the propodosoma from the hysterosoma. Claw attached to the end of the pretarsus and sometimes joined to the end of the tarsus. Genital opening of female with genital plates

not so strongly defined or if so, then the opening is between coxae I and II. Male without anal suckers

.....Fam. GLYCYPHAGIDAE

Without a subtarsal scale, usually with crista metopica*Glycyphagus* sp.

Family 14. ACARIDAE Ewing & Nesbitt

82. *Acarus farris* Oudemans

1905. *Aleurobius farris* Oudemans, *Ent. Ber.*

Material examined : 1 female, Dist. North Tripura, Kailashahar, ex coconut, 18. 12. 1993.

Distribution : India : Tripura (Dist. North Tripura), Meghalaya. Elsewhere : England, Scotland, Wales, Netherland, Germany, Kenya, U. S. A., Czechoslovakia.

Family 15. GLYCYPHAGIDAE Berlese

83. *Glycyphagus* sp.

Loc. : Dist. West Tripura (Agartala).

Habitat : *Colocasia* sp.

Remarks : These mites are more common in stored products, dust, etc. Hence, its occurrence in *Colocasia* is purely accidental.

District wise distribution of plant mite species in Tripura

Name of species	W. Tripura	N. Tripura	S. Tripura

Family	TETRANYCHIDAE		
1. <i>Aponychus corpuzae</i>	-	-	+
2. <i>Eotetranychus hirsti</i>	+	-	-
3. <i>E. kankitus</i>	+	-	-
4. <i>Eotetranychus</i> sp.	+	-	-
5. <i>Eutetranychus orientalis</i>	+	-	-
6. <i>Oligonychus biharensis</i>	-	+	+
7. <i>O. coffeae</i>	-	-	+

3-1/ZSI/Cal/2000

Name of species	W. Tripura	N. Tripura	S. Tripura

8. <i>O. gossypii</i> *	+	-	-
9. <i>O. iseilemae</i>	-	+	-
10. <i>O. mangiferus</i>	+	-	-
11. <i>O. oryzae</i>	+	-	-
12. <i>Panonychus citri</i>	+	+	-
13. <i>Schizotetranychus andropogoni</i>	+	-	-
14. <i>S. baltazari</i>	+	+	-
15. <i>S. cajani</i>	+	+	-
16. <i>Tetranychus hypogaeae</i>	+	+	-
17. <i>T. ludeni</i>	-	+	-
18. <i>T. neocaledonicus</i>	+	-	-
19. <i>T. urticae</i>	+	+	+
20. <i>Tetranychus</i> sp.	-	-	+

Family TENUIPALPIDAE

21. <i>Brevipalpus deleoni</i>	-	+	-
22. <i>B. phoenicis</i>	-	+	+
23. <i>Tenuipalpus micheli</i>	-	-	+
24. <i>T. punjabensis</i>	+	-	-

Family TARSONEMIDAE

25. <i>Polyphagotarsonemus latus</i>	+	+	-

Family ERIOPHYIDAE

26. <i>Aceria ficus</i>	-	+	-
27. <i>Aceria litchii</i>	+	+	-
28. <i>Acaphylla theae</i>	-	-	+

Family EUPODIDAE

29. <i>Eupodes sigmodensis</i>	+	-	-

Family CUNAXIDAE

30. <i>Cunaxa cynodonae</i>	-	+	-
31. <i>C. anacardae</i>	-	-	+
32. <i>C. bambusae</i>	-	+	-
33. <i>C. mangiferae</i>	-	-	+
34. <i>C. setirostris</i>	+	-	-

Name of species	W. Tripura	N. Tripura	S. Tripura	Name of species ¹¹	W. Tripura	N. Tripura	S. Tripura
35. <i>Neocunaxoides andrei</i> *	+	-	-	55. <i>A. (E.) finlandicus</i>	-	+	+
Family	CHEYLETIDAE			56. <i>A. (E.) ovalis</i>	+	+	-
36. <i>Cheletogenes ornatus</i>	+	-	-	57. <i>A. (E.) pruni</i>	+	+	-
37. <i>Cheletomimus</i> sp.	-	+	-	58. <i>A. (E.) rhododendronis</i> .	+	-	-
Family	STIGMAEIDAE			59. <i>A. (E.)</i> sp.	-	+	-
38. <i>Agistemus fleschneri</i>	+	+	-	60. <i>A. (Neoseiulus) longispinosus</i>	+	-	+
39. <i>A. terminalis</i>	+	-	-	61. <i>A. (N.) fallacis</i>	+	-	-
40. <i>A. unquiparvus</i> *	-	+	-	62. <i>A. (Paraphytoseius) multidentatus</i>	+	-	-
41. <i>Agistemus</i> sp.	-	+	-	63. <i>A. (Phytoscutella) salebrosus</i>	+	-	-
Family	TYDEIDAE			64. <i>A. (Typhlodromalus) kalimpongensis</i>	-	-	+
42. <i>Pronematus fleschneri</i>	+	-	-	65. <i>A. (Typhlodromips) crotalariae</i>	-	-	+
43. <i>Paralorryia fodderi</i>	+	-	-	66. <i>A. (T.) officinaria</i>	+	-	-
44. <i>Tydeus cumini</i>	-	-	+	67. <i>A. (T.) polyantheae</i>	+	-	-
45. <i>Tydeus</i> sp.	+	-	-	68. <i>A. (T.) suknaensis</i>	+	+	-
Family	BDELLIDAE			69. <i>A. (T.) syzygii</i>	+	+	+
46. <i>Bdellodes (Hoploscirus) affinis</i>	+	-	-	70. <i>Indoseiulus ricini</i>	+	-	-
Family	CALIGONELLIDAE			71. <i>Platyseiella mumai</i>	+	-	-
47. <i>Molothrognathus leptostylus</i> *	+	-	-	72. <i>Iphiseius andamanicus</i>	+	-	-
Family	ASCIDAE			73. <i>Phytoseius (Pennaseius) kapuri</i>	+	-	+
48. <i>Lasioseius</i> sp.	+	-	-	74. <i>P. (Phytoseius) brevicrinis</i>	-	-	+
Family	PHYTOSEIIDAE			75. <i>P. (P.) indicus</i>	+	-	-
49. <i>Amblyseius (Amblyseius) herbicolus</i>	+	+	+	76. <i>P. (P.) intermedius</i>	+	-	-
50. <i>A. (A.) largoensis</i>	+	+	+	77. <i>P. (P.) meyeræ</i>	-	+	-
51. <i>A. (Euseius) alstoniae</i>	+	+	-	78. <i>P. (P.) roseus</i>	+	-	-
52. <i>A. (E.) coccosocius</i>	-	-	+	79. <i>Typhlodromus (Amblydromella) darjeelingensis</i>	+	-	-
53. <i>A. (E.) coccineae</i>	+	+	-	80. <i>T. (A.) gopali</i>	-	-	+
54. <i>A. (E.) bambusae</i>	-	+	-				

Name of species	W. Tripura	N. Tripura	S. Tripura
81. <i>T. (A.) bambusicolus</i>	–	+	–
Family	ACARIDAE		
82. <i>Acarus farris</i>	–	–	+
Family	GLYCYPHAGIDAE		
83. <i>Glycyphagus</i> sp.	+	–	–
Total : 83	55	31	24

*New reports from India

SUMMARY

This paper deals with a total of 83 species known to occur on plants in Tripura. These belong to 3 orders, 15 families and 30 genera.

Among these, 3 species form new records from India and 70 species form new records from Tripura. Out of these 83 species, 29 species are plant feeding, 52 belong to predatory groups and the occurrence of the remaining 2 are accidental occurrence on plants. The important synonymies, collection records, distribution in India and abroad and keys to all the taxonomic categories are provided. In addition, a list of species showing their district-wise distribution in Tripura is also given. This is the first consolidated account on plant mite fauna of Tripura.

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ORIBATID MITES (ACARI : ORIBATEI)

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INTRODUCTION

Oribatid mites are numerically the most abundant soil acarine fauna. They form a complex group under the order Acarina. These mites are commonly called "beetle" or "moss" mites. Oribatid mites are very common inhabitants of soil, litter, humus, compost heaps, lichens, moss, bark of trees and bird nests, house-dust, caves, lava caves, nests of small mammals and various other habitats like pasture soils, coniferous taiga forest, arctic tundra and even in subantarctic zones (Wallwork, 1973).

From the economic point of view the oribatid mites have drawn a special attention of world acarologists because of their direct and indirect effect on human beings and other animals. They are known to promote soil fertility through humification of organic matter. These mites are also known to act as an agent for biological control of pests. There are a few number of oribatid species which feed on different parts of higher plants. Many oribatids are fungul spore carriers. They are also responsible for transmitting various helminth diseases to domestic animals. Oribatid mites have also been reported to cause injury to crop plants and economically important plants. The saprophytic oribatids play an important role in regulating soil nematode populations. There are many house dust mites of oribatid group which are causative agents of respiratory allergic diseases in human beings.

The present work is based on collection of oribatid mites from Tripura done by the author and his associates. The work also includes the

species which have not been studied by the author but were described or recorded earlier from the state through literature related to taxonomic and ecological studies done by previous workers.

REVIEW OF THE LITERATURE ON ORIBATID MITES OF TRIPURA

The study of oribatid mites of Tripura was started in recent times. The first attempt to study these mites was made by Subias and Sarkar (1982). They reported primitive oribatid belonging to the family Trhypochthoniidae and Malaconothridae and described three new species viz., *Allonothrus pararusseolus*, *Malaconothrus pauciareolatus* and *M. crassisetosus*. In the same study *M. robustus asiaticus* Aoki, 1967 was elevated to species status. A new species *Malacoangelia similis* and three new subspecies viz., *Cosmochthonius lanatus diversiseta*, *Epilohmannia pallida areolata* and *E. pallida rugosa* were described and two known species were recorded by Sarkar and Subias (1982). In the next year Sarkar added two new species *Cosmochthonius agartalensis* and *Trimalaconothrus tripurensis* to the list of Tripura fauna. Sarkar and Subias (1983) reported *Papillonotus tricarinatus* from Atharamura, Tripura. Further, Subias and Sarkar (1983) studied oppiidae from Tripura soils and reported the genera *Mystroppia*, *Stachyoppia* and *Oxyoppia* for the first time from India. In the same work they described three new species, *Striatoppia*

similis, *S. tripuraensis* and *Stachyoppia granulosa* and proposed a new combination for *Oxyoppia polynesia* (Hammer, 1972). In 1984, Sarkar and Subias described *Vepracarus cornutus* and *Paulianacarus foliatus* as new to science and regarded *Javacarus kuhnelti* var. *foliatus* Hammer, 1972 as *Javacarus foliatus* Hammer, 1972 n. stat. Later in the same year Subias and Sarkar described few Ptyctima species *Mesoplophora crassisetosa*, *Hoplophorella raychaudhurii* and *Hoplophorella perisi*. Sarkar (1985) reported *Archezogetes tuberculatus* from Agartala. After five years, in 1990 Sarkar published her studies on the community structure of soil microarthropods in different localities in the West district of Tripura and reported acarina as the most dominant soil inhabiting group. She listed 24 species of oribatids distributed over 18 genera under 11 families. She also recorded population maxima in winter (November) and minima in summer (July-August). Further, Sarkar (1991) described *Allonothrus dhananjayi* and *Eremulus jyotsnai* and reported *Eremulus truncatus* Hammer, 1991 for the first time from Tripura. Bondjema *et al.* (1991) analysed the quantitative variation of soil microarthropods in relation to edaphic factors in a rainforest in Tripura. Sarkar (1992) described three new species of *Microzetes* viz., *longistriatus*, *monoramai* and *rudrasagarensis* and the other species *Schizozetes quadrilineatus* from Tripura. Chakrabarty and Bhattacharya (1992) and Bhattacharya and Chakrabarti (1995) studied soil oribatid mites in an area of rubber plantation and an adjacent wastelands in South district of Tripura for two consecutive years. They listed a total of 46 species which included two genera and 13 species as first record from India.

Till now a total of 160 species under 98 genera over 44 families have been known from Tripura.

MATERIAL AND METHODS

For taxonomic studies of oribatid mites, samples mainly litter, soil and humus from all

possible habitats in different localities (Table 1) in Tripura were collected by the present and earlier workers. A map showing the sampling localities has been provided (Map 1). The samples were taken from upper 5-10 cm of soil profile and kept in polythene bags till those were subjected to the process of extraction. The mites extracted from the samples, by using modified Tullgren funnels, were collected in glass vials containing 70% alcohol. The oribatid specimens were then sorted out from their associated fauna and transferred into a vial containing an equal amount of 70% alcohol and lactic acid for desclerotization as suggested by J. Balogh (1965, 1972) and J. Balogh and S. Mahunka (1983). For microscopic observations, method of temporary mounting advocated by Grandjean (1949), Balogh (1965, 1972) and Balogh and Mahunka (1983) were followed. The camera lucida drawings were drawn as and when needed. After necessary microscopic observations the specimens were transferred in small glass vials containing 70% alcohol. The keys for identification prepared by Balogh (1965, 1972), Balogh and Mahunka (1983), Balogh and Balogh (1988) and Subias and Balogh (1989) have been followed.

The collection, after final examinations, with proper labels are deposited in the National Zoological Collection, Zoological Survey of India, Calcutta.

Table 1. Collection localities in the districts of Tripura

West District	
1. Mekliban	10. Lembuchhara
2. Khowai	11. Cinathani
3. Padmabari	12. Ramnagar
4. Mohanpur	13. Maharaniipur
5. Sonatala	14. Kalyanpur
6. Padmabill	15. Kunjaban
7. Narsinga	16. Abhoynagar
8. Chebri	17. Central Jail
9. Ramchandraghat	18. Subhasnagar

19. Agartala town	32. Teliamura
20. M.B.B. College Campus	33. Jampaijala
21. Khayerpur	34. Bisalgar
22. Badharghat	35. Sipahijala
23. Jirania	36. Brajapur
24. Jagendranagar	37. Matinagar
25. Madhuban	38. Nalchhara
26. Ananthanagar	39. Khedabari
27. Kamlasagar	40. Melaghar
28. Madhupur	41. Rudrasagar
29. Anandanagar	42. Sonamura
30. Lakshmipur	43. Battala
31. Atharamura R.F.	44. Jatrapur
	45. Durlavpur

South District

46. Garjanmura	62. Malbasa
47. Totabari	63. Paharpur
48. Udaipur	64. Jatanbari
49. Kankraban	65. Jarimura
50. Murapara	66. Ekchhari
51. Matarbari	67. Karbuk
52. Batsabari	68. Santirbazar
53. Baisabari	69. Radhakishoreganj
54. Joalikhamer	70. Laskhmipur
55. Matipocha	71. Puranarajbari
56. Ampinagar	72. Radhanagar
57. Birganj	73. Joalbari
58. Maharani	74. Pulchari
59. Amarpur	75. Manubazar
60. Rangtang	76. Uttarkalapani
61. Birchandranagar	77. Bellamukhi

North District

78. Manu	79. Ambasa

necessary for understanding these mites and for their identification are discussed here.

The body size of oribatids vary from being minute to large. The smaller group may measure between 100-300 mm in length, while a large number of species are in 300-900 mm size range. Only rarely the oribatids exceed 1000 mm.

The body of oribatid is covered by thin and hard cuticle. The degree of sclerotization and pigmentation varies considerably from one group to another. The body colour may be opaline white, yellow brown, dark brown or even black in some groups. However, the most dominant colour is brown. Various types of ornamentations being dotted, pitted, tuberculate, striolate, rugose, polygonal or reticulate are found on body surface.

In some cases the body surface may be covered by layer of secretion or cerotegument. Some oribatids in thier adult stage may carry the larval or nymphal exuviae on their back.

The body is divided into several regions. The body parts are generally immovably articulated but in some cases movable articulation is also present. There are three main types of articulatory systems :

- i) Dichoid : The body articulates between legs II and III.
- ii) Ptychoid : The body articulates behind legs IV.
- iii) Holoid : The body regions rigidly coalesced to form a uniform chitinous sheath.

MORPHOLOGICAL FEATURES

The body of oribatid mite consists mainly of two parts—the proterosoma and hysterosoma (Fig.1). These two parts are covered dorsally by the shields called prodorsum and notogaster respectively. On the ventral side there is an uniform shield—the ventral plate. The anterior part of the ventral plate includes the podosoma and is known as the coxosternal or epimeral region. The posterior side of the ventral plate is largely occupied by the genital and the anal

GENERAL MORPHOLOGY AND TERMINOLOGY

A high degree of diversity in regard to morphological features are observed in oribatid mites. The important features and terms, broadly

openings, and this part is called the anogenital region.

The morphological features greatly varies in primitive and higher groups of oribatid mites (Figs. 2-7).

Prodorsum : It is an anteriorly tapering and roughly triangular shield with a frontally extended portion rostrum and a pair of decurrent longitudinal lathe called lamellae (Figs. 2, 5) originating from the basal part of prodorsum. The lamellae are referred as true lamellae when they are flat, ribbon-shaped and distal part free from prodorsal surface. They are called costulae (Fig. 4), if they appear as simple lathe or ridges and without free portion. The free distal apices of lamellae are called cuspides. In some groups the lamellae are connected by thin or wide band, the translamellae (Fig. 5). The basal part of prodorsum may bear condyles, in some higher groups the prodorsal margin may have a longitudinal chitinous ridge like tutorium (Fig. 2) with a free apex. There are other chitinous excrescence, which may be borne by the prodorsum, are general tooth, pedotecta, tubercles, bothridial or other protruberences, condyles, etc. Prodorsum may be smooth or variously ornamented by foveolae, reticulation, punctation, etc.

Rostral (*ro*), lamellar (*la*), interlamellar (*in*) and exobothridial (*ex*) are the prominent prodorsal setae. In the primitive oribatids, there are two types of exobothridial setae definable as anterior exobothridial (*exa*) and posterior exobothridial (*exp*), while the higher groups possess only a pair of exobothridial setae (Figs. 2, 6, 8). For perception of vibrations, the sixth (in the higher oribatids the fifth) pair of setae are modified into trichobothria (Pseudostigmata) or sensillus whose shapes are highly variable from species to species being setiform, pectinate, clavate, spatulate, fusiform, lamelliform, caliciform, etc. (Fig. 10). Other prodorsal setae may be simple, rodlike, swordlike, leaflike, spatulate, brushlike, 'r'-shaped, etc. and they may be smooth, rough, ciliate, pectinate, squamose, etc.

The prodorsum is separated from the hysterosoma by dorsosejugal (*dsej*) and sejugal

(*sej*) sutures (Figs. 2, 6). These may be continuous lines or rarely interrupted medially or only exceptionally absent. In ptyctima group the prodorsum is called aspis. It can be moveably articulated with the hysterosoma or may be like penknife or immovably attached to hysterosoma.

Notogaster : It is a coalesced form of a total of ten segments of which only six segments (C, D, E, F, H and Ps) can be traced in the adults. Its structure and arrangement of setae differ considerably between the primitive and the higher oribatids. In the most primitive forms, either no closed shield evolves on the notogaster or even the original segments remain discernible. The notogaster may be elongated, oval, rounded, flat, pentagonal or hexagonal. It may bear chitinous excrescence like spines, condyles, teeth, posterior decurrent lamellae or cristae. The surface of the notogaster may be smooth, punctate, foveolate, pitted, granulate, reticulate, with sculpture or with semicircular depressions. The notogaster is generally undivided but in some cases it may be divided by 1-3 transverse sutures.

Some wing like extensions of notogaster—the pteromorphae—is present in a number of genera. The pteromorpha may be divided into five types as follows on the basis of shape, size, movability and articulation.

1. Aptera - Pteromorpha absent.
2. Immoptera not movable, without articulation; various shape and size.
3. Oxyptera immovable, large, anteriorly with a long, acute, spiniform appendage.
4. Euptera-Pteromorphae movable, with a hinge, without spiniform appendage.
5. Umbellata—both anterior and posterior margin of pteromorpha arcuate, pteromorphae large, auriculate or umbelliform.

Setation of Notogaster : The number of setae on notogaster is generally constant in oribatid mites. The number may vary and generally ranges between 1-16 pairs. In some groups secondary setae (neotrichia) may be observed.

The arrangement of setae also varies. In the primitive groups the setae appear in six rows as $C_1, C_2, C_3, C_p, d_1, d_2, e_1, e_2, f_1, f_2, h_1, h_2, h_3, Ps_1,$

Ps_2, Ps_3 . In the higher oribatids, the basic type is considered the one with 10 pairs of setae having the notation of $ta + te + ti - ms \quad ri + r_2 \quad p_1 + p_2 + p_3$. According to the opinion the longitudinal and transverse rows of setae are denoted as $C_1 + C_2 + C_3 - da + dm + dp - la_1 + lm_1 + lp \quad h_1 + h_2 + h_3 - p_1 + p_2 + p_3$ (Figs. 2, 6, 8).

Ototaxic organs : The notogastral surface often displays opening of glands (*gla*), stigmata and other sense organ (laryfissure). Also the notogaster bears areae porosae (pore fields), pori (simple pores) sacculi (tiny pockets), etc. There are usually four areae porosae, although the number may vary, and these are designated, from anterior to posterior direction as Aa, A_1, A_2 and A_3 . More seldom the areae porosae may occur in the line of dorsosejugal suture (*Ad*), lateral of prodorsum (A_l) or posterior to anal plate (*App*). There are a maximum of seven laryfissures indicated as *ia, im, ip, ih, ips, iad*, and *ian* (Figs. 2, 6, 8).

Gnathosoma : A well differentiable somatic part in camerostome which houses the oral organs like chelicerae, pedipalpi, hypostomal and epistomal structures. The articulation of gnathosoma with the epimeral region is protected by the mentotectum. It also contains unpaired mentum, paired genae and their continuation are in the rutelli. The mentum bears one pair (*h*), the genae one pair of robust (*a*) and two pairs of minute ($m_{1,2}$) setae. In most oribatids the chelicerae are simple and in few cases peloptoid (Figs. 11, 12). The chelicerae have two pairs (*cha, chb*) of setae, but in peloptoid type only one pair of setae is present. The labiogenal articulation varies in groups and the presence or absence of the articulation is sometimes important for the separation of taxa.

Epimeral Region : The epimeral or coxisternal region is that part of the ventral plate which is connected with legs I-III and extends to the genital opening. The epimeral fields or epimeres ($ep_1 - ep_4$) are separated from one another by epimeral furrows and their continuations which are called apodemes ($ap_1 - ap_3$). The sejugal furrow is backed by sejugal apodeme (*ap. sej*),

and often connected longitudinally by sternal apodeme (*ap. at.*).

The epimeres bear setae, their number being characteristic to the taxon. The total number of epimeral setae is expressed by a setal formula like 3-1-3-3 which means that ep_1 has 3 setae, ep_2 has 1 seta, ep_3 bears 3 setae as also ep_4 (Figs. 3, 7).

Anogenital Region : The anogenital region is the portion of the ventral plate behind the epimeral region. This area also includes, the genital and anal openings. This region is divided into two types on the basis of position of genital (GN) and anal (AN) plates. It can be Macropylic if the genital and anal plates touch each other and occupy the entire length of the genital region in a 'U' or 'Y' shape (Fig. 7). They often have adjacent aggenital and adanal lamellae of the same length indeed some other adventitious plates (peranal, preanal and postanal) may also occur. In the other, the Brachypylic type, the genital and anal plates are separated although the size of the gap may vary in groups, and they are situated on distinct ventral plates (Fig. 3). The aggenital, adanal and other adventitious plates are absent, they are fused with the ventral plate. The brachypylic aggenital region can be divided into four subtypes.

a) *Pseudodiagastic* : genital and anal openings separated by a parabolic line (Fig. 13);

b) *diagastic* : separating line between genital and anal plates disappears medially (Fig. 14);

c) *schizogastric* : separating line as above is straight (Fig. 15) and

d) *hologastric* : no separating line i. e. ventral plate is undivided (Fig. 16).

In some oribatids the genital plate itself may be divided by a median suture. The genital and anal fields or in the higher oribatids also the ventral plate, may possess slit like organ or pore called *iad*.

Legs : The legs of oribatid mites usually consists of five free segments, viz., trochanter, femur, genu, tibia and tarsus. In some cases the legs consist six segments where the coxae does

not fuse to the body surface. The tarsus has 1-3 claws on a short peduncle. The leg chaetotaxy offers good taxonomic characteristics and the setae on the legs can be of four types according to their structure, viz., simple setae, acanthoids, solenidia and famulus (Fig. 17).

The larvae have three pairs of legs and no genital opening. The protonymph has four pairs of legs and only one pair of genital papilla. The hysterosoma of deutonymph consists of 10 complete segments and two pairs of genital papillae. The tritonymph has three pairs of genital papillae and full complement of epimeral setal formula as in adult.

LIST OF ORIBATID TAXA KNOWN FROM TRIPURA

1. Family PALAEACARIDAE
Grandjean, 1932
 1. Genus *Palaeacarus* Tragardh, 1932
 1. *Palaeacarus* sp.
2. Family HYPOCHTHONIIDAE
Berlese, 1910
 2. Genus *Hypochthonius* Koch, 1835
 2. *Hypochthonius* sp.
 3. Genus *Malacoangelia* Berlese, 1913
 3. *M. remigera* Berlese, 1913
 4. *M. similis* Sarkar and Subias, 1982
3. Family MESOPLOPHORIDAE
Ewing, 1917
 4. Genus *Mesoplophora* Berlese, 1904
 5. *M. crassisetosa* Subias and Sarkar, 1984
 6. *M. gaveae* Schuster, 1962
 7. *M. pectinata* Mahunka, 1979
4. Family COSMOCHTHONIIDAE Grandjean, 1947
 5. Genus *Cosmochthonius* Berlese, 1910
 8. *C. agartalensis* Sarkar, 1983
 9. *C. lanatus diversiseta* Sarkar and Subias, 1982
 10. *C. plumatus suramericanus* Hammer, 1958
 11. *C. reticulatus* Grandjean, 1947
5. Family HAPLOCHTHONIIDAE
Hammer, 1959
 6. Genus *Haplochthonius* Willmann, 1930
 12. *H. clavatus* (Hammer, 1958)
 13. *H. simplex* Willmann, 1930
6. Family GEHYPOCHTHONIIDAE Strenzke, 1963
 7. Genus *Gehypochthonius* Jacot, 1936
 14. *Gehypochthonius rhadamanthus* Jacot, 1936
7. Family PHTHIRACARIDAE
Perty, 1841
 8. Genus *Atropacarus* Ewing, 1917
 15. *A. (Hoplophorella) scape llatus* (Aoki, 1965)
 16. *A. (Hoplophorella) schauenbergi* (Mahunka, 1978)
 9. Genus *Hoplophthiracarus* Jacot, 1933
 17. *Hoplophthiracarus* sp.
8. Family EUPHTHIRACARIDAE
Jacot, 1930
 10. Genus *Rhysotritia* Markel and Meyer, 1959
 18. *R. ardua ardua* (Koch, 1841)

19. *R. ardua* var. *otaheitensis* Hammer, 1972
9. Family LOHMANIIDAE Berlese, 1916
11. Genus *Annectacarus* Grandjean, 1950
20. *A. longisetosus* Bhattacharya et al., 1924
12. Genus *Cryptacarus* Grandjean, 1950
21. *C. dendrisetosus* Bhattacharyya et al., 1974
13. Genus *Haplacarus* Wallwork, 1962
22. *H. foliatus bengalensis* Bhattacharyya et al., 1974
14. Genus *Javacarus* Balogh, 1961
23. *J. foliatus* Hammer, 1972
24. *J. kuhnelti* Balogh, 1961
15. Genus *Paulianacarus* Balogh, 1960
25. *P. foliatus* Mondal and Chakraborty, 1982
16. Genus *Vepracarus* Aoki, 1965
26. *V. cornutus* Sarkar and Subias, 1984
10. Family EPILOHMANNIIDAE Oudemans, 1923
17. Genus *Epilohmannia* Berlese, 1916
27. *E. cylindrica* (Berlese, 1904)
28. *E. pallida areolata* Sarkar and Subias, 1982
29. *E. pallida pacifica* Aoki, 1965
30. *E. pallida rugosa* Sarkar and Subias, 1982
11. Family TRHYPOCHTHONIIDAE Willmann, 1931
18. Genus *Afronothrus* Wallwork, 1961
31. *A. sulcatus* Hammer, 1972
19. Genus *Allonothrus* Hammer, 1953
32. *A. dhananjayi* Sarkar, 1991
33. *A. pararusseolus* Subias and Sarkar, 1982
20. Genus *Archegozetes* Grandjean, 1931
34. *A. magnus longisetosus* Aoki, 1965
35. *A. tuberculatus* Sarkar, 1985
12. Family MALACONOTHRIDAE Berlese, 1916
21. Genus *Malaconothrus* Berlese, 1906
36. *M. asiaticus* Aoki, 1967
37. *M. crassisetosus* Subias and Sarkar, 1982
38. *M. dipankari* Saha and Sanyal, 1996
39. *M. pauciareolatus* Subias and Sarkar, 1982
40. *M. peruensis* Hammer, 1961
41. *M. pseudolamellaris* Willmann, 1931
42. *M. ramensis* Hammer, 1966
43. *M. rostopilosus* Saha and Sanyal, 1996
22. Genus *Trimalaconothrus* Berlese, 1916
44. *T. tripurensis* Sarkar, 1983
13. Family NANHERMANNIIDAE Sellnick, 1928
23. Genus *Cyrthermannia* Balogh, 1958
45. *Cyrthermannia* sp.
24. Genus *Masthermannia* Berlese, 1913

46. *M. mammillaris mammillaris* Berlese, 1913
14. Family LIODIDAE Grandjean, 1954
25. Genus *Liodes* von Heyden, 1826
47. *L. terrestris* Wallwork, 1963
26. Genus *Teleioliodes* Grandjean, 1934
48. *Teleioliodes ghanensis* Wallwork, 1963
15. Family TEGEOCRANELLIDAE P. Balogh, 1987
27. Genus *Tegeocranellus* Berlese, 1913
49. *Tegeocranellus* sp.
16. Family CEPHEIDAE Berlese, 1896
28. Genus *Sadocephus* Aoki, 1965
50. *Sadocephus* sp.
17. Family MICROTEGEIDAE Balogh, 1972
29. Genus *Microtegeus* Berlese, 1917
51. *M. reticulatus* Aoki, 1965
18. Family MICROZETIDAE Grandjean, 1936
30. Genus *Berlesezetes* Mahunka, 1980
52. *B. auxiliaris* (Grandjean, 1936)
53. *B. longistriatus* Sarkar, 1992
54. *B. monoramai* Sarkar, 1992
55. *B. rudrasagarensis* Sarkar, 1992
31. Genus *Schizozetes* Balogh, 1962
56. *B. quadrilineatus* Balogh, 1962
19. Family EREMULIDAE Grandjean, 1965
32. Genus *Eremulus* Berlese, 1908
57. *E. jyotsnai* Sarkar, 1991
58. *E. nigrisetosus* Hammer, 1958
59. *E. truncatus* Hammer, 1971
20. Family DAMAEOLIDAE Grandjean, 1965
33. Genus *Fosseremus* Grandjean, 1954
60. *Fosseremus* sp.
21. Family EREMOBELBIDAE Balogh, 1961
34. Genus *Eremobelba* Berlese, 1908
61. *Eremobelba* sp.
35. Genus *Pseuderemulus* Balogh and Mahunka, 1968
62. *Pseuderemulus* sp.
22. Family BASILOBELBIDAE Balogh, 1961
36. Genus *Basilobelba* Balogh, 1958
63. *B. indica* Bhaduri, Chakraborty & Raychaudhuri, 1974
23. Family ZETORCHESTIDAE Michael, 1898
37. Genus *Zetorchestes* Berlese, 1888
64. *Z. saltator* Oudemans, 1915
24. Family ASTEGISTIDAE Balogh, 1961
38. Genus *Cultroribula* Berlese, 1908
65. *C. lata* Aoki, 1961
25. Family PELOPPIIDAE Balogh, 1943
39. Genus *Furcoppia* Balogh and Mahunka, 1966
66. *F. cornuta* Hammer, 1972
26. Family CARABODIDAE Koch, 1837

40. Genus *Carabodes* Koch, 1936
 67. *C. peniculatus* Aoki, 1970
41. Genus *Phyllocarabodes* Balogh and Mahunka, 1969
 68. *Phyllocarabodes* sp.
27. Family TECTOCEPHEIDAE Grandjean, 1954
42. Genus *Tectocepheus* Berlese, 1913
 69. *T. latilamellaris* Kardar, 1974
 70. *T. velatus velatus* (Michael, 1888)
 71. *T. velatus sarekensis* Tragardh, 1910
28. Family OTOCEPHEIDAE Balogh, 1961
43. Genus *Acrotocepheus* Aoki, 1965
 72. *Acrotocepheus* sp.
44. Genus *Archegotocepheus* Aoki, 1965
 73. *Archegotocepheus* sp.
45. Genus *Dolicheremaeus* Jacot, 1936
 74. *D. cuspidata* (Wallwork, 1962)
 75. *D. lineolatus* Hammer, 1981
29. Family MACHADOBELBIDAE Balogh, 1972
46. Genus *Machadobelba* Balogh, 1958
 76. *M. symmetrica* Balogh, 1958
30. Family OPPIIDAE Grandjean, 1954
47. Genus *Aeropopia* Hammer, 1961
 77. *Aeropopia* sp.
48. Genus *Arcoppia* Hammer, 1977
 78. *A. bidentata* Hammer, 1979
79. *A. fenestralis orientalis* Balogh and Balogh, 1986
80. *A. mcadami* Balogh and Balogh, 1986
81. *A. rotunda* Hammer, 1972
49. Genus *Brachioppia* Hammer, 1961
 82. *B. brevipectinata* Kok, 1967
50. Genus *Brachioppiella* Hammer, 1962
 83. *Brachioppiella* sp.
51. Genus *Graptoppia* (*Graptoppia*) Balogh, 1983
 84. *G. (Graptoppia)* sp.
52. Genus *Lanceoppia* (*Lanceoppia*) Hammer, 1962
 85. *L. (Lanceoppia)* sp.
53. Genus *Multioppia* Hammer, 1961
 86. *M. gracilis* Hammer, 1972
54. Genus *Mystroppia* Balogh, 1959
 87. *M. sellnicki* Balogh, 1959
55. Genus *Oppia* Koch, 1836
 88. *O. akusiensis* Wallwork, 1961
 89. *O. arcidiaconoae* Bernini, 1973
 90. *O. brevifasciata*
 91. *O. fasciata* (Paoli, 1908)
 92. *O. sundensis* Hammer, 1979
 93. *O. tuxeni* Hammer, 1968
 94. *O. yodai* Aoki, 1965
56. Genus *Oxyoppia* Balogh and Mahunka, 1969
 95. *O. polynesia* (Hammer, 1972)
57. Genus *Ramusella* Hammer, 1962
 96. *R. (Ramusella) chulumanensis* Hammer, 1968

58. Genus *Stachyoppia* Balogh, 1961
 97. *S. granulosa* Subias and Sarkar, 1983
59. Genus *Striatoppia* Balogh, 1958
 98. *S. opuntiseta* Balogh and Mahunka, 1968
 99. *S. similis* Subias and Sarkar, 1983
 100. *S. tripurensis* Subias and Sarkar, 1983
31. Family PAPILLONOTIDAE Balogh, 1983
60. Genus *Papillonotus* Wallwork, 1961
 101. *P. tricarinatus* Sarkar and Subias, 1983
32. Family SUCTOBELBIDAE Grandjean, 1954
61. Genus *Novosuctobelba* Hammer, 1977
 102. *N. dentissima* Hammer, 1977
62. Genus *Suctobelba* Paoli, 1908
 103. *S. amurica* Krivolutsky, 1966
 104. *S. carcharodon* Moritz, 1966
63. Genus *Suctobelbella* Jacot, 1937
 105. *S. variosetosa* Hammer, 1961
64. Genus *Suctobelbila* Jacot, 1937
 106. *Suctobelbila* sp.
33. Family CHAUNOPROCTIDAE Balogh, 1961
65. Genus *Chaunoproctus* Pearce, 1906
 107. *C. abalai* Bhaduri *et al.*, 1975
 108. *C. longisetosus* Dhali & Bhaduri, 1980
34. Family MOCHLOZETIDAE Grandjean, 1960
66. Genus *Terrazetes* Jacot, 1936
 109. *T. mauritius* Jacot, 1936
67. Genus *Unguizetes* Sellnick, 1925
 110. *U. clavatus* Aoki, 1967
35. Family XYLOBATIDAE J. Balogh and P. Balogh, 1984
68. Genus *Brasilobates* Perez-Inigo and Baggio, 1980
 111. *Brasilobates punctata* Grobler, 1991
69. Genus *Plenoxyllobates* Hammer, 1979
 112. *P. curtiseta* Hammer, 1979
70. Genus *Setoxylobates* Balogh and Mahunka, 1967
 113. *S. foveolatus* Balogh and Mahunka, 1967
71. Genus *Xylobates* Jacot, 1929
 114. *X. capucinus* (Berlese, 1908)
 115. *X. seminudus* Hammer, 1971
 116. *Xylobates* sp.
36. Family PROTORIBATIDAE J. Balogh and P. Balogh, 1984
72. Genus *Haloribatula* Schuster, 1957
 117. *H. tenareae* Schuster, 1957
73. Genus *Liebstadia* Oudemans, 1906
 118. *Liebstadia* sp.
37. Family ORIBATULIDAE Thor, 1929
74. Genus *Zygoribatula* Berlese, 1917
 119. *Z. longiporosa* Hammer, 1953

38. Family HAPLOZETIDAE
Grandjean, 1936
75. Genus *Haplozetes* Willmann, 1935
120. *H. minimicoma* Beck, 1964
76. Genus *Peloribates* Berlese, 1908
121. *P. tripuraensis* Sanyal and Saha, 1997
77. Genus *Pilobatella* Balogh and Mahunka, 1967
122. *P. berlesei* Bhattacharya and Banerjee, 1979
78. Genus *Rostrozetes* Sellnick, 1925
123. *R. komodensis* Mahunka, 1977
124. *R. ovulum* (Berlese, 1908)
125. *R. punctatus* Karppinen, 1966
79. Genus *Tentaculozetes* Balogh, 1970
126. *Tentaculozetes* sp.
39. Family SCHELORIBATIDAE
Grandjean, 1953
80. Genus *Andeszetes* Hammer, 1961
127. *A. diversidactylus* Hammer, 1961
81. Genus *Euscheloribates* Kunst, 1958
128. *E. samsinaki* Kunst, 1958
82. Genus *Fijibates* Hammer, 1971
129. *Fijibates* sp.
83. Genus *Rhabdoribates* Aoki, 1967
130. *R. siamensis* Aoki, 1967
84. Genus *Scheloribates* Berlese, 1908
131. *S. caprai* Bernini, 1973
132. *S. fimbriatoides* Hammer, 1977
133. *S. fimbriatus* Thor, 1930
134. *S. fusifer* Berlese, 1908
135. *S. huancayensis* Hammer, 1961
136. *S. latoincisus* Hammer, 1973
137. *S. multiplisetus* Mahunka, 1977
138. *S. praeincisus interruptus* Berlese, 1916
139. *S. praelineatus* Hammer, 1977
140. *S. rectus* Hammer, 1958
141. *S. rufafulvus* Kardar, 1976
142. *S. sacsahuamanensis* Hammer, 1961
143. *S. saswatii* Dhali and Bhaduri, 1980
144. *S. striatus* Hammer, 1958
85. Genus *Tuberemaeus* Sellnick, 1930
145. *T. singularis* Sellnick, 1930
40. Family BIROBATIDAE J. Balogh and P. Balogh, 1984
86. Genus *Birobates* Balogh, 1970
146. *B. reductus* Balogh, 1970
41. Family AUSTRACHTERIDAE Luxton, 1985
87. Genus *Hypozetes* Balogh, 1959
147. *H. laysanensis* Aoki, 1964
88. Genus *Lamellobates* Hammer, 1958
148. *L. palustris* Hammer, 1958
89. Genus *Paralamellobates* Bhaduri and Raychaudhuri, 1968
149. *P. bengalensis* Bhaduri and Raychaudhuri, 1968
150. *P. ceylonicus* (Oudemans, 1967)

42. Family MYCOBATIDAE Grandjean, 1954
90. Genus *Mycobates* Hull, 1916
151. *M. tridactylus* Willmann, 1929
43. Family ORIBATELLIDAE Jacot, 1925
91. Genus *Oribatella* Banks, 1895
152. *O. unispinata* Hammer, 1958
44. Family GALUMNIDAE Jacot, 1925
92. Genus *Acrogalumna* Grandjean, 1956
153. *A. machadoi* Balogh, 1960
93. Genus *Disparagalumna* Hammer, 1973
154. *Disparagalumna* sp.
94. Genus *Galumna* von Heyden, 1826
155. *G. flabellifera* Hammer, 1958
95. Genus *Orthogalumna* Balogh, 1960
156. *O. saeva* Balogh, 1960
96. Genus *Pergalumna* Grandjean, 1936
157. *P. corolevuensis* Hammer, 1971
158. *P. magnipora capensis* Engelbrecht, 1972
97. Genus *Pilogalumna* Grandjean, 1936
159. *P. variabilis* Engelbrecht, 1972
98. Genus *Trichogalumna* Balogh, 1960
160. *T. seminuda* Balogh, 1960
- 2(1) Hysterosoma dorsally without small, separate sclerite ; legs with 5 free segments
- 3(8) Ptychoid body, propodosoma can be shut back against hysterosoma and ventral region like blade of penknife; generally laterally compressed body
- 4(5) Notogaster with 1-3 transverse sutures; anogenital region brachypylic i. e. genital and anal plates round and well separated MESOPLOPHORIDAE Ewing 1917
- 5(4) Notogaster without transverse suture; anogenital region macropylic i. e. genital and anal plates meeting each other
- 6(7) Anogenital region narrow, 'V'-shaped; body considerably compressed laterally EUPHTHRACARIDAE Jacot, 1930
- 7(6) Anogenital region wide, almost 'V'-shaped; body only slightly compressed laterally PHTHIRACARIDAE Perty, 1841
- 8(3) Body not ptychoid, propodosoma can not be shut back like blade of penknife; body not laterally compressed
- 9(24) Anogenital region of macropyline type; no ventral plate; tibia and genu of similar length and shape
- 10(19) Notogaster with 1 or 3 transverse sutures
- 11(16) Notogaster with only one transverse suture
- 12(13) Transverse suture on notogaster situated immediately behind setae of *d* rows; latero-abdominal gland present GEHYPOCHTHONIIDAE Strenzke, 1963
- 13(12) Transverse suture on notogaster either with insertion-points of setae *d* or *e* rows; latero-abdominal gland absent
- 14(15) Notogaster rounded, with polygonal reticulation ; transverse suture with insertion-points of setae *d* rows; notogastral setae 'T'-shaped, densely

SYSTEMATIC ACCOUNT

Key to the families of oribatid mites from Tripura

- 1(2) Hysterosoma dorsally with small, separate sclerites ; legs with 6 free segments
...PALAEACARIDAE Grandjean, 1932

- plumose except setae *d* ; body covered with cerotegument.....
.....SPHAEROCHTHONIIDAE
Grandjean, 1947
- 15(14) Notogaster flattened, elongate or pentagonal without reticulation; transverse suture with insertion-points of setae *e* ; notogastral setae simple, setiform or lanceolate; no cerotegument
.....HYPOCHTHONIIDAE Berlese, 1910
- 16(11) Notogaster with 3 transverse sutures
- 17(18) Notogastral setae e_1, e_2, f_1, f_2 long and rigid, arising in the transverse sutures ..
.....COSMOCHTHONIIDAE
Grandjean, 1947
- 18(17) All notogastral setae almost similar in length, not rigid, arising on the shields
.....HAPLOCHTHONIIDAE
Hammen, 1959
- 19(10) Notogaster without transverse suture
- 20(21) Body dichoid i. e. articulation between legs II and III, preanal plate present
.....LOHMANIIDAE Berlese, 1916
- 21(20) Body holoid i. e. the body regions rigidly coalesced; preanal plate absent
- 22(23) Two pairs of setae on epimere 3; genital setae 16-20 pairs; adanal setae two pairs
.....TRHYPOCHTHONIIDAE
Willmann, 1931
- 23(22) Three pairs of setae on epimere 3; 4-12 pairs of genital setae; adanal setae three pairs MALACONOTHRIDAE
Berlese, 1916.
- 24(9) Anogenital region of brachypyline type; ventral plate present; tibia and genu of different length and shape
- 25(70) Notogaster pycnonotic i. e. ototaxic organs absent; usually pteromorphae absent
- 26(33) Eight or nine pairs of genital setae
- 27(30) Anogenital plate either schizogastric type or diagastric type
- 28(29) Anogenital plate schizogastric type; 14 pairs of notogastral setae; genital setae 8 pairs; anal setae three pairs
.....EPILOHMANNIIDAE
Oudemans, 1923
- 29(28) Anogenital plate diagastric type; 15 pairs of notogastral setae; genital setae 9 pairs; anal setae two pairs.....
.....NANHERMANNIIDAE
Sellnick, 1928
- 30(27) Ventral plate hologastric type
- 31(32) Genital plates with transverse suture; seven pairs of genital setae in one longitudinal row (5+2) LIODIDAE
Grandjean, 1954
- 32(31) Genital plates without transverse suture
- 33(26) Genital setae numbering 3-6 pairs
- 34(51) Prodorsum having lamellae
- 35(36) Notogaster with ventrally deflected immovable pteromorphae, apodemata IV thickened.....MICROZETIDAE
Grandjean, 1936
- 36(35) Notogaster without pteromorphae; apodemata IV normal
- 37(38) All notogastral setae placed in marginal or postero-marginal position
.....CEPHEIDAE Berlese, 1896
- 38(37) At least one to four pairs of setae in the central part of notogaster
- 39(42) Lamellae converging and medially connected, with 1 more or less long cuspides bearing lamellar setae
- 40(41) Notogastral setae 11 pairs; genital and anal plates large, nearly meeting each other.....ASTEGISTIDAE Balogh, 1961
- 41(40) Notogastral setae 9-10 pairs, genital and anal plates smaller, well separated
.....PELOPPIIDAE Balogh, 1943
- 42(39) Lamellae less converging, never meeting, either free or connected by translamella
- 43(44) Central part of notogaster with one pair of setae, remaining notogastral setae

- submarginal and postero-marginal, lamellae "melt" into the prodorsum
.....MICROTEGEIDAE Balogh, 1972
- 44(43) Central part of notogaster with two to four pairs of notogastral setae; lamellae well developed
- 45(46) Large genital and anal plates, occupying almost the whole length of ventral plate; anterior part of notogaster with paired cavities
TEGEOCRANELLIDAE P. Balogh, 1987
- 46(45) Genital and anal plates normal, well separated from each other; no cavity in anterior part of notogaster
- 47(50) Translamella present; dorsosejugal suture absent or incomplete
- 48(49) Dorsosejugal suture absent; lamellae with relatively long cuspides; lamellar-interlamellar complex 'N'-shaped.....
...TECTOCEPHEIDAE Grandjean, 1958
- 49(48) Dorsosejugal suture incomplete in the middle; lamellae with short cuspides; no 'N'-shaped complex
...CHAUNOPROCTIDAE Pearce, 1906
- 50(47) Translamella often absent; dorsosejugal suture complete; lamellae with short cuspides
.....CARABODIDAE Koch, 1836
- 51(34) Prodorsum without true lamellae; either thin crest-shaped lamellae or thin costulae present or both lamellae and costulae absent
- 52(59) Ventral neotrichy present, more than four pairs of aggenital + adanal setae
- 53(54) Exuvia or at least tritonymphal exuvia affixed to one tubercle on notogaster....
.....BASILOBELBIDAE Balogh, 1961
- 54(53) Exuvia either absent or if present, never affixed by one tubercle to notogaster
- 55(56) Pedotecta II present; notogaster usually with polygonally arranged granulation; anal setae two pairs.....
.....EREMOBELBIDAE Balogh, 1961
- 56(55) Pedotecta II absent; notogaster without polygonally arranged reticulation
- 57(58) Notogaster with four large semicircular depression, ventral setae not branched..
.....DAMAEOLIDAE Grandjean, 1965
- 58(57) Notogaster without four large depressions; some epimeral and genital setae 3 to 6 branched
.....EREMULIDAE Grandjean, 1966
- 59(52) Ventral neotrichy absent
- 60(61) Five pairs of apodemes, four pairs of epimeres; sensillus bifurcate
...MACHADOBELBIDAE Balogh, 1972
- 61(60) Four pairs of apodemes, three pairs of epimeres; sensillus not bifurcate
- 62(63) Rostral setae bifurcate; legs IV longest ZETORCHESTIDAE Michael, 1898
- 63(62) Rostral setae never bifurcate; legs IV not longest
- 64(65) Notogastral setae 9 pairs; interlamellar and notogastral setae papilliform
.....PAPILLONOTIDAE Balogh, 1983
- 65(64) Notogastral setae 10-14 pairs
- 66(67) Body elongate, mostly at least twice longer than wide; prodorsal and notogastral condyles present.....
.....OTOCEPHEIDAE Balogh, 1961
- 67(66) Body not elongate, mostly never twice as long as wide
- 68(69) Chelicerae pelotoid; rostrum narrowing, mostly with lateral teeth; tectopodial-fields and lamellar knob on prodorsum ...SUCTOBELBIDAE Grandjean, 1954
- 69(68) Chelicerae normal; prodorsum without tectopodial-fields and lamellar knob.....
.....OPPIIDAE Grandjean, 1954
- 70(25) Notogaster poronotic i. e. areae porosae, sacculi or pori present; pteromorphae usually present
- 71(72) Pteromorphae movable, articulate or semicircular; prodorsum without true projecting lamellae; some chitinous lines

- present on the prodorsum.....
.....GALUMNIDAE Jacot, 1925
- 72(71) Pteromorphae immovable but never articulate, sometimes absent
- 73(76) Prodorsum with tutorium; usually six pairs of genital setae (exceptionally five or four pairs)
- 74(75) Pteromorphae movable; lamellae marginal, sometimes connected by translamella
.....MYCOBATIDAE Grandjean, 1954
- 75(74) Pteromorphae immovable; lamellae broad, sometimes synlamella type
AUSTRACHIPTERIIDAE Luxton, 1985
- 76(73) Prodorsum without tutorium; usually 3-5 pairs of genital setae (exceptionally six pairs)
- 77(84) Notogaster with true areae porosae
- 78(79) Sensillus long, reclinate, setiform, often slightly lanceolate at its tip
.....XYLOBATIDAE J. Balogh and P. Balogh, 1984
- 79(78) Sensillus either capitate, with short stalk, or fusiform; exceptionally fusiform
- 80(81) Legs monodactylous
.....PROTORIBATIDAE J. Balogh and P. Balogh, 1984
- 81(80) Legs tridactylous
- 82(83) Five to six pairs of genital setae; dorsosejugal suture interrupted medially ..
MOCHLOZETIDAE Grandjean, 1960
- 83(82) Three to four pairs of genital setae (exceptionally five pairs); dorsosejugal suture not interrupted
.....ORIBATULIDAE Thor, 1929
- 84(77) True areae porosae absent, notogaster with sacculi or pori
- 85(86) Pteromorphae movable, hinged
.....HAPLOZETIDAE Grandjean, 1936
- 86(85) Pteromorphae immovable or absent
.....SCHELORIBATIDAE Grandjean, 1953

1. Family PALAEACARIDAE Grandjean, 1932

1. Genus *Palaeacarus* Tragardh

1932. *Palaeacarus* Tragardh, *Ark. Zool.*, **24** (2) : 2.

1. *Palaeacarus* sp.

Remarks : The genus was reported by Bhattacharya *et al.* (1985) from West district of Tripura.

2. Family HYPOCHTHONIIDAE Berlese, 1910

Key to the genera of Hypochthoniidae

- 1(2) Shoulder without tubercle; notogastral setae simple
.....*Hypochthonius* Koch, 1836
- 2(1) Shoulder with tubercle; notogastral setae phylliform.....
.....*Malacoangelia* Berlese, 1913

2. Genus *Hypochthonius* Koch

1836. *Hypochthonius* Koch, *Deutschlands Crustacean, Myriapoden und Arachniden*, 1 9.

2. *Hypochthonius* sp.

Remarks : Bhattacharya and Chakraborty (1995) recorded unidentified species from South district of Tripura.

3. Genus *Malacoangelia* Berlese

1913. *Malacoangelia* Berlese, *Redia*, **9** : 101.

Key to the species of Malacoangelia

- 1(2) Rostral setae 'T'-shaped; 4-6 barbs in the inner margin of sensillus; tip of sensillus bifid
.....*remigera* Berlese, 1913
- 2(1) Rostral setae kidney-shaped; nearly 20 barbs in the inner margin of sensillus; tip of sensillus not bifid.....
.....*similis* Sarkar and Subias, 1982

3. *Malacoangelia remigera* Berlese

1913. *Malacoangelia remigera* Berlese, *Redia*, **9** : 101.

1992. *Malacoangelia remigera*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Malacoangelia remigera*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Rostral setae "T"-shaped, lamellar and interlamellar setae phylliform with long pointed tip; sensillus long, setiform, beset with 4-6 barbs inserted in inner side, tip of sensillus bifid; notogastral setae dilated like a blade, setae C_1 and C_2 on intercalary sclerite of transverse suture, smaller than the remaining notogastral setae; 10 pairs of genital setae.

Distribution : India : Tripura (South district), West Bengal. *Elsewhere :* Africa, Fiji Island, Indonesia, Malaysia, Mauritius Island, North America, Reunion Island, Seychelles, South America, Tahiti Island.

4. *Malacoangelia similis* Sarkar and Subias

1982. *Malacoangelia similis* Sarkar and Subias, *Eos*, **58** : 311.
1992. *Malacoangelia similis*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Malacoangelia similis*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Body covered with irregular cerotegument; rostrum truncate, foveolated anteriorly, thinly punctate posteriorly, rostral setae kidney-shaped with boundary; lamellar setae bifurcate, leaf-shaped; interlamellar setae leaf-shaped; sensillus long, setiform, barbed bilaterally; exostigmatic setae like interlamellar; notogastral setae leaf-shaped with mid rib, long except those of segment II being very small, thin, spiny; genital setae 10 pairs.

Distribution : India : Tripura (South district, West district).

3. Family MESOPLOPHORIDAE Ewing, 1917

4. Genus *Mesoplophora* Berlese

1904. *Mesoplophora* Berlese, *Redia*, **2** : 23.

Key to the species of *Mesoplophora*

- 1(2) Prodorsal and notogastral setae smooth
.....
...*crassisetosa* Subias and Sarkar, 1984
- 2(1) Prodorsal and notogastral setae spinulose
- 3(4) Sensillus with 8-10 cilia; notogastral setae long; exostigmatic setae very minute
.....*pectinata* Mahunka, 1979
- 4(3) Sensillus with 12-15 cilia; notogastral setae relatively short; exostigmatic setae minute*gaveae* Schuster, 1962

5. *Mesoplophora crassisetosa* Subias and Sarkar

1984. *Mesoplophora crassisetosa* Subias and Sarkar, *Folia Entomologica Hungarica*, XLV (1) : 215.
1992. *Mesoplophora crassisetosa*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Mesoplophora crassisetosa*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : All prodorsal setae very long, smooth, flagellate; rostral setae very thin; lamellar and interlamellar setae very stout; sensillus setiform, barbed unilaterally, thicker at the base; exostigmatic setae not discernible; notogastral setae 7 pairs, very thick, long, flagellate at tip; one pair of oval-shaped glandular like structures present posteromarginally; only 2 pairs of very small setae on anterior region of genital plates, rest of genital setae including their alveoli not discernible; anal setae 2 pairs; 5 pairs of long, smooth, thin setae on ventral plate.

Distribution : India : Tripura (West district, South district).

6. *Mesoplophora gaveae* Schuster

1962. *Mesoplophora gaveae* Schuster, *Senck biol.*, **43** : 489.
1984. *Mesoplophora gaveae*, Sarkar, *III Oriental Entomology Symposium*, Trivandrum : 52.

Diagnosis : Sensillus setiform, ciliate, with 12-15 cilia; setae of aspis densely spinulosae; exostigmatic setae not very small, genital setae 6+1 pairs; anal setae two pairs.

Distribution : India : Tripura (West district).

Elsewhere : Brazil.

7. *Mesoplophora pectinata* Mahunka

1979. *Mesoplophora pectinata* Mahunka, Revue suisse Zool., 86 (2) : 551.
1992. *Mesoplophora pectinata*, Chakraborty and Bhattacharya, Proc. zool. Soc., Calcutta, 45 (2) : 167.
1995. *Mesoplophora pectinata*, Bhattacharya and Chakraborty, Advances in Ecology and Environmental Sciences (eds. Mishra et al.) : 68.

Diagnosis : Rostrum acute; sensillus at least with 8 cilia equal in length; notogastral setae long, C_1 and C_2 almost equal in length; ventral plate with ten pairs of setae, small, thin; genital setae 7 pairs; anal setae two pairs.

Distribution : India : Tripura (South district).

Elsewhere : Greece.

4. Family COSMOCHTHONIIDAE Grandjean, 1947

5. Genus *Cosmochthonius* Berlese

1910. *Cosmochthonius* Berlese, Redia, 6 (2) : 218.

Key to the species of *Cosmochthonius*

- 1(6) Notogaster with polygonal reticulation
- 2(5) Borders of polygonal reticulation thickened; notogastral setae smooth or barbed
- 3(4) Notogastral setae smooth except those on posterolateral margins ...*agartalensis* Sarkar, 1983
- 4() All notogastral setae barbed*lanatus diversiseta* Sarkar and Subias, 1982
- 5(2) Borders of polygonal reticulation thin; notogastral setae barbed*reticulatus* Grandjean, 1947
- 6(1) Notogaster without polygonal reticulation; interlamellar setae bifurcated*plumatus suramericanus* Hammer, 1958

8. *Cosmochthonius agartalensis* Sarkar

1983. *Cosmochthonius agartalensis* Sarkar, Orient. Zool., 3 : 91.

Diagnosis : Rostrum rounded; rostral setae uniramous, unilaterally branched; lamellar setae biramous, unilaterally branched; interlamellar setae biramous, unilaterally branched; exobothridial setae similar to lamellar setae, uniramous; sensillus long, distal portion club-shaped and densely setose; notogaster with polygonal reticulation; notogastral setae 14 pairs, smooth except those on posterolateral margins; genital setae 10 pairs; 3 pairs of anal setae; 4 pairs of adanal setae; all ventral setae feathered bilaterally; epimeral setal formula 3 : 2 : 3 : 3, setae long, unilaterally feathered; tarsi I bidactylous, tarsi II-IV tridactylous.

Distribution : India : Tripura (West district).

9. *Cosmochthonius lanatus diversiseta* Sarkar and Subias

1982. *Cosmochthonius lanatus diversiseta* Sarkar and Subias, Eos, 58 : 313.
1992. *Cosmochthonius lanatus diversiseta*, Chakraborty and Bhattacharya, Proc. zool. Soc., Calcutta, 45 (2) : 167.
1995. *Cosmochthonius lanatus diversiseta*, Bhattacharya and Chakraborty, Advances in Ecology and Environmental Sciences (eds. Mishra et al.) : 68.

Diagnosis : Body with distinct sculpture of polygonal reticulation pattern; all prodorsal setae branched; base of sensillus narrow becoming increasingly thickened, apical portion densely setose; 14 pairs of notogastral setae, e_1 , e_2 , f_1 , f_2 very long, barbed on both sides; setae h_1 narrower than the other pesteromarginal setae; 10 pairs of genital setae.

Distribution : India : Tripura (South district, West district).

10. *Cosmochthonius plumatus suramericanus* Hammer

1958. *Cosmochthonius plumatus suramericanus* Hammer, Biol. Skr. Dan. Vid. Selsk., 10 (1) : 23.
1992. *Cosmochthonius plumatus suramericanus*, Chakraborty and Bhattacharya, Proc. zool. Soc., Calcutta, 45 (2) : 167.
1995. *Cosmochthonius plumatus suramericanus*, Bhattacharya and Chakraborty, Advances in Ecology and Environmental Sciences (eds. Mishra et al.) : 68.

Diagnosis : All prodorsal setae except interlamellar setae bilaterally branched hence densely plumose; rostral setae situated on short apophyses; interlamellar setae bifurcated; unilaterally branched sensillus long, apical half densely setose; notogastral setae 14 pairs, setae of segment III and IV very long, all setae barbed on both sides, distance between latter and two middle setae in segment II twice as great as between middle setae, in segment III all four setae have same mutual distance; 10 pairs of genital setae.

Distribution : India : Tripura (South district).
Elsewhere : Argentina.

11. *Cosmochthonius reticulatus* Grandjean

1947. *Cosmochthonius reticulatus* Grandjean, Arch. Sci. phys. nat. Geneve (5) : 29, 356.
1985. *Cosmochthonius reticulatus*, Bhattacharya et al., Environment & Ecology, 3 (2) : 146.

Diagnosis : Prodorsum with large foveolae medially; rostral setae incrassate, bacilliform; lamellar setae branching 'T'-shaped; notogaster with polygonal reticulation; cilia of erectile setae of notogaster long and uniform; setae *h* and *ps* widened like rostral setae.

Distribution : India : Tripura (West district).
Elsewhere : Egypt, France, Greece, Morocco, Tunisia.

5. Family HAPLOCHTHONIIDAE van Der Hammen, 1959

1930. *Haplochthonius* Willmann, Abh. naturw. Ver. Bremen., 28 (1) : 2.

6. Genus *Haplochthonius* Willmann, 1930

Key to the species of *Haplochthonius*

- 1(2) Rostral and lamellar setae on short apophyses.....*clavatus* (Hammer, 1953)
2(1) Rostral and lamellar setae not situated on apophyses*simplex* Willmann, 1930

12. *Haplochthonius clavatus* (Hammer)

1958. *Tetrochthonius clavatus* Hammer, Bio. Skr. Dan. Vid. Selsk., 10 (1) : 23.

1961. *Haplochthonius clavatus* (Hammer), Balogh, Acta Zool. Hung., 7 : 243.

1982. *Haplochthonius clavatus*, Sarkar and Subias, Eos, 58 : 314.

1984. *Haplochthonius clavatus*, Sarkar, III Oriental Entomology Symposium, Trivandrum, 52.

Diagnosis : Both rostral and lamellar setae on short apophyses, strong, equally thick throughout, a faint line connects the apophyses; a distinct sharp line between lamellar setae; sensillus long, flat, club-shaped, beset with fine bristles; notogastral setae 15 pairs, straight, stiff.

Distribution : India : Tripura (West district), West Bengal. **Elsewhere :** South America (Argentina).

Remarks : The species reported from Tripura clearly resembled Hammer's *H. clavatus* as far as dorsal view and body cerotegument concerned. But due to nonavailability of clear drawing of ventral side of Hammer's specimen, Sarkar and Subias (1982) compared their specimens with Grandjean's (1974) redescription of *H. simplex*, (Willmann, 1930) and also with spanish specimens and noted clear resemblance of ventral side but difference in cerotegument. In the circumstance, the specimens collected from Tripura were reported with "?" mark after the name of species.

13. *Haplochthonius simplex* Willmann

1930. *Haplochthonius simplex*, Willmann, Abh. naturw. Ver. Bremen, 28 (1) : 2.

1992. *Haplochthonius simplex*, Chakraborti and Bhattacharya, Proc. zool. Soc., Calcutta, 45 (2) : 167.

1995. *Haplochthonius simplex*, Bhattacharya and Chakraborti, Advances in Ecology and Environmental Sciences (eds. Mishra et al.) : 68.

Diagnosis : All prodorsal setae short, thin, setiform; rostral and lamellar setae turning towards each other; sensillus elliptical; notogastral setae 15 pairs, thin, setiform.

Distribution : India : Tripura (South district), West Bengal. **Elsewhere :** Africa, Greece, Netherlands, North America, Russia.

6. Family GEHYPOCHTHONII-
DAE Strenzke, 1933

7. Genus *Gehypochthonius* Jacot

1936. *Gehypochthonius* Jacot, *J. Elisha Mitchell Sci. Soc.*, **52** : 22.

14. *Gehypochthonius rhadamanthus* Jacot

1936. *Gehypochthonius rhadamanthus* Jacot, *J. Elisha Mitchell Sci. Soc.*, **52** : 22.

1992. *Gehypochthonius rhadamanthus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.

1995. *Gehypochthonius rhadamanthus*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra et al.) : 68.

Diagnosis : Sensillus fusiform with cilia; all notogastral setae simple, setiform; setae cp and d_2 equal in length; nine pairs of genital setae.

Distribution : India : Tripura (South district).
Elsewhere : Japan, USA.

7. Family PHTHIRACARIDAE
Perty, 1841

Key to the genera of Phthiracaridae

- 1(2) Genital setae forming a row or almost a row, located near the paraxial margin, distance between g_6 and g_5 greater than that between g_5 and g_4 *Atropacarus* (*Hoplophorella*) Niedbala, 1986
- 2(1) Genital setae g_1 - g_5 forming almost one row located near paraxial margin; seta g_5 away from paraxial margin; g_7 - g_9 displaced from the side of paraxial margin and forming one row; distance between g_5 and g_6 shorter than that between g_5 and g_4 *Hoplophthiracarus* Jacot, 1933

8. Genus *Atropacarus* Ewing

1917. *Atropacarus* Ewing, *J. Economic Ent. Concord*, **10** : 131.

Atropacarus (*Hoplophorella*) Niedbala

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

Key to the species of *Atropacarus*
(*Hoplophorella*)

- 1(2) Rostral setae directed inwards; interlamellar setae lanceolate; sensillus long, narrow, inflated in the middle
..... *scapellatus* (Aoki, 1965)
- 2(1) Rostral setae directed towards end of rostrum; interlamellar setae robust; sensillus sickle-shaped
..... *schauenbergi* (Mahunka, 1978)

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

1965. *Hoplophorella scapellata* Aoki, *Nat. Life Southeast Asia*, **4** : 131.
1967. *Hoplophorella africana* Wallwork, *Rev. zool. Bot. Afr.*, **75** : 36.
1984. *Hoplophorella raychaudhuri* Subias and Sarkar, *Folia Entomologica Hungarica*, **XLV** (1) : 218.
1984. *Atropacarus* (*Hoplophorella*) *scapellatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, **52**.
1990. *Atropacarus* (*Hoplophorella*) *scapellatus*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.
1992. *Atropacarus* (*Hoplophorella*) *scapellatus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1992. *Atropacarus* (*Hoplophorella*) *scapellatus*, Niedbala, In : *Phthiracaroida* (Acari, Oribatida). *Systematic Studies*, Amsterdam, 226.
1995. *Atropacarus* (*Hoplophorella*) *scapellatus*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra et al.) : 68.

Diagnosis : Colour yellowish brown; lateral carina reaches sinus; rostral setae robust, thick, rough, directed inwards; lamellar setae spiniform, minute; interlamellar setae lanceolate, rough; sensillus long, narrow, inflated in middle, covered with thin spines; notogastral setae 15 pairs, foliate, covered with thin spines; $c_1 < c_1 - d_1$; genito-aggenital plate with formula of genital setae : $6(4+2) : 3$; ad_2 foliate with spines, ad_1 and ad_3 spiniform, short, smooth.

Distribution : India : Tripura (South district, West district), Assam, Bihar, Manipur, Orissa, West Bengal. *Elsewhere* : Antilles, Australia, Bismarck Islands, Brazil, Chad, Jamaica, Panama.

Papua New Guinea, Peru, Saba, St. Eustacius, St. Martin, Uganda, Venezuela, Zaire.

16. *Atropacarus (Hoplophorella) schauenbergi* (Mahunka)

1978. *Hoplophorella schauenbergi* Mahunka, *Revue suisse Zool.*, **85** (1) : 183.
 1984. *Hoplophorella perisi* Subias and Sarkar, *Folia Entomologica Hungarica*, **XLV** (1) : 218.
 1982. *Atropacarus (Hoplophorella) schauenbergi*, Niedbala, In : *Phthiracaroida (Acari, Oribatida). Systematic Studies*, Amsterdam, 227.

Diagnosis : Colour yellowish; lateral carina reaches sinus; rostral setae spiniform, rough; lamellar setae spiniform, short, smooth; interlamellar setae robust, covered with spines; sensillus sickle-shaped, thick, distally covered with spines; notogastral setae 15 pairs, foliate, covered with thin spines; $c_1 < c_1-d_1$; genito-aggenital setal formula 6(4+2) : 3; ad_2 lanceolate, longest, covered with spines; ad_1 and ad_3 spiniform, smooth.

Distribution : India : Tripura (West district). **Elsewhere** : Antilles, Curacao, Jamaica, Mauritius, St. Eustacius, St. John, St. Martin.

9. Genus *Hoplophthiracarus* Jacot

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

17. *Hoplophthiracarus* sp.

Remarks : Bhattacharya *et al.* (1985) reported the genus from West district of Tripura.

8. Family EUPHTHIRACARIDAE
 Jacot, 1930

10. Genus *Rhysotritia* Markel and Meyer

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

Key to the species of *Rhysotritia*

- 1(2) Sensillus setiform, only distally ciliate, stalk not thickened; leg I bi- and II-V tridactylous
*ardua ardua* (Koch, 1841)
 2(1) Sensillus dilated distally into a flat head set with coarse bristles on its surface;

legs mono-or tridactylous
*ardua otaheitensis* Hammer, 1972

18. *Rhysotritia ardua ardua* (Koch)

1841. *Hoplophorella ardua* Koch, *Deutschlands Cruetaceen Myriapoden und Arachniden*, **32** : 315.
 1923. *Tritia ardua*, Sellnick, *Acari, Blatter fur Milben Kunde*, **3** : 12.
 1928. *Oribotritia ardua*, Sellnick, *Tierw. Mitteleur*, **3** (9) : 39.
 1930. *Pseudotritia ardua*, Jacot, *Proc. Boston Soc. Nat. Hist.*, **39** : 243.
 1959. *Rhysotritia ardua ardua* Markel and Meyer, *Zool. Anz.*, **168** : 329.

Diagnosis : Anterior part of aspis with minute granules, aspis with single lateral carina on each side; rostral setae weakly barbed; sensillus thick, pointed, finely barbed; notogaster finely punctate; lamellar and interlamellar setae thick, strongly barbed; punctate; notogastral setae 14 pairs, strong, apically barbed; genital setae 9 pairs; an_3 very minute.

Material examined : South district : 2(F), Birganj, Amarapur, 2. i. 1992, from litter and soil, Coll. S. Saha.

Distribution : India : Tripura (South district), Himachal Pradesh, Orissa, Uttar Pradesh, West Bengal. **Elsewhere** : Africa, Europe, Indonesia, Japan, Jordan, Midway Island, Nepal, North America, Pacific Island, Pakistan, South America, Tahiti Island.

Remarks : The genus and species are reported here for the first time from Tripura.

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

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

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

Material examined : South district : 4 (F), Birganj, Amarpur, 2. i. 1992, from litter and soil, coll. S. Saha; 2 (F), Karbuk, Amarpur, 1. iii. 1992, from moist soil beside a nalha, coll. S. Saha.

Distribution : India : Tripura (South district), West Bengal. **Elsewhere** : Tahiti Island.

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

9. Family LOHMANIIDAE Berlese, 1916

Key to the genera of Lohmanniidae

- 1(4) Genital plates with transverse suture
- 2(3) Anal and adanal plates fused; prodorsal and notogastral setae with very long branches.....*Vepracarus* Aoki, 1965
- 3(2) Anal and adanal plates separated; no long branched setae*Cryptacarus* Grandjean, 1950
- 4(1) Genital plates without transverse suture
- 5(6) Ano-adanal setae four pairs*Javacarus* Balogh, 1961
- 6(5) Ano-adanal setae five or six pairs
- 7(8) Five pairs of setae in the ano-adanal plates*Haplacarus* Wallwork, 1962
- 8(7) Six pairs of setae in the ano-adanal plates
- 9(10) Preanal plate narrow; slight pygidial neotrichy*Annectacarus* Grandjean, 1950
- 10(9) preanal plate wide; no pygidial neotrichy*Paulianacarus* Balogh, 1960

11. Genus *Annectacarus* Grandjean

1950. *Annectacarus* Grandjean, Arch. Zool. exp. gen. Paris, 87 : 131.

20. *Annectacarus longisetosus* Bhattacharya, Bhaduri and Raychaudhuri

- 1974. *Annectacarus longisetosus* Bhattacharya, Bhaduri and Raychaudhuri, *Oriental Ins.*, 8 (2) : 281.
- 1984. *Annectacarus longisetosus*, Bhattacharya and Halder, *Entomon*, 9 : 293.

Diagnosis : Rostral tectum entire; rostral setae barbed, inserted on ridge; lamellar and interlamellar setae finely barbed; sensillus pectinate; notogaster with polygonal reticulation; except c_1 , d_1 , e_1 all notogastral setae very long; each genital plate with 7-9 barbed setae.

Distribution : India : Tripura (West district), West Bengal.

12. Genus *Cryptacarus* Grandjean

1950. *Cryptacarus* Grandjean, Arch. Zool. exp. gen. Paris, 87 : 138.

21. *Cryptacarus dendrisetosus* Bhattacharya, Bhaduri and Raychaudhuri

- 1974. *Cryptacarus dendrisetosus* Bhattacharya, Bhaduri and Raychaudhuri, *Oriental Insects*, 8 (2) : 281.
- 1984. *Cryptacarus dendrisetosus*, Bhattacharya and Halder, *Entomon*, 9 : 293.
- 1985. *Cryptacarus dendrisetosus*, Bhattacharya et al., *Environment & Ecology*, 3 (2): 146.
- 1992. *Cryptacarus dendrisetosus*, Chakraborti and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.
- 1995. *Cryptacarus dendrisetosus*, Bhattacharya and Chakraborti, *Advances in Ecology & Environmental Sciences* (eds. Mishra et al.) : 68.

Diagnosis : Prodorsum with polygonal reticulation, lateral margin of prodorsum with distinct angular projection; all prodorsal setae branched; sensillus pectinate; notogaster with tubercles on the posterior portion; notogastral setae branched, pygidial setae bush-like; genital plates with 4-5 small and barbed setae.

Distribution : India : Tripura (South district, West district), West Bengal.

13. Genus *Haplacarus* Wallwork

1962. *Haplacarus* Wallwork, *Acarologia*, 4 : 465.

22. *Haplacarus foliatus bengalensis* Bhattacharya, Bhaduri and Raychaudhuri

- 1974. *Haplacarus foliatus bengalensis* Bhattacharya, Bhaduri and Raychaudhuri, *Oriental Insects*, 8 (2) : 281.
- 1984. *Haplacarus foliatus bengalensis*, Bhattacharya and Halder, *Entomon*, 9 : 293.

Diagnosis : Prodorsal setae smooth; an excrescence in the posterior margin of preanal plate; sensillus pectinate with 10-12 branches; notogastral setae 10 pairs, markedly foliate, usually smooth; notogaster with 10 transverse bands; notogastral setae less foliate; each genital plate with 10 setae.

Distribution : India : Tripura (West district), West Bengal.

14. Genus *Javacarus* Balogh

1961. *Javacarus* Balogh, *Acta Zool. Acad. Sci. Hung.*, 7 : 24.

Key to the species of Javacarus

- 1(2) Sensillus with 8-10 long secondary branches; notogastral setae without midrib.....*foliatus* Hammer, 1972
- 2(1) Sensillus with 7 secondary branches; notogastral setae lanceolate without midrib*kuhnelti* Balogh, 1961

23. *Javacarus foliatus* Hammer

1972. *Javacarus kuhnelti* Bal. var. *foliatus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 19 (3) : 15.
1984. *Javacarus foliatus* n. stat., Sarkar and Subias, *Oriental Insects*, 18 : 25.
1984. *Javacarus foliatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 52.

Diagnosis : Prodorsum with large sized tubercles; rostrum hyaline without any sculpture; prodorsal setae long, lanceolate; sensillus with 8 to 11 secondary branches besides some very short ones distally on posterior border; notogastral setae very long, foliate with mid rib; undulating chitinized keels along the sides of dorsum; ventral side with irregular pattern of sculpture; genital setae 10 pairs.

Distribution : India : Tripura (West district).

Elsewhere : Fiji Islands, Java, Peru.

24. *Javacarus kuhnelti* Balogh

1961. *Javacarus kuhnelti* Balogh, *Acta Zool. Acad. Sci. Hung.*, 7 : 31.
1984. *Javacarus kuhnelti*, Bhattacharya and Halder, *Entomon*, 9 : 293.

1984. *Javacarus kuhnelti*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 52.

Diagnosis : Prodorsum with small-sized tubercles; rostrum sculptured; prodorsal setae lanceolate; sensillus with 7 secondary branches; notogaster with light spots forming a pattern of beaded line; notogastral setae lanceolate without midrib, 10 pairs of genital setae.

Distribution : India : Tripura (North district, West district), West Bengal. **Elsewhere :** Fiji Islands, Indonesia, Malaysia, Philippines, Tahiti Islands.

15. Genus *Paulianacarus* Balogh

1960. *Paulianacarus* Balogh, *Mem. Inst. Sci. Madagascar*, 14A : 8.

25. *Paulianacarus foliatus* Mondal and Chakraborty

1982. *Paulianacarus foliatus* Mondal and Chakraborty, *Indian J. Acar.*, 7 (2) : 79.
1984. *Paulianacarus foliatus*, Sarkar and Subias, *Oriental Insects*, 18 : 26.
1984. *Paulianacarus foliatus*, Bhattacharya and Halder, *Entomon*, 9 : 293.
1985. *Paulianacarus foliatus*, Bhattacharya et al., *Environment & Ecology*, 3 (2) : 146.
1992. *Paulianacarus foliatus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.
1995. *Paulianacarus foliatus*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra et al.) : 68.

Diagnosis : Body integument tuberculate and punctate; prodorsum triangular; rostrum with two lateral lobulations; all prodorsal setae foliate with dentate margin, lamellar and interlamellar setae shorter than others; sensillus long, pectinate with long branches on one side and with small branches on other; a chain-like transverse ridge in between interlamellar setae; notogastral setae 16 pairs, similar to prodorsal setae, marginal setae more longer and foliate and bilaterally dentate; anterior and three posterior fossulae vittiformes transversales continues and others interrupted medially; genital setae 10 pairs, thin, smooth; anal setae 2 pairs, similar to genital setae; adanal setae

4 pairs, similar to dorsal setae; an incomplete faint line in between the row of anal and adanal setae.

Material examined : South district : 4 (F), Pulchari, 4. vii. 1993, from soil with decomposed litter, coll. D. Saha.

Distribution : India : Tripura (South district, West district), West Bengal.

16. Genus *Vepracarus* Aoki

1965. *Vepracarus* Aoki, *Nat. Life Southeast Asia*, 4 : 142.

26. *Vepracarus cornutus* Sarkar and Subias

1984. *Vepracarus cornutus* Sarkar and Subias, *Oriental Insects*, 18 : 26.

1992. *Vepracarus cornutus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.

1995. *Vepracarus cornutus* Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Body microsculpture in the form of tubercle but form a pattern of polygonal reticulation dorsally, all these tubercles thickly punctate; restral setae inserted far below rostral tip, bilaterally branched; lamellar, interlamellar, anterior exostigmatic setae similar to rostral setae but shorter; horn like projection in front of *exa*; sensillus bilaterally barbed with thick setae of 16 pairs, similar to prodorsal setae; pygidial neotrichy with approximately 18 pairs of setae, small, star-shaped; genital setae 10 pairs, 5 pairs on anterior genital plate, 5 pairs on posterior plate, very short, bilaterally barbed; anal setae 2 pairs, adanal setae 4 pairs, similar to notogastral setae.

Distribution : India : Tripura (South district, West district).

10. Family EPILOHMANNIIDAE Oudemans, 1923

17. Genus *Epilohmannia* Berlese

1916. *Epilohmannia* Berlese, *Redia*, 12 : 176.

Key to the species of *Epilohmannia*

- 1(2) Thickened setae on tarsus IV a" and pv'
.....*cylindrica* (Berlese), 1904

- 2(1) Thickened setae on tarsus IV ft", a" s and pv'

- 3(4) Right rostral setae inserted a little anterior to left one
.....*pallida pacifica* Aoki 1965

- 4(3) Both the rostral setae placed on same line

- 5(6) Notogaster areolate with punctations in between*pallida areolata* Sarkar and Subias, 1982

- 6(5) Notogaster rugose.....*pallida rugosa* Sarkar and Subias, 1982

27. *Epilohmannia cylindrica* (Berlese)

1904. *Lohmannia cylindrica* Berlese, *Redia*, 2 : 23.

1984. *Epilohmannia cylindrica*, Sarkar, *III Oriental Entomology Symposium*, Trivandrum, 52.

1990. *Epilohmannia cylindrica*, Sarkar, *Rev. Ecol. Biol. Sol.*, 27 (3) : 313.

Diagnosis : Rostral setae very minute; lamellar setae small, finely barbed; interlamellar setae long, a double difference in length between lamellar and interlamellar setae; sensillus fusiform with a distal barbed thickening; notogastral setae ciliate; apodemes 1 not meeting each other and not touching corresponding apodemes 2 posteriorly; tarsus of leg IV with two spiniform setae.

Distribution : India : Tripura (West district).
Elsewhere : Palaearctic region, Hawaii, Laysan Islands, Europe.

28. *Epilohmannia pallida areolata* Sarkar and Subias

1982. *Epilohmannia pallida areolata* Sarkar and Subias, *Eos* : 58 : 315.

Diagnosis : Notogaster with distinct areolate punctation middorsally, laterally areolae appear like foveolae; distance between setae $C_1 - C_2$ and $C_1 - C_3$ almost equal, equal length of $3b$ and $3c$; notogastral setae bilaterally barbed distally, Ps_1 touching each other; transverse ridge between epimeres I; outer margin of posterior coxisternal plate straight, smooth.

Distribution : India : Tripura (West district).

29. *Epilohmannia pallida pacifica* Aoki

1965. *Epilohmannia pallida pacifica* Aoki, *Pacific Insects*, 7 (2) : 321.
 1984. *Epilohmannia pallida pacifica*, Sarkar, *Proc. III Oriental Entomology Symposium*, 52.
 1984. *Epilohmannia pallida pacifica*, Bhattacharya and Halder, *Entomon*, 9 : 293.
 1985. *Epilohmannia pallida pacifica*, Bhattacharya *et al.*, *Environment & Ecology*, 3 (2) : 146.

Diagnosis : Rostral setae very fine, distal ends sometimes bifid, right setae placed a little anterior to left one; lamellar setae barbed distally; interlamellar setae minutely barbed, longer than lamellar setae; sensillus with a distinctly swollen fusiform barbed head; notogastral setae 14 pairs, short, barbed, posterior pair longer, $c_1-d_1-d_1-c_1$ almost forming a square; no ih and ip ; genital setae 7 or 8 pairs, very short; ag_2 nearly in level of anterior margin of genital aperture, ag_3 clearly anterior to genital aperture; a longitudinal curved ridge on coxisternal plate I; all tarsi monodactylous.

Material examined : South district : 1 (F), Maharani, Amarpur, 4. iii. 1992, from litter of mixed vegetation, coll. S. Saha.

Distribution : India : Tripura (South district, West district), Kerala, Orissa, West Bengal. *Elsewhere* : China, Europe (Bulgaria, Germany), New Zealand, Pakistan, South America (Brazil), Turkey.

30. *Epilohmannia pallida rugosa* Sarkar and Subias

1982. *Epilohmannia pallida rugosa* Sarkar and Subias. *Eos*, 58 : 315.

Diagnosis : Integumental microsculpture of notogaster distinctly rugose; microsculpture widely separated on middorsal part of notogaster and very close laterally; equal distance between $c_1 - c_2$ and $c_2 - c_3$; notogastral setae pointed.

Distribution : India : Tripura (South district).

11. Family TRHYPOCHTHONIIDAE Willmann, 1931

Key to the genera of Trhypochthoniidae

- 1(2) Genital setae four pairs; anal setae absent *Afronothrus* Wallwork, 1961
 2(1) Genital setae 7-14 pairs; anal setae present
 3(4) Legs monodactylous; seven pairs of genital setae; notogastral setae simple; quadrangular notogaster *Archegozetes* Grandjean, 1931
 4(3) Legs tridactylous; seven to fourteen pairs of genital setae; notogastral setae spatulate; pentagonal notogaster *Allonothrus* van der Hammen, 1953

18. Genus *Afronothrus* Wallwork

1961. *Afronothrus* Wallwork, *Acarologia*, 3 (2) : 237.

31. *Afronothrus sulcatus* Hammer

1972. *Afronothrus sulcatus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 19 (3) : 19.
 1984. *Afronothrus sulcatus*, Sarkar, *III Oriental Entomology Symposium*, Trivandrum, 52.

Diagnosis : Rostrum rounded; rostral setae long; smooth, flexible; lamellar setae as long as their mutual distance, stiff, erect; interlamellar setae very long, thin, flexible; sensillus with short stalk and a small almost circular flat head; prodorsum densely punctate; notogastral setae of very different lengths; c_2 very short, d about two thirds as long as c_1 , c_3 , c_p , d_1 , e_1 and e_2 , f_1 absent, f_2 stiff and sickle-shaped, h_2 very long and thin, h_3 also thin but little shorter than h_2 ; a distinct transverse furrow (sulcus) between the setae d_2 , laterally to d_2 it widens and becoming more indistinct; notogaster reticulate to foveolate, posterior end of notogaster with distinct pattern of reticulation; epimeres distinct; epimeral setae minute, smooth, 3_b situated more medially, 4_c on the latero-anterior corner of epimere IV; genital setae 4 pairs, smooth; anal setae represented by pores between ad_1 and ad_2 , two pairs of adanal

setae; ventral side with distinct sculpture of hexagonal meshes forming a reticulate pattern; all legs tridactylous.

Distribution : India : Tripura (West district).

Elsewhere : Rangiroa (an atoll, 300 km northeast of Tahiti).

19. Genus *Allonothrus* Hammen

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

Key to the species of Allonothrus

1(2) Lamellar setae long, club-shaped; sensillus long, thick, tips rounded with fine bristles; notogastral microsculpture consisting of areolae; genital setae 9 pairs *dhananjayi* Sarkar, 1991

2(1) Lamellar setae long, membranous, thickly barbed; sensillus long, papillate apically; notogastral microsculpture consisting of polygonally arranged punctations containing irregular-shaped lobulated foveolae inside; genital setae 12-14 pairs

.....
pararusseolus Subias and Sarkar, 1982

32. *Allonothrus dhananjayi* Sarkar

1991. *Allonothrus dhananjayi* Sarkar, *Advances in Management and Conservation of Soil Fauna* (eds. G. K. Veeresh, D. Rajagopal and C. A. Viraktamath), 727.

Diagnosis : Yellowish brown in colour; two pairs of lateral ridges and two pairs of central ridges not meeting with each other; rostral setae simple, thick, pointed; lamellar setae long, club-shaped beset with fine bristles; interlamellar setae minute, simple; no exobothridial setae; sensillus thick, tips rounded with fine bristles; notogaster having microsculpture of light coloured areolae; notogastral setae 15 pairs, fan-shaped, tip rounded, covered with fine bristles; fissure *ia* and *im* not discernible; epimeral setal formula 3 : 1 : 3 : 3, all setae simple; 9 pairs of genital setae, barbed; tarsi tridactylous.

Distribution : India : Tripura (West district).

33. *Allonothrus pararusseolus* Subias and Sarkar

1982. *Allonothrus pararusseolus* Subias and Sarkar, *Redia*, 65 : 40.

Diagnosis : Prodorsum finely punctated with sculptured area in between bothridia; rostral setae smooth, spiny; lamellar setae long, membranous, densely barbed with rib bifurcated at the base, tip rounded; small interlamellar setae; sensillus long, papillate apically, lateral and central prodorsal ridges prominent; notogaster with polygonally arranged punctations containing irregular-shaped lobulated foveolae inside; 12-14 pairs of genital setae, 15 pairs of notogastral setae, fan-shaped, membranous, thickly barbed, tips truncate or rounded; posterior setae longer than anterior ones; q_1 and q_2 smooth, others densely barbed; ad_1 barbed, others smooth.

Material examined : South district : 2 (F), Radhakishoreganj, Belonia, 4. iii. 1992, from soil beside paddy field, coll. D. Saha; 20 (F), Santirbazar, Belonia, 27. iv. 1992, from humus, coll. D. Saha.

Distribution : India : Tripura (South district, West district).

20. genus *Archegozetes* Grandjean

1931. *Archegozetes* Grandjean, *Bull. Mus. Hist. Nat. Paris*, 3 (2) 144.

Key to the species of Archegozetes

1(2) Prodorsal and notogastral setae very long, bilaterally barbed; setae d_1 extends beyond the base of d_2 ; sensillus fine, pointed; no tubercle at posterior end of notogaster; $4a$ about half as long as $4b$ *magnus longisetosus* Aoki, 1965

2(1) Notogastral setae short, unilaterally barbed; setae d_1 never reaches d_2 ; sensillus blunt at tip; tubercle at posterior end of notogaster; $4a$ as long as $4b$
.....*tuberculatus* Sarkar, 1985

34. *Archegozetes magnus longisetosus* Aoki

1965. *Archegozetes magnus longisetosus* Aoki, *Nat. Life Southeast Asia*, **4** : 147.
1982. *Archegozetes magnus longisetosus*, Subias and Sarkar, *Redia*, **65** : 39.
1984. *Archegozetes magnus longisetosus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 52.
1990. *Archegozetes magnus longisetosus*, Sarkar, *Rev. Ecol. Biol., Sol.*, **27** (3) : 313.
1992. *Archegozetes magnus longisetosus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Archegozetes magnus longisetosus*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Prodorsum punctate; prodorsal and notogastral setae long, fine, densely beset with fine bristles; sensillus long, fine, densely covered with bristles, d_1 longer than their mutual distance; genital setae 7 pairs, $4a$ about $1/2as$ long as $4b$, solenidia on palp sharp.

Material examined : South district : 1 (F), Joalikhamar, Paratia, 13. 2. 1983, from soil and litter, coll. A. K. Sanyal.

Distribution : India, (West district), Assam, Kerala, Orissa, West Bengal. *Elsewhere* : Malaysia, South America, Tahiti Is., Thailand.

Remarks : Subias and Sarkar (1982) reported the species from different places of Tripura. As their collection contained only tritonymphal stage, they put question mark after the name of the species.

35. *Archegozetes tuberculatus* Sarkar

1985. *Archegozetes tuberculatus* Sarkar, *Uttar Pradesh J. Zool.*, **5** (1) : 83.

Diagnosis : Prodorsum nearly triangular in outline, all prodorsal setae long, thick, unilaterally barbed; sensillus long, uniformly thick throughout, thinly barbed on outer margin; exobothridial setae absent; transverse chitinous thickening in front of interlamellar setae and close to lateral margins of prodorsum; notogastral setae 15 pairs, unilaterally barbed; setae f_1 lacking; posterior end of body with characteristic blunt tubercle; genital setae 7

pairs, thin, simple, moderately long; anal setae 2 pairs, thin, long; adanal setae 3 pairs, stout, longer than anal setae; aggenital setae absent; epimeral setae very thin, simple, moderately long except $3b$ which is thrice as long as other setae, epimeral setal formula 3 : 1 : 3 : 3; all legs monodactylous.

Distribution : India : Tripura (West district).

12. Family MALACONOTHRIDAE Berlese, 1916

Key to the genera of Malaconothridae

- 1(2) Notogaster largely parallel sided; legs monodactylous.....
.....*Malaconothrus* Berlese, 1904
- 2(1) Notogaster in general widening posteriorad, legs tridactylous.....
.....*Trimalaconothrus* Berlese, 1916

21. Genus *Malaconothrus* Berlese

1904. *Malaconothrus* Berlese, *Redia*, **2** : 24.

36. *Malaconothrus asiaticus* Aoki

1967. *Malaconothrus robustus asiaticus* Aoki, *Nat. Life Southeast Asia*, **5** : 182.
1982. *Malaconothrus asiaticus*, Subias and Sarkar, *Redia*, **65** : 43.
1984. *Malaconothrus asiaticus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 52.

Distribution : India : Tripura (West district). *Elsewhere* : Thailand.

Remarks : Aoki (1967) described the new subspecies *M. robustus asiaticus* from Thailand. But the observation of the specimen from Tripura which resembles Aoki's material reveals that *M. robustus asiaticus* differs from *M. robustus* on number of characters like rostral and lamellar setae, notogastral sculpture and structure of genital and adanal setae. On the basis of these differences Subias and Sarkar (1982) gave the status of species to *M. asiaticus*.

37. *Malaconothrus crassisetosus* Subias and Sarkar

1982. *Malaconothrus crassisetosus* Subias and Sarkar, *Redia*, **65** : 45.

Diagnosis : Body thickly punctate; rostral setae thicker at base; lamellar setae like rostral and slightly incurved; interlamellar setae very thin; exostigmatic setae small; lateral prodorsal ridges broad and connected by rostral ridge; posterior part of prodorsum with two rows of scaly sculptures; 15 pairs of notogastral setae, short, thicker at the base than tip except e_2 and h_2 being long and thin; distinct lateral ridges interrupted medially; two curved ridges posterolaterally joined posteriorly; a straight transverse ridge in between p_1 setae; 5 pairs of genital setae, thin; anal setae 1 pair, thin.

Distribution : India : Tripura (West district).

38. *Malaconothrus dipankari* Saha and Sanyal

1996. *Malaconothrus dipankari* Saha and Sanyal, *Entomon*, **21** (1) : 107.

Diagnosis : Prodorsum rounded; rostral setae smooth, thin, lamellar and interlamellar setae fine, smooth, long; neck region below the posterior transverse ridge finely punctated with some polygonal markings; notogaster densely foveolated with minute punctation; notogastral setae 15 pairs, smooth, long, fine; ventral surface foveolated and finely punctated; all epimeres complete; epimeral setal formula 3 : 1 : 3 : 3; genital setae 5 pairs; no anal setae; adanal setae 3 pairs, smooth; legs monodactylous.

Distribution : India : Tripura (South district).

39. *Malaconothrus pauciareolatus* Subias and Sarkar

1982. *Malaconothrus pauciareolatus*, Subias and Sarkar, *Redia*, **65** : 43.

Diagnosis : Body flat, thickly punctate, areolae present sparsely in some specimens; prodorsum with lateral and rostral ridges; rostral setae thin, long, placed on small protuberances; lamellar setae similar to rostral, curved anteriorly and outwardly; interlamellar setae like other prodorsal setae but longer; exostigmatic setae shorter than others; two oblique ridges present in between interlamellar setae; notogaster with lateral and posterior ridges; 15 pairs of notogastral setae,

thin, long, different in sizes; transverse ridge in between p_1 setae; 5 pairs of genital setae, very thin, g_1 and g_2 longer than others; anal plates with pair of minute setae.

Distribution : India : Tripura (West district).

40. *Malaconothrus peruensis* Hammer

1961. *Malaconothrus peruensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 19.

1982. *Malaconothrus peruensis*, Subias and Sarkar, *Redia*, **65** : 47.

1984. *Malaconothrus peruensis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 52.

Diagnosis : Prodorsum densely punctate; all prodorsal setae smooth; rostral setae a little longer than their mutual distance; lamellar setae as long as their mutual distance; interlamellar setae about three fourth as long as their mutual distance; lamellar ridge evenly curved at posterior part, anterior part slightly curved or convex, the two ridges join in a transverse ridge; notogaster with two longitudinal ridges; 15 pairs of notogastral setae; distance between $c_1 - d_1$ only half as long as $d_1 - e_1$; a pore near h_1 ; notogaster finely dotted; mentotectum with a nose like projection anteriorly; epimeral setal formula 3 : 1 : 3 : 3; genital setae 5 pairs; anal setae much shorter than adanal setae.

Distribution : India : Tripura (West district).
Elsewhere : South America (Peru).

41. *Malaconothrus pseudolamellatus* Willmann

1931. *Malaconothrus pseudolamellatus* Willmann, *Arch. Hydrabiol.*, **9** (2) : 244.

1982. *Malaconothrus pseudolamellatus*, Subias and Sarkar, *Redia*, **65** : 48.

1984. *Malaconothrus pseudolamellatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 52.

Distribution : India : Tripura (West district).
Elsewhere : Java, Sunda Islands.

42. *Malaconothrus ramensis* Hammer

1966. *Malaconothrus ramensis* Hammer, *Zool. Anz.*, **177** (3/4) : 272.

1984. *Malaconothrus ramensis*, Bhattacharya and Halder, *Entomon*, **9** : 293.

1985. *Malaconothrus ramensis*, Bhattacharya *et al.*, *Environment & Ecology*, **3** (2) : 146.

Diagnosis : Propodosoma narrow and proportionately very long as compared with the hysterosoma; lamellae meet anteriorly in a translamella, lamellae slightly convex in their anterior half; all prodorsal setae long, fine, smooth; prodorsum finely punctated; notogaster scatteredly foveolated and finely punctated; notogastral setae 15 pairs, fine, smooth, moderately long; behind h_2 an incurvation; posterior end of notogaster slightly concave; along one side of notogaster a longitudinal ridge; a curved ridge and two obtuse tubercles at the posterior end of notogaster; setae d_2 in a marginal position, epimeral setal formula 3 : 1 : 3 : 3; 5 pairs of smooth genital setae; no anal setae; 3 pairs of smooth adanal setae; legs monodactylous.

Distribution : India : (West district).
Elsewhere : Jordan.

43. *Malaconothrus rostopilosus* Saha and Sanyal

1996. *Malaconothrus rostopilosus* Saha and Sanyal, *Entomon*, **21** (1) : 105.

Diagnosis : Prodorsum broadly triangular, covered by secretion consisting of minute granules; rostral setae pilose, clavate-shaped; lamellar and interlamellar setae thin, smooth, tip pointed; light polygonal reticular markings and punctations present in area between lamellar ridges; notogaster punctate with two longitudinal ridges that converge at posterior one fourth and ultimately unite to form a single median ridge, which joins a slightly arched transverse ridge above setal bases of ps_1 , notogastral setae 15 pairs, thin, smooth, long, of different sizes; a punctate double lined oval area near fissure ip , epimeral plates punctated with some markings, epimeral setal formula 3 : 1 : 3 : 3; genital setae 5 pairs, an undulating chitinous ridge just above anterior part of genital plate; no anal setae; 3 pairs of adanal setae, smooth; legs monodactylous.

Distribution : India : Tripura (South district).

22. Genus *Trimalaconothrus* Berlese

1916. *Trimalaconothrus* Berlese, *Redia*, **12** : 336.

44. *Trimalaconothrus tripurensis* Sarkar

1983. *Trimalaconothrus tripurensis* Sarkar, *Orient. Zool.*, **3** : 92.

Diagnosis : Rostrum rounded; rostral and lamellar setae long, thin, simple, flagellate; lamellar setae sharply curved inward; interlamellar setae very short, thin; lamellae sharply curved, 'S'-shaped; notogastral setae 15 pairs, thin, smooth except h_1 and ps_1 , e_2 , h_3 much longer than others; genital setae 7 pairs, minute, thin, smooth; epimeral setae like genital setae; epimeral setal formula 3 : 1 : 3 : 3; legs tridactylous.

Distribution : India : Tripura (West district).

13. Family NANHERMANNIIDAE
Sellnick, 1928

Key to the genera of Nanhermanniidae

- 1(2) Notogastral setae simple, setiform; sensillus with dilated densely pilose head; epimeral setal formula 3 : 1 : 3 : 3
.....*Cyrthermannia* Balogh, 1958
- 2(1) Notogastral setae 'T'-shaped, branches distally flagellate; sensillus simple, never pilose; epimeral setal formula 3-1-3-4...
.....*Masthermannia* Berlese, 1913

23. Genus *Cyrthermannia* Balogh

1958. *Cyrthermannia* Balogh, *Rev. Zool. Bot. Afr.*, **58** (102) : 3.

45. *Cyrthermannia* sp.

Remarks : The genus was recorded from West district of Tripura by Bhattacharya *et al.* (1985).

24. Genus *Masthermannia* Berlese

1913. *Masthermannia* Berlese, *Redia*, **9** : 100.

46. *Masthermannia mammillaris mammillaris* Berlese

1913. *Masthermannia mammillaris mammillaris* Berlese, *Redia*, **9** : 100.

1984. *Masthermannia mammillaris mammillaris*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 52.

Diagnosis : Prodorsum finely punctate; a robust lath on lateral sides; sensillus long, incrassate, setiform, finely feathered; weak prodorsal condyles connected by transverse lath; notogaster foveolated; notogastral profile uneven due to tubercles; notogastral setae with very long branches, all originating from tubercles.

Distribution : India : Tripura (South district, West district), West Bengal. *Elsewhere :* Australia, China, Euc Island, Fiji Island, France, Indonesia, Italy, North America, Samoa, Tahiti Island, Yugoslavia.

14. Family LIODIDAE Grandjean, 1954

Key to the genera of Liodidae

- 1(2) Lamellar setae present; two pairs of anal setae*Teleoliodes* Grandjean, 1934
2(1) Lamellar setae absent; three pairs of anal setae.....*Liodes* Heyden, 1826

25. Genus *Liodes* von Heyden

1826. *Liodes* von Heyden, *Isis (Von Oken)*, 18.

47. *Liodes terrestris* Wallwork

1963. *Liodes terrestris* Wallwork, *Acarologia*, 5 (1) : 102.

Diagnosis : Prodorsum with three transverse ridges; rostral setae strongly curved, smooth, as long as their mutual distance; lamellar setae lacking; interlamellar setae minute; sensillus with slender stem and slightly expanded distal portion beset with fine barbs; larval scalp with series of prominent transverse ridges; protonymphal and deutonymphal scalps with radiating ridges; laterally each scalp terminates posteriorly in a conspicuous tubercle bearing two pairs of setae; notogaster rounded; regularly arranged polygonal figures on anterior portion of notogaster; notogastral setae 4 pairs; apodemata II-IV incomplete medially; epimeral setal formula 3 : 1 : 2 : 3, all setae thick, smooth, genital setae 7 pairs, smooth.

Material examined : South district : 4 (F), Radhanagar, Belonia, 12. x. 1993, from loose clay-loam soil with decomposed leaves, coll. D. Saha.

Distribution : India : Tripura (South district), West Bengal. *Elsewhere :* Africa (Ghana).

Remarks : The genus and species are reported here for the first time from Tripura.

26. Genus *Teleoliodes* Grandjean

1934. *Teleoliodes* Grandjean, *Ann. Soc. ent. Fr.*, 103 : 142.

48. *Teleoliodes ghanensis* Wallwork

1963. *Teleoliodes ghanensis* Wallwork, *Acarologia*, 5 (1) : 115.

Diagnosis : Rostrum broadly rounded anteriorly; rostral setae curved ventrad, smooth or with finely roughened surface; lamellar setae shorter than rostral, thick, granular in appearance, inserted on distinct tubercles on prodorsum; interlamellar setae short, thick, minutely roughened, inserted in a pair of chitinised plates located in interpseudostigmatic region; sensillus long with slender granular club-shaped head; exopseudostigmatic setae similar to lamellar setae; prodorsum ornamented with polygonal reticulations; larval scalp bears 7 pairs of foliate setae, 4 pairs inserted centrodorsally and three pairs laterally; posterior tubercle not well developed on larval scalp; dorsal shield of notogaster with a faintly ridged central elevated part, central elevated part broadens posteriorly at the highest elevation; bifid tubercle well developed; one pair of long notogastral setae inserted on tubercle, remaining three pairs of notogastral setae inserted at lower levels on the postero-lateral rim of notogaster; coxisternum reticulated; epimeral setal formula 3 : 3 : 2 : 3; all setae thick, rough; a single longitudinal ridge continues posteriad, flanking the anal aperture on each side; genital plates divided unequally by a transverse suture; genital setae 7 pairs; ventral plate with webbed setae; genu I with foliate setae.

Material examined : South district : 2 (F), Birchandra Nagar, Belonia, 12. x. 1993, from loose humus with decaying leaves, coll. D. Saha.

Distribution : India : Tripura (South district).
Elsewhere : Africa (Ghana).

Remarks : The genus and species are reported here for the first time from India.

15. Family TEGEOCRANELLIDAE
P. Balogh, 1987

27. Genus *Tegeocranellus* Berlese

1913. *Tegeocranellus* Berlese, *Redia*, 9 : 93.

48. *Tegeocranellus* sp.

Material examined : South district : 3 (F), Karbuk, Amarpur, 1. ii. 1992, from humus beside a nalha, coll. D. Saha.

Remarks : The genus is reported here for the first time from India.

16. Family CEPHEIDAE Berlese,
1896

28. Genus *Sadocepheus* Aoki

1965. *Sadocepheus* Aoki, *Japanese Journal of Zoology*, 14 (3) : 4.

50. *Sadocepheus* sp.

Remarks : The genus was recorded from West district of Tripura by Bhattacharya *et al.* (1985).

17. Family MICROTEGEIDAE
Balogh, 1972

29. Genus *Microtegeus* Berlese

1917. *Microtegeus* Berlese, *Documents Scientifiques*, 5.

51. *Microtegeus reticulatus* Aoki

1965. *Microtegeus reticulatus* Aoki, *Nat. Life Southeast Asia*, 1 : 156.

Diagnosis : The middle and posterior part of prodorsum with a definite pattern of reticulation, proximal part with long stria; lamellar setae placed

on apophyses; sensillus with fusiform head beset with several strong spines and with rhomboid-shaped hollow area; narrow trapeze like outgrowths on the notogaster; notogastral setae 9 pairs, smooth; genital setae 5 pairs.

Material examined : South district : 2 (F), Birchandra Nagar, Belonia, 12. x. 1993, from loose humus with decaying leaves, coll. S. Saha.

Distribution : India : Tripura (South district), West Bengal. *Elsewhere* : Indonesia, Thailand.

Remarks : The genus and species are reported here for the first time from Tripura.

18. Family MICROZETIDAE
Grandjean, 1936

Key to the genera of Microzetidae

- 1(2) Medial margins of lamellae parallel, 'U'-shaped; end of lamellae obliquely truncated; paired lamellar apophyses in interlamellar region.....*Berlesezetes* Mahunka, 1980
- 2(1) Medial margins of lamellae convergent, 'O'-shaped; end of lamellae with deep incisions; no lamellar apophyses*Schizozetes* Balogh, 1962

30. Genus *Berlesezetes* Mahunka

1980. *Berlesezetes* Mahunka, *Acta zool. hung.*, 26 (4) : 397.

52. *Berlesezetes auxiliaris* (Grandjean)

1936. *Berlesezetes auxiliaris* Grandjean, *Bull. Mus. Hist. Nat. Paris*, 8 (2) : 138.

1980. *Berlesezetes auxiliaris* (Grandjean), Mahunka, *Acta zool. hung.*, 26 (4) : 397.

1984. *Berlesezetes auxiliaris*, Bhattacharya and Halder, *Entomon*, 9 : 294.

1985. *Berlesezetes auxiliaris*, Bhattacharya *et al.*, *Environment & Ecology*, 3 (2) : 146.

Diagnosis : Lamellae long, folded to a sharp angle along the paraxial crest, not reaching the tip of rostrum; translamella well developed; rostral setae long, fine, smooth; apex of cuspis with incision; lamellar setae not extending beyond the tip of cuspis; interlamellar setae very long, short, extended beyond the tip of rostrum; notogaster

granulated.

Distribution : India : Tripura (West district), Orissa, West Bengal. *Elsewhere* : Africa, Indonesia, Japan, Malayasia, North America, Reunion Island, South America, Tonga Tapu Island.

53. *Berlesezetes longistriatus* Sarkar

1992. *Berlesezetes longistriatus* Sarkar, *Bull. Life Science*, **2** : 31.

Diagnosis : Chestnut brown in colour; prodorsum broad; rostral setae flagelliform; lamellar setae much longer than rostral setae with branches; interlamellar setae smooth, long, thick, strong; sensillus long, proclinate, filiform, bilaterally barbed; apical half of interlamellar region punctate; notogastral setae 9 pairs, simple, very short; 6 long longitudinal lines from dorsosejugal suture; genital setae 6 pairs, g_6 simple, very long; epimeral setae $3c$ longest; tarsi monodactylous.

Distribution : India : Tripura (West district).

54. *Berlesezetes monoramai* Sarkar

1992. *Berlesezetes monoramai* Sarkar, *Bull. Life Science*, **2** : 31.

Diagnosis : Deep brown in colour; prodorsum broad; rostral setae thin, smooth, much longer than their mutual distance; lamellae broad, well developed, translamellae distinct; lamellar setae long, thick, spine like, extending beyond the rostral tip; interlamellar setae long, thick, smooth, tentaculate, extend upto the level of rostral tip; sensillus proclinate, set with fine bristles, proximal part devoid of bristles; notogaster with 6 asymmetrical longitudinal lines extend from dorsosejugal suture; notogastral setae 7 pairs, smooth, tip pointed; genital setae 6 pairs, g_6 simple, very long; epimeral setae 4_b longest; tarsi monodactylous.

Distribution : India : Tripura (West district).

55. *Berlesezetes rudrasagarensis* Sarkar

1992. *Berlesezetes rudrasagarensis* Sarkar, *Bull. Life Science*, **2** : 31.

Diagnosis : Yellowish brown in colour; prodorsum slightly longer than broad; rostral setae flagelliform, simple; lamellar setae thick, strong, extended beyond rostral tip; interlamellar setae strong, smooth, tentaculate; a thin chitinous transverse ridge touching bases of interlamellar setae; sensillus proclinate, long, filiform, set with bilaterally symmetrical bristles from base to tip; 7 pairs of notogastral setae, simple; 4 short symmetrical lines from dorsosejugal suture; 6 pairs of genital setae, all equal; epimeral setae 3_b longest; tarsi monodactylous.

Distribution : India : Tripura (West district).

31. Genus *Schizozetes* Balogh

1962. *Schizozetes* Balogh, *Ann. Hist. nat. Mus. Hung.*, **54** : 415.

56. *Schizozetes quadrilineatus* Balogh

1962. *Schizozetes quadrilineatus* Balogh, *Ann. Hist. nat. Mus. Hung.*, **54** : 415.

1984. *Schizozetes quadrilineatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

1992. *Schizozetes quadrilineatus*, Sarkar, *Bull. Life Science*, **2** : 34.

Diagnosis : Rostral setae bifurcate from base, lamellae convergent, extending near each other, not covering lateral portion of prodorsum; lamellar cuspis cleft into three aciculate apices, inside rounded; lamellar setae straight, smooth, not reaching to rostrum; interlamellar region with horizontal line, but without interlamellar apophyses; interlamellar setae strong, smooth; sensillus proclinate, filiform, ciliate; notogaster longer than broad; notogastral setae minute; dorsosejugal suture with 4 chitinous lines extending posteriorly.

Distribution : India : Tripura (West district).

Elsewhere : Peru.

19. Family EREMULIDAE
Grandjean, 1965

32. Genus *Eremulus* Berlese

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

57. *Eremulus jyotsnai* Sarkar

1991. *Eremulus jyotsnai* Sarkar, *Advances in Management and Conservation of Soil Fauna* (eds. G. K. Veeresh, D. Rajagopal and C. A. Viraktamath), 729.

Diagnosis : Light brown in colour ; prodorsum with foveolae basally, densely punctate medially and laterally; rostral and lamellar setae long, thin, curved inwardly; interlamellar setae very short and closely situated; anterior exobothridial setae minute; sensillus long, barbed unilaterally, head swollen, ending in a deep curve appearing like a hook; notogaster having rounded pockmarks; notogastral setae 10 pairs, simple, foliate, tip pointed; epimeral setae branched; epimeral setal formula 3 : 1 : 3 : 3; genital setae 6 pairs, simple; tarsi monodactylous.

Distribution : India : Tripura (West district).

58. *Eremulus nigrisetosus* Hammer

1958. *Eremulus nigrisetosus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10** (1) : 60.
 1985. *Eremulus nigrisetosus*, Bhattacharya *et al.*, *Environment & Ecology*, **3** (2) : 146.
 1992. *Eremulus nigrisetosus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
 1995. *Eremulus nigrisetosus*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Rostrum conical; rostral setae slender, slightly rough, curved inwards; about as long as their mutual distance; lamellar setae situated on small apophyses on lamellae, stiff, little longer than their mutual distance; lamellae slightly 'S'-shaped; interlamellar setae closely situated, stiff, twice as long as their mutual distance; laterally to lamellae a stronger chitinous ridge; sensillus lash-shaped, bent at tip, provided unilaterally on anterior edge with black hairs; anterior border of hysterosoma straight, strongly chitinized which continues backwards as a keel near shoulder; notogastral setae 10 pairs, dark, curved irregularly, spine like, very thin at tip; a transversal row of small chitinous knobs arranged by three in oblique rows present between second pair of notogastral setae; all legs monodactylous.

Distribution : India : Tripura (South district, West district). *Elsewhere :* Argentina.

59. *Eremulus truncatus* Hammer

1971. *Eremulus truncatus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **16** (6) : 15.
 1984. *Eremulus truncatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
 1991. *Eremulus truncatus*, Sarkar, *Advances in Management and Conservation of soil Fauna* (eds. G. K. Veeresh, R. Rajagopal and C. A. Viraktamath), 731.

Diagnosis : Yellow in colour; prodorsum long and narrow as compared to broad notogaster; rostral and lamellar setae very long, tip very thin; interlamellar setae almost same as lamellar setae, a medially indistinct and irregularly curved ridge in front of the lamellar setae; no transverse lamellar ridge; sensillus flagellate, set with scattered short spines; notogaster truncate-shaped; behind the anterior margin of notogaster an oblong oval field bordered posteriorly and partly laterally by two rows of pits; notogastral setae stiff broadest across the middle and pointed at the tip.

Distribution : India : Tripura (West district). *Elsewhere :* Fiji Islands.

20. Family DAMAEOLIDAE
Grandjean, 196533. Genus *Fosseremus* Grandjean

1954. *Fosseremus* Grandjean, *Bull. Mus. Hist. nat. Paris*, **26** : 339.

60. *Fosseremus* sp.

Remarks : Bhattacharya *et al.* (1985) recorded the genus from West district of Tripura.

21. Family EREMOBELBIDAE
Balogh, 1961

Key to the genera of Eremobelbidae

- 1(2) Notogastral setae blade-shaped; aggenital setae 3-4 pairs.....*Pseuderemus*
 Balogh and Mahunka, 1968.
 2(1) Notogastral setae not blade-shaped; aggenital setae 6-23 pairs.....
*Eremobelba* Berlese, 1908

34. Genus *Eremobelba* Berlese1908. *Eremobelba* Berlese, *Redia*, **5** (1) : 9.61. *Eremobelba* sp.

Remark : The genus was reported from West district of Tripura by Bhattacharya *et al.* (1985).

35. Genus *Pseuderemulus* Balogh and Mahunka1968. *Pseuderemulus* Balogh and Mahunka, *Opusc. zool. Bpest.*; **8** : 321.62. *Pseuderemulus* sp.

Remark : Bhattacharya *et al.* (1985) recorded the genus from West district of Tripura.

22. Family BASILOBELBIDAE
Balogh, 196136. Genus *Basilobelba* Balogh1958. *Basilobelba* Balogh, *Rev. Zool. Bot. Afr.*, **58** : 9.63. *Basilobelba indica* Bhaduri, Chakrabarti and Raychaudhuri1974. *Basilobelba indica* Bhaduri, Chakrabarti and Raychaudhuri, *Acta Arachnol.*, **25** (2) : 86.1984. *Basilobelba indica*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Colour brown; body covered by cerotegument except centrodorsal portion of notogaster and sensillus; rostral and lamellar setae thin, smooth, interlamellar setae minute, smooth; sensillus long, flagelliform with two rows of fine barbs; notogastral setae 7 pairs; all setae except h_1 and ps_3 thick, rough, pointed at tips, h_1 and ps_3 very short and smooth; ventral plate with 10 pairs of setae; genital setae 6 pairs; thong or 'laniere' long, arms of buckle short; tritonymphal scalp with 7 pairs of long, strongly barbed setae; deutonymphal scalp with 9 pairs of long, flagelliform, barbed setae.

Material examined: South district : 7(F), Matarbari, Udaipur, 4.vii.1993, from soil and litter, coll. S. Saha.

Distribution: India : Tripura (West district, North district, South district), Orissa, West Bengal.

23. Family ZETORCHESTIDAE
Michael, 189837. Genus *Zetorchestes* Berlese1888. *Zetorchestes* Berlese, *Acari, Myriapoda et Scorpiones hucusqua in Italia reperta*, Padova.64. *Zetorchestes saltator* Oudemans1915. *Zetorchestes saltator*, Oudemans, *Ber. Ned. Ent. Ver.*, **4** : 194.

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

Material examined : South district : 6 (F), Maharani, Amarpur, 4.iii.1992, from rotten leaves of mixed vegetation, coll. S. Saha; 4 (F), Paharpur, Amarpur, 4.iii.1992, from soil under decomposed banana leaves; coll. D. Saha.

Distribution: India : Tripura (South district), West Bengal. *Elsewhere* : Japan, Srilanka.

Remark : The genus and species are reported here for the first time from Tripura.

24. Family ASTEGISTIDAE
Balogh, 196138. Genus *Cultroribula* Berlese1908. *Cultroribula* Berlese, *Redia*, **5** (1) : 9.65. *Cultroribula lata* Aoki1984. *Cultroribula lata*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Distribution : India : Tripura (West district).

25. Family PELOPPIIDAE Balogh, 1943

39. Genus *Furcoppia* Balogh and Mahunka1966. *Furcoppia* Balogh and Mahunka, *Acta zool. hung.*, **12** : 8.

66. *Furcoppia (Furcoppia) cornuta* Hammer

1972. *Furcoppia (Furcoppia) cornuta* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **19** (3) : 24.

Diagnosis : Propodosoma narrow; rostral setae placed on short apophyses, broad, pointed, set with long thin bristles, three pointed tips at tip of rostrum; lamellae with cusps, lamellae fused; 9 lamellar setae thick, feathered, approximately one and a half times longer than cuspis; interlamellar setae placed on low apophyses, thin, densely feathered; sensillus spindle-shaped, covered with poststanding bristles; 11 pairs of notogastral setae hardly discredable; epimeral setae thick, feathered; genital setae 6 pairs; tarsi tridactylous.

Material examined : South district : 2 (F), Tolabari, Udaipur, 15.xii.1991, from litter below banana plant, coll. S. Saha.

Distribution : India : Tripura (South district). *Elsewhere* : Tahiti.

Remark : The genus and species are reported here as the first record from India.

26. Family CARABODIDAE Koch, 1837

Key to the genera of Carabodidae

- 1(2) Notogastral setae phylliform; six pairs of genital setae; *Phyllocarabodes* Balogh and Mahunka, 1969
- 2(1) Notogastral setae simple; four pairs of genital setae *Carabodes* Koch, 1836

40. Genus *Carabodes* Koch

1836. *Carabodes* Koch, *Deutschlands Crustaceen, Myriapoden und Arachniden*, 3.

67. *Carabodes peniculatus* Aoki

1970. *Carabodes peniculatus* Aoki, *Bull. Nat. Sci. Mus. Tokyo*, **13** (3) : 417.

Diagnosis : Rostral setae lanceolate, slender; lamellar setae minutely barbed, strongly curved inward; interlamellar setae club-shaped with distal barbation; sensillus clavate, split distally to produce numerous prickles; notogastral setae 10

pairs, brush-like, split distally; genital setae 12 pairs.

Material examined : South district : 8 (F), Manubazar, Sabrum, 17.xii.1991, from soil and litter below mango tree, coll. S. Saha; 6(F), Puranrajbari, Belonia, 12.x.1993, from humus, coll. D. Saha.

Distribution : India : Tripura (South district), West Bengal : *Elsewhere* : Indonesia, Japan.

Remark : The genus and species are reported here for the first time from Tripura.

41. Genus *Phyllocarabodes* Balogh and Mahunka

1969. *Phyllocarabodes* Balogh and Mahunka, *Opusc. zool. Bpest.*, **9** : 48.

68. *Phyllocarabodes* sp.

Remark : Chakrabarty and Bhattacharya (1992) recorded the genus from South district of Tripura.

27. Family TECTOCEPHEIDAE Grandjean, 1954

42. Genus *Tectocephus* Berlese

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

69. *Tectocephus latilamellaris* Kardar

1974. *Tectocephus latilamellaris* Kardar, *Oriental Insects*, **8** (1) : 51.

1992. *Tectocephus latilamellaris*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.

1995. *Tectocephus latilamellaris*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Prodorsum smooth, bell-shaped; rostral setae short, finely setose; lamellae broad, extending beyond lateral margins of propodosoma, reaching level of rostral tip; translamella present; lamellar setae thick, finely setose; interlamellar setae and an extra pair of setae both represented by their insertions only present by the side of each lamellae; sensillus with peduncle and head almost of same length, head fusiform with sparsely

pock-marked surface; dorsosejugal suture absent; 9 pairs of insertions of notogastral setae; a pair of lunar-shaped small areae porosae present; apodemata well developed; 9 pairs of epimeral setal insertions; 5 pairs of fine genital setae; anal setae one pair; adanal setae 3 pairs; two pairs of setal insertions in a line perpendicular to long axis of notogaster; legs monodactylous.

Distribution: India : Tripura (South district).

70. *Tectocephus velatus velatus* (Michael)

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

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

Material examined : South district : 10(F), Jatanbari, Amarpur, 29.i.1992, from soil beside Gomti river, coll. S. Saha.

Distribution: India: Tripura (South district), Bihar, Himachal Pradesh, Orissa, Sikkim, West Bengal. *Elsewhere* : Africa, Central Asia, Easter Island, Europe, Fiji Island, Indonesia, Japan, Jordan, New Zealand, North America, Pakistan, South America, Spitsbergen, Tonga Island, Turkey.

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

71. *Tectocephus velatus sarekensis* Tragardh

1910. *Tectocephus velatus sarekensis* Tragardh, *Naturw. Unters Sarekgeb in Schw. Lappland*, 4 : 567.

1992. *Tectocephus velatus sarekensis*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.

1995. *Tectocephus velatus sarekensis*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*), 68.

Diagnosis : The median and lateral borders of lamella run parallel towards tip; prodorsum bears indistinct longitudinal furrows behind translamellae; tips of lamellae broad and round; *iad* directed laterally.

Distribution: India : Tripura (South district), West Bengal. *Elsewhere* : Europe (Germany, Spain), Indonesia, New Zealand.

28. Family OTOCEPHEIDAE Balogh, 1961

Key to the genera of Otocepheidae

- 1(2) Pedotecta 2+3 distinct but not so conspicuously developed; genital plates with 4 pairs of setae; anal plates with two pairs of setae *Dolicheremaeus* Jacot, 1938
- 2(1) Pedotecta 2+3 conspicuously developed; genital plates with 3 or 4 pairs of setae; anal plates with two or three pairs of setae.
- 3(4) Anal plates with three pairs of setae
..... *Archegotocephus* Aoki, 1961
- 4(3) Anal plates with two pairs of setae
..... *Acrotocephus* Aoki, 1965

43. Genus *Acrotocephus* Aoki

1965. *Acrotocephus* Aoki, *Bull. Nat. Sci. Mus., Tokyo*, 8 (3) : 279.

72. *Acrotocephus* sp.

Material examined : South district : 6 (F), Radhanagar, Belonia, 12.x.1993, from decomposed leaves, coll. D. Saha.

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

44. Genus *Archegotocephus* Aoki

1965. *Archegotocephus* Aoki, *Nat. Life Southeast Asia*, 4 : 158.

73. *Archegotocephus* sp.

Material examined : South district : 1 (F), Joalikhamar, Paratia, 13.ii.1983, from soil and litter, coll. A. K. Sanyal.

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

45. Genus *Dolicheremaeus* Jacot

1936. *Dolicheremaeus* Jacot, *Florida Ent.*, **21** (4) : 51.

74. *Dolicheremaeus cuspidata* (Wallwork)

1962. *Tetracondyla cuspidata* Wallwork, *Acarologia*, **4** (3) : 444.

1984. *Dolicheremaeus cuspidata*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Yellow brown in colour; lateral margins of prodorsum bear short angular tooth on each side; rostral setae barbed, tip fine; lamellar setae less conspicuously barbed; sensillus spindle-shaped, mid portion slightly expanded; notogastral setae 10 pairs, long, minutely barbed; *ia* aligned obliquely, *im* longitudinally aligned; 4 pairs of genital setae; adanal setae minutely barbed.

Distribution : India : Tripura (West district). **Elsewhere :** Africa.

75. *Dolicheremaeus lineolatus* Hammer

1981. *Dolicheremaeus lineolatus* Hammer, *Acarologia*, **22** (1) : 33.

1992. *Dolicheremaeus lineolatus*, Chakrabarty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.

1995. *Dolicheremaeus lineolatus*, Bhattacharya and Chakrabarty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Distribution : India : Tripura (South district, West district). **Elsewhere :** Java.

29. Family MACHADOBELBIDAE
Balogh, 1972

46. Genus *Machadobelba* Balogh

1958. *Machadobelba* Balogh, *Rev. Zool. Bot. Afr.*, **58** : 13.

76. *Machadobelba symmetrica* Balogh

1958. *Machadobelba symmetrica* Balogh, *Rev. Zool. Bot. Afr.*, **58** : 13.

1984. *Machadobelba symmetrica*, Sarkar, *III Oriental Entomology Symposium*, Trivandrum, 53.

1990. *Machadobelba symmetrica*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

1992. *Machadobelba symmetrica*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.

1995. *Machadobelba symmetrica*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Rostral setae originate before rostrum, short, fine, smooth; lamellae curved ridges, granular in appearance, extending for about half the length of propodosoma; lamellar setae very minute, placed on apices of lamellar ribs; interlamellar setae very minute; placed at the base of lamellar ribs exostigmatal setae very minute; sensillus branched into two rami of equal length; strongly curved, finely setose; notogaster oval, with two pairs of chitinous tubercles on anterior margin; notogastral setae 10 pairs, smooth, fairly thick, slightly curved; 4 pairs of epimeral plates, most anterior pair being inserted on anterior margin of genital plates, longer than rest.

Distribution : India : Tripura (South district, West district). **Elsewhere :** Africa, Annobon Island.

30. Family OPPIIDAE Grandjean,
1954

47. Genus *Aeroppia* Hammer

1961. *Aeroppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 65.

77. *Aeroppia* sp.

Material examined : South district : 2 (F), Pulcharri, Sabrum, 4.vii.1993, from decomposed litter, coll. D. Saha.

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

48. Genus *Arcoppia* Hammer

1977. *Arcoppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **21** (4) : 32.

78. *Arcoppia bidentata* Hammer

1979. *Arcoppia bidentata* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **22** (9) : 29.

1984. *Arcoppia bidentata*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : The tip of rostrum tripartite; rostral setae slightly rough, twice as long as their

mutual distance; lamellar arch incomplete; lamellar setae short, smooth, little shorter than their mutual distance; interlamellar setae thick, longer than rostral setae; a light furrow in front of interlamellar setae; sensillus with moderately long stalk having angular head with one long branch and two tiny tips or teeth; integument on the sides or prodorsum covered with tubercles; notogastral setae slightly rough different in lengths, *ti*, *te*, *ms* longer than remainder; *r*₂ longer than *r*₁, *r*₃ and *p*₁-*p*₃; genital setae 6 pairs, short; aggenital setae longer than adanal setae.

Distribution : India : Tripura (West district).
Elsewhere : Java.

79. *Arcoppia fenestralis orientalis* Balogh and Balogh

1986. *Arcoppia fenestralis orientalis* Balogh and Balogh, *Acta zool. hung.*, **32** (1-2) : 56.
1992. *Arcoppia fenestralis orientalis*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1992. *Arcoppia fenestralis orientalis*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Rostral and lamellar setae long, fine, smooth; interlamellar setae short, fine; sensillus with three setiform branches, posterior one longer than middle one, anterior branch extremely short; basal part of prodorsum with 4 or 5 longitudinal dark spots; notogastral setae 10 pairs, medium long, fine, smooth; distance *ti*-*ms* considerably longer than *ti*; genital setae 6 pairs.

Distribution : India : Tripura (South district).
Elsewhere : Papua New Guinea.

80. *Arcoppia mcadami* Balogh and Balogh

1986. *Arcoppia mcadami* Balogh and Balogh, *Acta zool. hung.*, **32** (1-2) : 50.
1992. *Arcoppia mcadami*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1992. *Arcoppia mcadami*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Rostral setae long, fine; lamellar and interlamellar setae short, fine; exobothridial setae as long as lamellar setae, interlamellar area

with two pairs of rounded, pale areolae; exobothridial region granulate; translamellar part of prodorsal arch sharp, almost semicircular; lamellar part evanescent; sensillus with one long setiform branch, dilated part of sensillus almost spherical; notogastral setae 10 pairs, fine, smooth, extremely short; notogastral surface circular; genital setae 6 pairs; pori in adanal position.

Distribution : India : Tripura (South district).
Elsewhere : Papua New Guinea.

81. *Arcoppia rotunda* Hammer

1972. *Arcoppia rotunda* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **22** (9) : 30.
1984. *Arcoppia rotunda*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Rostrum not tripartite; rostral, lamellar and interlamellar setae normal for the genus; lamellar arch semicircular, very broad, evenly developed throughout; sensillus with moderately long stalk having a small swollen head ending in a long, thin, curved thread; notogaster large, round; notogastral setae 10 pairs; *ti*, *te*, *ms* much longer than the remainder; three pairs of short apophyses on the posterior border of dorsum, lateral one with a tiny setae *p*₁; legs very slender.

Distribution : India : Tripura (West district).
Elsewhere : Java.

49. Genus *Brachioppia* Hammer

1961. *Brachioppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 51.

82. *Brachioppia brevipectinata* Kok

1967. *Brachioppia brevipectinata* Kok, *J. ent. Soc. Sth. Afr.*, **30** : 52.
1992. *Brachioppia brevipectinata*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Brachioppia brevipectinata*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Distribution : India : Tripura (South district).
Elsewhere : South Africa.

50. Genus **Brachioppiella** Hammer

1962. *Brachioppiella* Hammer, *Biol. Skr. Dan. Vid. Selsk.* **13** (2) : 47.

83. **Brachioppiella** sp.

Remark : The genus was reported from West district of Tripura by Bhattacharya *et al.* (1985).

51. Genus **Graptoppia** (**Graptoppia**) Balogh

1983. *Graptoppia* (*Graptoppia*) Balogh, *Acta zool. hung.*, **29** (1-3) : 48.

84. **Graptoppia** (**Graptoppia**) sp.

Material examined : South district : 4 (F), Kankraban, Udaipur, 28.iv.1992, from humus mixed with cowdung, coll. D. Saha.

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

52. Genus **Lanceoppia** Hammer

1982. *Lanceoppia* (*Lanceoppia*) Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (2) : 42.

85. **Lanceoppia** (**Lanceoppia**) sp.

Material examined : South district : 2 (F), Birchandranagar, Belonia, 12.x.1993, from loose humus, Coll. S. Saha.

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

53. Genus **Multioppia** Hammer

1961. *Multioppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 61.

86. **Multioppia gracilis** Hammer

1972. *Multioppia gracilis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **19** (3) : 30.
1992. *Multioppia gracilis*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Multioppia gracilis*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Rostral setae proximally barbed; lamellar setae smooth, shorter than their mutual distance; interlamellar setae smooth, little longer than lamellar setae; three pairs of light spots in

between interlamellar setae; exopseudostigmatic setae slightly barbed, situated on low tubercles; sensillus very long, slender secondary branches on a thin stalk; notogaster broad, circular; notogastral setae 12 pairs, short, smooth; sternum well developed; epimeres faintly reticulate; epimeral setal formula 3 : 1 : 2 : 3; distance between genital and anal field less than twice the length of genital field; genital setae 5 pairs; *iad* parallel to sides of anal field; genital, anal and adanal setae smooth.

Distribution : India : Tripura (South district).
Elsewhere : Tahiti.

54. Genus **Mystroppia** Balogh

1959. *Mystroppia* Balogh, *Ann. Univ. Sci. Budapest Biol.*, **2** : 33.

87. **Mysteroppia sellnicki** Balogh

1959. *Mysteroppia sellnicki* Balogh, *Ann. Univ. Sci. Budapest Biol.*, **2** : 33.
1984. *Mysteroppia sellnicki*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Rostral setae broad; prolamellae well-developed; lamellar setae also broad; translamella not developed, backwardly directed and pointed tubercles present posteriorly on prodorsum; sensillus with papillae or barbs; *ad*₁ and *ad*₂ broad; genital setae 5 pairs.

Distribution : India : Tripura (West district).
Elsewhere : Africa.

55. Genus **Oppia** Koch

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

88. **Oppia akusiensis** Wallwork

1961. *Oppia akusiensis* Wallwork, *Acarologia*, **3** (4) : 637.
1984. *Oppia akusiensis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
1990. *Oppia akusiensis*, Sarkar, *Rev. Ecol. Biol. Sol.* **27** (3) : 313.

Diagnosis : Integument almost smooth, postero-lateral margin between pseudostigmata and tectopodium I granulated; rostral setae placed

on raised tubercles located on a curved chitinated ridge posterior to rostrum; distinctly pilose; rostral setae pilose, almost straight, convergent; translamella short, weakly chitinated ridge; lamellae a pair of fine ridges; interlamellar setae smooth or slightly rough end; sensillus with a narrow stem and expanded distal portion, latter bears 10-12 pectinations, unequal and variable in length; exobothridial setae pilose; notogastral setae 10 pairs; setae except *ta*, *p*₁, *p*₂, *p*₃ pilose; epimeral setae except two pairs smooth; genital setae 5 pairs, smooth; anal and adanal setae pilose.

Distribution : India : Tripura (South district, West district). **Elsewhere** : Ghana.

89. *Oppia arcidiaconoae* Bernini

1973. *Oppia arcidiaconoae* Bernini, *Lav. Soc. It. Biogeogr.*, **3** : 402-409.
 1984. *Oppia arcidiaconoae*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
 1990. *Oppia arcidiaconoae*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Distribution : India : Tripura (West district). **Elsewhere** : Sicilian islands, Saudi Arabia, Algeria, Tuscan Archipelago.

90. *Oppia brevifasciata*

1985. *Oppia brevifasciata*, Bhattacharya *et al.*, *Environment & Ecology*, **3** (2) : 146.

Distribution : India : Tripura (West district). **Elsewhere** : Europe.

91. *Oppia fasciata* (Paoli)

1908. *Oppia fasciata* (Paoli), *Redia*, **5** (1) : 46.
 1948. *Oppia fasciata*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 531.
 1990. *Oppia fasciata*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3): 313.

Distribution: India : Tripura (West district). **Elsewhere** : Europe.

92. *Oppia sundensis* Hammer

1979. *Oppia sundensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **22** (9) : 32.
 1984. *Oppia sundensis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
 1990. *Oppia sundensis*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Diagnosis : Colour light brown; rostral setae barbed; lamellar ridges thin, lamellar setae situated behind transverse part of lamellar ridges, short, faintly barbed; interlamellar setae almost similar to lamellar setae; four large spots between lamellar ridges, sensillus with flat, disk-shaped head, its outer border set with 11 almost equally long spines, notogastral setae 10 pairs, *ta* tiny, others almost equal, short, finely barbed; genital setae 5 pairs, minute; aggenital setae minute; *Ad*₁ and *Ad*₂ thicker than *Ad*₃.

Distribution : India : Tripura (South district, West district). **Elsewhere** : Java.

93. *Oppia tuxeni* Hammer

1968. *Oppia tuxeni* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **16** (2) : 52.
 1984. *Oppia tuxeni*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Rostral setae barbed, twice as long as their mutual distance; lamellar setae situated behind a transverse ridge, thin, little longer than their mutual distance; posteriorly lamellae divided into two parts; interlamellar setae thin, smooth, longer than their mutual distance; exopseudostigmatic setae long, smooth; sensillus with a long, thin stalk and a round head; notogaster little narrower at the anterior end; notogastral setae equally long, stiff, smooth, *ta* missing; fissure *im* placed close to *r*₃; genital setae 6 pairs; fissure *iad* obliquely placed to anal field.

Distribution: India : Tripura (West district). **Elsewhere** : New Zealand.

94. *Oppia yodai* Aoki

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

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

Material examined : South district : 2 (F), Rankang, Amarpur, 4.iii.1992, from decomposed leaves beside paddy field, coll. S. Saha.

Distribution : India : Tripura (South district).

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

56. Genus *Oxyoppia* Balogh and Mahunka

1969. *Oxyoppia* Balogh and Mahunka, *Acta zool. hung.*, **15** : 269.

95. *Oxyoppia polynesia* (Hammer)

1972. *Oppiella polynesia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **19** (3) : 28.
1983. *Oxyoppia polynesia*, Subias and Sarkar, *Redia*, **66** : 444.
1984. *Oxyoppia polynesia*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
1992. *Oxyoppia polynesia*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Oxyoppia polynesia*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 68.

Diagnosis : Rostrum with distinct tubercle middorsally; rostral setae setiform, minutely barbed; lamellar and interlamellar setae minute, thin, sensillus fusiform with one row of barbs; two pointed posteriorly directed tubercles on the posterior part of prodorsum between bothridia; few areolae on middorsal area of notogaster and ventral plate; two distinct cristae present; notogastral setae 10 pairs, all setae long, setiform, barbed distally; epimeral setal formula 3 : 1 : 3 : 3, setae thin, short, smooth; genital setae 6 pairs, minute.

Distribution : India : Tripura (South district, West district). *Elsewhere* : Tahiti.

57. Genus *Ramusella* Hammer

1962. *Ramusella* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (2) : 50.

96. *Ramusella (Ramusella) chulumaniensis* (Hammer)

1958. *Oppia chulumaniensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10** (1) : 57.
1962. *Ramusella (Ramusella) chulumaniensis*, (Hammer), *Biol. Skr. Dan. Vid. Selsk.*, **13** (2) :
1992. *Ramusella (Ramusella) chulumaniensis*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1992. *Ramusella (Ramusella) Chulumaniensis* Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Rostral setae placed close together, extend beyond tip of rostrum by half their length, proximal part thick, set with bristles; lamellar setae stiff, thin directed forwards and inwards; about half as long as their mutual distance, situated on anterior end of short lamellae; interlamellar setae stiff spines, directed outwards; 3 pairs of light spots between interlamellar setae; sensillus strongly branched, head flat and almost semilunar-shaped; a broad chitinous border at the anterior end of notogaster; notogastral setae 10 pairs, almost equal in length, stiff.

Distribution : India : Tripura (South district). *Elsewhere* : Bolivia, Java, Peru.

58. Genus *Stachyoppia* Balogh

1961. *Stachyoppia* Balogh, *Ann. Univ. Sci. Budapest Biol.*, **4** : 5.

97. *Stachyoppia granulosa* Subias and Sarkar

1983. *Stachyoppia granulosa* Subias and Sarkar, *Redia*, **66** : 439.
1992. *Stachyoppia granulosa*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Stachyoppia granulosa*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Body granulated: rostrum rounded, dorsally tuberculated, rostral setae curved and barbed; lamellar setae setiform; interlamellar setae minute; a ridge between two interlamellar setae; sensillus with dilated head, with only one row of barbs; two chitinous structures present lateral and posterior to bothridia; notogaster pointed middorsally and protruded over prodorsum; cristae ill developed; 9 pairs of notogastral setae, lanceolate, sides irregular; epimeral setae thin, smooth, setal formula 3 : 1 : 3 : 3; 5 pairs of genital setae; all ventral setae smooth.

Distribution : India : Tripura (South district, West district).

59. Genus *Striatoppia* Balogh

1958. *Striatoppia* Balogh, *Rev. Zool. Bot. Afr.*, **58** (1-2) : 16.

98. *Striatoppia opuntiseta* Balogh and Mahunka

1968. *Striatoppia opuntiseta* Balogh and Mahunka, *Opusc. zool. Bpest.*, **8** : 342.
 1984. *Striatoppia opuntiseta*, Bhattacharya and Halder, *Entomon*, **9** : 294.
 1985. *Striatoppia opuntiseta*, Bhattacharya *et al.*, *Environment & Ecology*, **3** (2) : 146.

Distribution : India : Tripura (West district).
Elsewhere : Java.

99. *Striatoppia similis* Subias and Sarkar

1983. *Striatoppia similis* Subias and Sarkar, *Redia*, **66** : 441.

Diagnosis : Body granulated; rostrum with protuberance present middorsally, rostral setae at the end of two prolamellae, smooth, fine; lamellar setae broad with longitudinal striations, minutely barbed; interlamellar setae minute; two long ridges adjacent to interlamellar setae; sensillus fusiform with rows of papillae; notogaster straight with 10 pairs of setae like lamellar setae except c_2 and p_1 , different in shape; epimeral setal formula 3 : 1 : 3 : 3; $1b$, $3b$ and $4a$ long, broad, barbed, others minute; genital setae 5 pairs; all ventral setae minute except ad_1 which may be sometimes broader than others; ventral plate thickly punctated.

Distribution: India : Tripura (West district).

100. *Striatoppia tripurensis* Subias and Sarkar

1983. *Striatoppia tripurensis* Subias and Sarkar, *Redia*, **66** : 441.

Diagnosis : Rostrum rounded with dorsal prominence; rostral setae setiform; two prolamellae coalesced, except in middle with many elevated granules; lamellar costulae and translamella well developed; lamellar setae broad with striations and minute barbs; interlamellar setae minute ; two long ridges between interlamellar setae; fusiform sensillus with rows of papillae; notogaster straight with 10 pairs of setae, same as lamellar setae except p_1 and c_2 ; epimeral setae $1b$, $3b$ and $4a$ phylliform, others simple, minute, setal formula 3 : 1 : 3 : 3; 5 pairs of genital setae; ventral setae setiform.

Distribution : India : Tripura (West district).

**31. Family PAPILLONOTIDAE
 Balogh, 1983**

60. Genus *Papillonotus* Wallwork

1961. *Papillonotus* Wallwork, *Acarologia*, **3** (3) : 347.

101. *Papillonotus tricarinatus* Sarkar and Subias

1983. *Papillonotus tricarinatus* Sarkar and Subias, *Bull. Inst. Cat. Hist. Nat.*, **49** (Sec. Zool. 5) : 850.

Diagnosis : Rostrum rounded with a tubercle in middle; rostral setae thick, setiform, barbed; translamella interrupted medially; lamellar and interlamellar setae membranous, short, broad, interlamellar setae bounded by ridges laterally and anteriorly three distinct ridges extending from rostrum to translamella; anterior margin of notogaster pointed medially and protruding into prodorsum and interrupted medially, laterally this margin with light projection; one pair of longitudinal ridges present all over the notogaster medially; notogastral setae 9 pairs, membranous with mid rib, very long, broad, c_2 ill developed, epimeral setal formula 3 : 1 : 3 : 3, $1c$ not discernible, epimeral plate IV extending posteriorly to the end of genital plate; genital setae 5 pairs, thin, smooth; anal and adanal setae minute; ventral plate with tubercular reticulation.

Distribution: India : Tripura (West district).

**32. Family SUCTOBELBIDAE
 Grandjean, 1954**

Key to the genera of Suctobelbidae

- 1(2) Notogaster with rounded tubercles; notogastral setae minute.....*Suctobelbila* Jacot, 1937
 2(1) Notogaster without rounded tubercles; notogastral setae usually medium or long
 3(4) Rostrum with 2-3 pairs of lateral teeth and with incision.....*Suctobelba* Paoli, 1908
 4(3) Rostrum with one pair of lateral teeth and without incision*Novosuctobelba* Hammer, 1977

61. Genus *Novosuctobelba* Hammer

1977. *Novosuctobelba* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **21** (4) : 40.

102. *Novosuctobelba dentissima* Hammer

1977. *Novosuctobelba dentissima* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **21** (4) : 40.
1992. *Novosuctobelba dentissima*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Novosuctobelba dentissima*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Rostrum broad; rostral setae knee-bent, proximal part barbed, distal part smooth; two lateral teeth; dorsal surface to lamellar knob granulated; lamellar setae thin, smooth; interlamellar setae tiny, smooth; sensillus long, slender club, pointed; notogaster broad, oval; on either side of straight anterior border of notogaster a very strong tooth ; 9 pairs of strong, moderately long, barbed notogastral setae; epimeral setal formula 3 : 1 : 3 : 3; genital setae 5 pairs, anterior one very long and strong.

Distribution : India : Tripura (South district).
Elsewhere : Pakistan.

62. Genus *Suctobelba* Paoli

1908. *Suctobelba* Paoli, *Redia*, **5** (1) : 72.

103. *Suctobelba amurica* Krivolutsky

1966. *Suctobelba amurica* Krivolutsky, *Byull. Mosk. Obshch. Ispyt. Prir.*, **71** : 127.
1992. *Suctobelba amurica*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
1995. *Suctobelba amurica*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Distribution : India : Tripura (South district).
Elsewhere : Russia.

104. *Suctobelba carcharodon* Moritz

1966. *Suctobelba carcharodon* Moritz, *Zool. Anz.*, **177** : 276.
1984. *Suctobelba carcharodon*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
1990. *Suctobelba carcharodon*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Distribution : India : Tripura (West district).
Elsewhere : Germany.

63. Genus *Suctobelbella* Jacot

1937. *Suctobelbella* Jacot, *J.N.Y. ent. soc.*, **45** : 361.

105. *Suctobelbella variosetosa* Hammer

1961. *Suctobelba variosetosa* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 51.

Diagnosis : Prodorsum with four unequal rostral teeth; lamellar knob closed; sensillus with flat, obliquely cut off, rounded head set with short thick bristles; notogaster with two teeth; few notogastral setae thin, short and few spoon-shaped beset with bristles.

Material examined : South Tripura : 2(F), Ranking, Amarpur, 4.iii.1992, from soil near pond, coll. S. Saha.

Distribution : India : Tripura (South district), West Bengal. **Elsewhere** : Fiji, Peru.

Remark : The genus and species are reported here for the first time from Tripura.

64. Genus *Suctobelbilla* Jacot

1937. *Suctobelbilla* Jacot, *J.N.Y. ent Soc.*, **45** : 361.

106. *Suctobelbilla* sp.

Remark : Bhattacharya *et al.* (1985) reported the genus from West district of Tripura.

33. Family CHAUNOPROCTIDAE
Balogh, 196165. Genus *Chaunoproctus* Pearce

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

Key to the species of Chaunoproctus

- 1(2) Sensillus with round head; notogastral setae short**abalai**, Bhaduri *et al.* 1975
- 2(1) Sensillus club-shaped; notogastral setae very long**longisetosus** Dhali and Bhaduri, 1980

107. *Chaunoproctus abalai* Bhaduri,
Bhattacharya and Chakrabarti

1975. *Chaunoproctus abalai* Bhaduri, Bhattacharya and Chakrabarti, *Mitt. Zool. Mus. Berlin*, 5 (1) : 59.
1992. *Chaunoproctus abalai*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.
1995. *Chaunoproctus abalai*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

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

Distribution : India : Tripura (South district), West Bengal.

108. *Chaunoproctus longisetosus* Dhali and
Bhaduri

1980. *Chaunoproctus longisetosus* Dhali and Bhaduri, *Indian J. Acar.*, 5 : 53.

Diagnosis : Rostral setae placed laterally on apophyses, thin, curved inward, set with minute setae; lamellae narrow bar-like, joined by thin translamella; lamellar setae rough, slightly thicker than the rostral setae, curved inward and extend beyond the tip of rostrum; interlamellar setae barbed, slightly larger than lamellar setae; sensillus with club-shaped head and thin stalk directed outward slightly backward; notogastral surface rough and foveolated; notogastral setae 10 pairs, except *ta* which is short and without minute setae all notogastral setae exceptionally long, barbed; p_2 and p_3 shorter than p_3 ; five pairs of small area porosae present on notogaster; genital setae 6 pairs; all legs tridactylous.

Material examined : North district: 1 (F), Lalchhuri, Ambasa, 22.ii.1983, from soil, coll. A. K. Sanyal. South district : 1(F), Ampinagar, Amarapur, 13.ii.1983, from soil mixed with cowdung, coll. A. K. Sanyal.

Distribution : India : Tripura (North district, South district), Sikkim.

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

34. Family MOCHLOZETIDAE
Grandjean, 1960

Key to the genera of Mochlozetidae

- 1(2) Areae porosae A_2 and A_3 ribbon-shaped, much longer than wide
..... *Terrazetes* Jacot, 1936
2(1) Areae porosae A_2 and A_3 usually circular or slightly elongate
..... *Unguizetes* Sellnick, 1925

66. Genus *Terrazetes* Jacot

1936. *Terrazetes* Jacot, *Ann. Mag. nat. Hist.*, 17 (10) : 400.

109. *Terrazetes mauritius* Jacot

1936. *Terrazetes mauritius* Jacot, *Ann. Mag. nat. Hist.*, 17 (10) : 400.
1984. *Terrazetes mauritius*, Sarkar, *Proc. III Oriental Entomology symposium*, Trivandrum, 54.

Distribution : India : Tripura (West district)
Elsewhere : Mauritius.

67. Genus *Unguizetes* Sellnick

1925. *Unguizetes* Sellnick, *Treubia*, 6 : 473.

110. *Unguizetes clavatus* Aoki

1967. *Unguizetes clavatus* Aoki, *Nat. Life Southeast Asia*, 5 : 195.

Diagnosis : Lateral side of rostrum with crest; translamella carries a projection in the middle and one crest behind; prodorsal setae rough; sensillus clavate-shaped with few fine bristles on the head; 4 pairs of area porosae, A_2 placed in the middle of A_1 and A_3 ; notogastral setae represented by 7 pairs of alveoli; genital setae 6 pairs.

Material examined : South distinct; 6 (F), Uttarkalapania, Sabrum, 4.vii.1993, from humus mixed with rotten leaves, coll. S. Saha; 6 (F), Puranrajbari, Belonia, 12.x.1993, from humus, coll. D. Saha.

Distribution : India : Tripura (South district), West Bengal. **Elsewhere** : Japan, Thailand.

Remark : The genus and species are reported here for the first time from Tripura.

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

Key to the genera of Xylobatidae

- 1(4) Notogaster with 13-15 pairs of setae.
 2(3) 13 pairs of minute notogastral setae; legs monodactylous *Setoxylobates* Balogh and Mahunka, 1967
 3(2) 15 pairs of long notogastral setae; legs tridactylous *Plenoxylobates* Hammer, 1980
 4(1) Notogaster with 10-11 pairs of setae or alveoli.
 5(6) Legs monodactyle *Xylobates* Jacot, 1929
 6(5) Legs tridactyle *Brasilobates* Perez-Inigo and Baggio, 1980

68. Genus *Brasilobates* Perez-Inigo and Baggio

1980. *Brasilobates* Perez-Inigo and Baggio, *Boletim. Zool. Univ. S.*, **5** : 135.

111. *Brasilobates punctata* Grobler

1991. *Brasilobates punctata* Grobler, *Navors. Nas. Mus., Bloemfontein.* **7** (5) : 75.

Diagnosis : Prodorsal surface punctate; all prodorsal setae setiform; rostral setae convergent, barbed, lamellar setae long, thin, barbed; interlamellar setae long, barbed; sensillus long, reclonate, gradually becoming lanceolate, unilaterally barbed, pteromorphae movable, surface punctate; 10 pairs of minute notogastral setae; notogastral surface punctate; epimeral surface punctate with internal polygonal structure; epimeral setal formula 3 : 1 : 3 : 3, setae minute; anogenital surface punctate; genital setae 5 pairs, 2 pairs of anal setae; legs tridactylous.

Material examined : South district : 4 (F), Joalbari, Belonia, 4.vii.1993, from loose soil with decomposed leaves, coll. D. Saha; 6 (F), Radhanagar, Belonia, 12.x.1993, from loose soil with decomposed leaves, coll. D. Saha.

Distribution : India : Tripura (South district).
Elsewhere : South Africa.

Remark : The genus and the species are reported here for the first time from India.

69. Genus *Plenoxylobates* Hammer

1979. *Plenoxylobates* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **22** (9) : 58.

112. *Plenoxylobates curtiseta* Hammer

1979. *Plenoxylobates curtiseta* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **22** (9) : 59.

1984. *Plenoxylobates curtiseta*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Rostrum broadly rounded; rostral setae thin, barbed, lamellar and interlamellar setae longer and thicker than rostral setae, barbed; sensillus long, numerous bristles on its outer border, proximal bristles tiny; a round scale or lobe lateral to the sensillus; notogaster with almost straight anterior border and round posterior end; pteromorphae mobile with radiating lines; a thin seta c_3 and fissure ai in middle of pteromorphae; notogastral setae 15 pairs, thin, set with upstanding scattered bristles; Im , Ip , dp , h_1 , h_2 , h_3 longer than those in the anterior part of the dorsum; c_1 , c_2 , c_3 short; integument faintly pitted at a deeper level, above the pits finely punctate; epimeres reticulate, densely punctate, epimeral setae barbed, epimeral setal formula 3 : 1 : 3 : 3; genital setae 5 pairs, finely barbed; anal and adanal setae finely barbed.

Distribution : India : Tripura (West district).
Elsewhere : Java.

70. Genus *Setoxylobates* Balogh and Mahunka

1967. *Setoxylobates* Balogh and Mahunka, *Acta zool. Acad. Sci. Hung.*, **23** (1-2) : 59.

113. *Setoxylobates foveolatus* Balogh and Mahunka

1967. *Setoxylobates foveolatus* Balogh and Mahunka, *Acta zool. Acad. Sci. Hung.*, **13** (1-2) : 59.

1984. *Setoxylobates foveolatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : Prodorsum, pteromorphae, notogaster and ventral plate with scattered foveolae; rostral setae shorter than lamellar ones, weakly barbed; lamellar setae extending beyond

rostrum, apical half weakly barbed; interlamellar setae arising anteriorly on dorsosejugal suture, weakly barbed; sensillus reclinate, long, fusiform, acutely terminated, unilaterally barbed; 14 pairs of notogastral setae, very minute; 4 pairs of true areae porosae of medium size; genital plate punctate, 5 pairs of genital setae, epimeral setal formula 3 : 1: 2: 2; epimeral region foveolate.

Distribution : India: Tripura (West district), West Bengal. *Elsewhere* : Vietnam.

71. Genus *Xylobates* Jacot

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

Key to the Species of Xylobates

- 1(2) Rostral and lamellar setae smooth; sensillus with swollen, barbed head; notogastral setae minute, 11 pairs
*capucinus* (Berlese, 1908)
- 2(1) Rostral and lamellar setae unilaterally barbed; sensillus with lanceolate head; notogastral setae 10 pairs represented by pores*seminudus* Hammer, 1971

114. *Xylobates capucinus* (Berlese)

1908. *Protoribates capucinus* Berlese, *Redia*, 5 : 2.

1989. *Xylobates capucinus*, Norton and Kethly, *Redia*, 62 (2) : 428.

Diagnosis : Rostral setae small, fine, smooth; lamella broad in the middle, tip pointed; lamellar setae smaller than rostral setae, smooth; interlamellar setae long, fine, barbed unilaterally; sensillus with long stalk, head swollen, barbed outwardly; notogastral setae 11 pairs, minute.

Material examined: South district : 6 (F), Joalbari, Belonia, 4.vii.1993, from decaying humus of banana trunk, coll. S. Saha, 12 (F), Radhanagar, Belonia, 12.x.1993, from soil with decomposed leaves, coll. D. Saha.

Distribution : India : Tripura (South district), West Bengal. *Elsewhere* : Africa (Sahara), Europe (Bulgaria, Italy, Spain), Indonesia, New Zealand, North America, Pakistan, Russia Samoa, South America, Tonga Tapu Island, Turkey.

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

115. *Xylobates seminudus* Hammer

1971. *Xylobates seminudus* Hammer, *Biol. Skr. Dan. vid. Selsk.*, 16 : 38.

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

Material examined : South district : 4 (F), Murapara, Udaipur, 4.vii.1993, from humus with rotten straw, coll. S. Saha; 10(F), Radhakisoraganj, Belonia, 12.x.1993, from soil mixed with cowdung. coll. D. Saha.

Distribution : India : Tripura (South district), West Bengal. *Elsewhere* : Fiji, Tahiti Island, Tonga Tapu Island.

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

116. *Xylobates* sp.

Remark : The genus was earlier recorded from North district, South district and West district of Tripura.

36. Family PROTORIBATIDAE J. Balogh and P. Balogh, 1984

Key to the genera of Protoribatidae

- 1(2) 14 pairs of notogastral setae
*Haloribatula* Schuster, 1957
- 2(1) 10 pairs of notogastral setae
*Liebstadia* Oudemans, 1906

72. Genus *Haloribatula* Schuster

1957. *Haloribatula* Schuster, *Zool. Anz.*, 159 : 123.

117. *Haloribatula tenareae* Schuster

1957. *Haloribatula tenareae* Schuster, *Zool. Anz.*, 159 : 123.

1984. *Haloribatula tenareae*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Distribution : India : Tripura (West district).
Elsewhere : France.

73. Genus *Liebstadia* Oudemans

1906. *Liebstadia* Oudemans, *Ber. Ned. Ent. Ver.*, 2 : 101.

118. *Liebstadia* sp.

Remark : The genus was recorded by Bhattacharya *et al.* (1985) from West district of Tripura.

37. Family ORIBATULIDAE Thor, 1929

74. Genus *Zygoribatula* Berlese

1917. *Zygoribatula* Berlese, *Documents Scientifiques*, 5.

119. *Zygoribatula longiporosa* Hammer

1953. *Zygoribatula longiporosa* Hammer, *Australian Journal of Zoology*, 1 (2) : 236.

Diagnosis : Rostrum with a median tooth; prodorsal setae rough, erect, anteriorly directed; sensillus with setose club-shaped head; notogaster with 11 pairs of short, stiff, rough setae; areae porosae adalaris and mesonotica elongate, narrow.

Material examined : North district : 2 (F), Manu, 23.ii.1983 from soil, coll. A. K. Sanyal. South district : 12 (F), Jatanbari, Amarpur, 29.i.1992, from soil beside Gomti river, coll. S. Saha.

Distribution : India : Tripura (North district, South district), West Bengal. *Elsewhere* : Australia.

Remark : The genus and the species are reported here for the first time from Tripura.

38. Family HAPLOZETIDAE Grandjean, 1936

Key to the genera of Hoplozetidae

- 1(2) Genital plates with six pairs of setae; three pairs of aggenital setae *Pilobatella* Balogh and Mahunka, 1967

- 2(1) Genital plates with four or five pairs of genital setae; one pair of aggenital setae

- 3(4) Interlamellar setae originating on dorsosejugal suture; genital setae four pairs

.....
Haplozetes Willmann, 1935

- 4(3) Interlamellar setae not originating on dorsosejugal suture; genital setae five pairs

- 5(6) Dorsosejugal suture medially interrupted; notogastral setae with clubby tip

.....
Tentaculozetes Balogh, 1970

- 6(5) Dorsosejugal suture not interrupted; no clavate-tipped notogastral setae

- 7(8) Dorsosejugal suture with three arches; notogastral setae 10 pairs

.....
Rostrozetes Sellnick, 1925

- 8(7) Dorsosejugal suture with a single arc; notogastral setae 14 pairs

.....
Peloribates Berlese, 1908

75. Genus *Haplozetes* Willmann

1935. *Haplozetes* Willmann, *Zool. Jahrb., Syst.*, 66 : 333.

120. *Haplozetes minimicoma* Beck

1964. *Haplozetes minimicoma* Beck, *Senck. biol.*, 45 : 169.

1992. *Haplozetes minimicoma*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.

1995. *Haplozetes minimicoma*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Prodorsum broad; rostral and lamellar setae short, fine, smooth; interlamellar setae very minute; sensillus long, with long stalk and short, minutely barbed, slightly dilated head; notogastral setae 10 pairs, very short, smooth; genital setae 4 pairs.

Distribution : India : Tripura (South district).
Elsewhere : Peru.

76. Genus *Peloribates* Berlese

1908. *Peloibates* Berlese, *Redia*, 5 : 3.

121. *Peloribates tripuraensis* Sanyal and Saha

1996. *Peloribates tripuraensis* Sanyal and Saha, *Hexapoda*, 8 (2) : 71.

Diagnosis : Rostrum rounded, foveolae on rostral surface closely placed; rostral setae long, bilaterally barbed; lamellar setae long, pointed, bilaterally barbed; interlamellar setae moderately long, bilaterally barbed, tip blunt; sensillus club-shaped, head smooth; notogastral setae 14 pairs, short, thick, rounded, blunt-tipped, minutely barbed pteromorphae short, granulate-foveolate, broadest anteriorly; all epimeres foveolated, epimeral setae slightly barbed, epimeral setal formula 2 : 1 : 2 : 2; genital and anal plates foveolated; genital setae 5 pairs, slightly barbed; anal setae 2 pairs, minutely barbed; ventral plate with foveolae; adanal setae 3 pairs minutely barbed; leg tridactylous.

Distribution : India : Tripura (South district).

77. Genus *Pilobatella* Balogh and Mahunka

1967. *Pilobatella* Balogh and Mahunka, *Opusc. zool. Bpest.*, 7 : 40.

122. *Pilobatella berlesei* Bhattacharya and Banerjee

1979. *Pilobatella berlesei* Bhattacharya and Banerjee, *Indian J. Acar.*, 4 (1) : 21.

1984. *Pilobatella berlesei* Bhattacharya and Halder, *Entomon*, 9 : 294.

Diagnosis : All prodorsal setae finely barbed; rostral setae long, slightly shorter than their mutual distance; lamellar setae about half as long as their mutual distance; interlamellar setae as long as lamellar setae; sensillus long, reclinate-arcuate, finely barbed; anterior portion of notogaster with polygonal reticulation, posterior portion with fine punctations; notogastral setae 10 pairs, simple; epimeral region with polygonal sculpture, setae thin, smooth, minute; genital setae 6 pairs; tarsi monodactylous.

Distribution : India : Tripura (West district), West Bengal.

78. Genus *Rostrozetes* Sellnick

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

Key to the Species of *Rostrozetes*

- 1(2) Body foveolated; head of sensillus aciculate or brush like
- 2(1) Body punctated; head of sensillus thickened and ciliated*punctatus* Karppinen, 1966
- 3(4) Rostrum incised, tripartite; notogaster medially foveolated*komodensis* Mahunka, 1977
- 4(3) Rostrum not incised; whole body foveolated*ovulum* (Berlese 1908)

123. *Rostrozetes komodensis* Mahunka

1977. *Rostrozetes komodensis* Mahunka, *Revue suisse Zool.*, 84 (1) : 271.

1984. *Rostrozetes komodensis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : Rostrum incised, tripartite, large tutorial tooth, lamellar cuspis triangular; lamellar setae originate from cuspidal apex, larger than rostral setae; interlamellar setae short; sensillus with incrassate and aciculate head; notogaster medially with round foveolae; notogastral margins with two incrassate convex cristae; area between crista and body margin with rough rugae; notogastral setae thin, short; entire ventral surface except genital plates ornamented with round foveolae; genital plates with irregularly-shaped foveolae of different sizes; genital setae minute.

Distribution : India : Tripura (West district).
Elsewhere : Indonesia.

124. *Rostrozetes ovulum* (Berlese)

1908. *Tachyoribates ovulum* Berlese, *Redia*, 5 : 3.

1925. *Rostrozetes foveolatus* Sellnick, *Suppl. Ent. Berlin*, 11 : 85.

1984. *Rostrozetes foveolatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

1984. *Rostrozetes ovulum*, Bhattacharya and Halder, *Entomon*, 9 : 294.

1985. *Rostrozetes ovulum*, Bhattacharya et al., *Environment & Ecology*, 3 (2) : 146.

1989. *Rostrozetes ovulum* (Berlese, 1908), Norton and Kethley, *Redia*, 72 (2) : 472.

1990. *Rostrozetes ovulum*, Sarkar, *Rev. Ecol. Biol. Sol.*, 27 (3) : 313.

1992. *Rostrozetes ovulum*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.

1995. *Rostrozetes ovulum*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra et al.) : 69.

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

Material examined : South district : 4 (F), Garjanmura, Udaipur, 10.viii.1991, from litter and soil below sal tree, coll. D. Saha; 10(F), Lakshmipur, Belonia, 28.iv.1992, from humus, coll. S. Saha.

Distribution : India : Tripura (North district, South district, West district), Bihar, Meghalaya, West Bengal. *Elsewhere* : Fiji, Greece, Indonesia, Japan, Mauritius, New Zealand, North America, Samoa, Seychelles, South America, Spain, Tahiti Island, Tonga Tapu Island.

125. *Rostrozetes punctatus* Karppinen

1966. *Rostrozetes punctatus* Karppinen, *Ann. Ent. Fenn.*, **32** (4) : 280.

1984. *Rostrozetes punctatus*, Sarkar, *Proc. III oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : Body punctated; rostral and lamellar setae ciliated; head of sensillus thickened and ciliated; interlamellar setae curved sharply medially; 10 pairs of notogastral setae, minute.

Distribution : India : Tripura (West district), West Bengal. *Elsewhere* : Africa (Guinea, Nimba).

79. Genus *Tentaculozetes* Balogh

1970. *Tentaculozetes* Balogh, *Acta Zool. Acad. Sci. Hung.*, **16** (3-4) : 318.

126. *Tentaculozetes* sp.

Remark : Chakrabarty and Bhattacharya (1992) and Bhattacharya and Chakrabarty (1995) reported the genus from South district of Tripura.

39. Family SCHELOBATIDAE Grandjean, 1953

Key to the genera of Schelobatidae

1(4) Genital plates with three pairs of setae

2(3) Rostrum not incised; notogastral setae ten pairs, well visible; aggenital setae present *Euschelorbates* Kunst, 1958

3(2) Rostrum with two incisions; notogastral setae 14 pairs; aggenital setae absent *Rhabdoribates* Aoki, 1967

4(1) Genital plates with four pairs of setae

5(8) Rostral setae placed apart; dorsosejugal suture distinct; legs tridactyle

6(7) Sensillus setiform *Andeszetes* Hammer, 1961

7(6) Sensillus capitate or fusiform with setiform tip *Schelorbates* Berlese, 1908

8(5) Rostral setae near each other; dorsosejugal suture indistinct; legs monodactyle *Fijibates* Hammer, 1971

80. Genus *Andeszetes* Hammer

1961. *Andeszetes* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 103.

127. *Andeszetes diversidactylus* Hammer

1961. *Andeszetes diversidactylus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13** (1) : 103.

1984. *Andeszetes diversidactylus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : The anterior end of propodosoma conical, narrow, posterior part with round lateral sides, rostral setae inserted on a small apophyses; lamellar setae thin scattered unilaterally feathering; lamella connected by a thin line; no translamella; interlamellar setae thin, with scattered feathering; sensillus thread-shaped, slightly thicker in the distal two thirds, tapering towards tip, anterior or outer border beset with fine bristles in one row, tip slightly bifurcate; notogastral setae 10 pairs, very short, thin; areae porosae absent; genital setae 4 pairs; anal setae 2 pairs; ventral setae thick, rough; tarsus having dorsally a sharp distal keel, behind the keel a sharp tooth; legs tridactylous.

Distribution : India : Tripura (West district). *Elsewhere* : South America (Peru).

81. Genus *Euscheloribates* Kunst

1958. *Euscheloribates* Kunst, *Acta Soc. Ent. Cech.*, **55** : 67.

128. *Euscheloribates samsinaki* Kunst

1958. *Euscheloribates samsinaki* Kunst, *Acta Soc. Ent. Cech.*, **55** : 68.
 1984. *Euscheloribates samsinaki*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
 1990. *Euscheloribates samsinaki*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Distribution : India : Tripura (West district).
Elsewhere : Czechoslovakia.

82. Genus *Fijibates* Hammer

1971. *Fibates* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **16** (6) : 48.

129. *Fijibates* sp.

Material examined : South district : 1(F), Batsabari, Udaipur, 10.viii.1991, from litter and soil, coll. S. Saha.

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

83. Genus *Rhabdoribates* Aoki

1967. *Rhabdoribates* Aoki, *Nat. Life Southeast Asia*, **5** : 197.

128. *Rhabdoribates siamensis* Aoki

1967. *Rhabdoribates siamensis* Aoki, *Nat. Life Southeast Asia*, **5** : 197.
 1984. *Rhabdoribates siamensis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Dorsal and ventral surface including pteromorphae covered either with vermicular stripes or granules; lamellae placed laterally, without cuspis, distal end slightly bent inside; prolamellae present; rostral setae inserted on tip of prolamellae, small, finely barbed; lamellar setae inserted on lamellar apices, long, barbed; interlamellar setae almost equal to rostral setae, directed outwards; sensillus with short thin stalk and round head; notogastral setae 14 pairs, small, smooth; no sacculi; lyrifissures present; genital setae 3 pairs, g_2 - g_3 two times longer than g_1 - g_2 ; adanal setae 3 pairs, adanal fissure one

pair; no aggenital setae; epimeral setal formula 3 : 2 : 3 : 1; tarsi monodactylous.

Distribution : India : Tripura (West district).
Elsewhere : Thailand.

84. Genus *Scheloribates* Berlese

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

131. *Scheloribates caprai* Bernini

1973. *Scheloribates caprai* Bernini, *Lav. Soc. It. Biogeogr.*, **3** : 459-463.
 1984. *Scheloribates caprai*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.
 1990. *Scheloribates caprai*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Distribution : India : Tripura (West district).
Elsewhere : Aticudi and Basiluzzo (Sicilian islands), Tuscan Archipelago.

132. *Scheloribates fimbriatoides* Hammer

1977. *Scheloribates fimbriatoides* Hammer, *Biologiske Skr.*, **21** (4) : 49.
 1984. *Scheloribates fimbriatoides*, Bhattacharya and Halder, *Entomon*, **9** : 254.
 1985. *Scheloribates fimbriatoides*, Bhattacharya *et al.*, *Environment & Ecology*, **3** : (2) : 146.
 1992. *Scheloribates fimbriatoides*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
 1995. *Scheloribates fimbriatoides*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Distribution : India : Tripura (North district, West district, South district). *Elsewhere* :

133. *Scheloribates fimbriatus* Thor

1930. *Scheloribates fimbriatus* Thor, *Arch. Hydrobiol.*, **9** : 273.
 1992. *Scheloribates fimbriatus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45** (2) : 167.
 1995. *Scheloribates fimbriatus*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Distribution : India : Tripura (South district).
Elsewhere : Sunda Islands.

134. *Scheloribates fusifer* Berlese

1908. *Scheloribates fusifer* Berlese, *Redia*, **5** (1) : 2.
 1984. *Scheloribates fusifer*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Distribution : India : Tripura (West district).
Elsewhere : Europe.

135. *Scheloribates huancayensis* Hammer

1961. *Scheloribates huancayensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 13 (1) : 94.

Diagnosis : Posterior half of hysterosoma semicircular, anterior part nearly rectangular; propodosoma long, narrow; all prodorsal setae distinctly feathered, one and a half times longer than their mutual distance; sensillus very slender, head narrowly spear-shaped, pointed at the tip, set with short bristles in four longitudinal rows, not reaching beyond the pteromorphae; pteromorphae straight anteriorly, rounded distally, almost right-angled; fairly striped; notogastral setae represented by chitinous pores, ventral side with typical features, apodemata II and III meeting in front of the genital field; leg setae distinctly feathered; tridactylous.

Material examined : West district : 1(F), Subhas Nagar, Agartala, 5.ii.1983, from soil and litter, coll. A. K. Sanyal. South district : 1(F), Matipocha, Paratia, 11.ii.1983, from soil and litter, coll. A. K. Sanyal; 1 (F), Joalikhmar, Paratia, 13.ii.1983, from soil and litter, coll. A. K. Sanyal.

Distribution: India : Tripura (South district, West district), Assam. **Elsewhere** : South America (Peru).

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

136. *Scheloribates latoincisus* Hammer

1973. *Scheloribates latoincisus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 20 (3) : 42.

1984. *Scheloribates latoincisus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Diagnosis : Rostral tip extremely pointed and white in colour; prodorsal setae slightly barbed; lamellar and interlamellar setae equally long; the incision in the line between the lamellae broad with parallel sides; sensillus short, club-shaped, head set with coarse scales; an incurvation between the pseudostigmata and the tip of the pteromorpha; notogastral setae indiscernible, pores indistinct; five pairs of indistinct sacculi;

apodemata II and III short; legs tridactylous.

Distribution : India : Tripura (West district).
Elsewhere : Eua Island, Tongatapu Island.

137. *Scheloribates multiplisetus* Mahunka

1977. *Scheloribates multiplisetus* Mahunka, *Revue suisse zool.*, 84 (2) : 475.

1984. *Scheloribates multiplisetus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : All prodorsal setae ciliate; distal half of rostral setae sparsely ciliated, other half densely ciliated; lamellar setae much longer than rostral setae; interlamellar setae much longer than lamellar setae; sensillus fusiform, short thickened part; notogastral setae of various lengths, 13 pairs, ciliate; epimeral setal formula 3 : 1 : 3 : 3; genital setae 4 pairs; aggenital setae 1 pair; anal setae 2 pairs; adanal setae 3 pairs; ad_3 shortest.

Distribution : India : Tripura (West district).
Elsewhere : Kenya.

138. *Scheloribates praeincisus interruptus* Berlese

1916. *Scheloribates praeincisus interruptus* Berlese, *Redia*, 12 : 315.

1925. *Protoribates (Scheloribates) praeincisus* var. *interruptus*, Sellnick, *Supplementa Entomologica*, No. 11 : 82.

1984. *Scheloribates praeincisus interruptus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

1984. *Scheloribates praeincisus interruptus*, Bhattacharya & Halder, *Entomon*, 9 : 294.

1985. *Scheloribates praeincisus interruptus*, Bhattacharya et. al., *Environment & Ecology*, 3 (2) : 146.

1992. *Scheloribates praeincisus interruptus*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.

1995. *Scheloribates praeincisus interruptus*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra et al.) : 69.

Diagnosis : Prodorsal setae very long, sensillus long, club-shaped, rounded at tip, set with minute bristles; notogastral setae hardly discernible, setal pores long, narrow in middle, or dividing into two parts, with the setae arising from smaller part; all tarsi tridactylous.

Material examined : North district : 4 (F), Manu, 23.11.1993, from soil, coll. A. K. Sanyal.

South district : 5(F), Joalikhmar, Paratia, 13.ii.1983, from soil and litter, coll. A. K. Sanyal; 4 (F), Baisabari, Udaipur, 10.viii.1991, from litter and soil of paddy field, coll. S. Saha; 3 (F), Malbasa, Amarpur, 15.xii.1991, from soil and litter, coll. S. Saha.

Distribution : India : Tripura (North district, South district, West district). *Elsewhere* : Easter Island, Fiji, Sumatra, Indonesia, Polynesia, Samoa, South Africa, Tonga Tapu Island.

139. *Scheloribates praelineatus* Hammer

1977. *Scheloribates praelineatus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 21 (4) : 50.

1984. *Scheloribates praelineatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : Rostral setae faintly barbed. about one and a half times longer than their mutual distance; a distinct line in front of lamellae (hence the specific name), middle area slightly incurved, behind it a weak line; prolamella absent; lamellar and interlamellar setae faintly barbed; thin at tip, at least one and a half times longer than their mutual distance; sensillus clavate-shaped, broadest behind its end; anterior border of notogaster arched projecting beyond the pseudostigmata; all notogastral setae except p_1 represented by pores, only p_1 present; so much longer than other sacculi; sternum replaced by longitudinal wrinkles; apodemata III faintly developed, being short and not reaching genital field; genital setae 5 pairs; anal setae asymmetric; legs tridactylous.

Material examined : South district: 1(F), Joalikhmar, Paratia, 13.ii.1983, from soil and litter, coll. A. K. Sanyal; 2(F), Bagma (Udaipur, 4.viii.1993, from soil and litter near pond, coll. D. Saha; 7(F), Birchandra Nagar, Amarpur, 12.x.1993, from loose humus with decaying leaves, coll. S. Saha. North district : 20(F), Manu town, 23.ii.1983, from soil and litter, coll. A. K. Sanyal.

Distribution : India : Tripura (South district, West district, North district). *Elsewhere* : Pakistan.

140. *Scheloribates rectus* Hammer

1958. *Scheloribates rectus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 10 (1) : 77.

1984. *Scheloribates rectus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

1990. *Scheloribates rectus*, Sarkar, *Rev. Ecol. Biol. Sol.*, 27 (3) : 313.

Diagnosis : All prodorsal setae finely barbed; rostral setae much smaller than lamellar setae, lamellar and interlamellar setae thin, set with fine bristles, not much longer than lamellae; sensillus directed outwards and backwards, bent about one third of its length from the border of the pseudostigmatic cup, head lanceolate, pointed at tip, set with small setae or spines, especially along anterior or outer margin, inner or posterior margin smooth; anterior border of notogaster slightly arched in middle; notogastral setae not discernible except at the posterior end of notogaster; all tarsi tridactylous.

Distribution : India : Tripura (South district, West district), West Bengal. *Elsewhere* : Argentina, South Africa.

141. *Scheloribates rufafulvus* Kardar

1976. *Scheloribates rufafulvus* Kardar, *Indian J. Acar.*, 1 : 40.

1984. *Scheloribates rufafulvus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

1990. *Scheloribates rufafulvus*, Sarkar, *Rev. Ecol. Biol. Sol.*, 27 (3) : 313.

Diagnosis : Rostrum rounded; lamellar outer margin blade-like, extends slightly beyond lateral margin of prodorsum; lamellar apices pointed; prodorsal setae fine, smooth; lamellar setae longer than rostral setae; three extra pairs of prodorsal setae placed in mid longitudinal line, two discernible by insertions only; interlamellar setae as long as lamella; sensillus long with fusiform head set with very fine bristles on its outer margin; 8 pairs of notogastral setae discernible; a distinct band of pock marks along posterior most margin of notogaster; genital setae 5 pairs; ad_1 and ad_2 distinctly long, smooth, ad_3 represented by insertion.

Distribution : India : Tripura (North district, West district), Uttar Pradesh.

142. *Scheloribates sacsahuamanensis* Hammer

1961. *Scheloribates sacsahuamanensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, 13 (1) : 96.

1984. *Scheloribates sacsahuamanensis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : The tip of rostrum protrudes as a small nose or tip; rostral setae thick, densely barbed; lamellar and interlamellar setae much thinner, furnished with fine bristles; rostral and lamellar setae less than twice their mutual distance; interlamellar setae about twice as long as their mutual distance; sensillus short, head short about as long as stalk, set with fine bristles; two incurvations in lateral border of pteromorphae; femora I and II faintly reticulated; legs tridactylous.

Distribution : India : Tripura (West district).
Elsewhere : Peru.

143. *Scheloribates saswatii* Dhali and Bhaduri

1980. *Scheloribates saswatii* Dhali and Bhaduri, *Indian J. Acar.*, **5** : 52.

Diagnosis : Prodorsum broad at the base; all prodorsal setae feathered, lamellar setae extend beyond the tip of rostrum; interlamellar setae equal to the length of lamellar setae; faint interlamellar line present; sensillus with club-shaped head backwardly directed, reaches beyond the lateral margin of pteromorph, dorsosejugal suture arched; notogastral setae 10 pairs, except postero-lateral setae all represented by alveoli; light spots of glandular tissue present along the lateral border of notogaster; fissures *is*, *im*, and *ip* found on dorsal side; genital setae 4 pairs; distance between aggenital setae greater than width of genital plate; legs tridactylous.

Material examined : South district : 4(F), Manubazar, Sabrum, 13.ii.1983, from decaying banana trunk and soil, coll. A. K. Sanyal. West district : 2(F), Khasimongal, Teliamura, 16.ii.1983, from soil, coll. A. K. Sanyal; 1(F), Chakmaghat, Teliamura, 17.ii.1983, from soil, coll. A. K. Sanyal; 2(F), BSF camp, Khasimongal, Teliamura, 18.ii.1983, from soil, coll. A. K. Sanyal.

Distribution : India : Tripura (South district), Sikkim.

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

144. *Scheloribates striatus* Hammer

1958. *Scheloribates striatus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10** (1) : 74.

1984. *Scheloribates striatus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

1990. *Scheloribates striatus*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Diagnosis : Rostral setae moderately long, fine, beset with fine bristles; lamellar and interlamellar setae long, very thin towards tip; former densely set with small bristles, latter not quite so feathered; sensillus with small stalk having a short black club-shaped head rounded at tip and set with short scales or spines in longitudinal rows; pteromorphae distinctly radially striped; notogastral setae distinct, short, thin, across the notogaster some brown spots arranged in two more or less regular arches; legs tridactylous.

Distribution : India : Tripura (West district).
Elsewhere : Bolivia.

85. Genus *Tuberemaeus* Sellnick

1930. *Tuberemaeus* Sellnick, *Zool. Anz.*, **86** : 229.

145. *Tuberemaeus singularis* Sellnick

1930. *Tuberemaeus singularis* Sellnick, *Zool. Anz.*, **86** : 229.

1984. *Tuberemaeus singularis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Distribution : India : Tripura (West district).
Elsewhere : Sumatra.

40. Family BIROBATIDAE J. Balogh and P. Balogh, 1984

86. Genus *Birobates* Balogh

1970. *Birobates* Balogh, *Acta zool. hung.*, **16** (3-4) : 312.

146. *Birobates reductus* Balogh

1970. *Birobates reductus* Balogh, *Acta zool. hung.*, **16** (3-4) : 313.

1984. *Birobates reductus*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 53.

Distribution : India : Tripura (West district).
Elsewhere : New Guinea.

41. Family AUSTRACHTERIIDAE
Luxton, 1985

Key to the genera of Austrachipteriidae

- 1(2) Adanal region with 3 pairs of setae
.....*Hypozetes* Balogh, 1959
- 2(1) Adanal region with 1 or 2 pairs of setae
- 3(4) Interlamellar area small; lamellae without
free tips
.....*Lamellobates* Hammer, 1958
- 4(3) Interlamellar area large; lamellae with
free tips*Paralamellobates*
lobates Bhaduri and Raychaudhuri, 1968

87. Genus *Hypozetes* Balogh

1959. *Hypozetes* Balogh, *Acta zool. hung.*, 5 : 15.

147. *Hypozetes laysanensis* Aoki

1964. *Hypozetes laysanensis* Aoki, *Pacific Ins.*, 6 : 655.
1992. *Hypozetes laysanensis*, Chakraborty and
Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) :
167.
1995. *Hypozetes laysanensis*, Bhattacharya and
Chakraborti, *Advances in Ecology and Environmental
Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Rostrum tricuspidate; rostral setae
densely barbed on each side and situated on
apophyses; lamellar and interlamellar setae
minutely barbed; sensillus with a finely barbed
club-shaped head; notogastral setae 10 pairs,
minutely barbed; sacculi placed closer to *ti*
than to *te*.

Material examined : North district : 6(F),
Manu town, 23.ii.1983, from soil and litter, coll.
A. K. Sanyal. South district : 1 (F), Manubazar,
Sabrum, 13.ii.1983, from humus with decomposed
leaves, coll. A. K. Sanyal.

Distribution : India : Tripura (North district,
South district, West district), West Bengal.
Elsewhere : Hawaiian Island.

88. Genus *Lamellobates* Hammer

1958. *Lamellobates* Hammer, *Biol. Skr. Dan. Vid. Selsk.*,
10 (1) : 100.

148. *Lamellobates palustris* Hammer

1958. *Lamellobates palustris* Hammer, *Biol. Skr. Dan.
Vid. Selsk.* 10 (1) : 100.
1984. *Lamellobates palustris*, Bhattacharya and Halder,
Entomon, 9 : 294.
1985. *Lamellobates palustris*, Bhattacharya *et al.*,
Environment & Ecology, 3 (2) : 146.
1992. *Lamellobates palustris*, Chakraborty and
Bhattacharya, *Proc. zool. Soc., Calcutta*, 45 (2) : 167.
1995. *Lamellobates palustris*, Bhattacharya and Chakraborti,
Advances in Ecology and Environmental Sciences
(eds. Mishra *et al.*) : 69.

Diagnosis : Rostrum pointed with concave
sides; rostral setae very long reaching far beyond
the tip of rostrum, unilaterally feathred; lamellae
broad plate without distal tips; inner cuspides of
lamellae rounded, outer lamellar cuspides tapering
into a short and sharp point; lamellar setae
situated a short distance behind anterior border
nearest to median side; equally very thick
throughout, rough; interlamellar setae situated
where lamellae and anterior border of hysterosoma
meet, very long, rough tip reaches beyond lamellar
setae; sensillus long, slender, club-shaped, tip
pointed, beset with short hairs; notogaster almost
as broad as long, posterior end narrow; notogastral
setae 9 pairs, thin, long, occupy dorsal part of
notogaster; genital setae 6 pairs; tarsi
monodactylous.

Material examined : South district : 4(F),
Jarimura, Amarpur, 2.i.1992, from humus beside
Gomti river, coll. D. Saha; 6 (F), Jatanbari,
Amarpur, 2.i.1992, from soil with decomposed
mango leaves, coll. D. Saha.

Distribution : India : Tripura (North district,
South district, West district), Bihar, Meghalaya,
West Bengal. *Elsewhere* : Fiji Island, Indonesia,
New Zealand, Pakistan, Seychelles, Argentina,
Thailand, Tongatapu Island.

89. Genus *Paralamellobates* Bhaduri and
Raychaudhuri

1968. *Paralamellobates* Bhaduri and Raychaudhuri,
Oriental Insects, 2 (2) : 197.

Key to the Species of Paralamellobates

- 1(2) Anal setae one pair.....*bengalensis*
Bhaduri and Raychaudhuri, 1968

- 2(1) Anal setae two pairs
*ceylonicus* (Oudemans, 1967)

149. *Paralamellobates bengalensis* Bhaduri
 and Raychaudhuri

1968. *Paralamellobates bengalensis* Bhaduri and
 Raychaudhuri, *Oriental Insects*, 2 (2) : 197.

Diagnosis : The lamellar cuspis, prodorsal
 and notogastral setae and sensillus similar to
Lamellobates palustris. The main diagnostic
 feature of *P. bengalensis* is presence of one pair
 of anal setae.

Material examined : South district: 9 (F),
 Echhari, Amarpur, 4.iii.1992, from decomposed
 mango leaves, coll. S. Saha; 6(F), Maharani,
 Amarpur, 4.iii.1992, from decomposed leaves of
 mixed vegetation, coll. S. Saha.

Distribution : India: Tripura (North district,
 South district, West district), Kerala, Sikkim,
 West Bengal.

Remark : The species is recorded here for first
 time from Tripura.

150. *Paralamellobates ceylonicus* (Oudemans)

1984. *Paralamellobates ceylonicus*, Bhattacharya and
 Halder, *Entomon*, 9 : 294.
 1992. *Paralamellobates ceylonicus*, Chakraborty and
 Bhattacharya, *Proc. zool. Soc., Calcutta*, 45(2) : 167.
 1995. *Paralamellobates ceylonicus*, Bhattacharya and
 Chakrabarty, *Advances in Ecology and Environmental
 Sciences* (eds. Mishra *et al.*) : 69.

Distribution : India : Tripura (South district,
 West district).

42. Family MYCOBATIDAE
 Grandjean, 1954

90. Genus *Mycobates* Hull

1916. *Mycobates* Hull, *Trans. Nat. Hist. Soc.*, 4 : 395.

151. *Mycobates tridactylus* Willmann

1929. *Mycobates tridactylus* Willmann, *zool. Anz.*, 80 : 43.
 1984. *Mycobates tridactylus*, Sarkar, *Proc. III Oriental
 Entomology Symposium*, Trivandrum, 54.

Distribution : India : Tripura (West district).
Elsewhere : Germany.

43. Family ORIBATELLIDAE
 Jacot, 1925

91. Genus *Oribatella* Banks

1895. *Oribatella* Banks, *Trans. Amer. Ent. Soc.*, 22 : 4.

152. *Oribatella unispinata* Hammer

1958. *Oribatella unispinata* Hammer, *Biol. Skr. Dan. Vid.
 Selsk.*, 10 (1) : 100.
 1992. *Oribatella unispinata*, Chakraborty and Bhattacharya,
Proc. zool. Soc., Calcutta, 45(2) : 167.
 1995. *Oribatella unispinata*, Bhattacharya and Chakrabarty,
Advances in Ecology and Environmental Sciences
 (eds. Mishra *et al.*) : 69.

Diagnosis : Rostrum rounded; rostral setae
 densely feathered; lamellae slightly furrowed,
 densely punctate; lamellar setae rough, about twice
 as thick as median tip; interlamellar setae rough,
 thin; sensillus with slender head and stalk, cup of
 sensillus with sharp point on its anterior border;
 anterior border of notogaster with 8-10 paralld
 lines lateral to sensillus; notogastral setae thin;
 areae porosae small; notogaster densely punctate;
 all tarsi tridactylous.

Distribution : India : Tripura (South district).
Elsewhere : Bolivia.

44. Family GALUMNIDAE Jacot,
 1925

Key to the genera of Galumnidae

- 1(8) Lamellar line present
 2(3) Lamellar setae placed between lines *L* and
S *Galumna* Heyden, 1826
 3(2) lamellar setae placed between lines *L* and
L
 4(5) Notogastral setae present
 *Trichogalumna* Balogh, 1960
 5(4) Notogastral setae absent
 6(7) Line *L* straight, lines *Land S* diverging ...
 *Orthogalumna* Balogh, 1960
 7(6) Line *L* arcuate; lines *L* and *S* more or less
 parallel *Pergalumna* Grandjean, 1936
 8(1) Lamellar line (line *L*) absent

- 9(10) Sublamellar line (line *S*) present
*Acrogalumna* Grandjean, 1956
- 10(9) Sublamellar line (line *S*) absent
- 11(12) Fissure *iad* oblique, far from anal plates
*Disparagalumna* Hammer, 1973
- 12(11) Fissure *iad* in adanal position
*Pilogalumna* Grandjean, 1956

92. Genus *Acrogalumna* Grandjean

1956. *Acrogaluma* Grandjean, *Bull. Soc. zool. Fr.*, **81** : 135.

153. *Acrogalumna machadoi* Balogh

1960. *Acrogalumna machadoi* Balogh, *Publ. cult. Co. Diam. Ang. Lisboa*, **51** : 36.
1984. *Acrogalumna machadoi*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : Sutura dorsosejugal is interrupted in middle between areae porsae *Ad*; rostral setae glabrous or invisibly barbed; lamellar setae glabrous, inserted on laterodorsal aspects or prodorsum; interlamellar setae extremely long, slightly barbed, curve outwards in an anterodorsal direction; sensillus setiform, arcuated posteriorly, distinctly barbed; areae porosae adalares very large, one on both sides, irregularly rounded; notogastral setae 10 pairs, represented by alveoli except p_1 and p_2 very minute; epimeral setal formula 1 : 0 : 1 : 2; genital setae $g_{1,3}$ not transversely inserted on anterior margins of genital plates; setae ad_1 and ad_2 distinct.

Distribution : India : Tripura (West district). Elsewhere : South Africa.

93. Genus *Disparagalumna* Hammer

1973. *Disparagalumna* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **20** (3) : 55.

154. *Disparagalumna* sp.

Remark : Chakraborty and Bhattacharya (1992) and Bhattacharya and Chakrabarty (1995) reported the genus from South district of Tripura.

94. Genus *Galumna* von Heyden

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

155. *Galumna flabellifera* Hammer

1958. *Galumna flabellifera* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10**(1) : 93.
1992. *Galumna flabellifera*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45**(2) : 167.
1995. *Galumna flabellifera*, Bhattacharya and Chakraborti, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Rostral setae thin and short, situated halfway between tip of rostrum and lamellar setae; lamellar setae shorter than rostral setae, inserted on the tip of lamellar ridge, interlamellar setae minute; lamellae well developed; sensillus directed outwards in a big curve, head of sensillus long, broad, rounded along anterior margin, one third of distal end set with bristles, posterior margin flat without bristles; anterior border of hysterosoma slightly incurvated; notogastral setae represented by pores only; distance between genital and anal plates about twice as long as length of genital plates.

Material examined : North district : 2 (F), Raiposa, Ambasa, 20.ii.1983, from soil, coll. A. K. Sanyal.

Distribution : India : Tripura (North district, South district). Elsewhere : Argentina, Bolivia.

95. Genus *Orthogalumna* Balogh

1960. *Orthogalumna* Balogh, *Mem. Inst. Sci. Madagaskur*, **14A** : 30.

156. *Orthogalumna saeva* Balogh

1960. *Orthogalumna saeva* Balogh, *Mem. Inst. Sci. Madagascar*, **14A** : 31.
1984. *Orthogalumna saeva*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.
1990. *Orthogalumna saeva*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Diagnosis : Rostrum arcuated, without undulations; sutura dorsosejugal is distinct; lamellar and interlamellar setae rigid, erect, slightly lanceolate, glabrous; sensillus short, directed anterolaterally, sensillar heads slightly incrassate, not pointed; areae porosae adalares single on both sides, elongated transversely, dilating laterally; areae porosae posteriores shorter

than areae porosae adalares, twice as long as areae porosae mesonoticae; adanal and aggenital setae minute; genital setae g_{1-3} inserted on anterior margins of genital plates; areae porosa postanal is large, elongated.

Distribution : India : Tripura (West district).
Elsewhere : South Africa.

96. Genus *Pergalumna* Grandjean

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

Key to the Species of Pergalumna

- 1(2) Rostral and lamellar setae moderately long; lamellar setae distally barbed; interlamellar setae absent; areae porosae A_1 and A_2 separate*corolevuensis* Hammer, 1971
- 2(1) Rostral and lamellar setae very short; lamellar setae smooth; interlamellar setae long; areae porosae A_1 and A_2 fused
...*magnipora capensis* Engelbrecht, 1972

157. *Pergalumna corolevuensis* Hammer

- 1971. *Pergalumna corolevuensis* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **16** (6) : 35.
- 1984. *Pergalumna corolevuensis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.

Diagnosis : Propodosoma light brown, slightly pointed; rostral setae inserted ventrally, moderately long, barbed; lamellar setae situated on a small edge at some distance in front of lamellar tip, longer than rostral setae, distally barbed; interlamellar setae absent; sensillus very thin, long, feathered with fine hairs; dorsosejugal suture absent; pteromorphae with brown pattern and finger-like spots radiating from medial border towards distal border; Aa removed from pteromorpha by a distance similar to its own length, oval, a little broader medially; A_1 almost round, A_2 about half as big as A_1 , A_3 elongate; notogastral setae absent, represented by pores; genital and anal fields separated by a distance as long as length of anal field; genital setae 6 pairs; ventral setae moderately long, smooth; legs tridactylous.

Distribution : India : Tripura (West district).
Elsewhere : Fiji Island.

158. *Pergalumna magnipora capensis* Engelbrecht

- 1972. *Pergalumna magnipora capensis* Engelbrecht, *Acarologia*, **14** (1) : 115.
- 1992. *Pergalumna magnipora capensis*, Chakraborty and Bhattacharya, *Proc. zool. Soc., Calcutta*, **45**(2) : 167.
- 1995. *Pergalumna magnipora capensis*, Bhattacharya and Chakraborty, *Advances in Ecology and Environmental Sciences* (eds. Mishra *et al.*) : 69.

Diagnosis : Sutura dorsosejugal is absent or very indistinct between areae porsae Ad ; rostral setae very short, minutely barbed; lamellar setae very short, glabrous; interlamellar setae longer, slightly barbed; areae porsae Ad narrow, slightly elongated; sensillus slender, filiform, barbed, directed outwards and backwards; only alveoli of 10 pairs of notogastral setae present; fused areae porosae mesonoticae $A_1 + A_2$ very large; notogaster and ventral plates minutely punctated; genital setae g_{1-3} inserted on anterior margin of genital plates.

Distribution : India : Tripura (South district).
Elsewhere : South Africa.

97. Genus *Pilogramma* Grandjean

- 1956. *Pilogramma* Grandjean, *Bull. Soc. zool. Fc.*, **81** : 135.

159. *Pilogramma variabilis* Engelbrecht

- 1972. *Pilogramma variabilis* Engelbrecht, *Acarologia*, **14**(1) : 131.
- 1984. *Pilogramma variabilis*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.
- 1990. *Pilogramma variabilis*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Diagnosis : Rostral, lamellar, interlamellar setae short, glabrous; sensillus head lanceolate, glabrous, apices pointed; dorsosejugal suture interrupted in middle between areae porsae dorsosejugal is; notogastral setae 10 pairs, distinct; all notogastral areae porosae except areae porosae posteriores round, small; areae porosae adalares double on both sides.

Distribution : India: Tripura (West district).
Elsewhere : South Africa (Port Elizabeth).

98. Genus *Trichogalumna* Balogh

1960. *Trichogalumna* Balogh, *Publ. cult. Co. Diam. Ang. Lisboa*, **51** : 26.

160. *Trichogalumna seminuda* Balogh

1960. *Trichogalumna seminuda* Balogh, *Publ. cult. Co. Diam. Ang. Lisboa*, **51** : 28.
1984. *Trichogalumna seminuda*, Sarkar, *Proc. III Oriental Entomology Symposium*, Trivandrum, 54.
1990. *Trichogalumna seminuda*, Sarkar, *Rev. Ecol. Biol. Sol.*, **27** (3) : 313.

Distribution : India : Tripura (West district).
Elsewhere : Angola.

DISCUSSION

The detailed assessment of taxa so far recorded from Tripura shows that a total of 160 species, 98 genera and 44 families, are known from the state. Of these, 27 species and 18 genera are reported in this paper for the first time from Tripura. The paper also records 22 species and 17 genera for the first time from India and 10 species already known to Tripura have been recorded here again. It may be recorded here that after this present study the oribatid fauna of Tripura represents about 40% of the total oribatid species in India.

The assessment of the species reported in the present account shows that 23 species have so far been described as new to science from Tripura. Of the total number of species, distribution of 58 species and 38 genera are still restricted to the state. It is also noted that 10 species under 8 genera are not yet known from outside India. Besides this, 58 species under 37 genera known from Tripura are so far not yet reported from other states of India.

Table 2 shows that of the three districts of Tripura West district occupies highest position in respect of number of oribatid species (106). This

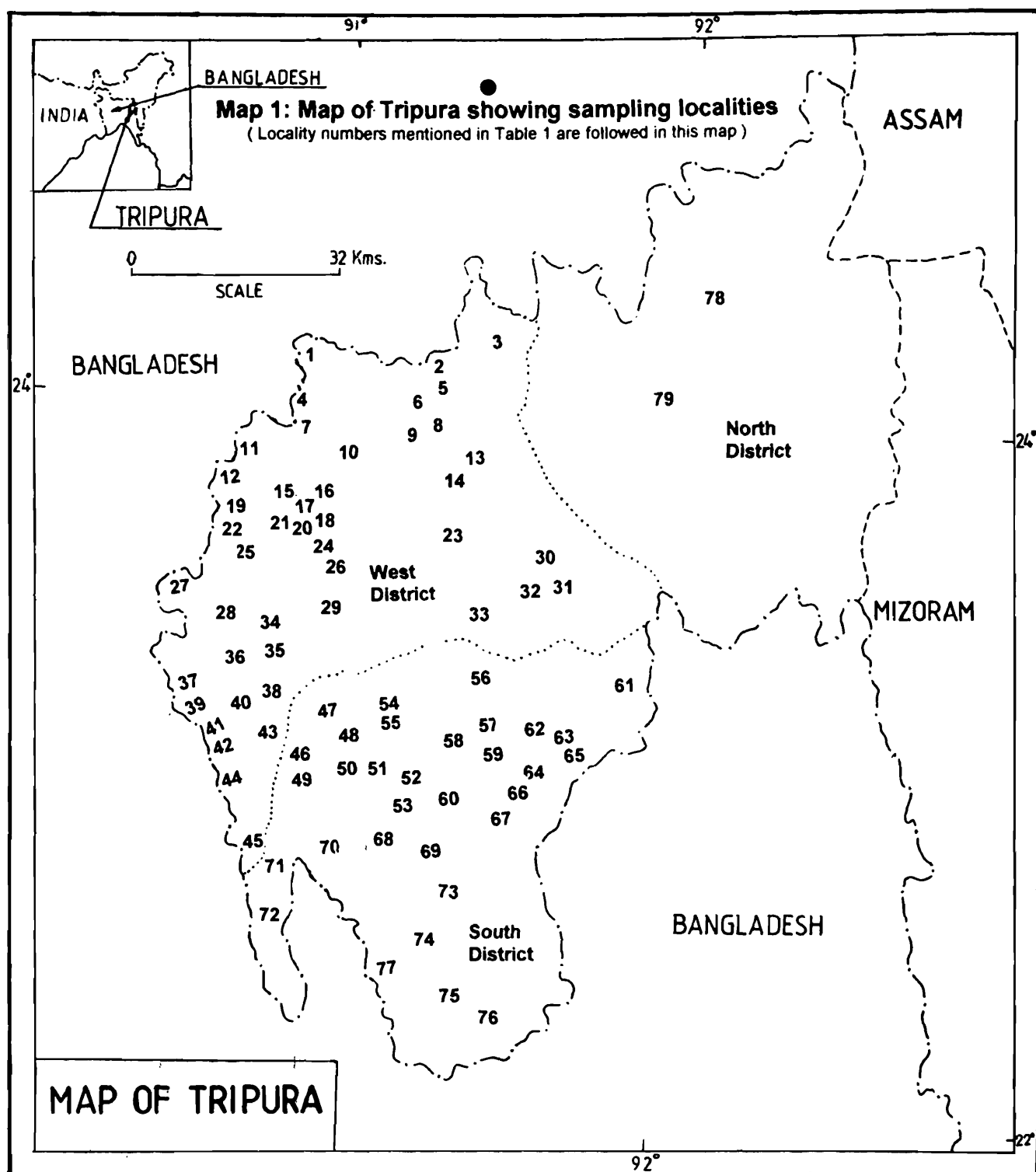
may be due to the fact that this district was surveyed extensively. The district next in respect of number of species is South district (87). The oribatid species here from North district is very poor (16). The reason for poor representation is that the district was not extensively surveyed due to some unavoidable reasons. The distribution of oribatid species in different districts of Tripura is shown in Maps 2-11.

SUMMARY

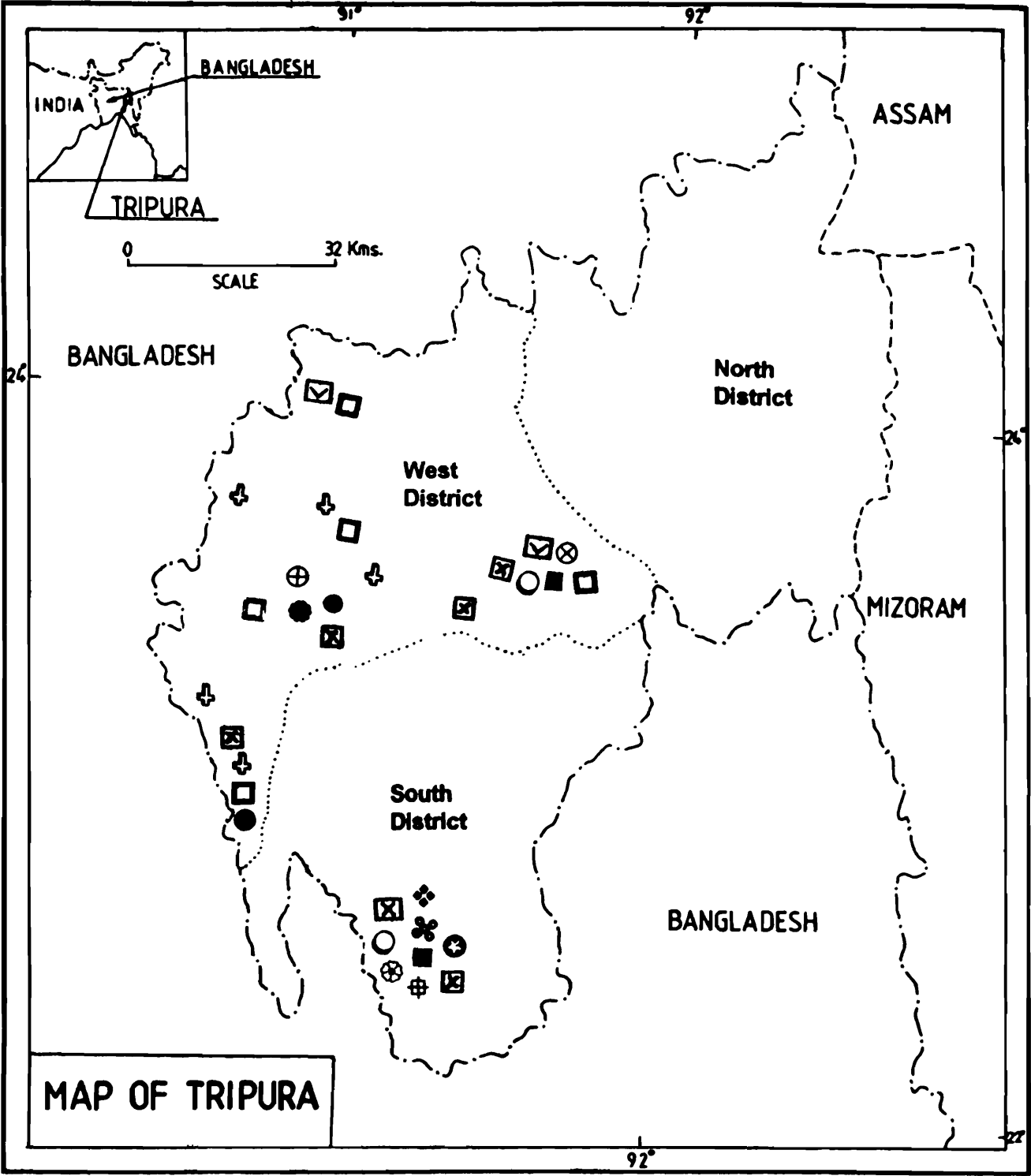
The paper deals with the oribatid fauna collected from three districts of Tripura. A total of 160 species pertaining to 98 genera and 44 families have been recorded. The present work added 37 species under 33 genera to the list. The paper records that so far 23 species have been described as new to science from Tripura. Maximum number of species have been recorded from West district. Key to identification of families, genera and species; diagnostic features and distribution of the species have also been incorporated in the paper.

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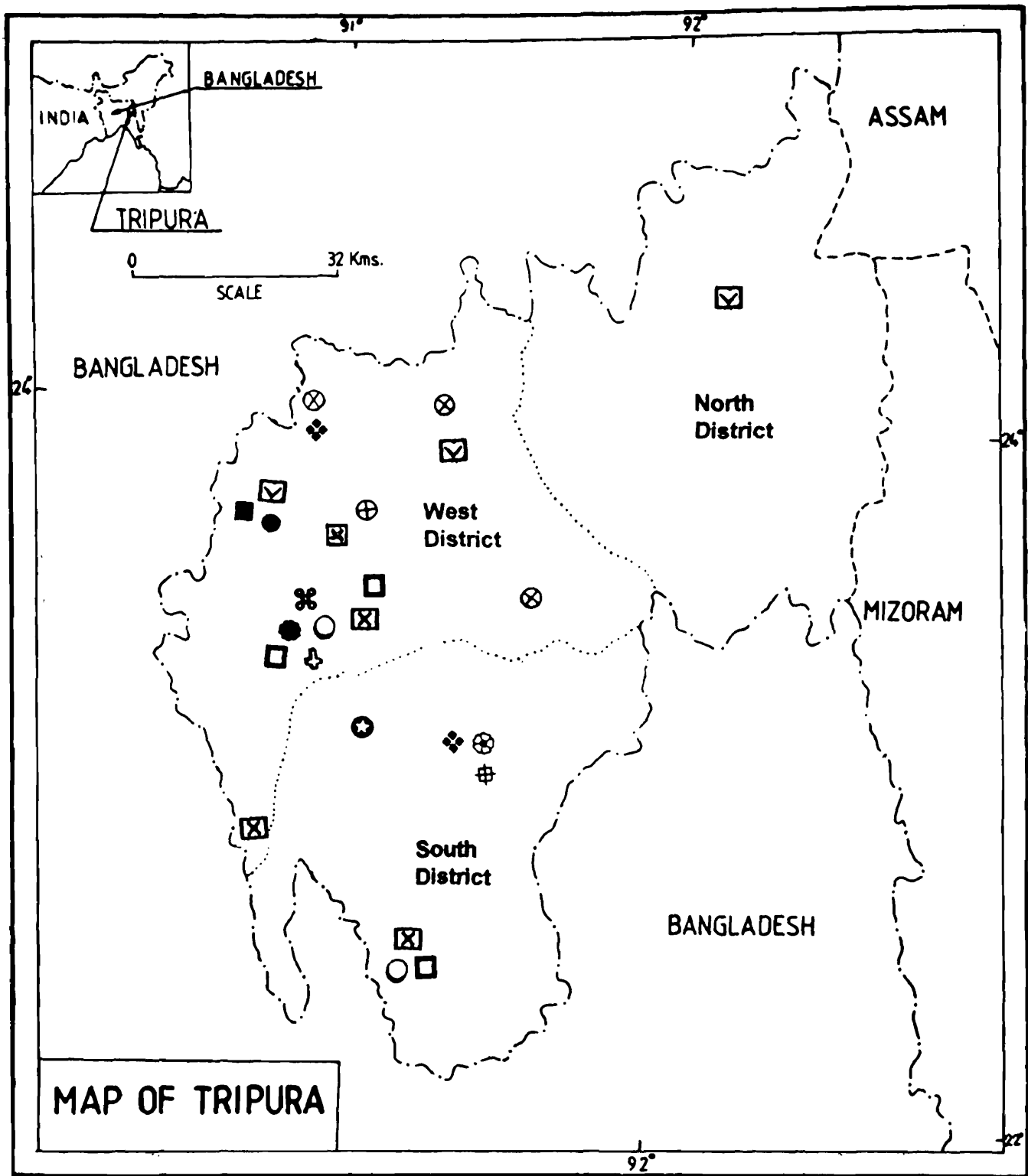


Map 1 : Map of Tripura showing sampling localities
(Locality numbers mentioned in Table 1 are followed in this map).



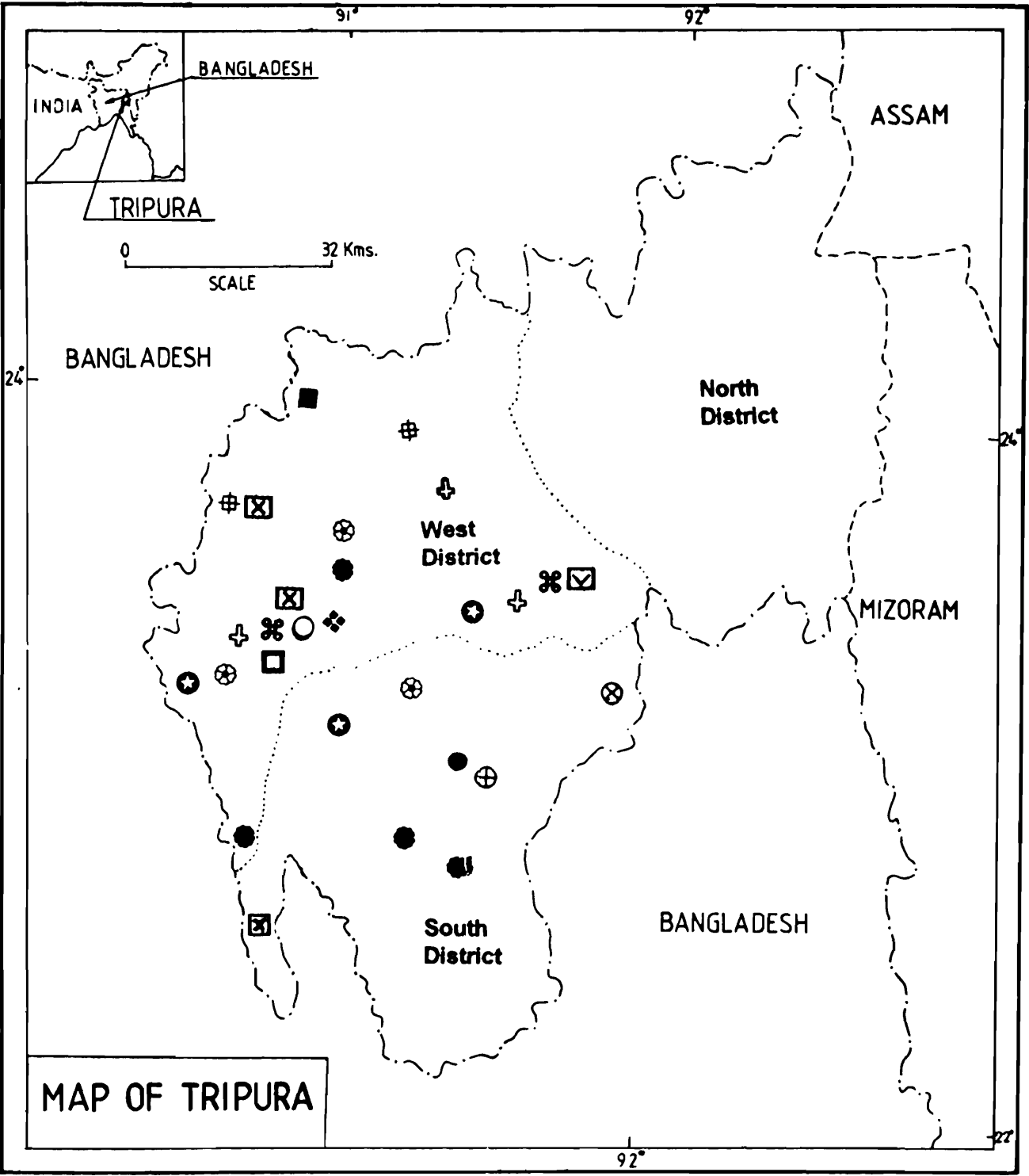
Map 2 : Showing Distribution of Oribatid Species in Tripura.

⊙ <i>Palaeacarus</i> Sp.	□ <i>C. lanatus diversiseta</i>
⊕ <i>Hypochthonius</i> Sp.	⊗ <i>C. plumatus suramericanus</i>
⊞ <i>Malacoangelia remigera</i>	⊕ <i>C. reticulatus</i>
■ <i>M. similis</i>	† <i>Haplochthonius clavatus</i>
○ <i>Mesoplophora crassisetosa</i>	◆ <i>H. simplex</i>
● <i>M. gaveae</i>	⊖ <i>Gehypochthonius rhadamanthus</i>
⊗ <i>M. pectinata</i>	⊞ <i>Atropacarus (Hoplophorella) scapellatus</i>
⊞ <i>Cosmochthonius agartalaensis</i>	⊗ <i>A. (H.) schauenbergi</i>

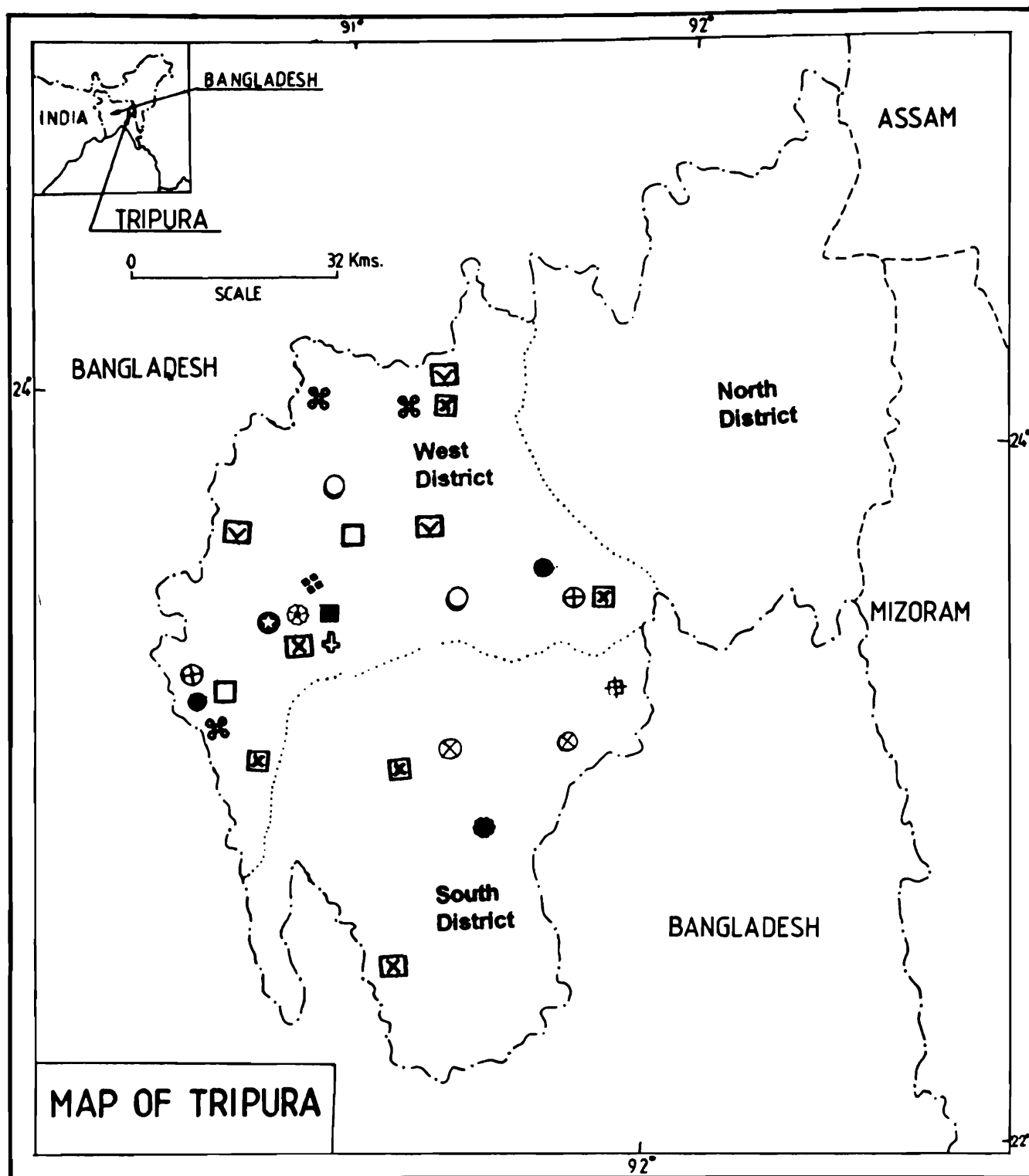


Map 3 : Showing Distribution of Oribatid Species in Tripura.

⊗ <i>Hoplophthiracarus</i> sp.	□ <i>Paulianacarus foliatus</i>
⊙ <i>Rhysotritia ardua ardua</i>	⊗ <i>Vepracarus cornutus</i>
⊕ <i>R. a. var. otaheitensis</i>	⊕ <i>Ephilohmannia cylindrica</i>
■ <i>Annectacarus longisetosus</i>	† <i>E. pallida areolata</i>
○ <i>Cryptacarus dendrisetosus</i>	◆ <i>E. pallida pacifica</i>
● <i>Haplacarus foliatus bengalensis</i>	⊙ <i>E. pallida rugosa</i>
⊗ <i>Javacarus foliatus</i>	⊗ <i>Afronothrus sulcatus</i>
☑ <i>J. kuhnelti</i>	⊗ <i>Allonothrus dhananjayi</i>

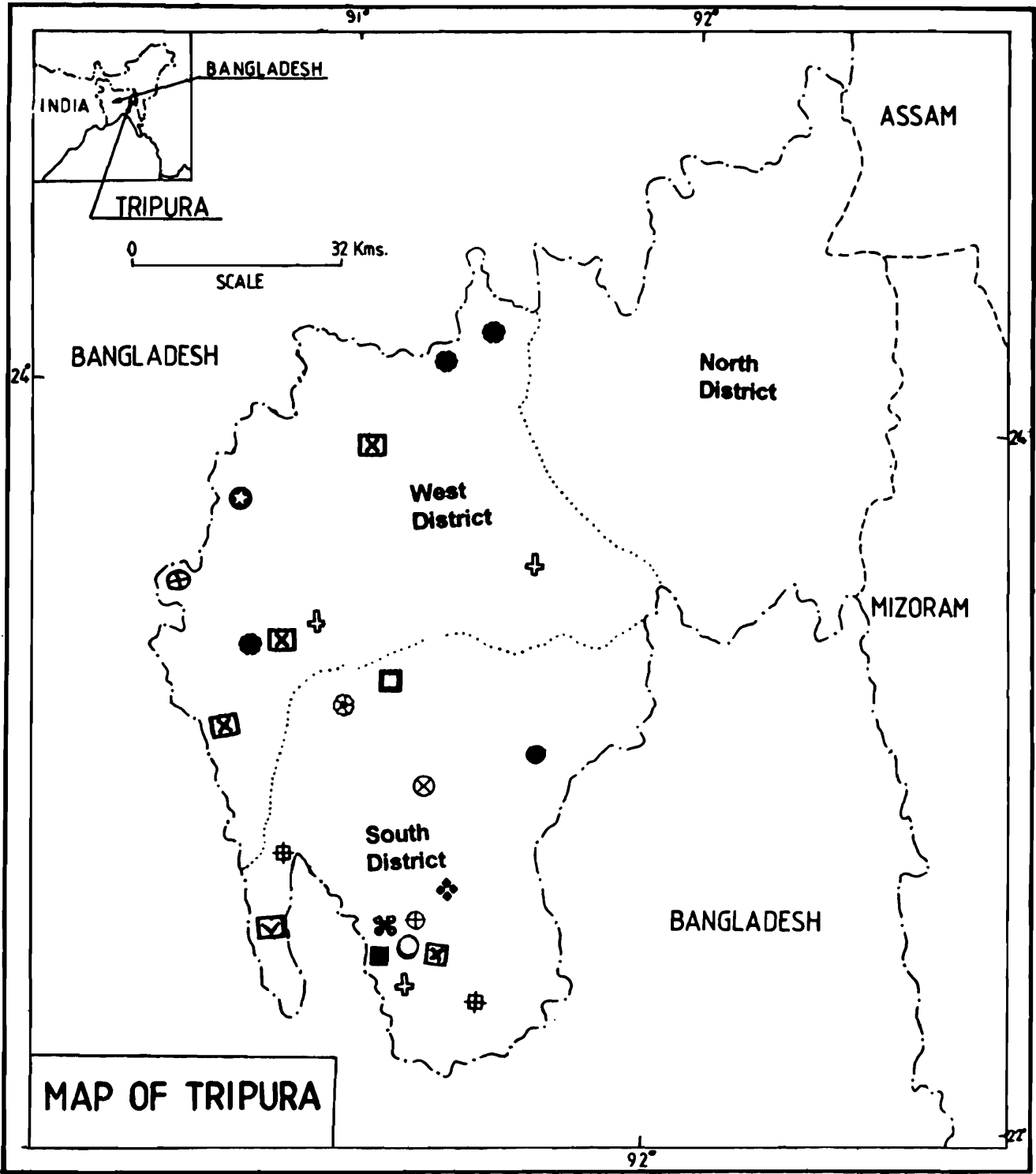


Map 4 : Showing Distribution of Oribatid Species in Tripura.



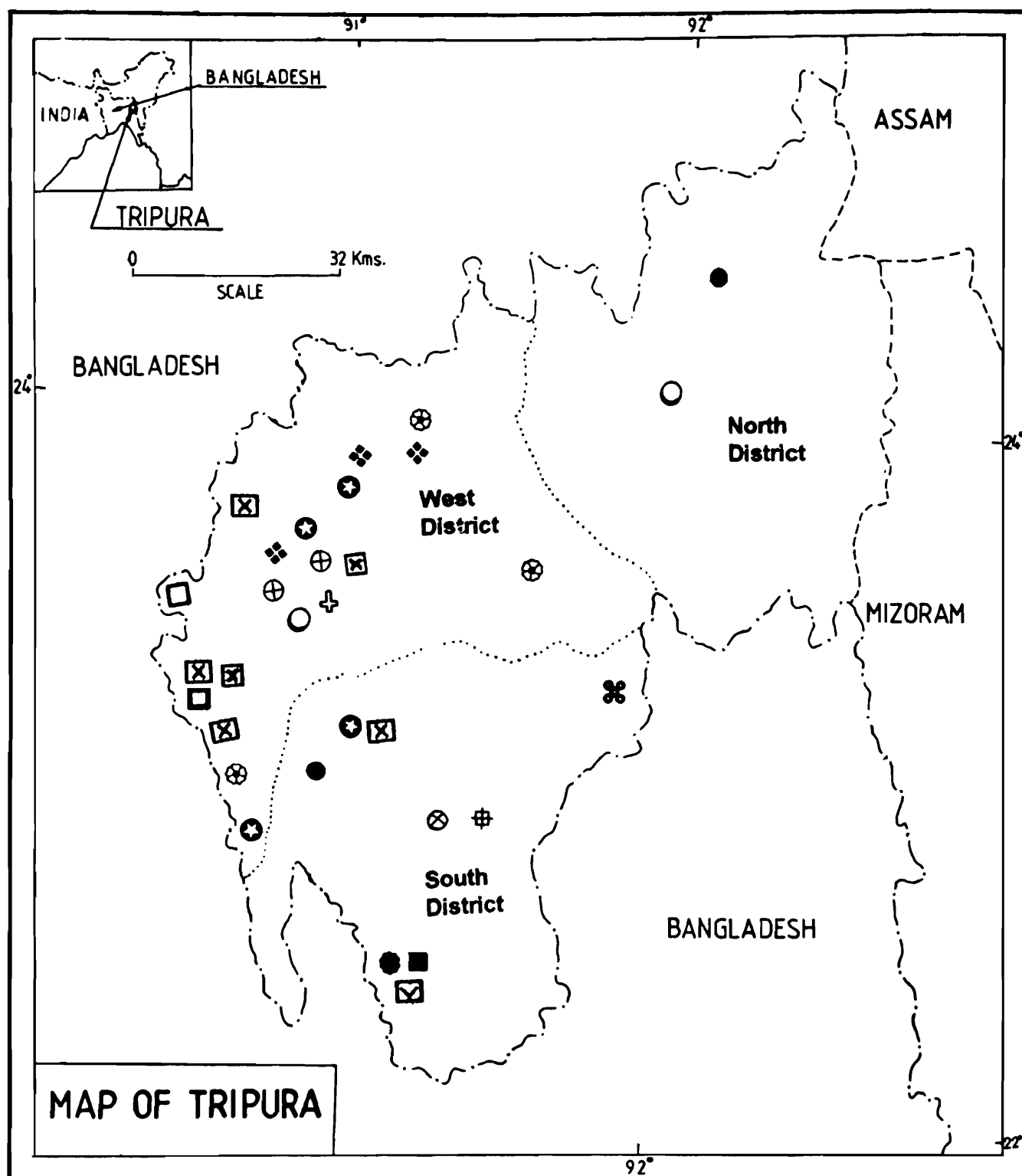
Map 5 : Showing Distribution of Oribatid Species in Tripura.

⊛ <i>Tegeocranellus</i> sp.	□ <i>Eremulus jyotsnai</i>
⊗ <i>Sadocephus</i> sp.	⊗ <i>E. nigrisetosus</i>
⊞ <i>Microtegeus reticulatus</i>	⊕ <i>E. truncatus</i>
■ <i>Berlesezetes auxiliaris</i>	† <i>Fosseremus</i> sp.
○ <i>B. longistriatus</i>	◆ <i>Eremobelba</i> sp.
● <i>B. monoramai</i>	⊙ <i>Pseuderemulus</i> sp.
⊗ <i>B. rudrasagarensis</i>	⊞ <i>Basilobelba indica</i>
⊞ <i>Schizozetes quadrilineatus</i>	⊗ <i>Zetorchestes saltator</i>



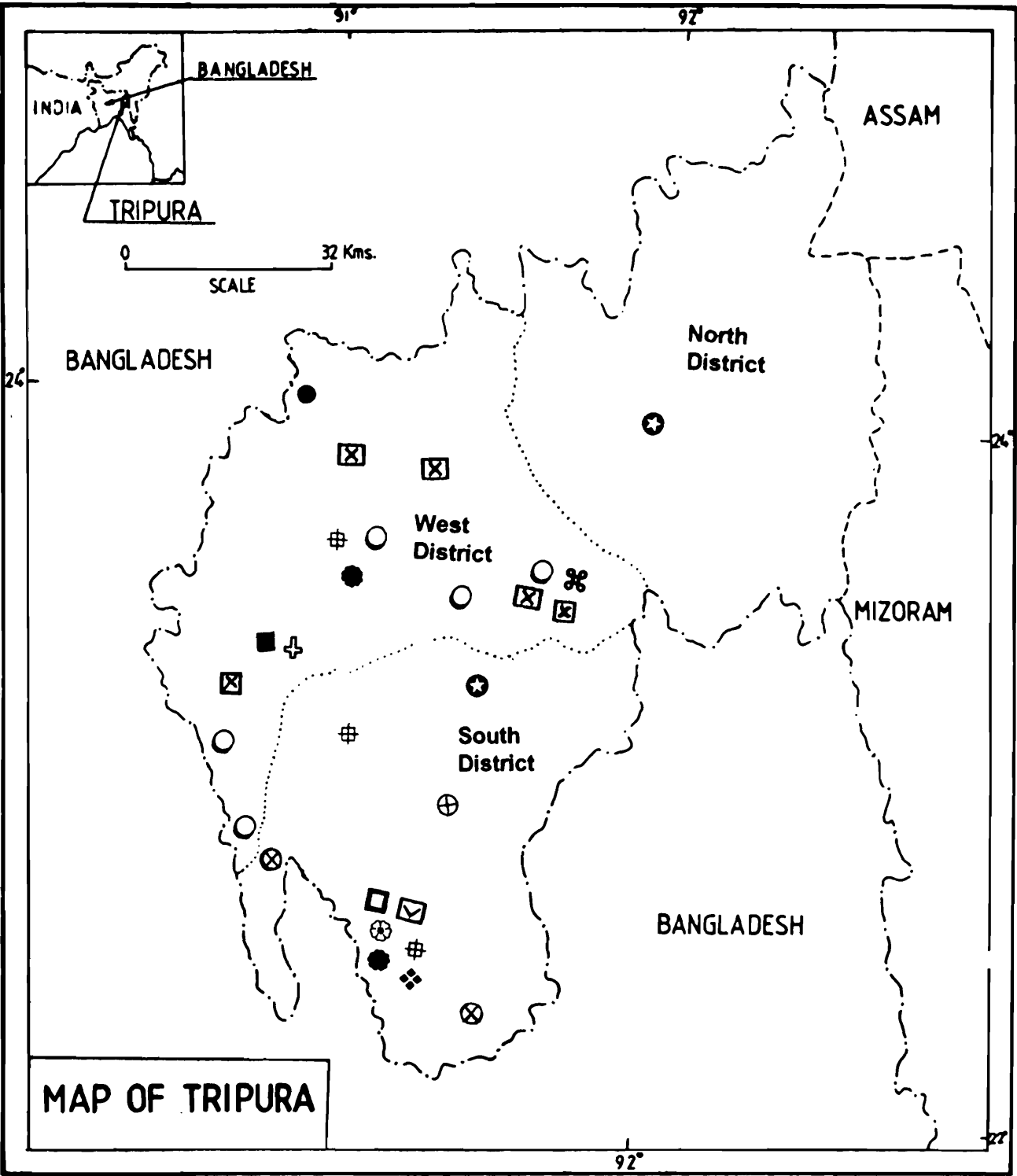
Map 6 : Showing Distribution of Oribatid Species in Tripura.

● <i>Cultroribula lata</i>	□ <i>Archegotocepheus</i> sp.
⊕ <i>Furcoppia cornuta</i>	⊗ <i>Dolicheremaeus cuspidata</i>
⊞ <i>Carabodes peniculatus</i>	⊕ <i>D. lineolatus</i>
■ <i>Phyllocarabodes</i> sp.	† <i>Machadobelba symmetrica</i>
○ <i>Tectocepheus latilamellaris</i>	◆ <i>Aeroppia</i> sp.
● <i>T. velatus velatus</i>	⊞ <i>Arcoppia bidentata</i>
⊞ <i>T. velatus sarekensis</i>	⊞ <i>A. fenestralis orientalis</i>
⊞ <i>Acrotocepheus</i> sp.	⊗ <i>A. Indica</i>



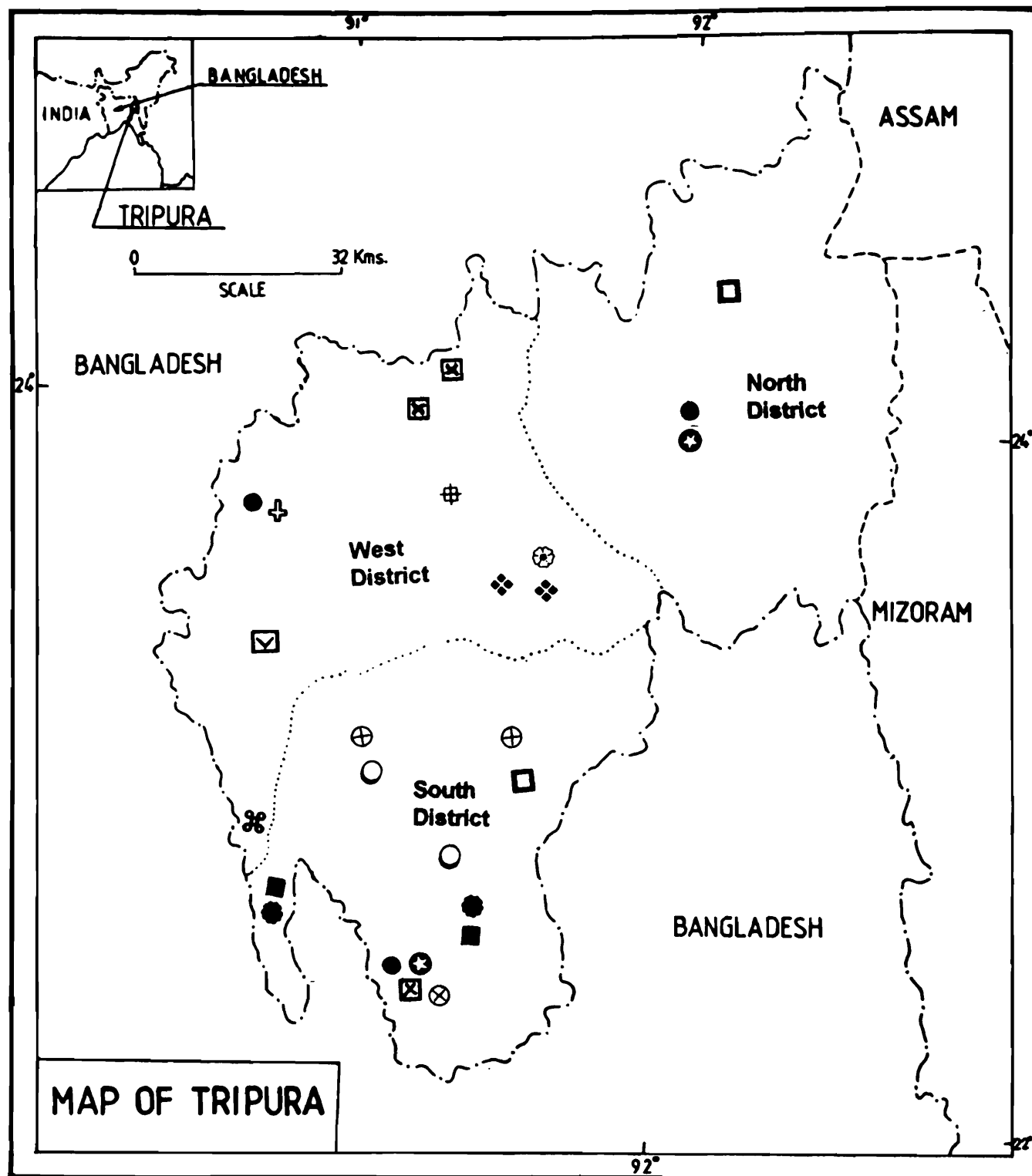
Map 7 : Showing Distribution of Oribatid Species in Tripura.

⊗	<i>Arcoppia mcadami</i>	□	<i>Mystroppia sellnicki</i>
⊕	<i>A. rotunda</i>	⊗	<i>Oppia akusiensis</i>
⊕	<i>A. tripuraensis</i>	⊕	<i>O. arcidiaconoae</i>
■	<i>Brachioppia brevipectinata</i>	†	<i>O. brevifasciata</i>
○	<i>Brachioppiella</i> sp.	◆	<i>O. fasciata</i>
●	<i>Graptoppia (Graptoppia)</i> sp.	⊗	<i>O. sundensis</i>
⊗	<i>Lanceoppia (Lanceoppia)</i> sp.	⊗	<i>O. tuxeni</i>
☑	<i>Multioppia gracilis</i>	⊗	<i>O. yodai</i>

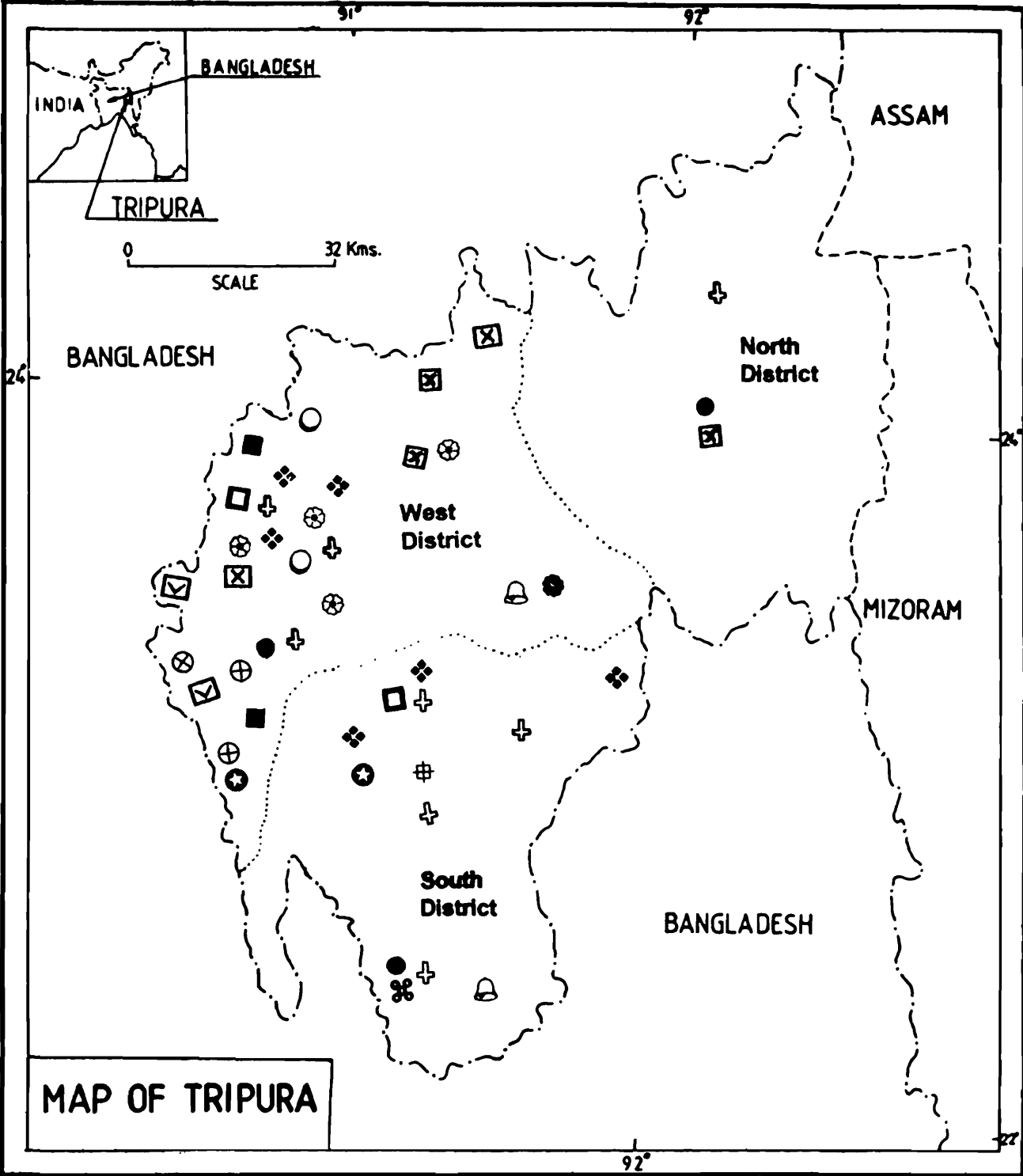


Map 8 : Showing Distribution of Oribatid Species in Tripura.

⊛ <i>Oxyoppia polynesia</i>	□ <i>Suctobelba amurica</i>
⊙ <i>Ramusella (Ramusella) chulumaniensis</i>	⊗ <i>S. carcharodon</i>
⊞ <i>Stachyoppia granulosa</i>	⊕ <i>Suctobelbella variosetosa</i>
■ <i>Striatoppia opuntiseta</i>	† <i>Suctobelbilla</i> sp.
○ <i>S. similis</i>	⋄ <i>Chaumoproctus abalai</i>
● <i>S. tripurensis</i>	⊙ <i>C. longisetosus</i>
⊗ <i>Papillonotus tricarinatus</i>	⊞ <i>Terrazetes mauritius</i>
⊞ <i>Novosuctobelba dentissima</i>	⊗ <i>Unguizetes clavatus</i>

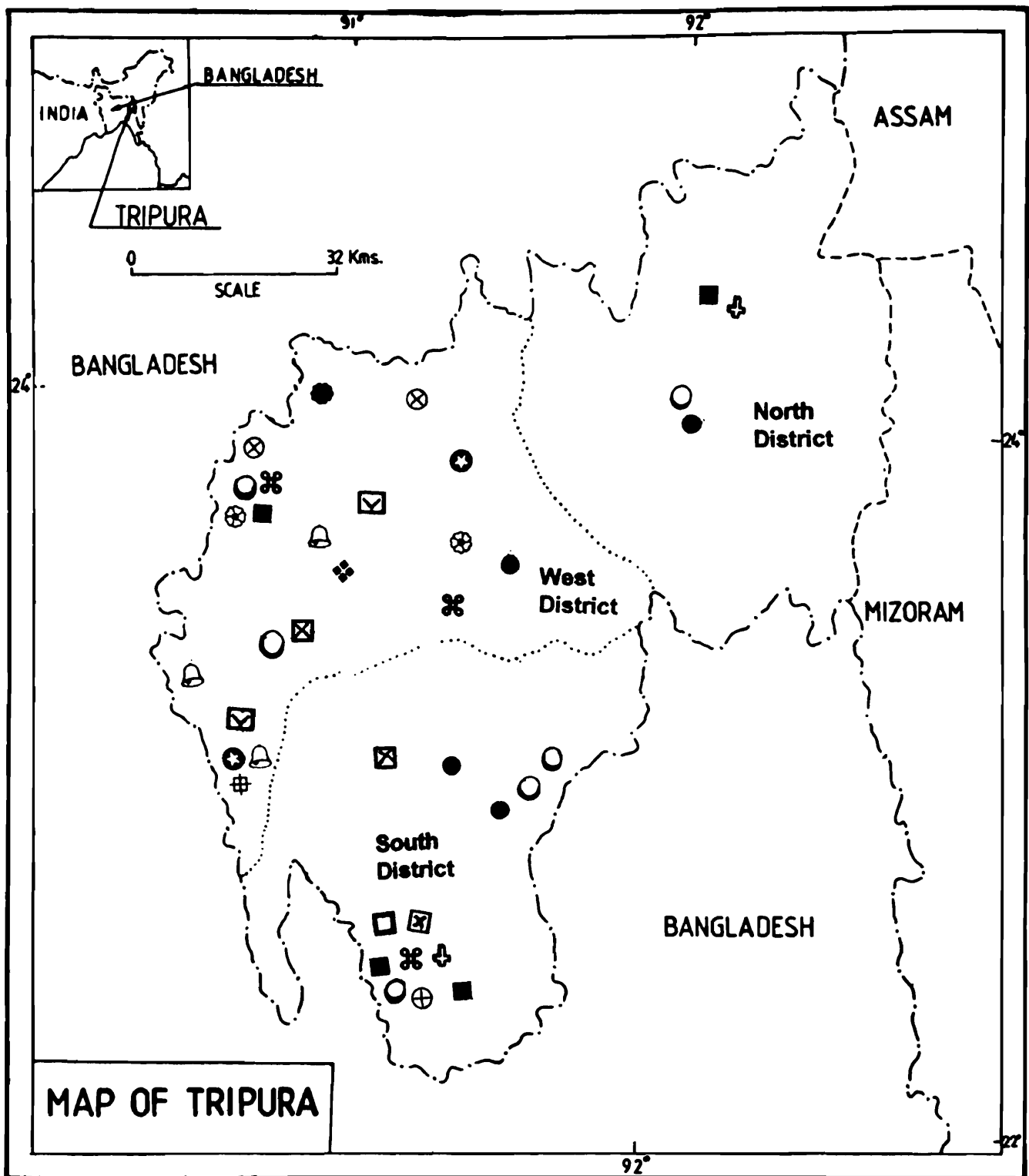


Map 9 : Showing Distribution of Oribatid Species in Tripura.

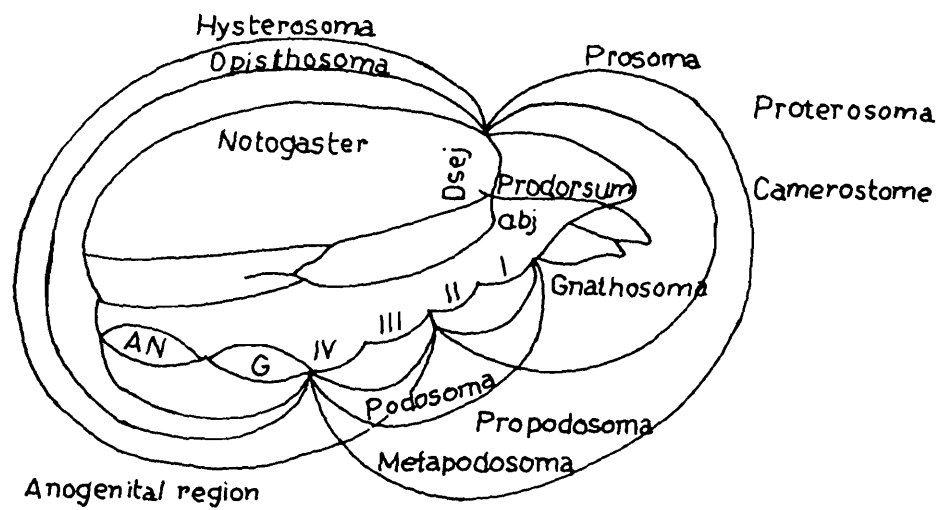


Map 10 : Showing Distribution of Oribatid Species in Tripura.

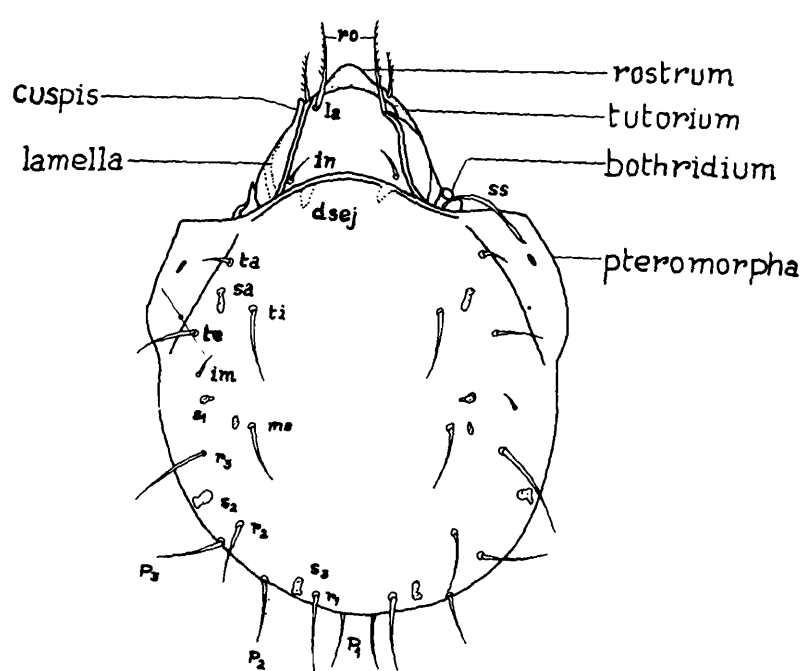
⊙	<i>Andeszetes diversidactylus</i>	□	<i>S. huancayensis</i>
⊗	<i>Euscheloribates samsinaki</i>	⊗	<i>s. latoincisus</i>
⊕	<i>Fijibates</i> sp.	⊕	<i>S. multiplisetus</i>
■	<i>Rhabdoribates siamensis</i>	†	<i>S. praeincisus interruptus</i>
○	<i>Scheloribates caprai</i>	⋄	<i>S. praelineatus</i>
●	<i>S. fimbriatoides</i>	⊗	<i>S. rectus</i>
⊗	<i>S. fimbriatus</i>	⊗	<i>S. rufafulvus</i>
⊗	<i>S. fusifer</i>	⊗	<i>S. sacsaluamanensis</i>
		⊗	<i>S. saswatii</i>



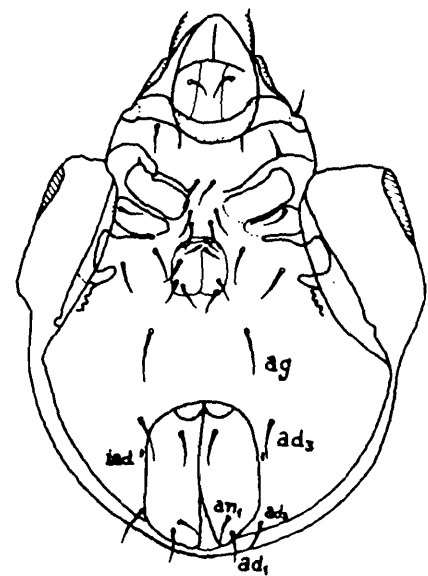
⊗	<i>S. striatus</i>	□	<i>Oribatella unispinata</i>
⊗	<i>Tuberemaeus singularis</i>	⊗	<i>Acrogalumna machadoi</i>
⊗	<i>Birobates reductus</i>	⊕	<i>Disparagalumna</i> sp.
■	<i>Hypozetes laysanensis</i>	†	<i>Galumna flabellifera</i>
○	<i>Lamellobates palustris</i>	⊗	<i>Orthogalumna saeva</i>
●	<i>Paralamellobates bengalensis</i>	⊗	<i>Pergalumna corolevuensis</i>
⊗	<i>P. ceylonicus</i>	⊗	<i>P. magnipora capensis</i>
⊗	<i>Mycobates tridactylus</i>	⊗	<i>P. variabilis</i>
		⊗	<i>Trichogalumna seminuda</i>



1



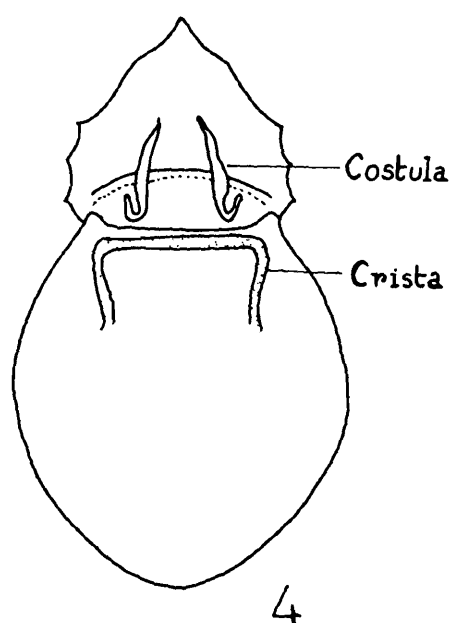
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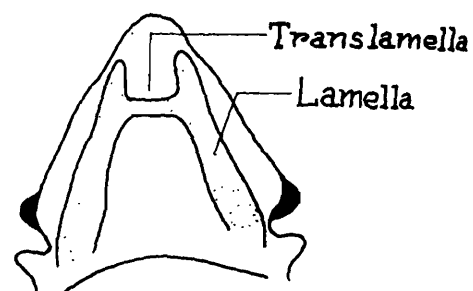
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Fig. 1 : Schematic diagram of body regions of the oribatids. An=anal plate, G= genital plate, I-IV=acetabula of legs I-IV (modified from Balogh and Mahunka, 1983).

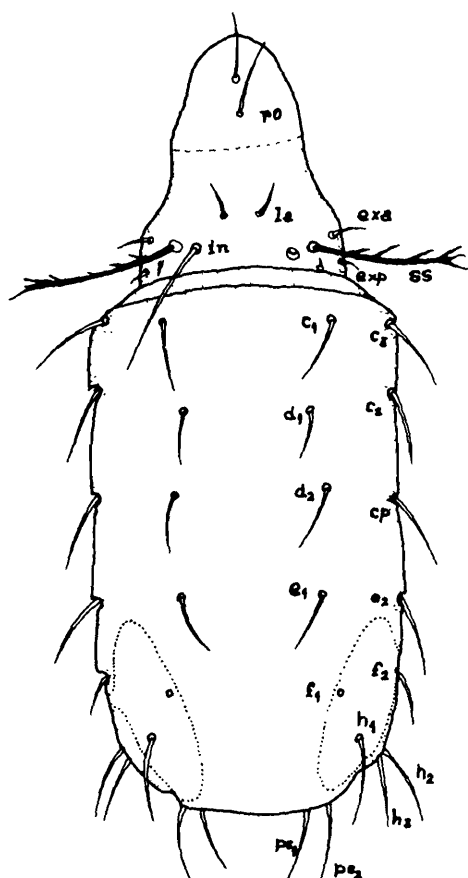
Figs. 2-3 : Body of higher oribatids. 2. dorsal view. 3. ventral view.



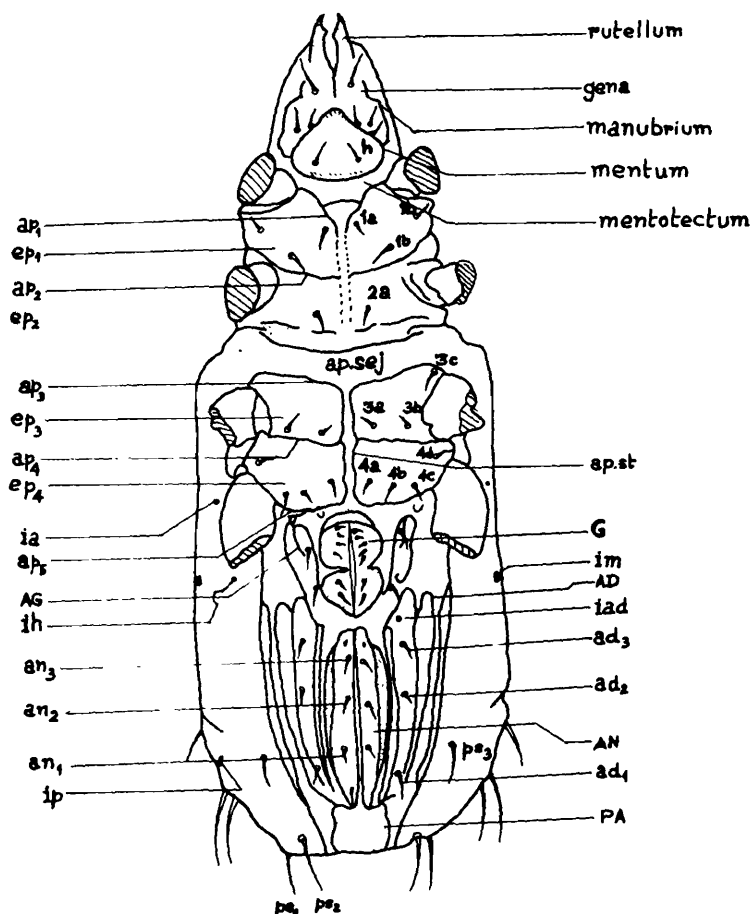
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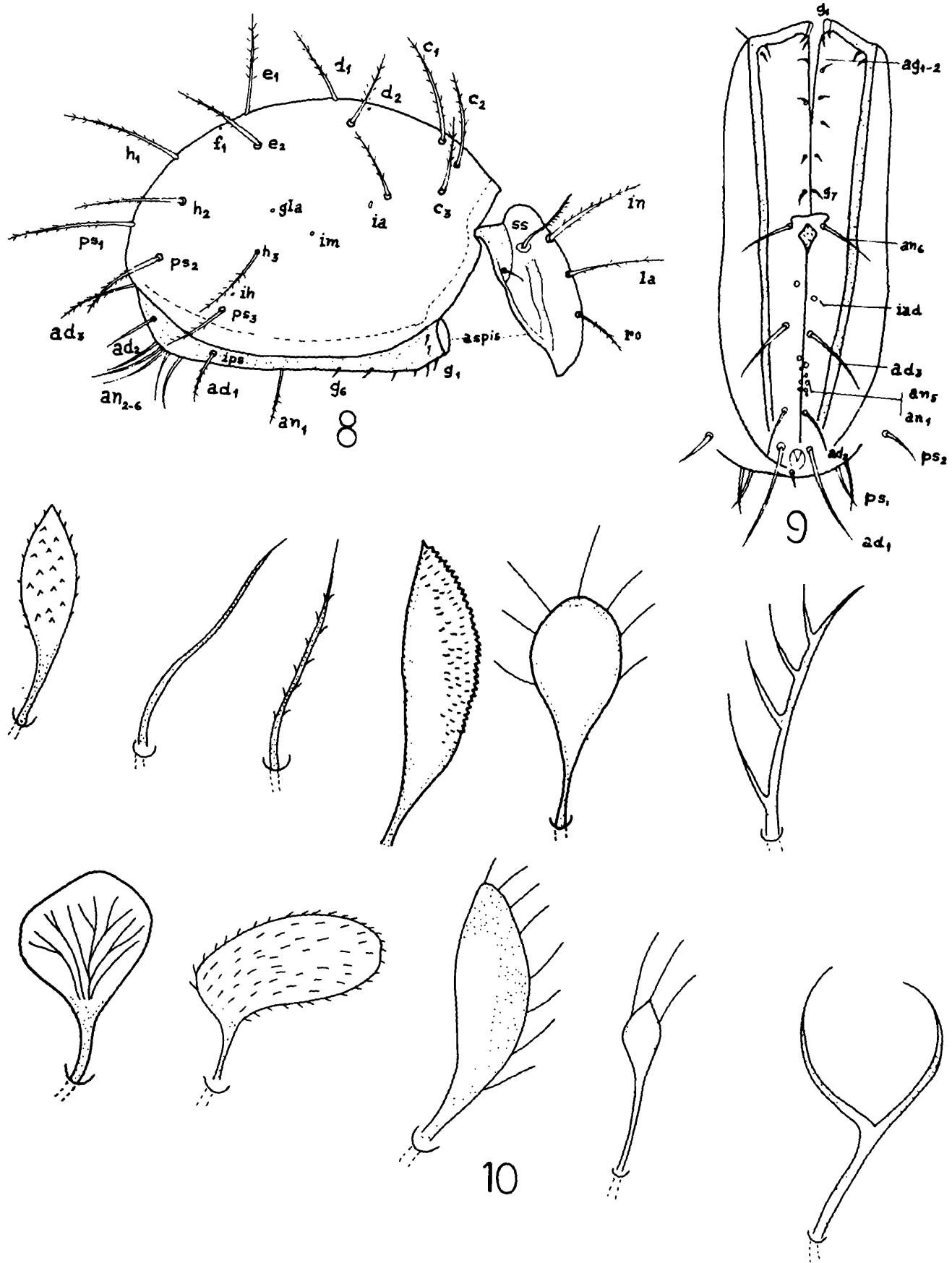


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Fig. 4 : Costula and crista of higher oribatids.

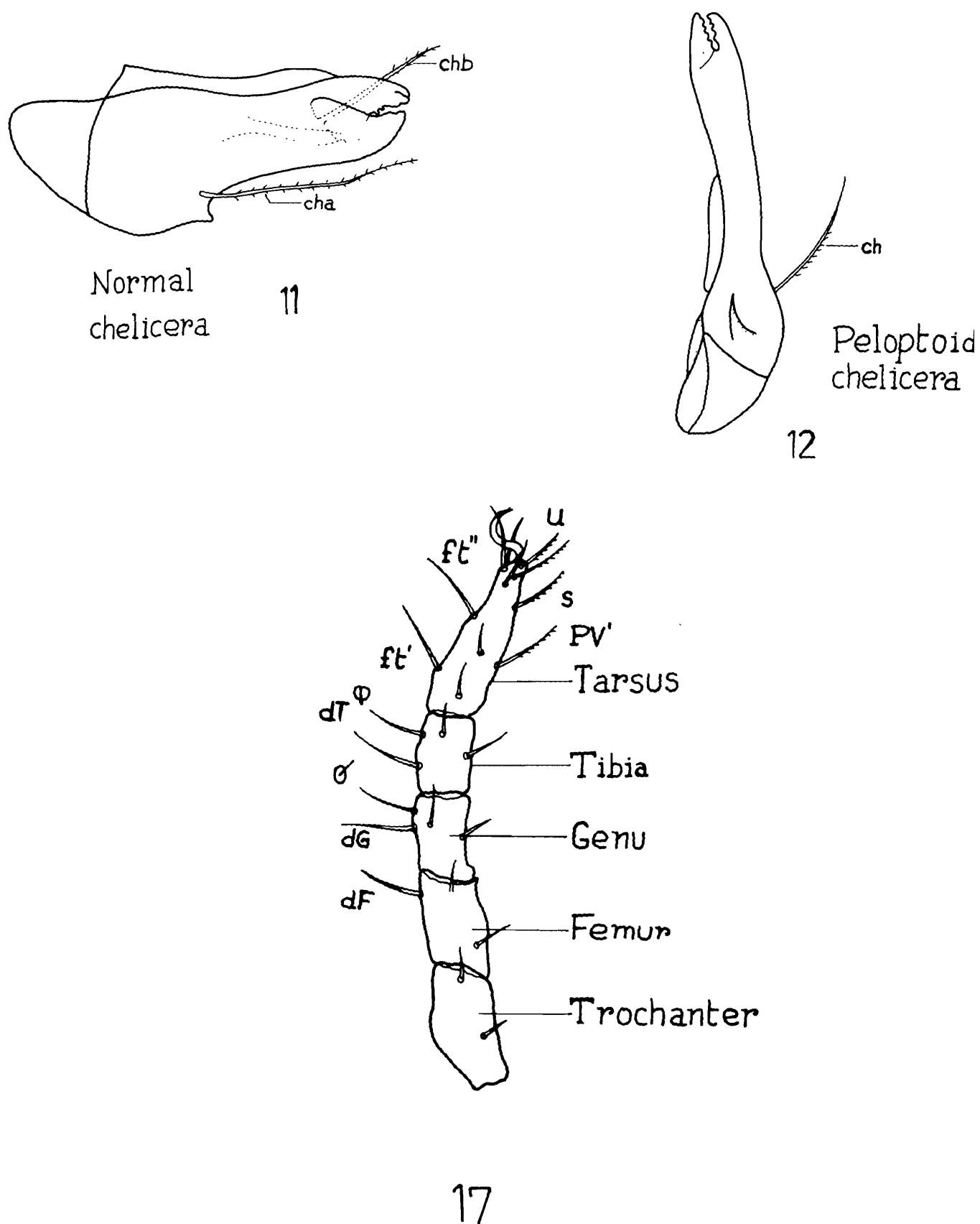
Fig. 5 : Prodorsum showing translamella.

Figs. 6-7 : Primitive oribatids of the dichoid type. 6. dorsal view: *ro*=rostral seta, *la*= lamellar seta, *in*= interlamellar seta, *exa*= exterior exobothridial seta, *exp*= posterior exobothridial seta, *ss* = sensillus, *c*₁-*c*₃, *cp*, *d*₁, *d*₂, *e*₁, *e*₂, *f*₁, *f*₂, *h*₁, *h*₂, *h*₃, *ps*₁, *ps*₂ = notogastral setae, *gla* = oil gland. 7. ventral view: *G* = genital plate, *AG* = aggenital plate, *AN*= anal plate, *AD*= adanal plate, *PA* = postanal plate, *ap*₁-*ap*₅ = apodemes, *ap.sej.* = sejugal apodeme, *ap.st.* = sternal apodeme, *ep*₁-*ep*₄ = epimeres, *ia*, *ih*, *im*, *ips*, *iad*, *ian* = lyrifissures, *an*₁-*an*₃=anal setae, *ad*₁-*ad*₄=adanal setae, *ps*₁=notogastral seta, *la-lc* = setae of epimere 1, *2a* = seta of epimere 2, *3a-3c* = setae of epimere 3, *4a-4d*= setae of epimere 4.

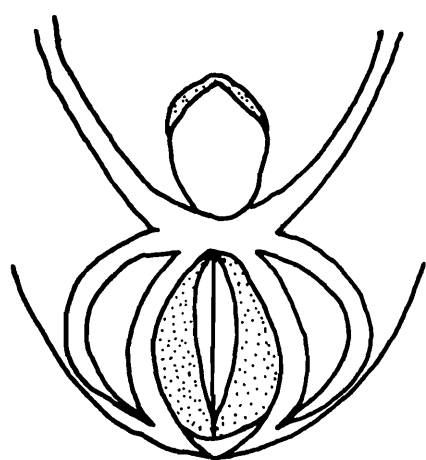


Figs. 8-9 : Primitive oribatids of ptychoid type. 8. lateral view : ex = exobothridial seta. g_1 - g_8 =genital setae. 9. anogenital region : ag_1 - ag_2 = aggenital setae.

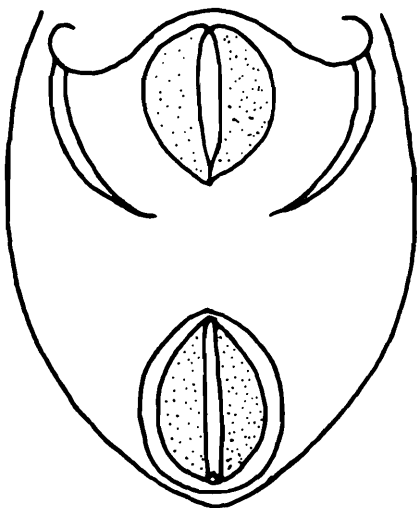
Fig. 10. : Different types of sensillus.



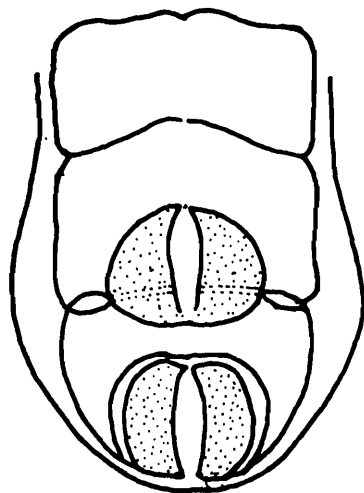
Figs. 11-12 : Two main types of chelicera, 11. normal : *cha*, *chb* = cheliceral setae. 12. peloptoid ; *ch* = cheliceral seta.
Fig. 17 : Legs of oribatid (normal setae marked with Latin letters, solenidia marked with Greek letters).



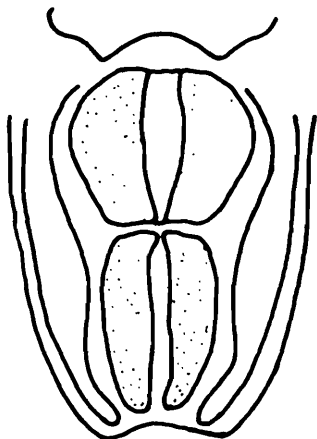
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Figs. 13-16 : Types of anogenital regions. 13. pseudogastric, 14. diagastric, 15. schizogastric, 16. hologastric.

Table 2. Distribution of oribatid genus/species in different districts of Tripura

	North district	South district	West district
Name of the genus/species	1	2	3
<i>Palaeacarus</i> sp.	—	—	+
<i>Hypochthonius</i> sp.	—	+	—
<i>Malacoangelia remigera</i>	—	+	—
<i>M. similis</i>	—	+	+
<i>Mesoplophora crassisetosa</i>	—	+	+
<i>M. gaveae</i>	—	—	+
<i>M. pectinata</i>	—	+	—
<i>Cosmochthonius agartalaensis</i>	—	—	+
<i>C. lanatus diversiseta</i>	—	+	+
<i>C. plumatus suramericanus</i>	—	+	—
<i>C. reticulatus</i>	—	—	+
<i>Haplochthonius clavatus</i>	—	—	+
<i>H. simplex</i>	—	+	—
<i>Gehypochthonius rhadamanthus</i>	—	+	—
<i>Atropacarus</i> (<i>Hoplophorella</i>) <i>scapellatus</i>	—	+	+
<i>A. (H) schauenbergi</i>	—	—	+
<i>Hoplophthiracarus</i> sp.	—	—	+
<i>Rhysotritia ardua ardua</i>	—	+	—
<i>R. a. var. otaheitensis</i>	—	+	—
<i>Annectacarus longisetosus</i>	—	—	+
<i>Cryptacarus dendrisetosus</i>	—	—	+
<i>Haplacarus foliatus bengalensis</i>	—	—	+
<i>Javacarus foliatus</i>	—	—	+
<i>J. kuhnelti</i>	+	—	+
<i>Paulianacarus foliatus</i>	—	+	+
<i>Vepracarus cornutus</i>	—	+	+
<i>Epilohmannia cylindrica</i>	—	—	+
<i>E. pallida areolata</i>	—	—	+
<i>E. pallida pacifica</i>	—	+	+

Name of the genus/species	1	2	3
<i>E. pallida rugosa</i>	-	+	-
<i>Afronothrus sulcatus</i>	-	-	+
<i>Allonothrus dhananjayi</i>	-	-	+
<i>A. pararusseolus</i>	-	+	+
<i>Archegozetes magnus longisetosus</i>	-	+	+
<i>A. tuberculatus</i>	-	-	+
<i>Malaconothrus asiaticus</i>	-	-	+
<i>M. crassisetosus</i>	-	-	+
<i>M. dipankari</i>	-	+	-
<i>M. pauciareolatus</i>	-	-	+
<i>M. peruensis</i>	-	-	+
<i>M. pseudolamellatus</i>	-	-	+
<i>M. ramensis</i>	-	-	+
<i>M. rostopilosus</i>	-	+	-
<i>Trimalaconothrus tripurensis</i>	-	-	+
<i>Cyrthermannia</i> sp.	-	-	+
<i>Masthermannia mammillaris mammillaris</i>	-	+	+
<i>Liodes terrestris</i>	-	+	-
<i>Teleioliodes ghanensis</i>	-	+	-
<i>Tegeocranellus</i> sp.	-	+	-
<i>Sadocepheus</i> sp.	-	-	+
<i>Microtegeus reticulatus</i>	-	+	-
<i>Berlesezetes auxiliaris</i>	-	-	+
<i>B. longistriatus</i>	-	-	+
<i>B. monoramai</i>	-	-	+
<i>B. rudrasagarensis</i>	-	-	+
<i>Schizozetes quadrilineatus</i>	-	-	+
<i>Eremulus jyotsnai</i>	-	-	+
<i>E. nigrisetosus</i>	-	+	+
<i>E. truncatus</i>	-	-	+
<i>Fosseremus</i> sp.	-	-	+
<i>Eremobelba</i> sp.	-	-	+
<i>Pseuderemulus</i> sp.	..	-	+

Name of the genus/species	1	2	3
<i>Basilobelba indica</i>	+	+	+
<i>Zetorchestes saltator</i>	-	+	-
<i>Cultroribula lata</i>	-	-	+
<i>Furcoppia cornuta</i>	-	+	-
<i>Carabodes peniculatus</i>	-	+	-
<i>Phyllocarabodes</i> sp.	-	+	-
<i>Tectocepheus latilamellaris</i>	-	+	-
<i>T. velatus velatus</i>	-	+	-
<i>T. velatus sarekensis</i>	-	+	-
<i>Acrotocepheus</i> sp.	-	+	-
<i>Archegotocepheus</i> sp.	-	+	-
<i>Dolicheremaeus cuspidata</i>	-	-	+
<i>D. lineolatus</i>	-	+	+
<i>Machadobelba symmetrica</i>	-	+	+
<i>Aeroppia</i> sp.	-	+	-
<i>Arcoppia bidentata</i>	-	-	+
<i>A. fenestralis orientalis</i>	-	+	-
* <i>A. indica</i>	-	+	-
<i>A. mcadami</i>	-	+	-
<i>A. rotunda</i>	-	+	-
* <i>A. tripuraensis</i>	-	+	-
<i>Brachioppia brevipectinata</i>	-	+	-
<i>Brachioppiella</i> sp.	+	-	+
<i>Graptoppia (Graptoppia)</i> sp.	-	+	-
<i>Lanceoppia (Lanceoppia)</i> sp.	-	+	-
<i>Multioppia gracilis</i>	-	-	+
<i>Mystroppia sellnicki</i>	-	-	+
<i>Oppia akusiensis</i>	-	-	+
<i>O. arcidiaconoae</i>	-	-	+
<i>O. brevifasciata</i>	-	-	+
<i>O. fasciata</i>	-	-	+
<i>O. sundensis</i>	-	+	+
<i>O. tuxeni</i>	-	-	+

Name of the genus/species	1	2	3
<i>O. yodai</i>	-	+	-
<i>Oxyoppia polynesia</i>	-	+	+
<i>Ramusella (Ramusella) chulumaniensis</i>	-	+	-
<i>Stachyoppia granulosa</i>	-	+	+
<i>Striatoppia opuntiseta</i>	-	-	+
<i>S. similis</i>	-	-	+
<i>S. tripurensis</i>	-	-	+
<i>Papillonotus tricarinatus</i>	-	-	+
<i>Novosuctobelba dentissima</i>	-	+	-
<i>Suctobelba amurica</i>	-	+	-
<i>S. carcharodon</i>	-	-	+
<i>Suctobelbella variosetosa</i>	-	+	-
<i>Suctobelbila</i> sp.	-	-	+
<i>Chaunoproctus abalai</i>	-	+	-
<i>C. longisetosus</i>	+	+	-
<i>Terrazetes mauritius</i>	-	-	+
<i>Unguizetes clavatus</i>	-	+	-
<i>Brasilobates punctata</i>	-	+	-
<i>Plenoxylobates curtiseta</i>	-	-	+
<i>Setoxylobates foveolatus</i>	-	-	+
<i>Xylobates capucinus</i>	-	+	-
<i>X. seminudus</i>	+	+	+
<i>Xylobates</i> sp.	-	-	+
<i>Haloribatula tenareae</i>	-	-	+
<i>Liebstadia</i> sp.	+	+	-
<i>Zygoribatula longiporosus</i>	-	+	-
<i>Haplozetes minimicoma</i>	-	+	-
<i>Peloribates tripuraensis</i>	-	+	-
<i>Pilobatella berlesei</i>	-	-	+
<i>Rostrozetes komodensis</i>	-	-	+
<i>R. ovulum</i>	+	+	+
<i>R. punctatus</i>	-	-	+
<i>Tentaculozetes</i> sp.	-	+	-
<i>Andeszetes diversidactylus</i>	-	-	+

Name of the genus/species	1	2	3
<i>Euscheloribates samsinaki</i>	—	—	+
<i>Fijibates</i> sp.	—	+	—
<i>Rhabdoribates siamensis</i>	—	—	+
<i>Scheloribates caprai</i>	—	—	+
<i>S. fimbriatoides</i>	+	+	+
<i>S. fimbriatus</i>	—	+	—
<i>S. fusifer</i>	—	—	+
<i>S. huancayensis</i>	—	+	+
<i>S. latoineisus</i>	—	—	+
<i>S. multiplisetus</i>	—	—	+
<i>S. praeincisus interruptus</i>	+	+	+
<i>S. praelineatus</i>	+	+	+
<i>S. rectus</i>	—	+	+
<i>S. rufafulvus</i>	+	—	+
<i>S. sacsahuamanensis</i>	—	—	+
<i>S. saswatii</i>	—	—	+
<i>S. striatus</i>	—	—	+
<i>Tuberemaeus singularis</i>	—	—	+
<i>Birobates reductus</i>	—	—	+
<i>Hypozetes laysanensis</i>	+	+	+
<i>Lamellobates palustris</i>	+	+	+
<i>Paralamellobates bengalensis</i>	+	+	+
<i>P. ceylonicus</i>	—	+	+
<i>Mycobates tridactylus</i>	—	—	+
<i>Oribatella unispinata</i>	—	+	—
<i>Acrogalumna machadoi</i>	—	+	+
<i>Disparagalumna</i> sp.	—	+	—
<i>Galumna flabellifera</i>	+	+	—
<i>Orthogalumna saeva</i>	—	—	+
<i>Pergalumna corolevuensis</i>	—	—	+
<i>P. magnipora capensis</i>	—	+	—
<i>P. variabilis</i>	—	—	+
<i>Trichogalumna seminuda</i>	—	—	+

* New species, published separately.

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ARACHNIDA : ARANEAE

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INTRODUCTION

The spider fauna of Tripura has not so far been studied in a comprehensive manner. The only published information about the spider fauna of Tripura is Tikader & Malhotra (1980) which recorded only one species. The present work was taken up to provide an up-to-date information regarding the families : Araneidae, Oxyopidae, Tetragnathidae, Salticidae, Lycosidae and Heteropodidae from Tripura in the light of modern taxonomic concept and it is hoped that this work will prove quite useful to the future workers. Though the sincerest effort was made here to make this faunal account as comprehensive as possible but yet it is believed that there are many more species awaiting discovery from this region.

1. Family ARANEIDAE

1806. *Araneidae* Latreille, *Genova Crustaceorum et Insectorum*, 1 : 82.

1981. *Araneidae* : Tikader & Bal, *Rec. zool. Surv. India*, occ. pap. No. 24 : 1-60.

Type-genus : *Araneus* Clerck.

Distribution : Cosmopolitan.

Key to the genera of the family ARANEIDAE *Latreille*

1. Abdomen generally flat with variable shape; epigyne provided with thin or thick median septum.....***Argiope***
Abdomen not flat or variable shape; epigyne not provided with thin or thick median septum 2

2. Cephalic region more elevated than the thoracic region and armed posteriorly one pair of tubercles***Nephila***

Cephalic region not elevated than the thoracic region and not armed posteriorly with one pair of tubercles 3

3. Eyes of the anterior median closer to the anterior laterals than to each other***Gea***

Eyes of the anterior median not closer to the anterior laterals than to each other 4

4. Carapace with cephalic region bulging behind the ocular area, anterior eyes procurved
.....***Parawixia***

Carapace without cephalic region bulging behind the ocular area, anterior row of eyes not procurved 5

5. Abdomen hard flattened dorsally and provided with a conical humps and spines; epigyne not provided with tongue like scape
.....***Gasteracantha***

6. Abdomen not hard, oval or sub-triangular and not provided with conical humps and spines; epigyne provided with simple tongue like scape with one or two pairs of lateral lobes
.....***Neoscona***

Genus 1. *Argiope* Audouin

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

1970. *Argiope* : Tikader, *Rec. zool. Surv. India*, 64 (1-4) : 27.

Type-species : *Argiope lobata* (Thorell)

Distribution : Tropical and temperate countries of the world.

1. *Argiope shillongensis* Sinha

1951. *Argiope shillongensis* Sinha, *Rec. Indian Mus.*, **49** : 75.

Specimen examined : 2 F, Sinhaigla Reserve forest, South Tripura, India, 14.x.1990, coll. S. Ahmed.

Diagnosis : Cephalothorax longer than wide, ocular quadrate much longer than wide; both anterior and posterior medians sub-equal in size. Anterior row of eyes procurved; posterior row strongly procurved. Labium wider than long. Chelicerae small and weak. Legs are long and strong.

Abdomen longer than wide, truncated anteriorly, overlapping in front on the cephalothorax. Dorsum marked with broad transverse bands.

Distribution : India : South Tripura (New record); Meghalaya, West Bengal.

Genus 2. *Nephila* Leach

1815. *Nephila* Leach, *Zoological Miscellany*, : 133.

1962. *Nephila* : Tikader, *J. Linn. Soc.*, **44** (300) : 566.

Type-species : *Nephila maculata* (Fabricius)

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

Key to the species of the genus *Nephila* Leach

1. Abdomen having one pair of sub-median longitudinal yellow lines and numerous small longitudinal pale lines placed laterally; ducts of spermathecae originated dorso-posteriorly
.....*maculata*
2. Abdomen having single median, broad longitudinal yellow bar and no small pale lines; ducts of spermathecae originated ventro-posteriorly*robusta*

2. *Nephila maculata* (Fabricious)

1793. *Aranea maculata* Fabricious, *Ent. Syst.*, **2** : 425.

1982. *Nephila maculata* : Tikader, *Fauna of India*, Spiders : Araneae, **2** (1) : 97.

Specimen examined : 1 F, Ambasa, North Tripura, India, 10.xi.1988, coll. G. N. Saha; 1 F, Sepahijala, West Tripura, India, 27.xii.1991, coll. M. Dutta.

Distribution : India : Tripura (Dists. North Tripura and South-Tripura), (New record); Assam; Andaman & Nicobar islands; Karnataka; Gujarat; Maharashtra; Meghalaya; West Bengal; Burma, Australia, China, Japan, Malaysia, New Guinea, Sri Lanka.

3. *Nephila robusta* Tikader

1962. *Nephila robusta* Tikader, *J. Linn. Soc.*, **44** (300) : 566.

1982. *Nephila robusta* : Tikader, *Fauna of India*, Spiders : Araneae, **2** (1) : 100.

Specimen examined : 1 F, Pulikhel, South Tripura, India, 29.xii.1991, coll. M. Dutta; 1 F, Sepahijala, South Tripura, India, 14.vi.1990, coll. G. N. Saha.

Distribution : India : Tripura (Dist. South Tripura), (New record); West Bengal.

Genus 3. *Gea* C. L. Koch

1843. *Gea* C. L. Koch, *Die Arachniden*, **10** : 101.

Type-species : *Gea heptagon* (Hentz)

Distribution : Asia, America.

4. *Gea corbetti* Tikader

1982. *Gea corbetti* Tikader, *Fauna of India*, Spiders : Araneae, **2** (1) : 109.

Specimen examined : 1 F, Raibasa village, Ambasa, North Tripura, India, 18.xii.1991, coll. S. Ahmed.

Diagnosis : Carapace with moderately convex; ocular quad forms a trapezium. Chelicerae small, weak and having small boss. In male, tibia I curved and armed with microsetae (spines) unlike that of *Argiope*. Adult female smaller than 6 mm.

Distribution : India : Tripura (Dist. North Tripura), (New record); Uttar Pradesh.

Genus 4. *Parawixia* F.O.P. Cambridge

1904. *Parawixia* F.O.P. Cambridge, *Biologia. cent. am. (Zool)*, 2 : 487.
 1982. *Parawixia* : Tikader, *Fauna of India, Spiders : Araneae*, 2 (1) : 212.

Type-species : *Parawixia destricta* (O.P. Cambridge).

Distribution : India, Japan, Malaysia, Mexico, South America.

5. *Parawixia dehaanii* (Doleschall)

1859. *Epeirida dehaanii* Doleschall, *Act. Soc. Ind. Neerl.*, 5 (5) : 33.
 1900. *Araneus dehaanii* : Pocock, *Fauna Brit. India Arachn.*, : 225.
 1970. *Araneus dehaanii* : Tikader, *Rec. zool. Surv. India*, 63 (1-4) : 30.
 1982. *Parawixia dehaanii* : Tikader, *Fauna of India, Spiders : Araneae*, 2 (1) : 212.
 1992. *Parawixia dehaanii* : Biswas & Biswas, *Fauna of West Bengal, Spiders : Araneae*, State Fauna Series No. 3 (3) : 463.

Specimen examined : 1 F, Pulikhel, Dist. South Tripura, Tripura, India, 29.xii.1991, coll. M. Dutta.

Diagnosis : Cephalothorax and legs reddish brown, abdomen dark brown in colour. Cephalothorax longer than wide, narrowing in front, clothed with white pubescence, hair and spines with granular base. Cephalic region much elevated in the middle then forming a ridge behind the ocular area. Thoracic region provided with transverse groove. Ocular quad situated on an elevation, slightly wider in front than behind. Anterior median eyes of both the rows nearly same size, close and situated on the base of horn-like projection. Anterior row of eyes procurved and posterior rows of eyes recurved. Sternum heart-shaped pointed behind, reddish brown in colour, clothed with pubescence and hair with granular base. Chelicerae strong, reddish brown, provided with moderate base. Abdomen triangular, longer than wide, clothed with pubescence and hair, provided with two conspicuously pointed shoulder humps directed outward and on pointed tail hump at the posterior end. Five pairs of sigilla on the dorsum.

Distribution : India : Tripura (Dist. South Tripura), (New record); West Bengal; Karnataka; Sikkim; Burma, Java, Japan, Indo and Austro-Malaysia, Sumatra.

5. Genus *Gasteracantha* Sundevall

1833. *Gasteracantha* Sundevall, *Conspectus Arachnidum*, : 14.
 1981. *Gasteracantha* : Tikader & Biswas, *Rec. zool. Surv. India*, occ. pap. No. 30 : 33.

Type-species : *Gasteracantha cancriformis* (Linneaus).

Distribution : Tropical countries of the world.

Key to the species of the genus Gasteracantha
Sundevall

1. Dorsum of the abdomen provided with three conspicuous transverse yellowish bars
*diadesmia*
 Dorsum of the abdomen not provided with three conspicuous transverse yellowish bars2
2. Scape of the epigyne rounded from the lateral view*hasseltii*
 Scape of the epigyne not rounded from the lateral view 3
3. Dorsum of the abdomen provided with one conspicuous transverse yellowish bar, median spine not abruptly narrow at its apex ..*kuhlii*
4. Dorsum of the abdomen not provided with one conspicuous yellowish bar, median spine abruptly narrowed at its apex*unquifera*

6. *Gasteracantha diadesmia* Thorell

1887. *Gasteracantha diadesmia* Thorell, *Ann. Mus. civ. Genova*, 25 : 225.
 1982. *Gasteracantha diadesmia* : Tikader, *Fauna of India, Spiders : Araneae*, 2 (1) : 61.

Specimen examined : 2 F, Dhalubari, Ambassa, Dist. North Tripura, India, 26.xii.1991, coll. S. Ahmed.

Distribution : India : Tripura (Dist. North Tripura), (New record); West Bengal; Andaman & Nicobar Islands; Sikkim; Burma, Thailand.

7. *Gasteracantha hasseltii* C. L. Koch

1838. *Gasteracantha hasseltii* C. L. Koch, *Die Arachniden*, 4 : 29.

1982. *Gasteracantha hasseltii* : Tikader, *Fauna of India*, Spiders : Araneae, 2 (1) : 63.

Specimen examined : 1 F, Chakma forest, Dist. West Tripura, India, 15.xii.1991, coll. S. Ahmed, 1 F, Gargee, Dist. South-Tripura, India, 23.ii.1991, coll. G. K. Srivastava.

Distribution : India : Tripura (Dist. South Tripura), (New record); Assam; West Bengal; Sikkim; Burma.

8. *Gasteracantha kuhlii* C. L. Koch

1838. *Gasteracantha kuhlii* C. L. Koch, *Die Arachniden*, 4 : 20.

1982. *Gasteracantha kuhlii* : Tikader, *Fauna of India*, Spiders : Araneae, 2 (1) : 59.

Specimen examined : 1 F, Sinhaigla Reserve forest, South Tripura, India, 14.x.1990, coll. S. Ahmed.

Distribution : India : Tripura (Dist. South Tripura), (New record); Assam; Bihar; West Bengal; Sikkim; Andaman & Nicobar Islands; Bhutan, Burma, Indomalayasia, Japan.

9. *Gasteracantha unguifera* Simon

1889. *Gasteracantha unguifera* Simon, *J. Asiat. Soc. Bengal*, 58 : 336.

1982. *Gasteracantha unguifera* : Tikader, *Fauna of India*, Spiders : Araneae, 2 (1) : 57.

Specimen examined : 1 F, Ushagram, Dist. Agartola, Tripura, India, 28.xii.1991, coll. S. Ahmed.

Distribution : India : Tripura (Dist. Agartola), (New record); Uttar Pradesh; Sikkim.

6. Genus *Neoscona* Simon

1864. *Neoscona* Simon, *Hist. nat. des Aragin.*, 1 : 261.

1981. *Neoscona* : Tikader & Biswas, *Rec. zool. Surv. India*, occ. pap. No. 30 (1) : 22.

Type-species : *Neoscona anabesca* (Walckenaer)

Distribution : Cosmopolitan.

Key to the species of the genus *Neoscona* Simon

1. Carapace provided with two lateral and one median longitudinal brown patches
.....*shillongensis*
2. Carapace not provided with two lateral and one median longitudinal brown patches
.....*mukerjei*

10. *Neoscona shillongensis* Tikader & Bal

1981. *Neoscona shillongensis* Tikader & Bal, *Rec. zool. Surv. India*, occ. pap. No. 24 : 34.

Specimen examined : 1 F, Sepahijala, Dist. West Tripura, India, 27.xii.1991, coll. M. Dutta.

Distribution : India : Tripura (Dist. West Tripura), (New record); Meghalaya.

11. *Neoscona mukerjei* Tikader

1980. *Neoscona mukerjei* Tikader, *Proc. Indian Acad. Sci.*, 89 (3) : 247.

1982. *Neoscona mukerjei* : Tikader, *Fauna of India*, Spiders : Araneae, 2 (1) : 248.

Specimen examined : 1 F, Kamalachera, Dulubari, Dist. North Tripura, India, 15.iii.1992, coll. T. Roy & party.

Distribution : India : Tripura (Dist. North Tripura), (New record); Maharashtra; West Bengal.

2. Family : OXYOPIDAE

1870. *Oxyopidae* Thorell, *Ofvers. Kongl. Vet. Acad. Forh.*, 27 (4) : 367.

1965. *Oxyopidae* : Tikader, *Proc. Indian Acad. Sci.*, 62 (3) : 140.

Type-genus : *Oxyopes* Latreille

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

Genus 7. *Oxyopes* Latreille

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

1900. *Oxyopes* : Pocock, *Fauna of Brit. India Arach.*, : 255.

Type-species : *Oxyopes heterophthalmus* Latreille

Distribution : Cosmopolitan.

Key to the species of the genus Oxyopes
Latreille

1. Abdomen provided with irregular darty white and deep brown hair*sikkimensis*
Abdomen not provided with irregular darty white and deep brown hair 2
2. Lower side of the femora of all legs provided with only one longitudinal black line
.....*shweta*
3. Lower side of the femora of all legs not provided with one longitudinal black line
.....*sunandae*

12. *Oxyopes sikkimensis* Tikader

1970. *Oxyopes sikkimensis* Tikader, *Rec. zool. Surv. India*, **64** (1-4) : 76.

Specimen examined : 2 F, Sinhahigla forest rest house, Dist. South Tripura, India, 14.x.1990, coll. S. Ahmed; 1 F, Amarpur, Dist. South Tripura, India, 5.iii.1991, coll. G. K. Srivastava.

Distribution : India : Tripura (Dist. South Tripura), (New record); Sikkim; West Bengal.

13. *Oxyopes shweta* Tikader

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

1992. *Oxyopes shweta* : Biswas & Biswas, *Fauna of West Bengal*, Part-III, Araneae Spiders : State Fauna Series No. 3 : 434.

Specimen examined : 2 F, Raibaso village, Ambassa, Dist. North-Tripura, India, 18.xii.1991, coll. S. Ahmed; 2 F, Sipahijala, Dist. South Tripura, India, 24.iii.1991, coll. G. K. Srivastava; 1 F, Khowae, Dist. West Tripura, India, 4.iii.1991, coll. G. K. Srivastava; 1 F, Solema, Dist. North-Tripura, India, 28.iii.1991, coll. G. K. Srivastava; 1 F, Kamalsagar, Dist. West Tripura, India, 12.v.1992, coll. S. Chakraborty.

Distribution : India : Tripura (Dists. North Tripura, South-Tripura, West-Tripura), (New record); West Bengal; West Sikkim.

14. *Oxyopes sunandae* Tikader

1970. *Oxyopes sunandae* Tikader, *Rec. zool. Surv. India*, **64** (1-4) : 74.

Specimen examined : 2 F, Pulinpur, Dist. West Tripura, India, 10.v.1992, coll. S. Chakraborty.

Distribution : India : Tripura (Dist. West Tripura), (New record); West Sikkim.

3. Family : LYCOSIDAE

1833. *Lycosidae* Sundevall, *Conspectus Arachnidum*, : 1-39.

1970. *Lycosidae* : Tikader, *Rec. zool. Surv. India*, **64** (1-4) : 62-69.

Type-genus : *Lycosa* Latreille

Distribution : Cosmopolitan.

Key to the genera of the family LYCOSIDAE
Sundevall

1. Head at the top is wider than at clypeus and the metatarsi IV usually longer than tibia plus patella IV together.....*Pardosa*
Head at the top is narrower than at clypeus and metatarsi IV, shorter than tibia plus patella IV together 2
2. Anterior row of eyes straight or slightly procurved; sternum provided with black mid-longitudinal band.....*Hippasa*
Anterior row of eyes not straight, slightly recurved; sternum not provided with black mid-longitudinal band 3
3. Third pair of legs longer than the first pair, anterior spinnerets longer than the posterior spinnerets.....*Ocyale*
Third pair of legs not longer than the first pair of legs; anterior spinnerets not longer than the posterior spinnerets.....*Lycosa*

Genus 8. *Pardosa* Koch

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

1951. *Pardosa* : Sinha, *Rec. Indian Mus.*, **48** (2) : 45.

Type-species : *Pardosa striatipes* Koch

Distribution : Asia, America, Europe.

Key to the species of the genus Pardosa Koch

1. Cephalothorax dorsally provided with median longitudinal broad pale band; maxillae with conspicuous scopulae*sumatrana*
Cephalothorax not provided with dorsally median longitudinal broad pale band; maxillae without conspicuous scopulae 2
2. Abdomen not provided with ventrally two lateral irregular brown patches on the side of the spinnerets*sutherlandi*
Abdomen ventrally provided with two lateral irregular brown patches on the side of the spinnerets*heterophthalmus*

15. *Pardosa sumatrana* (Thorell)

1890. *Lycosa sumatrana* Thorell, *Ann. Mus. Stor. nat. Genova*, **30** : 136.
1980. *Pardosa sumatrana* : Tikader & Malhotra, *Fauna of India, Spiders : Araneae*, **1** (2) : 353.

Specimen examined : 2 F, Kotitila, Teliamura, Dist. West Tripura, India, 16.xii.1991, coll. S. Ahmed; 1 F, Ambasa, Dist. North Tripura, India, 2.iii.1991, coll. G. K. Srivastava.

Distribution : India : Tripura (Dists. North Tripura, West Tripura); Maharashtra; Bihar; Himachal Pradesh; West Bengal; Meghalaya; Rajasthan; Gujarat; Madhya Pradesh; Arunachal Pradesh; Bangladesh, Sumatra, Sri Lanka.

16. *Pardosa sutherlandi* (Gravely)

1924. *Lycosa sutherlandi* Gravely, *Rec. Indian Mus.*, **26** : 606.
1980. *Pardosa sutherlandi* : Tikader & Malhotra, *Fauna of India, Spiders : Araneae*, **1** (2) : 347.

Specimen examined : 1 F, Kanjbam, Dist. Agartola, Tripura, India, 19.ii.1991, coll. G. K. Srivastava.

Distribution : India : Tripura (Dist. Agartola), (New record); West Bengal.

17. *Pardosa heterophthalmus* (Simon)

1898. *Acroniops heterophthalmus* Simon, *Hist. nat. des. Araignees*, **2** : 362.
1980. *Pardosa heterophthalmus* : Tikader & Malhotra, *Fauna of India, Spiders : Araneae*, **1** (2) : 345.

Specimen examined : 1 F, Kamalachera, Dulubari, Dist. North Tripura, India, 15.iii.1992, coll. T. Roy & party.

Distribution : India : Tripura (Dist. North Tripura), (New record); Tamil Nadu; Java (Type-locality).

Genus 9. *Hippasa* Simon

1885. *Hippasa* Simon, *Bull. Soc. Zool. Fr.*, **10** : 31.
1951. *Hippasa* : Sinha *Rec. Indian Mus.*, **48** (2) : 11.

Type-species : *Hippasa agelenoides* (Simon).

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

18. *Hippasa holmerae* Thorell

1895. *Hippasa holmerae* Thorell, *Spider of Burma* : 218.
1951. *Hippasa holmerae* : Sinha, *Rec. Indian Mus.*, **48** (2) : 17.

Specimen examined : 1 F, Kamalachera, Dulubari, Dist. North Tripura, India, 15.iii.1992, coll. T. Roy & party.

Diagnosis : Cephalothorax longer than wide, convex. Anterior row slightly procurved and equal sized. Posterior row equal size and provided with black patches. Labium wider than long. Legs long and thin; the IV leg exceptionally longer. Abdomen longer than wide, dorsum decorated with greenish brown and white spots.

Distribution : India : Tripura (Dist. North Tripura), (New record); West Bengal; Manipur; Uttar Pradesh; Burma, Singapore.

Genus 10. *Ocyale* Audouin

1825. *Ocyale* Audouin, in Savigny's '*Description de l' Egypte Arachides*' Paris, **1** : 150.
1951. *Ocyale* : Sinha, *Rec. Indian Mus.*, **48** (2) : 18.

Type-species : *Ocyale atalanta* Audouin

Distribution : India; Egypt; Ethiopia; Sri Lanka; Burma, Senegal, Guinea, Congo, Europe.

19. *Ocyale atalanta* Audouin

1825. *Ocyale atalanta* Audouin, in Savigny's 'Description de l'Egypte Arachnides', Paris, 1 : 150.

1980. *Ocyale atalanta* : Tikader & Malhotra, *Fauna of India, Spiders : Araneae* 1 (2) : 364.

Specimen examined : 1 F, Raibasa village, Ambasa, Dist. North Tripura, India, 18.xii.1991, coll. S. Ahmed.

Diagnosis : Cephalothorax longer than wide, centre with prominent fovea; thoracic region provided with thin bands radiating laterally from fovea. Anterior row slightly recurved and slightly wider than second row, anterior medians larger than the anterior laterals. Bases of the posterior eyes provided with conspicuous black patches. Labium slightly longer than wide. Maxillae very much wider at the distal end. Chelicerae strong, inner margin with three prominent teeth. Legs long and strong. Abdomen oval jointed behind, dorsally provided with irregular brown and yellow patches.

Distribution : India : Tripura (Dist. North Tripura), (New record); Bihar; Orissa; Africa, Burma, Sri Lanka.

Genus 11. *Lycosa* Latreille

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

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

Type-species : *Lycosa tarantula* Rossi

Distribution : All over the world.

20. *Lycosa nigrotibialis* Simon

1884. *Lycosa nigrotibialis* Simon, *Ann. Mus. Stor. Nat. Genova*, 20 : 330.

1980. *Lycosa nigrotibialis* : Tikader & Malhotra, *Fauna of India, Spiders : Araneae*, 1 (2) : 405.

Specimen examined : 1 F, Sephaijala, Dist. South Tripura, India, 14.vi.1990, coll. G. N. Saha.

Diagnosis : Cephalothorax longer than wide and convex, provided with some dark patches, centre provided with a distinct fovea. Anterior row of eyes slightly shorter than second row, almost straight, second row larger than others. Bases of posterior row of eyes provided with conspicuous black patches. Labium longer than wide. Maxillae broader in front. Chelicerae strong, inner margin provided with three teeth. Legs long and strong. Abdomen longer than wide, oval, broader behind the middle. Anterior distal side provided with longitudinal dark patches.

Distribution : India : Tripura (Dist. South Tripura), (New record); Assam; Bihar; Himachal Pradesh; Gujarat; Maharashtra; Sikkim; West Bengal; Afganistan, Burma, Pakistan.

4. Family : SALTICIDAE

1841. *Salticidae* Blackwall, *Trans. Linn. Soc., London*, 18 : 616.

1967. *Salticidae* : Tikader, *Sci & Cult.*, 5 : 262.

Type-genus : *Salticus* Latreille

Distribution : Asia, Africa, America and Europe.

Key to the genera of the family SALTICIDAE Blackwall

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

Cephalothorax rectangular in shape and pointed behind *Phidippus*

Genus 12. *Marpissa* Koch

1846. *Marpissa* Koch, *Die. Arachn.*, 13 : 56.

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

Type-species : *Marpissa muscosa* Clerck

Distribution : Cosmopolitan.

Key to the species of the genus *Marpissa* Koch

1. Dorsum of the abdomen provided with deep brown transverse band *ludhianaensis*

Dorsum of the abdomen not provided with deep brown transverse band*dhakuriensis*

21. *Marpissa ludhianaensis* Tikader

1974. *Marpissa ludhianaensis* Tikader, *Proc. Indian Acad. Sci.*, **79** (5) : 205.

Specimen examined : 2 F, Baxanagar, Dist. South Tripura, India, 17.x.1990, coll. G. N. Saha & party.

Distribution : India : Tripura (Dist. South Tripura), (New record); Punjab.

22. *Marpissa dhakuriensis* Tikader

1974. *Marpissa dhakuriensis* Tikader, *Proc. Indian Acad. Sci.*, **79** (5) : 207.

Specimen examined : 1 F, Sinhaigla rest house, Dist. South Tripura, India, 15.x.1990, Coll. S. Ahmed.

Distribution : India : Tripura (Dist. South Tripura), (New record); West Bengal.

Genus 13. *Phidippus* Koch

1846. *Phidippus* Koch, *Die. Arachn.*, **13** : 125.

1949. *Phidippus* : Comstock, *The Spider Book* : 688.

Type-species : *Phidippus variegatus* (Lucas)

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

23. *Phidippus punjabensis* Tikader

1974. *Phidippus punjabensis* Tikader, *Proc. Indian Acad. Sci.*, **79** (3) : 121.

Specimen examined : 1 F, Pulikhal, Dist. South Tripura, India, 29.xii.1991, coll. M. Dutta.

Diagnosis : Cephalothorax longer than wide, high in front, posterior and lateral sides very sloping. Eyes comparatively small according to the size of the spider. Chelicerae with one small tooth on inner and two small teeth on the outer margin. Abdomen longer than wide and pointed behind, clothed with fine and coarse hair. Dorsum provided with a black ornamented patch.

Distribution : India : Tripura (Dist. South Tripura), (New record); Punjab.

5. Family : HETEROPODIDAE

1873. *Heteropodidae* Thorell, *Nova Act. Reg. Soc. set. d'. Upsaliae*, **7**(3) : 606.

1951. *Heteropodidae* : Bonet, *Biblic. Araneorum*, **2** (3) : 2202.

Type-genus : *Heteropoda* Latreille.

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

Genus 14. *Heteropoda* Latreille

1804. *Heteropoda* Latreille, *Nouv. Dict. d' hist. nat.*, **24** : 135.

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

Type-species : *Heteropoda venatoria* Linn.

Diagnosis : Carapace nearly as long as wide; cephalic parts slightly depressed in front. Posterior row of eyes recurved. Anterior row of eyes slightly procurved or straight; anterior laterals longer than medians. Maxillae plain not crested. Epigynum provided with a pair of lobes.

Distribution : From India eastward to Australia.

Key to the species of the genus *Heteropoda* Latreille

1. Abdomen provided with three pairs of sigilla and mid-longitudinal yellow streak up to middle from the anterior end on the dorsum*leprosa*
Abdomen not provided with three pairs of sigilla and mid-longitudinal yellow streak up to middle from the anterior end on the dorsum 2
2. Epigynum provided with a horizontal plate over the anterior end of the lateral lobes; labium with no lateral notch*sikkimensis*
Epigynum not provided with a horizontal plate over the anterior end of the lateral lobes; labium provided with lateral notch on each side*venatoria*

24. *Heteropoda leprosa* Simon

1884. *Heteropoda leprosa* Simon, *Ann. Mus. Genova*, **30** : 144.

1988. *Heteropoda*, : Sethi & Tikader, *Rec. zool. Surv. India*, occ. pap. No. 93 : 20.

Specimen examined : 1 F, Boxanagar, Dist. South Tripura, India, 15.vi.1990, coll. G. N. Saha.

Distribution : India : Tripura (Dist. South Tripura), (New record); Assam; Nicobar Island; Sikkim; Tamil Nadu; Uttar Pradesh; West Bengal; Burma.

25. *Heteropoda sikkimensis* Gravely

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

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

Specimen examined : 1 F, Sephaijala, Dist. South Tripura, India, 14.vi.1990, coll. G. N. Saha.

Distribution : India : Tripura (Dist. South Tripura), (New record); Meghalaya; Sikkim; West Bengal.

26. *Heteropoda venatoria* (Linnaeus)

1766. *Araneae venatoria* Linnaeus, *Syst. Nat.*, **12** : 1035.

1988. *Heteropoda venatoria* : Sethi & Tikader, *Rec. zool. Surv. India*, occ. pap. No. 93 : 16.

Specimen examined : 1 F, Sinhahigla rest house, Dist. South Tripura, India, 15.x.1990, coll. S. Ahmed.

Distribution : India : Tripura (Dist. South Tripura), (New record); Bihar, Tamil Nadu; West Bengal and almost all over the India.

6. Family : TETRAGNATHIDAE

1866. *Tetragnathidae* Menge, *Schr. naturj. Ges. Danzig*, **1** : 1-152.

1953. *Tetragnathidae* : Locket & Millidge, *British Spider, Ray Society*, **2** : 94.

Type-genus : *Tetragnatha* Latreille

Distribution : Tropical countries of the world.

Genus 15. *Tetragnatha* Latreille

1804. *Tetragnatha* Latreille, *Nouv. Dict. d'hist. nat.*, **24** : 135.

1953. *Tetragnatha* : Locket & Millidge, *British Spider, Ray Soc.*, **2** : 94.

Type-species : *Tetragnatha extensa* Linn.

Diagnosis : Cephalothorax longer than wide. Both the lateral eyes nearly contiguous. Chelicerae very long. Abdomen long and narrow bearing the spinnerets near its end.

Distribution : Tropical-countries of the world.

27. *Tetragnatha andamanensis* Tikader

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

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

Specimen examined : 1 M, Halahali, Dist. North Tripura, India, 24.xii.1991, coll. S. Ahmed.

Diagnosis : Cephalothorax longer than wide, narrowing in cephalic region; flat, cephalic slightly high, centre of the cephalothorax depressed. Eyes in two rows, anterior row more than the posterior row. Chelicerae nearly as long as carapace and divaricate. Fang slender and narrowed. Abdomen long, nearly parallel sided. Spinnerets nearly to the posterior end of the abdomen. Borsum decorated with minute silvery white dots.

Distribution : India : Tripura (Dist. North Tripura), (New record). Andaman Islands; West Bengal.

SUMMARY

This faunistic work summerizes the two years (1988-1990) of the families : Araneidae, Oxyopidae, Lycosidae, Salticidae, Heteropodae, Tetragnathidae. The materials provided this work usually collected from the different districts of Tripura : North Tripura, South Tripura, West Tripura and Agartola.

During the course of studies 100 specimens of these families were examined and identified. Altogether 27 species 15 genera under 6 families were treated here. Among these, 26 species 15 genera under 6 families are recorded here for the first time from Tripura.

The synonymes, distributional records both in India and abroad, ecological observation are given as far as possible for each species. All the references cited in the text are listed in the bibliography which is arranged authorwise and chronologically.

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INSECTA : APTERYGOTA : THYSANURA

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INTRODUCTION

The order Thysanura comprises "bristle tails", popularly known as "Silver fish, belonging to sub-class Apterygota. There are two sub-orders, viz., Microcoryphia and Zygentoma. Two families, Machilidae and Meinertellidae can be recognised under Microcoryphia while, Zygentoma has four families viz., Lepidotrichidae, Nicoletiidae, Lepismatidae and Ateluridae. They are found in the forest floor, under bark of trees, under rocks, in the nest of ants and termites. Some species often cause damage to books and other household articles.

The Indian fauna of Thysanura has attracted little attention except for some stray contributions from the workers like Escherich (1903, 1905), Silvestri (1913, 1938, 1948), Wygodzinsky (1954, 1972) and Hazra (1980). Mendes (1990) has pointed out that these insects being cryptia in habit, special efforts are needed for their collection. From India, 31 species under 21 genera involving 5 families under 2 sub orders have been recorded so far. Present communication is based on a small collection, available in the National Zoological Collection of the Zoological Survey of India from Tripura.

Key to families of ZYGENTOMA

1. Eyes present LEPISMATIDAE
- Eyes and ocelli absent.....
- NICOLETIIDAE

FAMILY-LEPISMATIDAE

Key to the genera of *Lepismatidae*

1. Last tergum not sharply pointed with 1 + 1 bristle combs *Ctenolepisma* Esch.

Last tergum sharply pointed with more than 1 + 1 bristle combs *Acrotelsa* Esch.

Genus *Ctenolepisma* Escherich, 1905

Key to the species

1. Several abdominal terga with 3 + 3 bristle combs; maximum length not more than 8 mm. 2
Abdominal terga with II-VI, with 3 + 3 bristle combs; maximum length 13-15 mm. *Ctenolepisma longicaudata* Esch.
- 2 Abdominal terga II-V with 3 + 3 bristle combs, maximum length 8 mm; last tergum with 1 + 1 bristle combs.....
..... *Ctenolepisma tripurensis* n. sp.
Maximum length 6 mm; last tergum without any bristle comb..... *C. nigra* (Oudm.)

1. *Ctenolepisma longicaudata* Escherich, 1905

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

1940. *Ctenolepisma urbana* Slabaugh. *Ent. News.*, 51 : 95.

1993. *Ctenolepisma longicaudata*, Hazra, *Rec. zool. Surv. India*, (4) : 3.

Material examined : 1 ♀ INDIA : Tripura, Teliamura, Z. S. I., Lot. No. 99/71, 2. xi. 1971, Coll. V. C. Agarwal.

Diagnosis : Body long, the thorax is very little broader than the abdomen, gradually tapering with silvery metallic lusture; 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 base; posteriorly last abdominal tergum distinctly truncate; long stylets are present on sternum VIII-IX; ovipositor long and slender.

Geographical distribution : *INDIA* : Tripura (Teliamura), West Bengal, Uttar Pradesh, Manipur, *Elsewhere* : U. S. A., *SOUTH AFRICA*, *AUSTRALIA*.

Remarks : This species is widely distributed in the tropics and sub-tropics of Old and New world. Further surveys may prove it to be widely distributed in India. This species is very common in houses and libraries and is a very serious house hold pest.

2. *Ctenolepisma tripurensis* sp. nov.

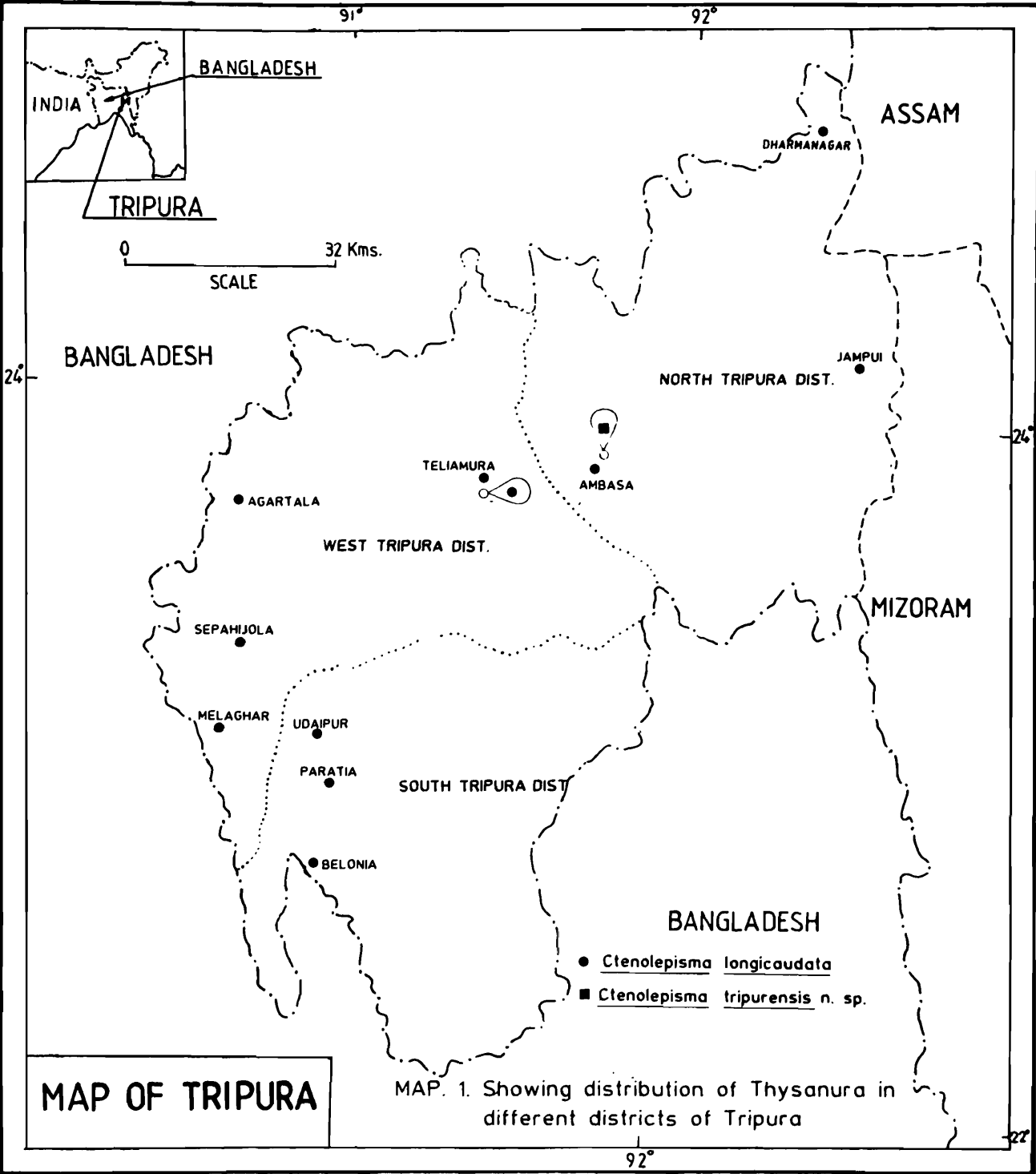
Male and Female : Maximum length : 8mm (M) and 7mm(F) ; colour (in spirit) dorsally pale yellow with a dense covering of reddish brown scales, ventrally yellowish white; shape of the body elongate, more or less parallel sided, dorsoventrally compressed anteriorly, sub-cylindrical posteriorly; thorax very slightly wider than abdomen; dorsally with darker scales, darker in the lateral region and ventrally light yellow; body with faintly violaceous pigment distinct on sides and apical border of scapus of antennae, on second and third segments of maxillary palp ; faint spot on the labial palp and tibiae violaceous entirely, first tarsal segment, apex and lateral margin of femur, lateral margin of the head, VIII and IX stylets with violet pigment all along their length; head semicircular in outline anteriorly, fused with thorax and bearing anteriorly two very conspicuous tufts of stout cephalic setae, pectinate and radially arranged; chaetotaxy of head as in fig. 1, eyes relatively small, located well behind from the origin of the antennae; antennae as usual for the genus, shorter than the body length; mandible normal, strongly chitinized, the outer surface is covered over its proximal

half with numerous long stout, pectinate setae; maxillary palp (Fig. 4) slender, having two terminal segments shorter than the third segment, first segment the shortest, the setae on the palp are simple and spirally arranged on the third segment, being more numerous than the two preceding segments, basal segment with a single row of setae, the second with two rows; apical segment of the labial palp (Fig 2 & 3) distinctly broader, sub-globular in shape bearing five sensory papillae arranged in a single row, palp is densely clothed with short, simple and spinous setae; the cervix distinct; posterior margin of each thoracic segment with a few short and long simple setae; prosternum (Fig. 7) subtriangular, not narrowing posteriorly lateral border of each segment with 5 + 5 bristle combs each composed of 2-5 macrochaetae, posterior comb longer than the anterior; mesosternum (Fig. 8) longer, sub-triangular, more wider than posternum, with two rows of setae on each side consisting of 2-7 setae; metasternum (Fig. 9) wider and round apically and bears 1 + 1 bristle combs on each side of the apex, composed of 7 setae.

The legs stout, femur short, one stout seta each on its outer and inner margins distally near the junction with tibia, tibia and tarsus moderately elongate, tarsus with slightly curved claws.

Abdomen parallel sided, slightly tapering from the VIII segment to X; scales more abundant on abdominal segments than thorax; first few abdominal sternites with straight posterior edges, each with 1 + 1 lateral bristle comb, each composed of 10 setae arranged in a semicircular whorl; median bristle combs on sternites absent.

Tergum I with 1 + 1 bristle comb, II-V each with 3 + 3 bristle combs, comprising median comb with 2, sub-median with 3 and lateral with 4 setae, tergum VI-VIII with 2 + 2 bristle combs, median with 2 and lateral with 5, terga IX devoid of any bristle comb; tergum X (Fig. 12) short, more truncated angular portion round, posterior margin with 1 + 1 prominent bristle combs, each composed of 4 setae; stylets occur only on VIII and IX sternites; coxite IX long, triangular, narrow



Map 1 : Showing Distribution of Thysanura in different districts of Tripura

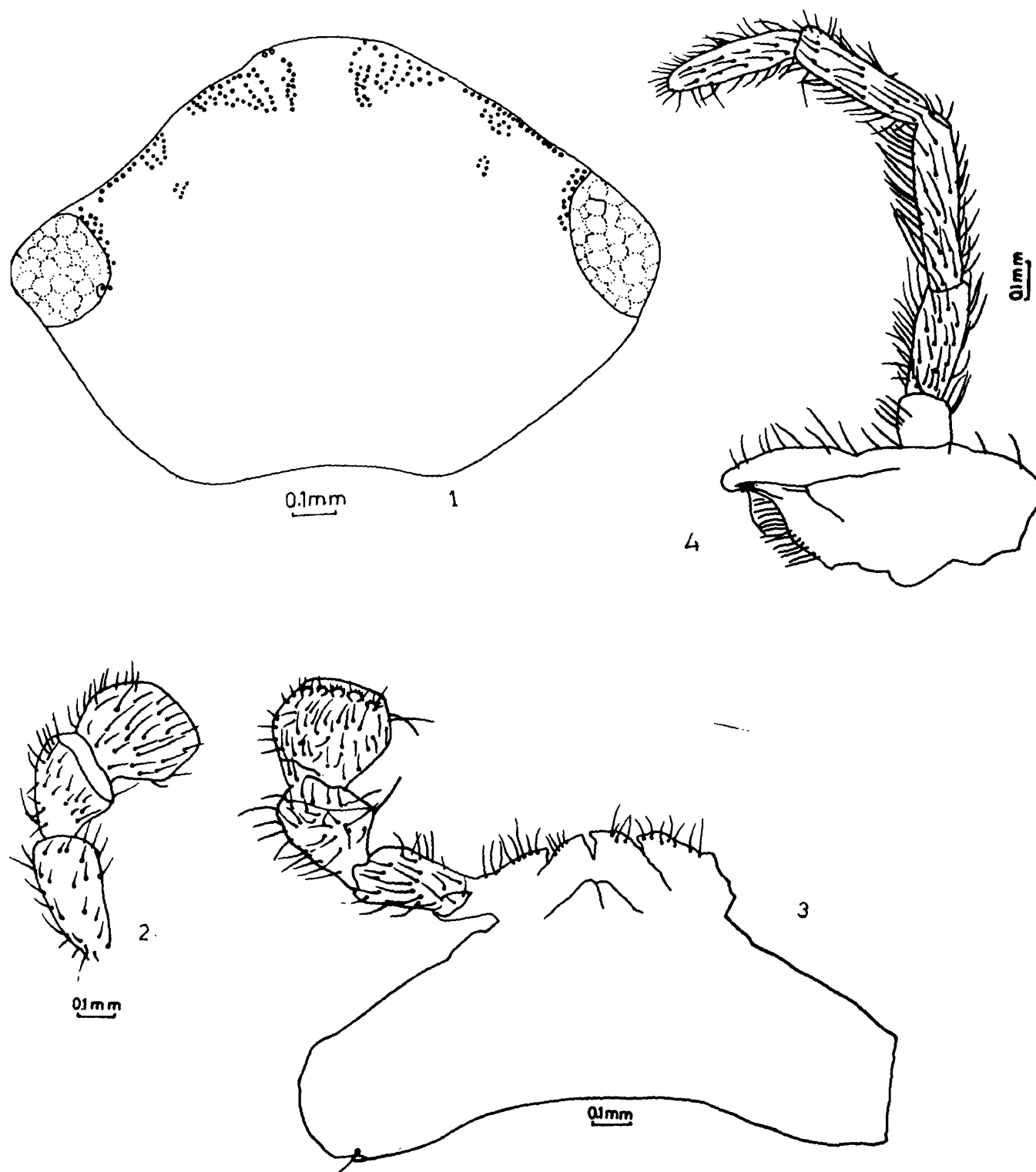


Fig. 1-4 : Showing head and mouth parts of *Ctenolepisma tripurensis* n. sp.

1. Dorsal view of head capsule with fields of macrochaetae ; 2. Dorsal view of labial palp ; 3. Ventral view of labial palp showing the arrangement of sensory papillae ; 4. Dorsal view of maxillary palp.

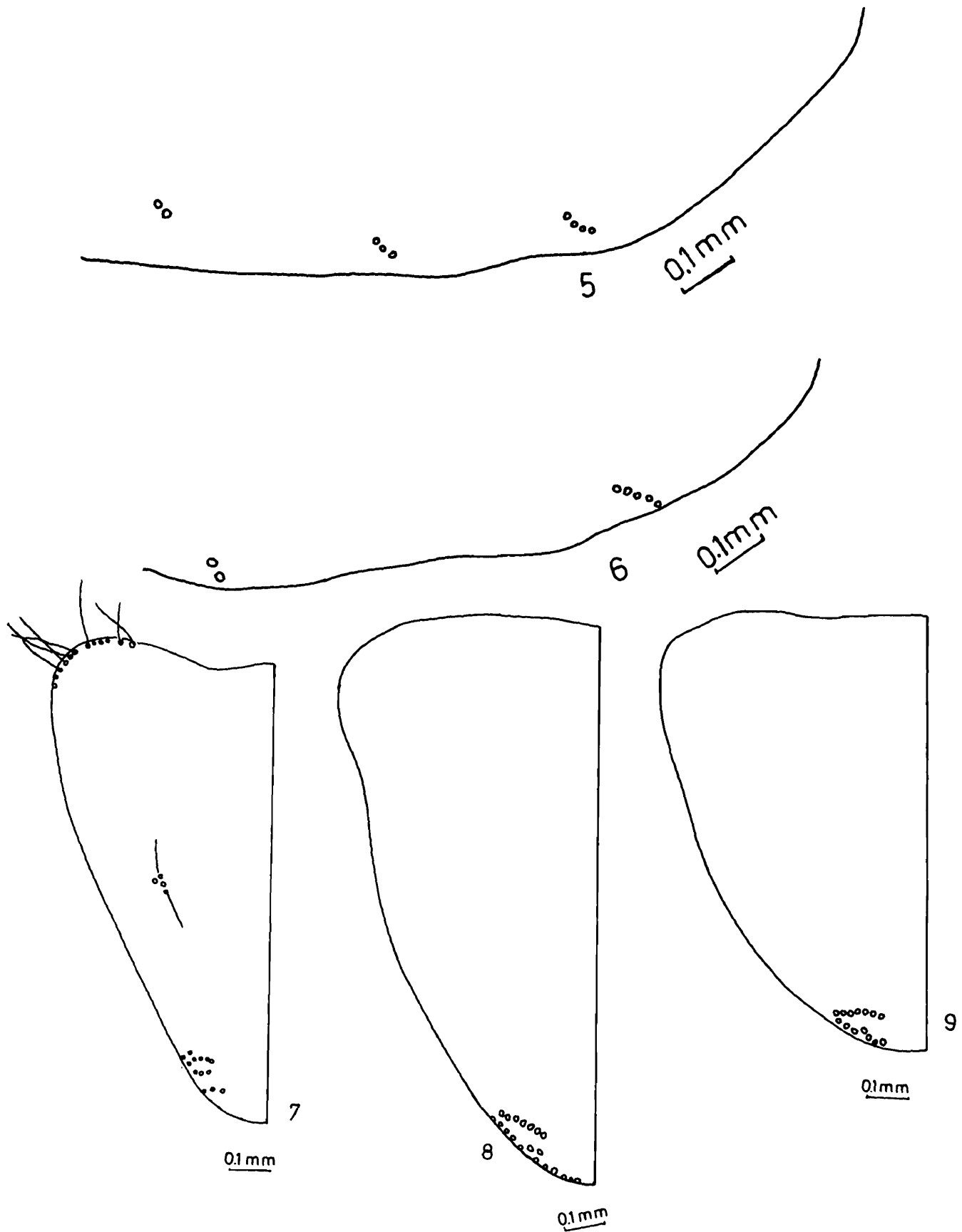


Fig. 5 : Abdominal tergum V showing arrangement of bristle comb of *C. tripurensis*.

Fig. 6 : Abdominal tergum VI showing arrangement of bristle comb of *C. tripurensis*.

Fig. 7-9 : Abdominal sternum with arrangement of bristle comb of *C. tripurensis*. 7. Prosternum ; 8. Mesosternum ; 9. Metasternum.

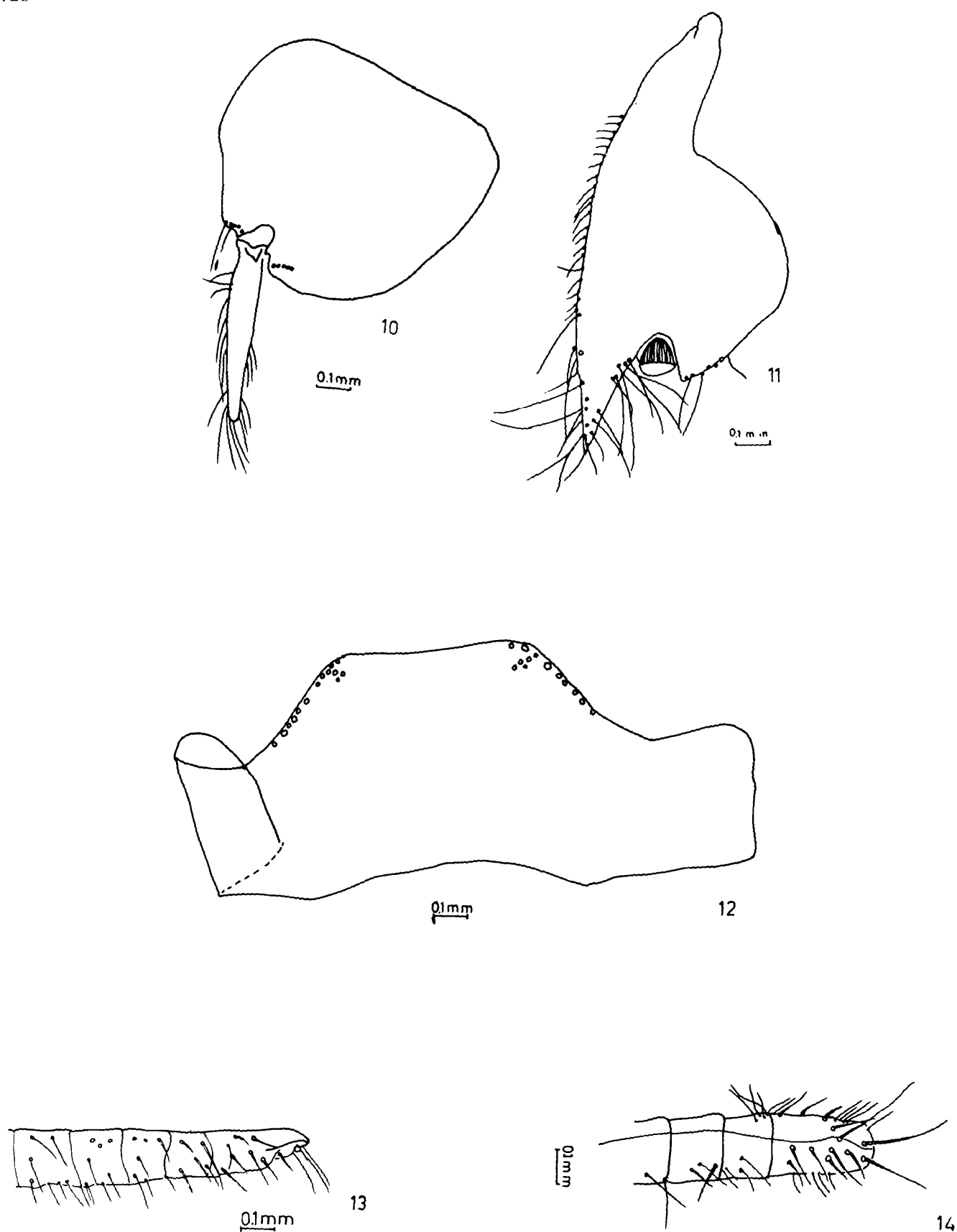


Fig. 10-11 : Dorsal view of coxite of *C. tripurensis*. 10. Coxite VIII with stylets ; 11. Coxite IX.

Fig. 12 : Dorsal view of X. tergum showing arrangement of bristle comb of *C. tripurensis*.

Fig. 13-14 : Apex of gonapophysis of *C. tripurensis*. 13. Apex of anterior gonapophysis ; 14. Apex of posterior gonapophysis.

and pointed at the tip, coxite VIII round (Fig. 10); ovipositor elongate and longer than the extended process of the coxite IX, both dorsal and ventral valves carry fine bristles only; apex of anterior gonapophyses (Fig. 13) with 3-4 long setae and posterior gonapophyses (Fig. 14) with 3 such setae and numerous short spine-like setae, ovipositor without any trace of fossorial spines.

Geographical distribution : INDIA : Tripura

Type-locality : India : Tripura, Ambasa Forest (South), Stn. 18, 17. xi. 1974, Z. S. I. Lot No. 14/75, Coll. M. S. Shishodia, 11 exs.

Type specimens : Holotype, ♀ in alcohol and allotype (♂) in alcohol; paratypes, in alcohol and on slides, deposited in the National Zoological Collection, Zoological Survey of India, Calcutta.

Comparisons : This species is close to

Ctenolepisma nigra (oudm.). However, it may be readily distinguished from the later by the presence of more truncated tenth tergite with 1 + 1 distinct bristle combs, composed of 3-4 macrochaetae (cf., *nigra*, without any bristle comb) and also in the shape of the labial palp and arrangement of the sensory papillae. The anterior outer margin of the labial palp is semicircular in shape in *C. nigra* (cf., almost straight in the present species (Fig. 2). The sensory papillae of *C. nigra* is compact and arranged in a straight line but in the new species the sensory papillae are sparse and not arranged in a straight line (Fig. 3).

ACKNOWLEDGEMENT

We express our sincere thanks to Dr. J. R. B. Alfred, Director, Zoological Survey of India for providing laboratory facilities.

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INSECTA : EPHEMEROPTERA

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INTRODUCTION

Ephemeroptera are popularly known as mayflies. These insects are amphibiotic in their life cycle. Immature stages from oviposition to different stages of developing larvae are aquatic, while adults are winged form and are of conspicuously short duration. These insects play significant role in food-chain, fish-food, model for fish bait and also as bioindicator of water quality.

These are soft bodied, minute to medium sized (2-25 mm) insects, with minute setaceous antennae, atrophied mouth parts, two pairs of wings, a long filamentous cerci and usually with a median caudal filament. Larvae are aquatic, spindle shaped or broad bodied and with number of tracheal gills. These insects are relatively less conspicuous, specially in their adult stage because of very short span of life.

The order is known to be represented in India by 105 species spread over 40 genera and 13 families vis-a-vis a little over 2000 species world over under 155 genera and 22 families. Major component of Indian Ephemeroptera are represented under families Baetidae (40 species), Heptageniidae (15 species) Ephemeridae (15 species), Leptophlebiidae (13 species). Thus these 4 families together constitute a little more than 4/5 (or 83 : 22) of whole Indian Ephemeroptera. Ephemeroptera fauna of Tripura is represented by 5 species under 4 genera and 2 families; leaving there by further scope of additional species for the state.

HISTORICAL BACKGROUND

Perusal of literature reveals that hitherto no contributions were made on these insects from Tripura. It is, though, found that 2 mayflies species are recorded from erstwhile Assam in general and record of 5 species, 4 genera and 2 families viz., Ephemeridae and Heptageniidae, Hubbard and Peters (1978) and Srivastava (1995). Mayfly species recorded from Assam, *Anagenesia lata* (Walker) and *Anagenesia robusta* (Eaton) both representing family Palingeniidae. Same is true on wider Indian scenario as well, which can be attributed mainly due to very short adult lifespan and less developed taxonomy of larvae of these insects. Among neighbouring Meghalaya (also part of erstwhile Assam) mayfly component are known due to Chopra (1927) and Kimmins (1937). Chopra (1927) described a new species of Ephemeridae viz., *Ephemerella annandalei*. Later on a new genus was established by Kimmins namely *Cinygmula* (Heptageniidae) to accommodate a new species as its genotype viz., *C. assamensis* Kimmins. 3 other new species were also established by Kimmins (1937) of Heptageniidae. One of these was under genus *Heptagenia* Walsch, namely *H. nubilia* Kimmins; while other 2 new species were under genus *Ecdyonurus* Eaton. viz., *E. eatoni* Kimmins and *E. subfuscus* Kimmins. Subsequently Hubbard (1974) changed the last named species to *indicus*, as *subfuscus* was preoccupied thus was established *E. subfuscus* (= *E. indicus* Hubbard). Besides record of 5 species from Meghalaya under 4 genera and 2 families by Srivastava (1995).

SYSTEMATIC ACCOUNT

Ephemeroptera fauna of Tripura is known only by 5 species, 4 genera and 4 family viz., Baetidae, Ephemeridae, Heptageniidae and Palingeniidae (refer distribution map). A brief mention is made of saliant morphological features, with special reference to taxonomic importance. A note on collection preservation and study techniques are also provided, along-with comprehensive list of technical terms used, key and synonymy, diagnostic feature, discussion and distribution. Same was felt necessary before dealing systematic account.

GENERAL MORPHOLOGY

(Figs. 1 & 2)

Imago (adult) and sub-imagos are small to medium size (Tripura component are in range of 6-15 mm body length). These are air breathing, soft bodied insects with small setaceous antennae. Mesothorax much larger than Pro- and Metathorax. Wings paired, membraneous, fragile with network of longitudinal, and cross veins in between. Legs are long, prothoracic leg in some instance longer than body. Abdomen 11 segmented, last reduced and fused with X. Epiproct is tergal part of XI, truncate at posterior margin, which is called supra-anal plate or pygidium. On it is based the stump of median caudal filament; the tail or 'telofilum' Paraprocts are lateral portions of vestigial 11 segment and support two lateral tails or cerci. Male genitalia is comprised of forceps and penes; former is 4 segmented. Penes are bilobed, lobes separated or jointed. Tip of each lobe may have titillators, which are proleged sclerites and may be pointed or hooked.

COLLECTION PRESERVATION AND STUDY TECHNIQUE

Mayflies adult (imago) and subimago are very short lived. These are though winged form but are not good fliers, hence remain normally very much in the vicinity of water bodies to which they are associated in their immature stages.

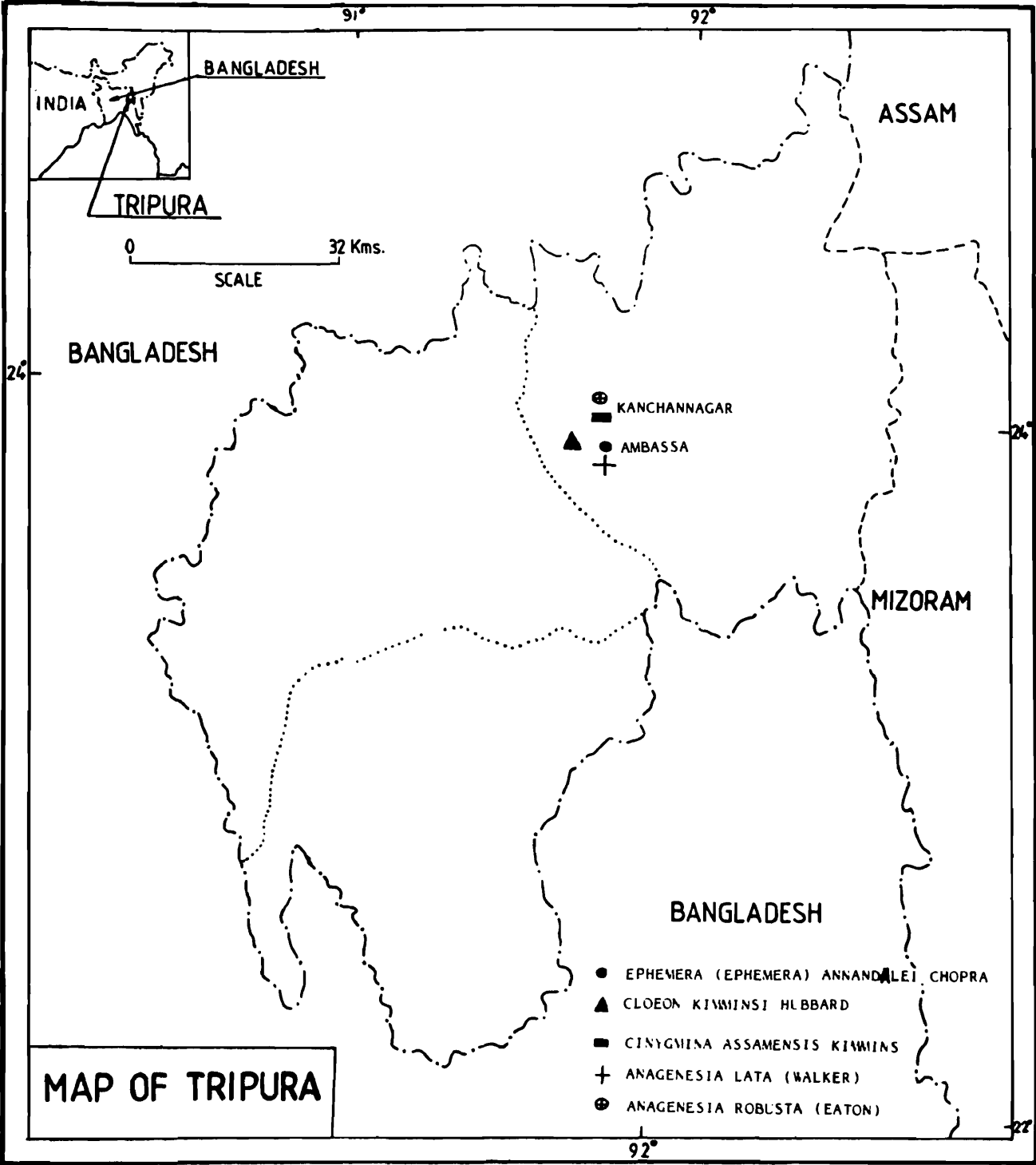
Imago/subimago normally remain sitting/resting amongsts vegetation; mostly on the underside of leaves. These can be collected by hand picking using forcep, soft brush or even with delicate hold of thumb and forefinger. Imagos are also collected on their flight the evening (dusk) and also can be picked up when occasionally get attracted to light source.

Imago and adult are best preserved in 70% alcohol; which enables their study eaiser, even after long duration of preservation. Wings tend to crumple or folded. A set of dry preserved specimens are also useful for studying wing ventation. In both cases mentioned above, wing venation (specially smaller sized), antennae, cerci and genitalia are best studied on slide mounts. Pigmentation can be examined in reflected light; hypodermaly lodged pigments in wet and cuticular pigments in dry preserved specimens are best observed.

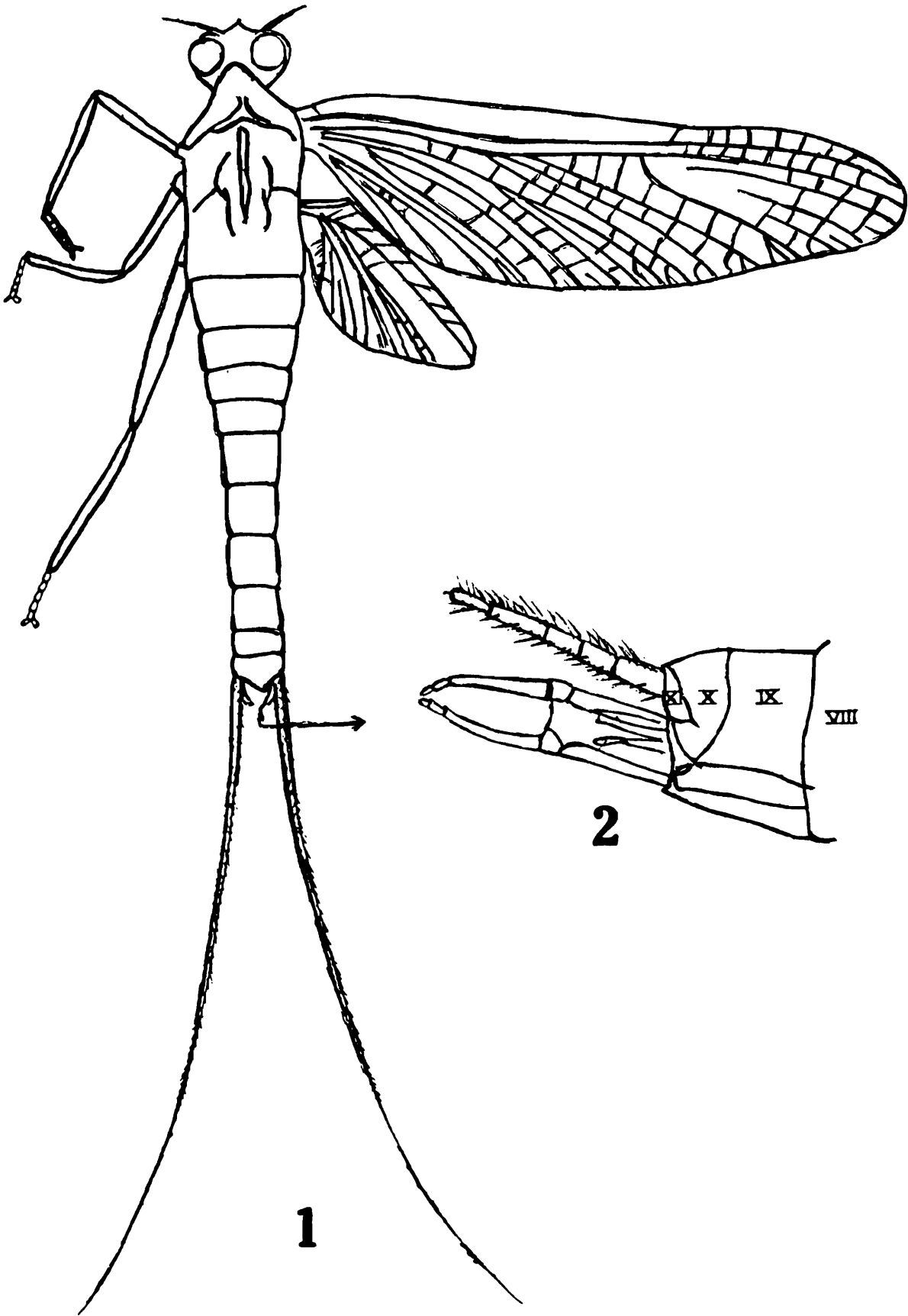
TERMS AND EXPLANATION USED IN KEY AND TEXT

A list of technical terms used in key and or text are indicated below, alongwith their explanations. Same are arranged alphabetically :

<i>Name of term</i>	<i>Explanation</i>
Annulated	With annules (ring) like external markings without corresponding internal septa/ wall.
Bistre	Pigment of warm brown colour.
Bulf	Light yellow colour.
Bulla	A weak spot on principal vein midway their length, increases flexibility of wing tip.
Chesnut pigment	Light brown.
Costal space	Space between costa and subcosta.
Cross vein	Veins running across longitudinal veins.



Map 1 : Distribution map of Ephemeroptera in Tripura.



Figs. 1 & 2 : Generalized diagram of imago of a Ephemeroptera, with wings of right side and legs of left side and enlarged genital forceps.

<i>Name of term</i>	<i>Explanation</i>
Cubitoanal area	Lower basal portion of wing where anal and cubital veins are present.
Emarginate	Inward cleft or dent in the margin.
Endemic	Confined to particular area.
Epiproct	Plate covering anus from above primarily tergite XI, but often regarded as part of tergite X.
Fuscous	Brown.
Paraprocts	A pair of ventral plates of abdomen XI on the sides and below abdomen.
Pygidium	It is term equivalent to epiproct; and is met with in Ephemeroptera and Isoptera.
Sagittate marking	Markings shaped as arrow head.
Stigmatic area	Very slightly chitinezed on apical side of costal space.
Subcostal space	Space between subcostal and radius first vein.
Subimago	A stage of life cycle in mayflies (prior to adult-imago stage) immediately after emergence from last stage aquatic larva.

SYSTEMATIC ACCOUNT OF EPHEMEROPTERA KNOWN FROM TRIPURA

Key to the families Represented

1. Veins M and Cui strongly divergent at base, M₂ strongly bent towards base, outer fork of Rs in hindwing absent, Hind tarsi 4 jointed .
.....Family EPHEMERIDAE
- Veins M and Cui only little or not divergent at base, M₂ almost symmetrical, outer fork of Rs in hind wing present or absent, hind tarsus 3-5 jointed 2
2. Venation greatly reduced, hind wing absent or when present less developed
.....Family BAETIDAE
- Venation rather well developed, hind wing present and well developed 3
3. Cubital intercalaries in two parallel pairs, long and short alternatively Family HEPTAGENIIDAE
- Cubital intercalaries not in two parallel pairs Family PALINENIIDAE

SYSTEMATIC ACCOUNT

Family EPHEMERIDAE

Family Ephemeridae is represented in India by 3 genera viz., *Ephemera* Linnaeus, *Eatonigenia* Ulmer and *Ichthyobotus* Eaton. Of these only former is represented in Tripura. Hence no key is provided for the genera.

Genus *Ephemera* Linnaeus

1758. *Ephemera* Linnaeus. *Syst. Nat.* : 546.
1973. *Ephemera*, Mc Cafferty and Edmunds, *Pan-Pac. Ent.*, 49 : 300.
1978. *Ephemera*, Hubbards and Peters. *Oriental Ins.*, Suppl., 9 : 15.

Remarks : This genus is represented in India by 12 species and second maximum represented; after genus *Baetis* Leach (Baetidae) with 22 species. This genus was recognized with 2 subgenera viz., *Ephemera* Linnaeus and *Aethephemera* McCafferty and Edmunds; only former of these is represented in Tripura, hence no key to the subgenera is provided. The subgenus *Ephemera* is represented in India by 9 species but in Tripura only represented by single species hence no key to the species of the genus is provided.

Members of the genus are characterized by moderate size (10-15 mm), wings dark spotted, eyes of male relatively small separated by distance of at least the diameter of one eye. Cross veins at and below bulla distinctly more; in hind wing M₂ often detached from M₁ at base and directed

downwards toward Cu²; paired cerci, and median cercus all of equal length.

***Ephemera (Ephemera) annandalei* Chopra**

1937. *Ephemera (E.) annandalei* Chopra, in Hafiz, *Rec. Indian Mus.*, **39** : 360.
1971. *Ephemera annandalei*, Dubey, *Oriental Ins.*, **5** : 529.
1978. *Ephemera (E.) annandalei*, Hubbard and Peters, *Oriental Ins.*, *Suppl.*, **9** : 15.

Material : 1 M, Ambassa, St. No. 11, N. Tripura, 5.xii.91, coll. K. K. Ray and party. Besides, Type species, 1, sub-imago (No. 967/HB) Shillong Assam (= Meghalaya), 4500 ft., April, 1918, coll. N. Annandale were also examined.

Diagnostic features : Moderate sized (Body length, Forewing 15 : 13.5 mm) for male subimago and 15 : 15 mm. for female imago. Wings dirty white, pale yellow subcostal zone, a very prominent spot at bifurcating point of M; Sc and R are opaque white. Abd. 3-9 with 3 clear streaks on each side, submedian oblique and meets with other side at the anterior end of tergite; black square spot on abd. 10.

Remarks : This species was described on male subimago, female imago but larva (nymph) are not known. It has resemblance with *Ephemera (E.) expectans* (Walker) known in India from Bihar, Uttar Pradesh, Karnataka; Burma. It is distinguished from same by more dark and dense pigmentation on dorsum, wing membrane also brighter as compared to dull white, lesser subsidiary veins at the wings inner margin from A₁ and more pointed, finger like structure at the sides of penes lobe.

Distribution : India : Tripura (Ambassa, N. Tripura) and Meghalaya.

Family BAETIDAE

Family Baetidae is represented in India by 35 species, 6 genera. Of these only genus *Cloeon* Leach is represented in Tripura by single species viz., *C. kimminsi* Hubbard. Hence no key to

genera of the family and species of the genus is provided.

Genus *Cloeon* Leach

1815. *Cloeon* Leach, *Brewsters Edinburgh encyclop.*, **9** : 137.
1866. *Cloeopsis*, Eaton, *Ann. Mag. Nat. Hist.*, (3) **18** : 146.
1932. *Neocloeon*, Traver, *J. Newyork Esst. Soc.*, **40** : 365.
1978. *Cleon*, Hubbard and Peters, *Oriental Ins.*, *Supply.*, **9** : 7.

Remarks : This genus is represented in India by 10 species. This genus thus represents second largest number of species under the family Baetidae; the maximum number of species (18) are represented under genus *Baetis* Leach. Genus has sole representation in Tripura by *C. kimminsi* Hubbard.

Member of the genus are of small size (Body : 4-8 mm. wings : 3-7 mm.). Eyes of male turbinate while of female single; larger than that of genus *Baetis*, Foreleg of male slightly shorter than body. Hindwing are absent in contrast to highly reduced hindwing of the genus *Baetis*. In forewing marginal intercalaries are single. Foreleg of male slightly shorter than body. Basal joint of forceps in male short and stout, apical margin of 9 sternite of female almost straight but for very slight backwards extension at the mid ventral line.

This genus is represented in Tripura by a single species, hence no keys provided.

***Cloeon kimminsi* Hubbard**

(Fig. 3)

1947. *Cloeon viridis* Kimmins, *Proc. R. Ent. Soc. London*, (B), **16** : 98.
1974. *Cloeon kimminsi*, Hubbard, *J. Kanss Ent. Soc.*, **47** : 358.

Material examined : 2 M, Ambassa, N. Tripura, 5.xii.91, coll. K. K. Roy and party.

Diagnostic feature : This is of moderate size (6 mm) Head pale yellow with narrow brown

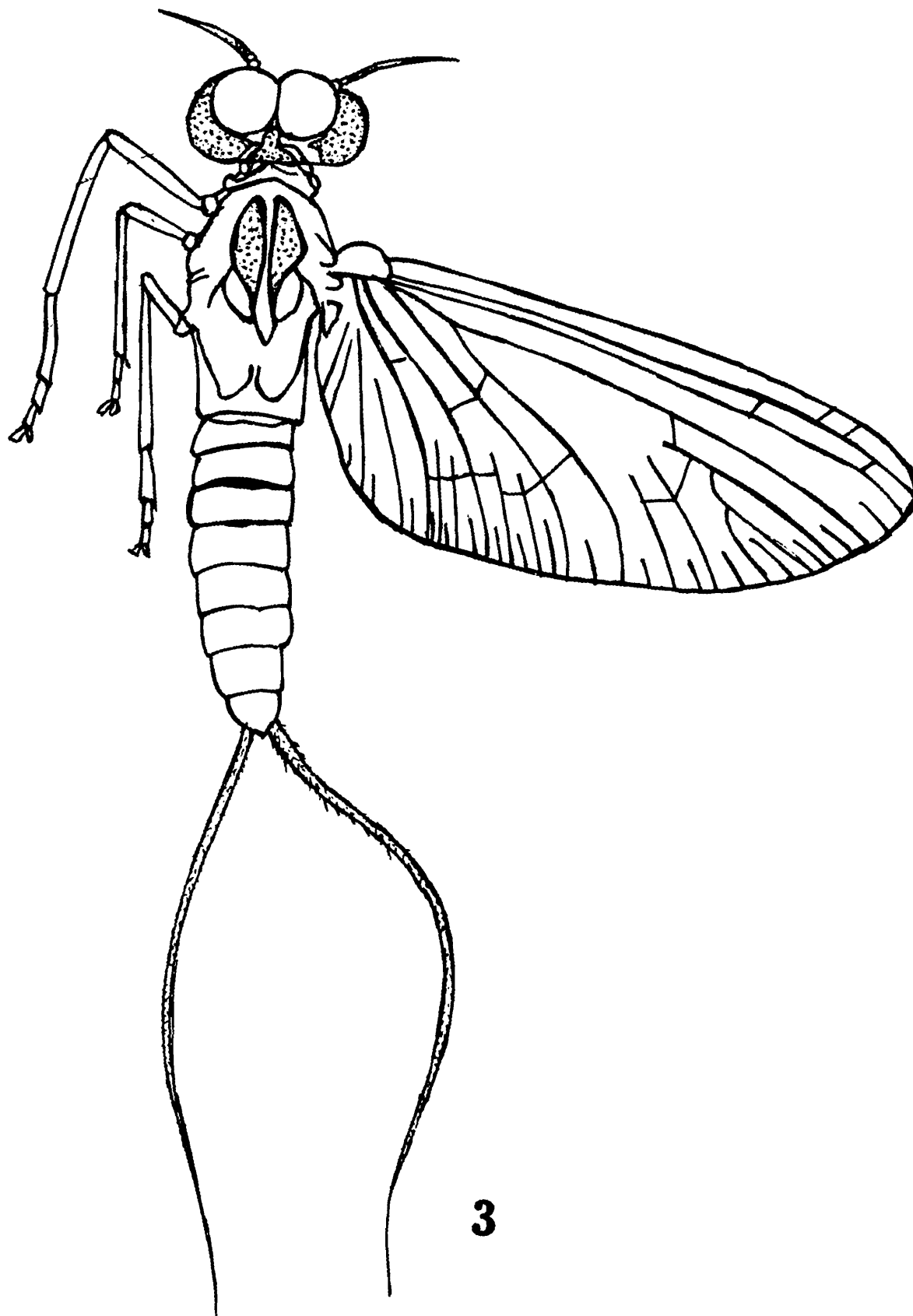


Fig. 3 : Male imago of *Cloeon kimminsi* Hubbard showing left side legs and right side wing.

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

Distribution : India : Tripura, West Bengal, Maharashtra (Western Ghats) and Malaysia.

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

Family HEPTAGENIIDAE

Family Heptageniidae is represented in India by 15 species and 8 genera. Of these 8 genera only 3 are represented in neighbouring Meghalaya by 4 species. These genera are *Cinygmina* Kimmins, *Ecdyonurus* Eaton and *Heptagenia* Walsch. While this family is represented in Tripura by single genus namely *Cinygmina* hence no key to genera of Heptageniidae is provided.

Genus *Cinygmina* Kimmins

1937. *Cinygmina* Kimmins, *Ann. Mag. nat. Hist.*, (10) : 19 : 435.

1978. *Cinygmina*, Hubbard and Peters, *Oriental Ins.*, Suppl., 9 : 18.

Remarks : This genus is represented in India by single species viz., *C. assamensis* Eaton from Khasi Hills (Meghalaya) and is endemic to it. No key to the species of genus is required as it is the sole representative. This species is also the genotype.

Members of this genus are of moderate size (Body : Wing 8-9 : 10-13; Caudal cerci and body 20-30 : 8-9). Numerous, well spread cross veins; 2 parallel pair of intercalaries which are basally free; no cross-veins in stigmatic area in fore wing. Fore tarsus 1.5 times tibia; fore tarsus : Tibia 4 : 7, hind-tarsus : tibia, 10 : 9. Genital forcep 4 segmented, penes joint at base, diverges apically and widens; apical lobes rounded, devoid of spine, genital stimuli reduced, paired chitinous plate.

Cinygmina assamensis Kimmins

1937. *Cinygmina assamensis* Kimmins, *Ann. Mag. nat. Hist.*, (10) 19 : 435.

1978. *Cinygmina assamensis*, Hubbard and Peters, *Oriental Inst.*, Suppl., 9 : 18.

Material : 1 M, Kanchannagar, Tripura, 29.xii.1991, coll. K. K. Ray and party.

Diagnostic features : Body length M : F 8 : 9 mm; wing 10 : 13-14 mm. cerci 23-25 : 20 mm. Ground colour brown-reddish brown on head, yellowish brown on thorax and abdomen. Fore tarsal segments in ratio of 8 : 14 : 10 : 5 : 5 and hind tarsal segments 10 : 9 : 7 : 5 : 12. Wings hyaline, venation pale; costa, subcosta and radius grey, a black spot at junction of subcosta and cross-vein. Abd. 1-9 with broad reddish brown stripe; additional pair of triangular spot on abd. 2, paired reniform spot on abd. 3-8.

Remarks : This species was described by Kimmins based on imago of both sexes; larva is yet to be described.

Distribution : India : Tripura (Kanchannagar) and Meghalaya.

Family PALINGENIIDAE

This family has relatively very little representation among Indian Ephemeroptera under the single genus *Anagenesia* Eaton. In Tripura only 2 out of 3 Indian Palingenids is represented.

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

Genus *Anagenesia* Eaton, 1883

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

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

Genus *Anagenesia* has characteristically 5 jointed tarsi, 3 jointed genital forcep, besides other details under species.

Key to the species of *Anagenesia*

1. The two terminal joints of the male genital forceps are subequal*lata* (Walker)
- The two terminal joints of the male genital forceps are not equal i.e., last segment of the genital forceps is longer than the one preceding it*robusta* (Eaton)

Anagenesia lata (Walker)

1853. *Palingenia lata* Walker, Brit. Mus. Catal., Neurop., Part-III, 550.

1883. *Palingenia* (*Anagenesia*) *lata*, Eaton, Trans. Linn. Soc. London (Ser. 2) 3 : 26.

1920. *Anagenesia lata*, Ulmer, Stettin. Entomol. Zeitung 81 : 102.

Material : 1 M, Ambassa, North Tripura, 5.xii.1991, coll. K. K. Ray and party.

Diagnostic features : This species is easily recognised by the brownish colour of body and wings. The thorax and parts of the head are vandyke-brown to warm sepia, but the wings are considerably lighter, the two terminal joints of the male genital forceps are subequal. Abdomen is rusty, with the posterior ends of the segments vandyke-brown.

Distribution : India : Tripura (Ambassa) and Assam (Sibsagar).

Anagenesia robusta (Eaton)

1892. *Palingenia robusta* Eaton, Journ. As. Soc. Bengal, 60 : 407-408.

1920. *Anagenesia robusta*, Ulmer, Stettin. Entomol. Zeitung., 81 : 102.

Material : 2 M, Kanchannagar, 29.xii.1991, Tripura, coll. K. K. Ray and party.

Diagnostic features : *Anagenesia robusta* is easily recognised by its large size and light colour of body and wings. Some of the male being as much as 28.00 mm long with the caudal setae about 70.00 mm. The wing is about 24.00 mm long. The females are somewhat smaller in size. This species is further distinguished from the other two species, on account of the last joint of the male forcep being longer than the penultimate.

Remarks : This species was described by Eaton from Cachar, Assam. The nymphs were described by Gravely.

Distribution : India : Tripura (Kanchannagar) and Assam (Cachar).

SUMMARY

Present paper deals with known Ephemeroptera fauna of Tripura and study of type/other material : faunal composition is very meagre and is known to comprise of 5 species under 4 genera and 4 families viz., Baetidae, Ephemeridae, Heptageniidae and Palingeniidae. A systematic list, key to various taxa is also provided; besides diagnostic characters, affinity with allied taxa distribution.

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INSECTA : APTERYGOTA : COLLEMBOLA

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INTRODUCTION

Perusal of literature reveals that first study of Collembola from India is of Ritter (1911) and Imms (1912) made a significant contribution on Indian Collembola. Thereafter, the knowledge on the collembolan fauna from India was further enriched through the contributions of several workers like Carpenter (1913, 1924), Handschin (1920), Mukherjee (1932), Denis (1936), Salmon (1957), Baijal (1955), Choudhuri (1963), Choudhuri and Roy (1965), Yosii (1966a, b), Mitra (1967-1993), Prabhoo (1971) and Hazra (1995).

It is worthwhile to mention that, this is the first record of collembolan fauna from the State of Tripura. In this communication, 11 species under 8 genera are described from Tripura. Though a number of surveys were conducted at Tripura from 1991-1995 by several parties, the collection of this group has remained meagre owing to the difficulties in their collection because of their minute size and cryptic habit and concealed habitats. The present study, therefore, is based on a collection made by one of the authors (A. K. Hazra), involving only two districts of Tripura. Thus there remains much of the collembolan fauna to be explored and the present contribution is an initiation towards that direction.

Order : COLLEMBOLA

Sub order : ARTHROPLEONA

Super family : ENTOMOBRYOIDEA

Key to the families of ENTOMOBRYOIDEA

1. Hind coxae usually with trochanteral organ. Abdomen IV appreciably longer than abdomen III. Scales present or absent, often ciliated. Furcula well developed..... ENTOMOBRYIDAE Tomosvary, 1882.
2. Hind coxae without trochanteral organ. Abdomen III and IV usually subequal; the abdomen IV never more than one and one half times as long as the abdomen III, the other posterior abdominal segments often fused. Scales usually not present..... ISOTOMIDAE Börner, 1913

Key to the subfamilies of ENTOMOBRYIDAE

1. Dens dorsally crenulated and curving upward, basally in line with manubrium ENTOMOBRYINAE Schaeffer, 1896
- Dens not crenulated, straight and usually forming a basal angle with manubrium 2
2. Eyes and pigment absent; dens with large dorsal scales and without apical lobe CYPHODERINAE Börner, 1913
- Eyes and pigment present, dens without dorsal scales and with apical lobe PARONELLINAE Börner, 1913

Subfamily PARONELLINAE Börner, 1913

The members of this subfamily can be distinguished from other entomobryids by the rigid & stout denticles, not ringed, and often in the presence of dental scale appendages on the terminal part of denticles. The mucrones in majority

cases are plump, lobed into several teeth and is different in shape from the members of subfamily entomobryinae.

Key to genera of subfamily Paronellinae from Tripura

1. Body covered with scale 2.
- Body not covered with scale 4.
2. Eyes 8 + 8 3
- Eyes reduced in number
.....ALLOSCOPUS Börner.
3. Basal seta of the outer maxillary ramus is blunt CALLYNTRURA Börner
- Basal seta of the outer maxillary ramus is pointed DICRANOCENTROIDES Schött
4. Mucro stout, usually tridentate, dentes not annulated SALINA MacGillivray
- Mucro vestigial, sometimes visible as hooklet fused with dentes, dentes annulated
.....YOSIIA Mitra

I. Genus : *Alloscopus* Börner,

The genus is represented by only one species from Tripura

1. *Alloscopus tetracantha* Börner, 1906

(Fig. 1, Map. 1)

1906. *Heteromurus (Alloscopus) tetracantha* Börner, Mitt. Nat. Hist. Mus. Hamburg, **23** : 177.
1959. *Alloscopus tetracantha* : Yosii, Contr. Biol. Lab. Kyoto Univ., **10** : 38.
1971. *Alloscopus tetracantha* : Prabhoo, Oriental insect **5** (1) : 33.

Material examined : West Tripura dist. : from drainage side beside cottage no. 4 of Sepahijola WLS, 26. iv. 1995, coll. A. K. Hazra, 30 exs. South Tripura dist. : Hatiposa village, 4. v. 1995, coll. A. K. Hazra, 12 exs.

Diagnostic characters : Whitish on all parts of the body. Ant. I is basally subdivided. Head without eye but has a redish brown spot at that place. Unguis dorsally carinate and with a pair of winged ventral teeth. Unguiculus lanceolate with

prominent outer tooth. Mucro bidentate and without basal spine.

II. Genus : *Callyntrura* Börner, 1906

The genus is represented by two species from the state.

Key to the species of the genus Callyntrura

1. Dental scale appendage present, ventral side of the mucro without serration
C. (Handschinphysa) lineata (Parona) 1982
- Dental scale appendage absent, ventral side of the mucro with serration
C. (Callyntrura) serrata (Salmon) 1957
2. *Callyntrura (Handschinphysa) lineata* (Parona) 1892 (Fig. 2; Map. 1)

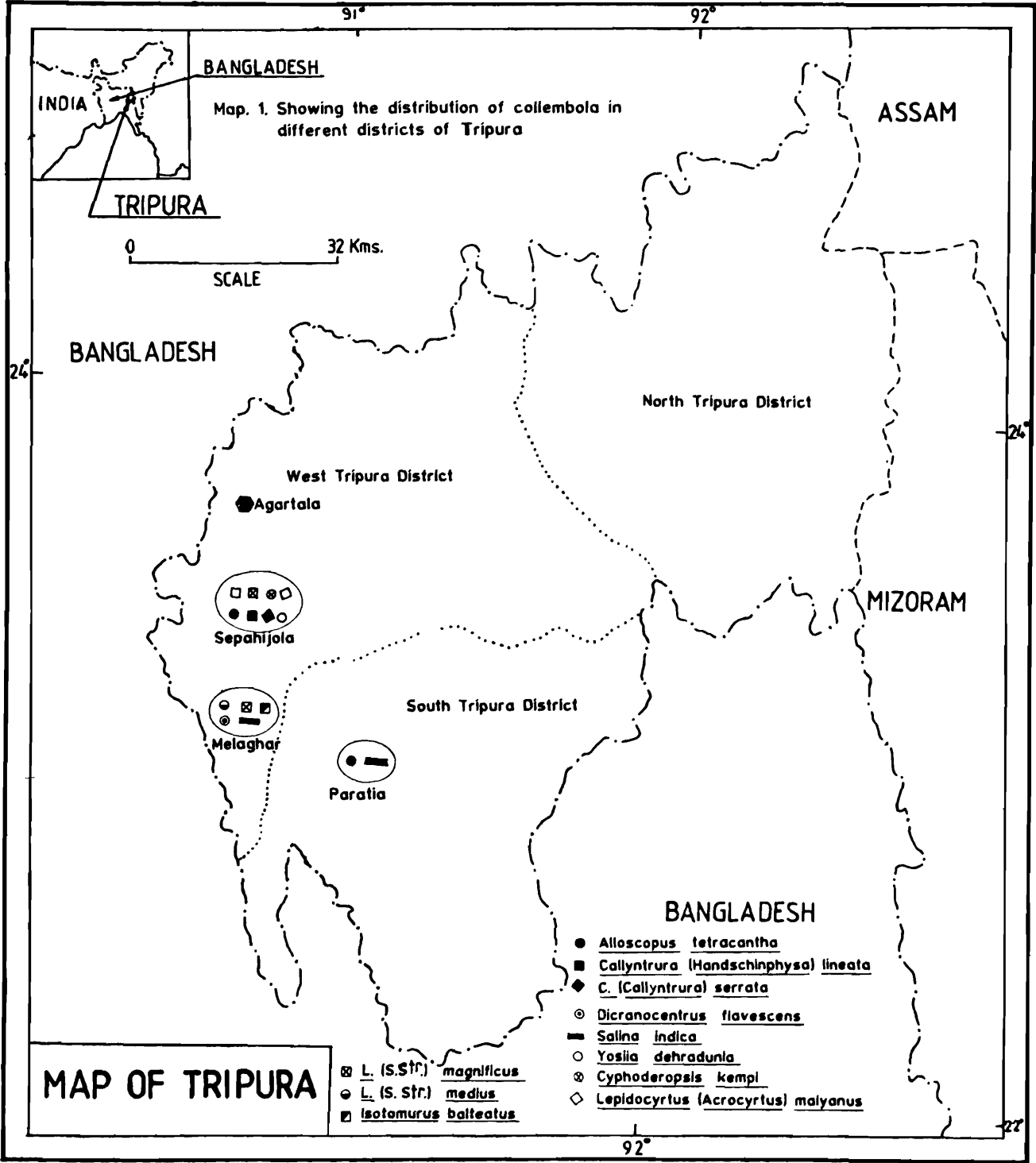
1892. *Entomobrya lineata* Parona, Atti. Soc. Hal. Milano, **34** : 132-135.

1912. *Paronella borneri* : Imms, Proc. zool. Soc., London, pp. 80-126.

1912. *Paronella phanolepis* : Imms, Proc. zool. Soc. London. pp. 80-125.

Material examined : West Tripura dist., 1 km. west from the Rest House of Sepahijola, 1. v. 1995, coll. A. K. Hazra, 5 exs., 1 km. North side from the Rest House at rubber plantation, 29. iv. 1995, coll. A. K. Hazra, 6 exs.

Diagnostic character : Pigmentation variable, involving forms without pigment to darkly pigmented; in the lightest form, targa margins of Ths. II, III and Abds. I-III pigmented, Abd. IV with at least a pair of symmetrical pigmented spots medially; in dark pigmented forms, pigmented patches occur dorsally on Ths II, III and Abds. I-VI. Head pear shaped; 4 + 4 frontal spines present; ocelli 8 + 8. Apex of the Ant IV with a conspicuous sense-knob guarded with some smooth setae. Relative length index of Ths. II : III = 52 : 22. Unguis elongate, little curved with paired inner, 2 distal unpaired teeth, external basolateral teeth well developed. Unguiculus lanceolate. Relative length index of the segments of abdomen, 13 : 24 : 8 : 130 : 12 : 5. Ventral tube long with darker macrochaetae anteriorly. Relative length index of manubrium : mucrodens



Map 1 : Showing the distribution of Collembola in different districts of Tripura.

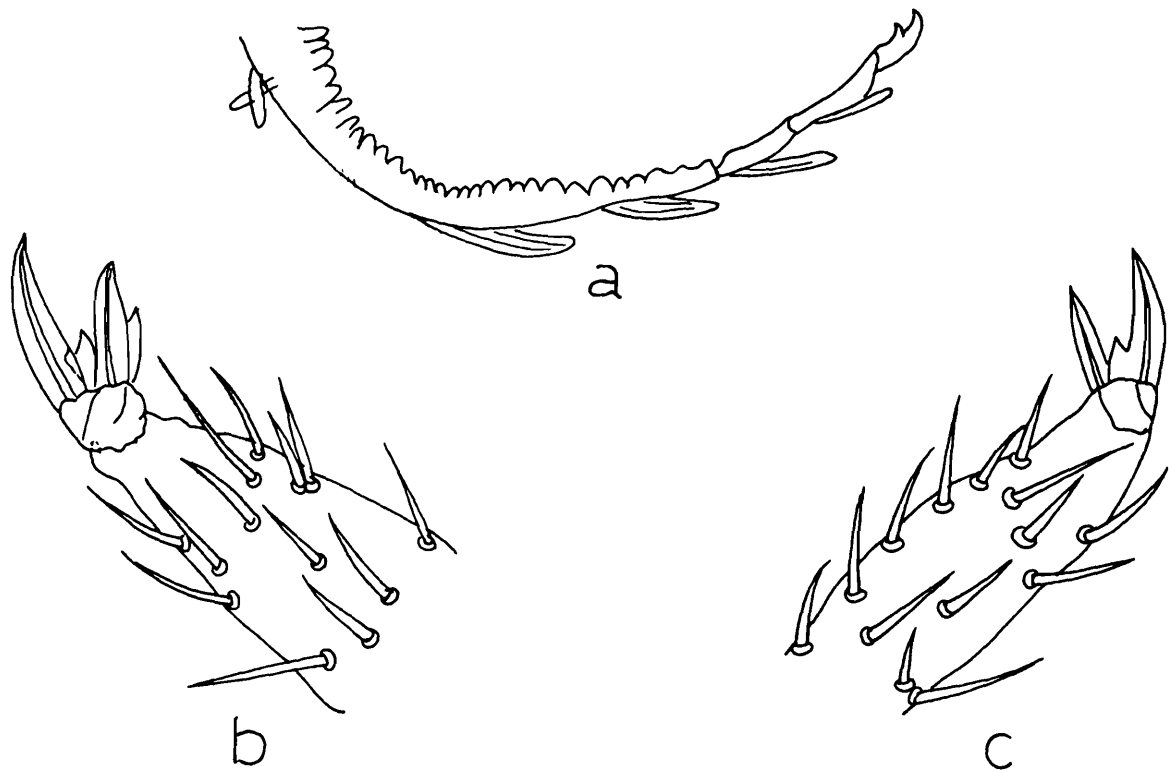


Fig. 1 : *Alloscopus tetracantha* : a. mucro-dens, b. hind claw, c. fore claw.

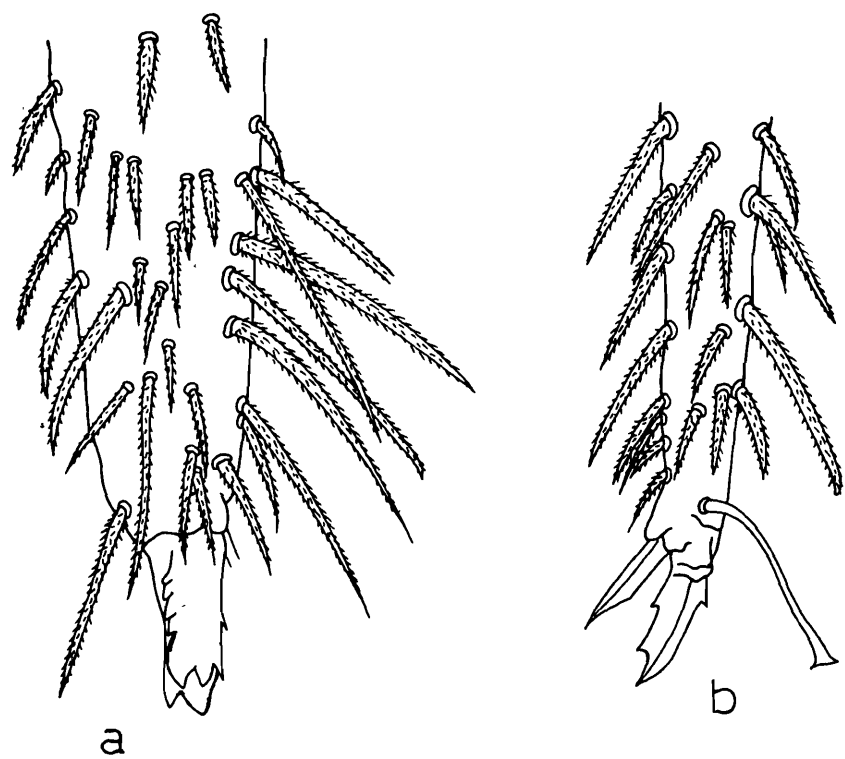


Fig. 3 : *Callyntrura (Callyntrura) serrata* : a. mucro-dens, b. hind claw.

= 110 : 148; dentes stout, slightly taper distally, number of mucronal teeth in adult varies from 6-9, dental scale appendage well developed. Body length 2.5-4 mm.

Remarks : The present authors have examined some sub-adult with the following observations : length 2.5-3 mm., all unguiculi lanceolate with inner truncate angles in the form of cuspidate teeth beyond the middle of the inner lamella anteriorly, tenent hairs clavate, tallied with the stage V.

Distribution : INDIA : Tripura (West Dist.), Manipur, Sikkim, U. P., Oriental Indo-Malayan Regions; Palaearctic Region, JAPAN.

3. *Callyntrura (Callyntrura) serrata* (Salmon) 1957

(Fig. 3, Map. 1)

1957 *Handschinphysa serrata* Salmon, *Acta. zool. Cracov*, **11** (14) : 313-362.

1964 *Aphysa serrata* : Salmon, *Bull. Roy. Soc. N. Z.*, (7) **2** : 145-644,

1974. *Callyntrura (Callyntrura) serrata* Mitra, *Rev. Ecol. Biol. Soc.* **11** (3) : 391-439.

Material examined : West Tripura dist., from the decomposed leaf litter near the first gate of WLS, 1 km. north side of the rest house of Sepahijola, 29. iv. 1995, coll. A. K. Hazra, 5 exs.

Diagnostic character : Tergal margin of Ths. II, III, Abds. I, III with dark blue pigment, lateral extension of Abds. III, IV with the same pigment, pigment also present dorsally on Abds. IV. Ocelli 8 + 8. Manubrium to dens to mucro 54 : 85 : 4. Mucro with two prominent apical teeth, one prominent subapical tooth on the posterior face, a large lateral tooth and a row of tooth-like serrations along the posterior edge being the most salient feature of the species. Body length 1.4 mm.

Distribution : INDIA : Tripura (West dist.)

III Genus : *Dicranocentroides* (Imms) 1912

The genus is represented by only one species from the state.

15-1/zSI/Ca1/2000

4. *Dicranocentroides flavescens* Yosii, 1966 (Fig. 4, Map. 1)

1966. *Dicranocentroides fasciculatus* f. n. *flavescens* Yosii, *Res. Kyoto Univ. Sci. Exped. Korakoram and Hindukush*. 1955, **8** : 333-405.

Material examined : West Tripura dist. : Rautkhola, 1 km. away from Bisalgar, from decomposed bamboo leaves, 2. v. 1995, coll. A. K. Hazra, 4 exs.

Diagnostic character : Darker patch absent on body but a dark patch on the vertex in between two ocellar fields is the characteristic of the species. Ocelli 8 + 8. Relative length index of Ants. I : II : III : IV = 15 : 17 : 12 : 19. Relative length index of Ths. II : III = 14 : 8.5. Legs all similar, unguiculus lanceolate, acuminate, with 2 external teeth. Relative length index of Abds. I : II : III : IV : V : VI : = 5 : 6 : 4 : 39 : 5.5 : 2. Ventral tube long with a row of macrochaetae anteriorly. Relative length of manubrium : mucrodens = 28 : 38, dentes armed with two closely apposed rows of spines on inner margin; mucro large, parallel sided with 6 teeth. Body length 2-3.5 mm.

Distribution : INDIA : Tripura (West dist.), West Bengal, Maharashtra, U. P.

IV. Genus : *Salina* MacGillivray 1984 (Imms) 1912

The genus is represented by only one species.

5. *Salina indica* (Imms) 1912

(Fig. 5, Map. 1)

1912. *Cremastocephalus indicus* Imms, *Proc. Zool. Soc. London*, : 80-125.

1957. *Salina indica* Salmon, *Acta. Zool. Cracov.*, **11** (14) : 313-362 (in part).

1973. *Salina indica* Mitra, *Oriental Ins.*, **7** (2) : 159-202.

Material examined : West Tripura dist.: Beside water pool near Nirmahal, 7. v. 1995, coll. A. K. Hazra, 6 exs : South Tripura dist. : Paratia, 4. v. 1995, coll. A. K. Hazra, 10 exs.

Diagnostic character : General ground colour of the body pale yellow, occasionally the tergal

margins and lateral extension of Abds. III with faint blue pigment. Frontal spine 1 + 1. Ocelli 8 + 8. Relative index of Ants. I : II : III : IV = 36 : 53 : 40 : 60. Relative index of Ths. II : III = 25 : 17, unguiculus truncate and non-dentate. Tenent hair finely ciliated. Relative index of manubrium: mucrodens = 45 : 54. Mucro long narrow, superficially lobed with three teeth, dental scale appendage relatively small, faintly striated. Body length 1.4 mm.

Distribution : INDIA : Tripura (West and South dists.), U. P., Manipur, Sikkim, West Bengal.

V Genus : *Yosiia* Mitra, 1967

The genus is represented by only one species from Tripura.

6. *Yosiia dehradunia* Mitra, 1967

(Fig. 6, Map. 1)

1967. *Yosiia dehradunia* Mitra, *Proc. Zool. Soc.*, Calcutta, 20 : 43-47.

Material examined : West Tripura dist. : from the decomposed leaf litter at the coffee plantation area in deep dark channel, outside zoo garden, 27. v. 1995, coll. A. K. Hazra, 6 exs.

Diagnostic character : Ground colour pale yellow, dusted with blue pigment all over the body, a pair of dark blue black patches one on each side on Abds. III and IV. Scale absent, head and body clothed with setae arising in cluster. Pear shaped head, 8 + 8 ocelli. Ants. III and IV faintly annulated, relative length index of Ants I : II : III : IV = 32 : 46 : 48 : 70. Th. I reduced, the relative length index of Ths. II : III = 23 : 11. Each tibiotarsus with two large tibio-tarsal lobes. The relative length index of Abds, I : II : III : IV : V : VI = 6 : 15 : 4 : 67 : 9 : 6. Ventral tube short. Dens and manubrium subequal, dens crenulated, mucro vestigial, dental scale appendage greatly enlarged, dorsal in relation to dens and with longitudinal striations. Body length 1.14 mm.

Distribution : INDIA : Tripura (West dist.), West Bengal, U. P.

Subfamily CYPHODERINAE

Unlike other entomobryides the members of this subfamily do not have well developed ocelli, dental crenulations absent and dental spines present or absent.

VI. Genus : *Cyphoderopsis* Carpenter, 1917

(Fig. 7, Map. 1)

The genus is represented by only one species from Tripura.

7. *Cyphoderopsis kempi* Carpenter, 1917

1917. *Cyphoderopsis kempi* Carpenter, *Rec. Ind. Mus*, Calcutta, 26 : 285-289.

Material examined : West Tripura dist. : from the decomposed leaf litter at the coffee plantation in deep dark channel area outside zoo garden, 27. iv. 1995, coll. A. K. Hazra, 4 exs.

Diagnostic character : Colour white, antenna one and a quarter times as long as head, relative length index of Ants. I : II : III : IV : = 5 : 8 : 6 : 14. 2nd and 3rd pairs of legs with clubbed hairs; claws with strong internal basal teeth and two internal distal teeth. Abd. IV four times as long as Abd. III. Dens three and half times as long as mucro ; mucro with blunt terminal tooth and a strong proximal distal tooth with minute serration at its base and a feeble distal dorsal tooth. Body length 1.5 mm.

Distribution : INDIA : Tripura (West dist.), Assam.

Subfamily ENTOMOBRYINAE Schaeffer, 1896

Dentes crenulated dorsally. Mucrone fucate with basal spine, it is short and hook-like. Body with hairs or scales or both the chaetotaxy of head and trunk, and eye numbers are useful in identifying the members of this family.

VII. Genus : *Lepidocyrtus* Bourlet, 1839

The genus is represented by three species from Tripura.

Key to the subgenera of *Lepidocyrtus*

1. Dental lobe dorsally with accessory apparatus *Acrocyrtus*

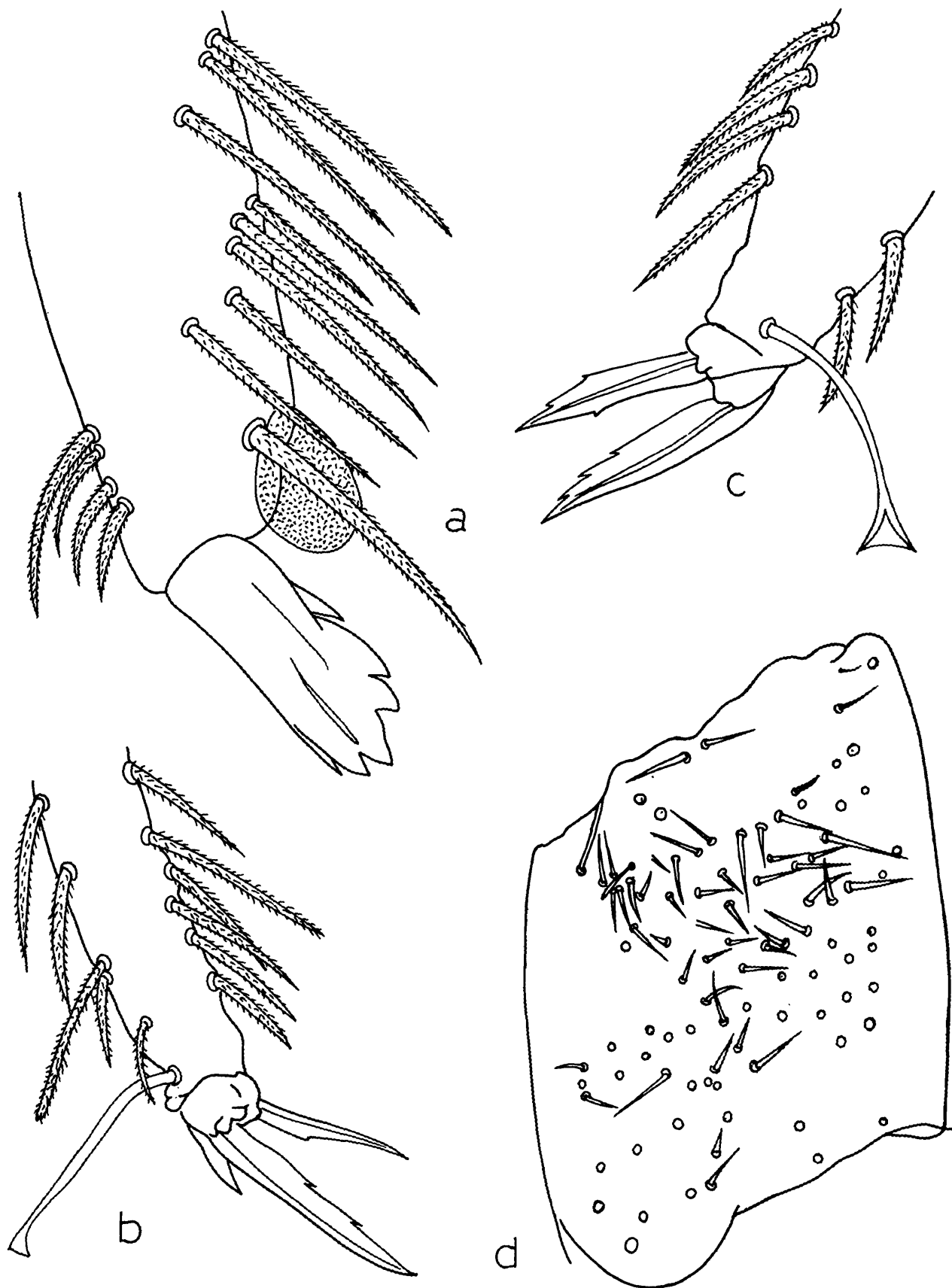


Fig. 2 : *Callynistrura (Handschinphysa) lineata* : a. mucro, dental scale, b. fore claw, c. hind claw, d. trochanteral organ.

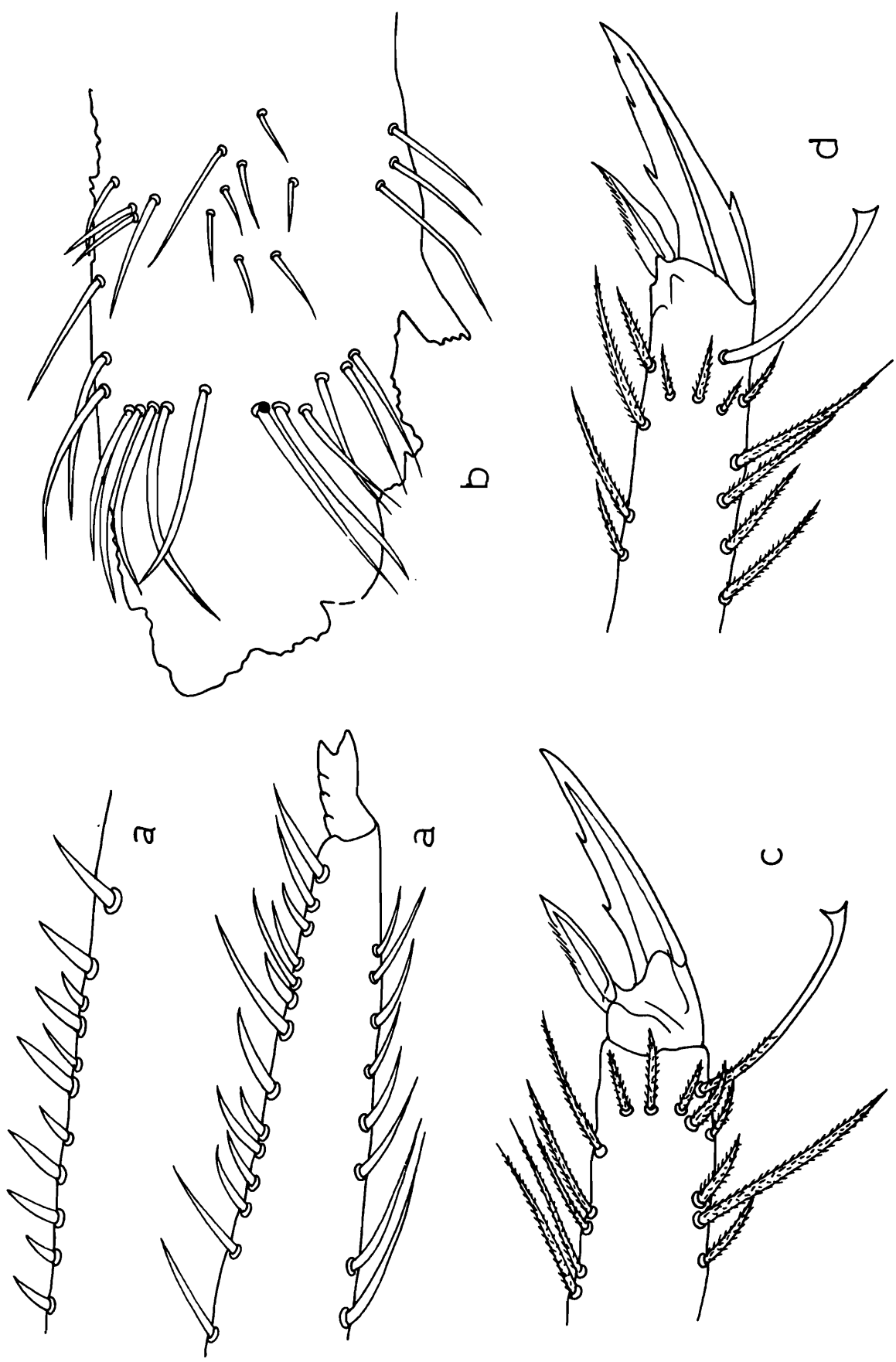


Fig. 4 : *Dicranocentroides flavesceus* : a. mucro-dens, b. ventral tube, c. fore claw, d. hind claw.

Dental lobe dorsally without accessory apparatus.....*Lepidocyrtus*

Key to the species of subgenus Lepidocyrtus

This subgenus is represented by two species from Tripura.

1. Th. II is very prominent and protruded over the head. Abd. II : IV = 1 : 7 *L* (s. str.) *magnificus* Carpenter, 1917 Th. II is protruded considerably over the head. Abd. III : IV = 1 : 3 *L* (s. str.) *medius* Schaeffer, 1893
8. *Lepidocyrtus* (*Acrocyrtus*) *malayanus* Yosii, 1959

(Fig. 8, Map. 1)

1959. *Lepidocyrtus* (*Acrocyrtus*) *malayanus* Yosii, *Contr. Biol. Lab. Kyoto Univ.*, 10 : 28

Material examined : West Tripura dist : from the drainage side beside cottage no. 4 of Sepahijola WLS., 26. iv. 1995, coll. A. K. Hazra, 7 exs.

Diagnostic character : Ground colour brownish white, antennae distally bluish pigment from Ant. II. Eye 6 + 6. Scales are present dorsally upon Ant. I and II, ratio of Ant. segs. = 9 : 18 : 11 : 23. Th. II : III = 7 : 3. Abd. III : IV = 1 : 5. Manubrium : dentes = 9 : 8. Dorsal appendix of dental lobe is prominent, acutely pointed in profile. Body length 2.5 mm.

Distribution : INDIA : Tripura (West dist.) SINGAPORE.

9. *Lepidocyrtus* (s. str.) *magnificus* Carpenter, 1924

(Fig. 9, Map. 1)

1924. *Lepidocyrtus* (s. str.) *magnificus* Carpenter, *Rec. Ind. Mus.*, Calcutta, 26 : 285-289.

Material examined : West Tripura dist.: from the leaf litter of sal plantation area, 1 km. away from the rest house of Sepahijola, 1. v. 1995, coll. A. K. Hazra, 5 exs. South Tripura dist. : from the Hatiposa village, 4. v. 1995, Coll A.K. Hazra, 1 ex.

Diagnostic character : Th. II is very prominent, Th. II : III = 4 : 1. Abd. III : IV = 1 : 7. Antennae as long as head, proportional length of their segments = 6 : 14 : 17. The relatively short Ant.

III and the strong teeth of the mucro appear to be the most evident structural distinction. Body length 2.75 mm.

Distribution : INDIA : Tripura (West dist.), Assam.

10. *Lepidocyrtus* (s. str.) *medius* Schaeffer, 1898

(fig. 10, Map.1)

1898. *Lepidocyrtus* (s. str.) *medius* Schaeffer, *Contr. Biol. Lab. Kyoto Univ.*, 10 : 26.

1913. *Lepidocyrtus* (s. str.) *medius* : Börner, *Tijdschr. V. Entom.*, 56 : 44-61.

1926. *Lepidocyrtus* (s. str.) *medius* : Handschin, *Treubia*, 8 : 446-461.

1949. *Lepidocyrtus* (s. str.) *medius* : Uchida, *Insecta Matsumunana*, Sapporo, 17 : 38-47.

Material examined : West Tripura dist. : from the decomposed litter on the northern bank of the lake of Rudrasagar, 6. v. 1995, coll. A. K. Hazra, 25 exs.

Diagnostic character : Colour brownish white. Antennae pigmented purple distally. A median spot between eyes. Ant. segs. as 12 : 28 : 30 : 42: Th. II : III = 15 : 7. Abd. III : IV = 1 : 3. Manubrium : dens as 1 : 1. Mucro with apical tooth elongated, anteapical tooth is little smaller.

Distribution : INDIA : Tripura (West dist.) SINGAPORE.

Subfamily ISOTOMINAE Schaeffer, 1896

Head prognathus, tracheae absent. Antennae inserted in front half of head. P. A. O. usually present; always simple. Mucrones short.

VIII. Genus : *Isotomurus* Börner, 1906

11. *Isotomurus balteatus* (Reuter)

(Map. 1)

1876. *Isotoma balteatus* Reuter, *Med. Soc. Fauna et. Flora Fenn.*, 1 : 82.

1963. *Isotomurus balteatus* : Yosii, *Contr. Biol. Lab. Kyoto Univ.*, 15 : 4.

Material examined : West Tripura dist. : beside the water pool near Nirmahal, 7. v. 1995, coll. A. K. Hazra, Naraura village, 60 exs.

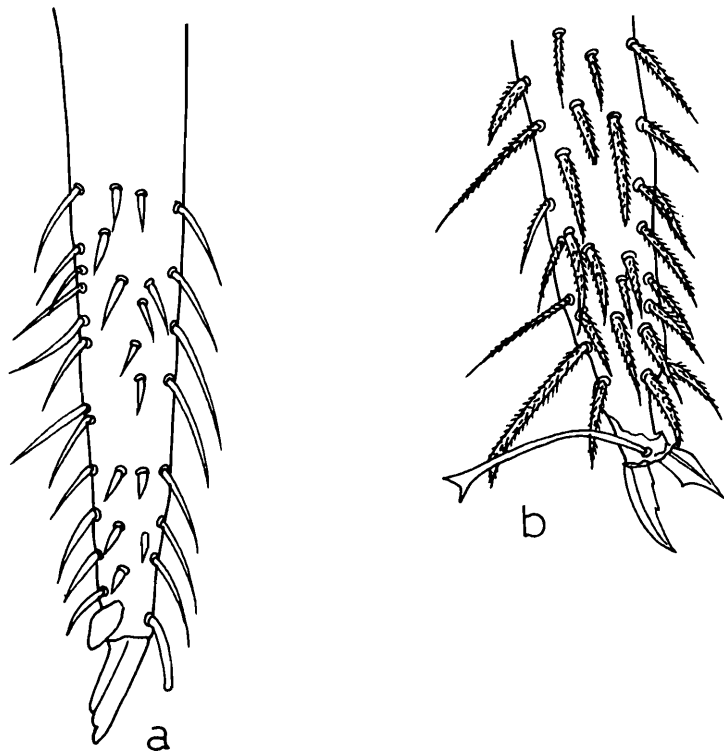


Fig. 5 : *Salina indica* : a. mucro-dens, b. hind claw.

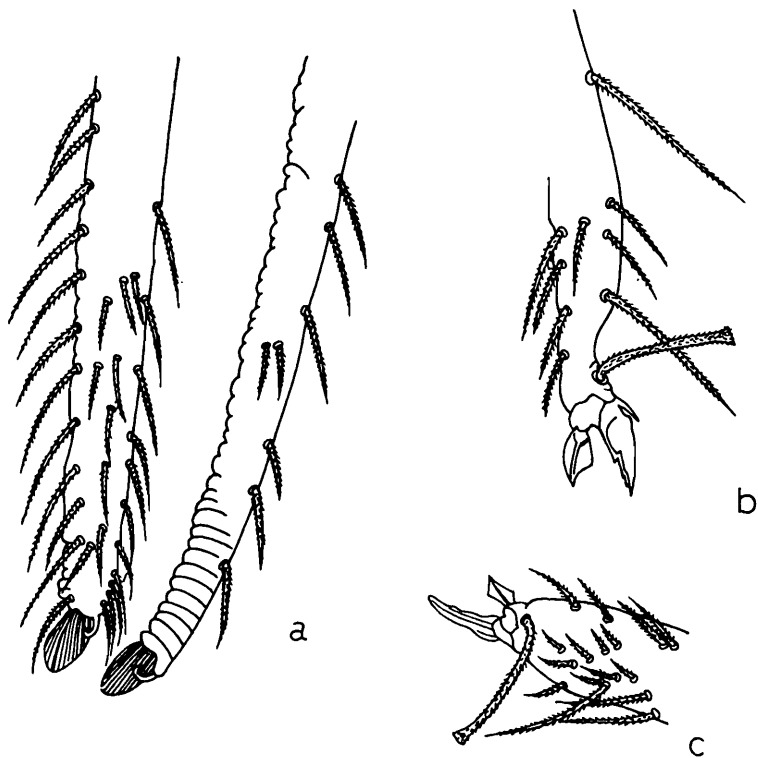


Fig. 6 : *Yosiia dehradunia* : a. mucro-dens, b. hind claw, c. fore claw.

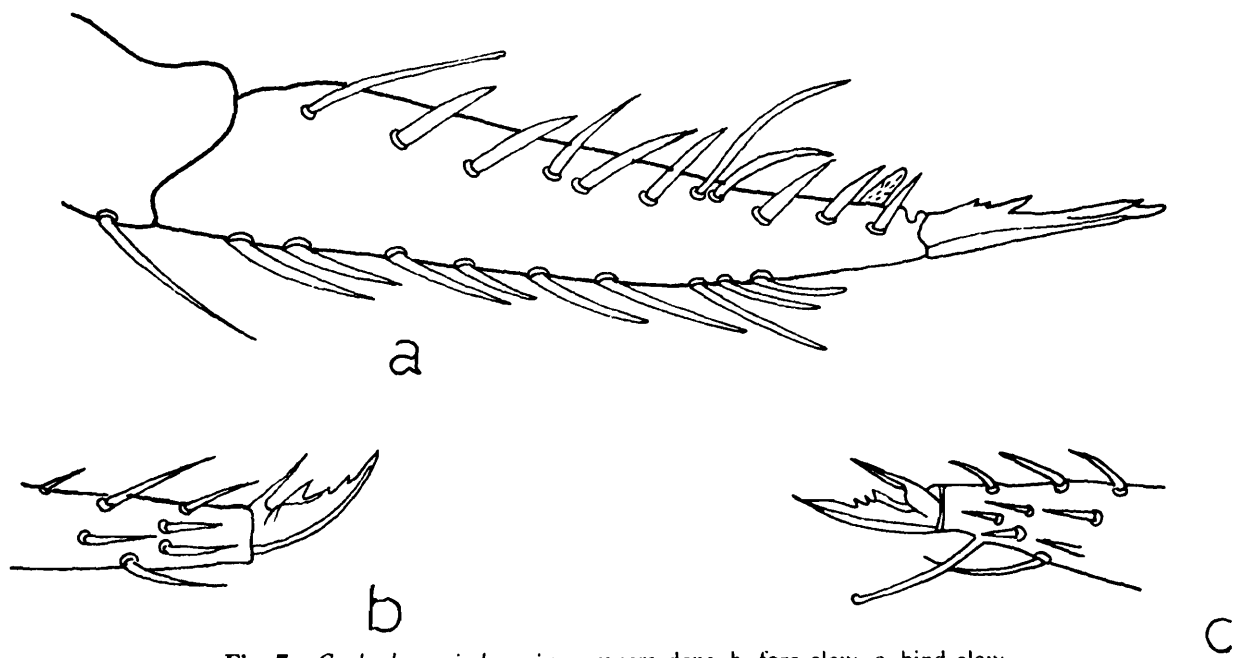


Fig. 7 : *Cyphoderopsis kempī* : a. mucro-dens, b. fore claw, c. hind claw.

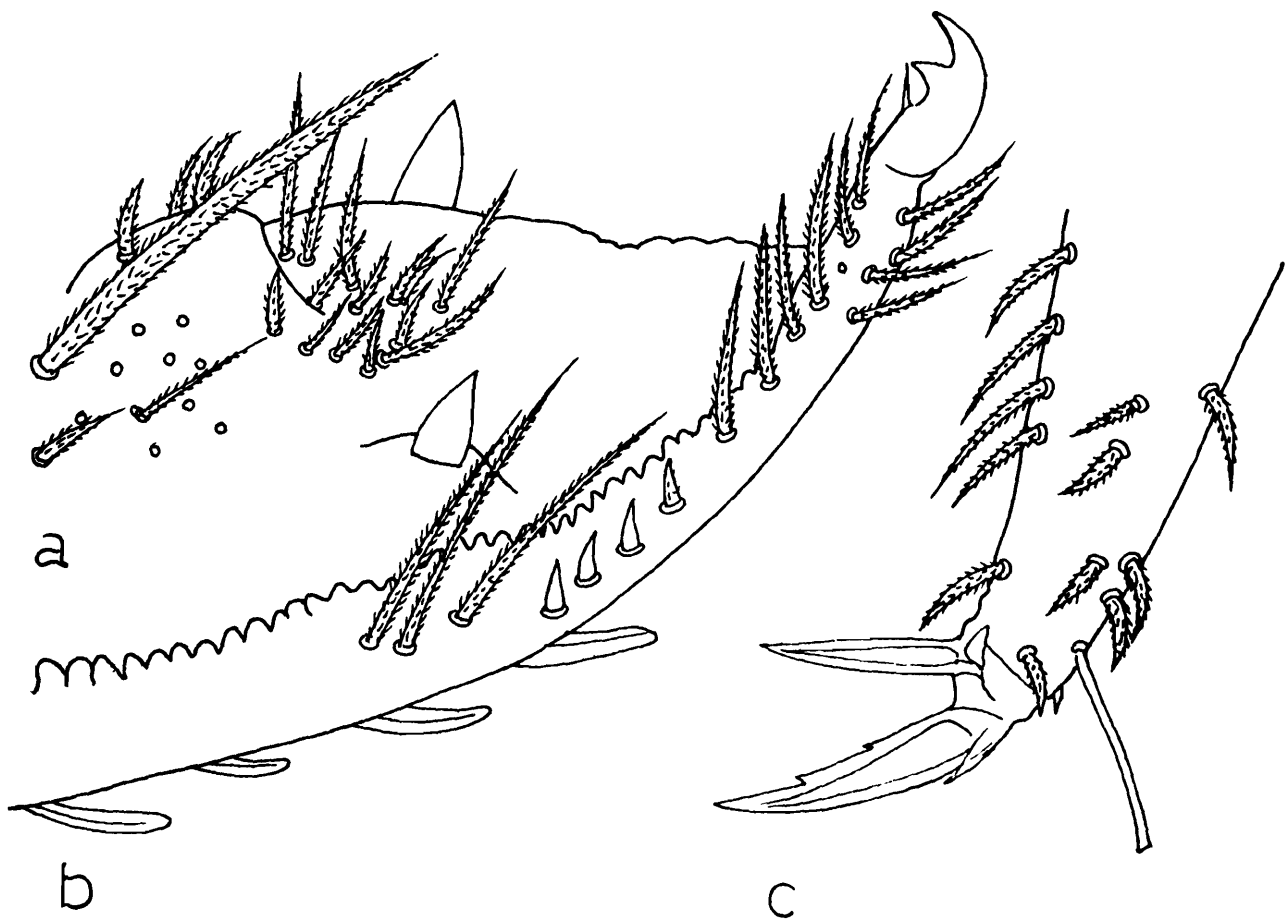


Fig. 8 : *Lepidocyrtus (Acrocyrtus) malayanus* : a. dental end of manubrium, b. lateral view of dentes & mucro, c. hind claw.

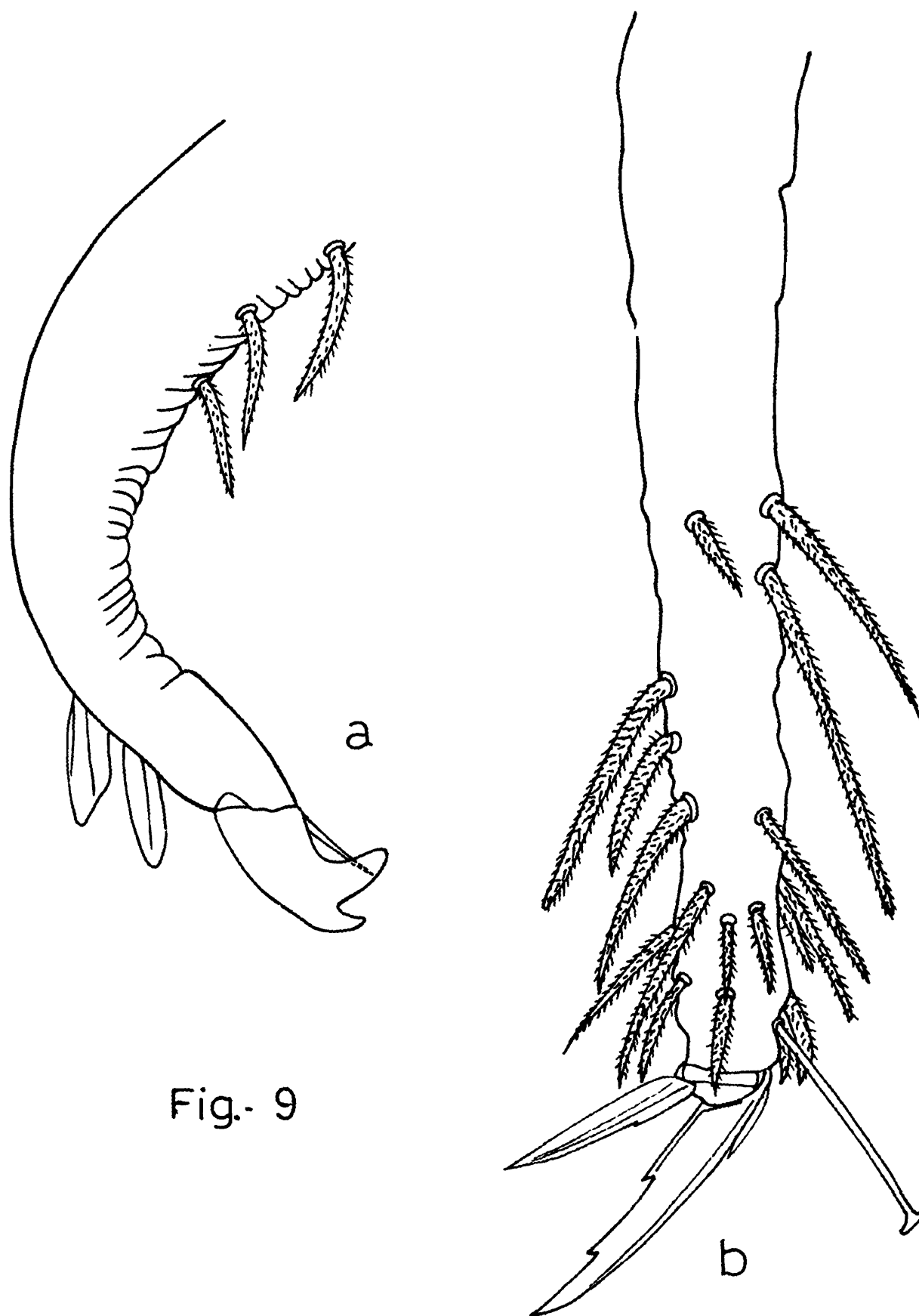


Fig.- 9

Fig. 9 : *Lepidocyrtus* (s. str.) *magnificus* : a. mucro-dens, b. hind claw.

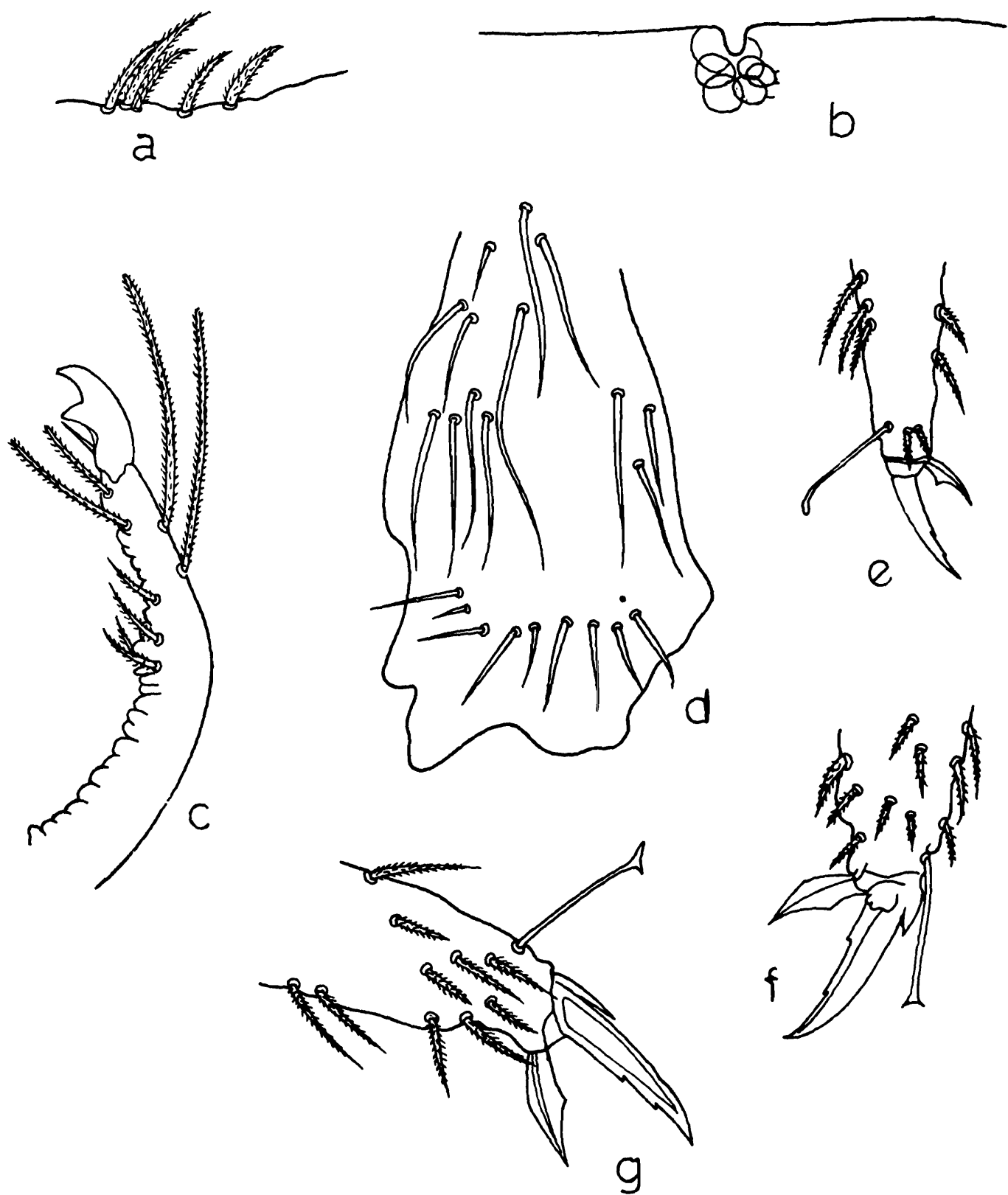


Fig. 10 : *Lepidocyrtus* (s. str.) *medius* : a. dorsal view of manubrium, b. ventral view of manubrium, c. mucro-dens, d. ventral tube, e. fore claw, g. hind claw.

Diagnostic character : Colour with a violettish black pigment which from distinct transverse band on the anterior margin of tergites. Antennal ratio = 10 : 15 : 16 : 26 ; ant. IV with two short subapical sense rods. P. A. O as large as anterior ocellus. Ocelli 8 + 8. Furcula reaches forward to the

ventral tube, segments as 5 : 12 : 1. Dens distinctly annulated with dorsal side; mucro with a small apical, 2 large subapical and a large external lateral teeth.

Distribution : INDIA : Tripura (West dist.), Kerala.

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INSECTA : ODONATA

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INTRODUCTION

Odonata fauna of Tripura comprises of elements of both Submontane and montane zone. Material on which this work is based was mainly collected by various Zoological Survey of India parties. This includes collection made recently on special state faunal studies programme ; besides those present in National Zoological Collection. Present contribution also includes the study of type material of certain species and earlier odonata work from the state so as to make it more comprehensive. Details of material studied are indicated under each species in the systematic account of present contribution.

Perusal of literature reveals that no consolidated account is available on the Odonata fauna of Tripura. One of the earlier publication of the order from the area, which also is the first record, is to the credit of Mitra and Sen (1975). This deals with 7 species under 5 genera of the anisopterous odonates representing the family Libellulidae. Genera represented were *Orthetrum* Newman (2 species), *Neurothemis* Brauer (2 species), *Brachythemis* Brauer (2 species) and one species each of genera *Palpopleura* Rambur and *Pantala* Hagen.

GENERAL MORPHOLOGY

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

A brief morphological features are, though, indicated here for 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 practically all the Zygopterans ; while most of the Anisopterans have the posterior pair of wing wider, specially in their anal area. Abdomen is long, slender, ten segmented terminating in paired anal appendages. Most characteristic feature of male accessory genitalia is that these are shifted to the underneath of 2, 3 abdomen, while gonopere are in their usual position. This necessitates their peculiar bending and coupling, in male-female forming some short of loop called 'tandem' Ovipositors are simple for exophytic forms (most of Anisopterans) or strong, serrated for endophytic forms (most of Zygopterans).

Larvae are long, elongated cylindrical in littoral and stout, broad bodied in benthic forms. These have extenstile, prehensile labium, Zygopterans have abdominal gills and caudal filament, which are lacking in Anisopterans and these breathe by cloacal chamber suited for 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>
Anal appendage	Male of Zygopterans with 2 pairs, male of anisoptera with 1 pair & single inferior and one pair in female uniformly at the end of abdomen.
Anal loop	An area of cells at the base of hindwing just adjacent to discoidal cell.
Anal triangle	Triangle at extremity 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 Cu ₁ and border of wings.
Enfumed	Smoky or brownish in tint.
Hypertrigone	Narrow triangular cell above discoidal cell of Anisopterans.

<i>Name of term</i>	<i>Explanation</i>
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.

Diagram : Generalized diagram of a dragonfly and a damselfly imago showing head, thorax, abdomen, wings. Another generalized diagram of a dragonfly and damselfly larvae showing head, thorax, abdomen extended prehensile labium, abdominal and caudal gills. Diagrams of certain representative anal appendages are also provided.

MATERIAL AND METHOD

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

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

ascertain nodal variations. Irridescence and metallic pigmentation pattern, in most of Zygopterans and some Anisopterans, were also best observed under reflected light.

SYSTEMATIC ACCOUNT

Odonata fauna of Tripura comprises of 35 species under 21 genera and 5 families. This component is just a small fraction of whole Indian Odonates approximately 1 : 14.11 (35 : 494). In comparison to Meghalaya Odonates studied by present authors (1996) it is approximately 1 : 5 (35 : 151). Among these the Zygopterans (Damselflies) are represented by 14 species, 8 genera and 3 families. Anisopteran (Dragonflies) component comprises of 21 species 13 genera and 2 families. Libellulidae is single largest family having representation among odonata fauna of Tripura by 20 species under 11 genera. The Zygopterous family coenagrionidae is next large family having representation by 11 species and 6 genera. Thus above mentioned 2 families are relatively represented respectively by 20 species, 11 genera : 11 species, 6 genera.

Family wise systematic account of Tripura component of odonates are dealt, hereunder, along with original reference, material examined and or based on reviewed literature, a diagnosis, distribution pattern within Tripura, elsewhere in India and also extended distribution if any, in orient or other Zoogeographical zones. Distribution maps of certain odonate species (abundant, endemic or rare) are also provided for districts of the state of Tripura. Keys of various level of taxa involved i.e. families, subfamilies genera, species are also provided. These are formulated, partly based on, Fraser (1933, 34, 36, 57) and partly modified on basis of authors own observations/interpretations.

A consolidated list of systematically arranged list of Tripura component of the odonate insects is provided, followed by citation of certain most important/relevant references.

TAXONOMIC ACCOUNT**Order Odonata***Key to the suborders, superfamilies and families*

1. Fore and hind-wing more or less of same shape and venation, head transversely elongated both superior and inferior anal appendage in male paired-suborder ZYGOPTERA 2

—Fore and hind wings are distinctly different in shape and venation ; hind wings broader specially in the anal area ; head not transversely elongated rather globular ; paired superior and single inferior appendages in male-suborder ANISOPTERA 5

2. Antenodal only 2, postnodals coinciding with veins below 3

—Antenodals more than 2, postnodals not coinciding with veins below Superfamily CALOPTERYGOIDEA 4

3. Ir iii and RIV + V more near node than arc superfamily Coenagrionoidea (containing only a single Family COENAGRIONIDAE)

4. 2 primary antenodals distinct from secondaries Family CHLOROCYPHIDAE

—2 primary antenodals not distinct from secondaries Family CALOPTERYGIDAE

5. Labial mask of larva flattened without setae, lateral lobes narrow with long robust moveable hook ; Imago with costal and subcostal veins not coinciding, eyes are not so broadly contiguous, not meeting all along its dorsum superfamily Aeshnoidea (represented by single family Aeshnidae)

—Labial mask of larvae broad, concave with numerous setae, lateral lobes broad with tuft of setae ; Imago with costal and subcostal veins coinciding, eyes are broadly contiguous, meeting all along on its dorsum Superfamily Libelluloidea (represented by single family Libellulidae)

Suborder ZYGOPTERA**Superfamily COENAGRIONOIDEA**

This superfamily is represented in Tripura by the sole family Coenagrionidae and 3 subfamilies namely Pseudagriinae, Ischnurinae and Agriocneminae.

No key to the families of Coenagrionoidea is given as it has sole representative in Tripura.

Family COENAGRIONIDAE

This family is represented in Tripura by 11 species and 6 genera. It has not been dealt under subfamilies, as indicated above, due to the inconsistency of characters formulated by previous workers or same was applicable to only one sex. Earlier, though, Tillyard and Fraser (1938-1940) had divided the family into subfamilies ; while Fraser (1957) divided it into 6 subfamilies.

Key to the genera of Coenagrionidae

Characters distinguishing male and female are different, hence a separate key is indicated here—under for male and female.

Male Key

1. Arc situated distally, distal to distal antenodal nervure ; abdomen shorter (20 mm. or less)*Agriocnemis* Selys

—Arc situated at the level or only slightly distal to distal antenodal nervure 2

2. Ab arises at level of Ac or only slightly proximal to it 3

—Ab arises distinctly distal to level of Ac 5

3. Pterostigma in forewing distinctly longer than that of hind wing *Aciagrion* Selys

—Pterostigma in forewing and hindwing of same length or nearly so 4

4. Prominent ridge on frontal side of frons present *Ceriagrion* Selys

—Ridge on frontal side of frons absent *Pseudagrion* Selys

5. Pterostigma of similar and uniform colour in both wings *Enallagma* Charpentier
 —Pterostigma of dissimilar colour in fore and hindwing, that of hindwing not uniform
 *Ischnura* Charpentier

Female Key

1. Arc situated distinctly distal to distal antenodal nervure, vulver spine absent ; abdomen short (25 mm or less) *Agriocnemis*
 —Arc at the level of distal antenodal nervure or only very slightly distal, vulver spine present or absent 2
2. Ab arises at the level of Ac or only slightly proximal to it, vulver spine present or absent 3
 —Ab arises distinctly distal to the level Ac, vulver spine present 5
3. Pterostigma in forewing distinctly longer than that of hindwing, vulver spine present
 *Aciagrion* Selys
 —Pterostigma in forewing and hindwing equal in length or nearly so, vulver spine absent...
 4
4. Prominent ridge on frontal side of frons present *Ceriagrion* Selys
 —Ridge on frontal side of frons absent
 *Pseudagrion* Selys
5. Labrum narrowly black at base
 *Ischnura* Charpentier
 —Labrum entirely yellow or greenish yellow
 *Enallagma* Charpentier

Genus Ceriagrion Selys

1876. *Ceriagrion* Selys *Bull. Acad. Belg. Sci.*, 42 : 525.
 1933. *Ceriagrion* : Fraser, *Fauna Brit. India, Odon.*, : 313.
 1967. *Ceriagrion* : Asahina, *Jap. J. Zool.*, 15 : 255.

Key to the species of the genus Ceriagrion

1. Abdomen Uniformly dull olivaceous in both sexes *Olivaceum* Laidlaw
 —Abdomen not dull olivaceous but brightly coloured 2

2. Abdomen bright citron yellow without markings *Coromandelianum* Fabricius
 —Abdomen bright red at basal and anal ends, black on dorsum in between
 *Cerinorubellum* (Brauer)

Ceriagrion olivaceum Laidlaw

1914. *Ceriagrion olivaceum* Laidlaw, *Rec. Indian Mus.*, 8 : 345.
 1933. *Ceriagrion olivaceum* : Fraser, *Fauna Brit. India. Odon.*, 1 : 324.
 1967. *Ceriagrion olivaceum olivaceum*, Laidlaw, *Jap. J. Zool.*, 15(3) : 305.
 1967. *Ceriagrion olivaceum auranticum*, Asahina, *Jap. J. Zool.*, 15(3) : 307.

Material : 1 M, Bhalia Avaynagar, Agartala, 3.x. 74, M. S. Shishodia coll.; 1 M, 1 F, Garjee, Udaipur, St. No. 10, 7.xi. 74, M. S. Shishodia coll.; 1 F, Kunjnagar, Teliamura, St. No. 16, 14.xi. 74, M. S. Shishodia coll.

Diagnosis : This species is distinguished from all other species of the genus by its abdomen having uniform dull olivaceous colour in both sexes.

Distribution : INDIA : Tripura (Agartala dist.) ; Assam, Kerala, Manipur, Maharashtra, Uttar Pradesh, West Bengal. Burma, Thailand, Vietnam, Laos, Cambodia and Malaysia.

Remarks : This species inhabits weedy and grassy habitats in vicinity of lotic water body. Fraser (1933) remarked that quite contrary to habits of genus this species "appear to breed in streams."

Ceriagrion coromandelianum (Fabr.)

1798. *Agrion coromandelianum* Fabricius *Ent. Syst. Suppl.*, : 287.
 1842. *Agrion cerinum*, Rambur *Hist. Nat. Ins. Nevrop.*, : 279.
 1876. *Ceriagrion coromandelianum*, Selys, *Bull. Acad. Belg. Sci.*, (2) : 13 : 528.
 1933. *Ceriagrion coromandelianum*, Fraser, *Fauna Brit. India. Odon.*, 1 : 315.

Material : 1 M, Kosilong, Teliamura, Stn. No. 15, xi. 74, M. S. Shishodia and party coll.;

1M, Jaynagar, Agartala, Stn. No. 2, 3.x. 74, M. S. Shishodia coll.; 1F, Mohanpur, Stn. No. 1, W. Tripura, 21. xi. 91, K. K. Ray & party coll.; 1 F, Teliamura, Stn. No. 9, 14.xi.91, K. K. Ray & party coll.; 1 F, Ambassa, Stn. No. 11, N. Tripura, 5.xii. 91, K. K. Ray & party coll.; 1 M, 1 F, Kanchannagar, Stn. No. 7, 29.xi. 91, K. K. Ray & party coll.; 2 MM, 2 FF, Jatanbari, 16.vi. 90, G. N. Saha & party coll.; 1 M, 1 F, Santibazar, S. Tripura, 11.vi. 90, G. N. Saha & party coll.; 1 F, Mohanpur, W. Tripura, 7.vi. 90, G. N. Saha & party coll.; 1 F, Jatanbari, W. Tripura, 12.vi. 90, G. N. Saha & party coll.; 1 M, Maharchapa, W. Tripura, 20.v. 92, B. C. Das & party coll.

Diagnosis : This species is easily distinguished from all other species of the genus by its abdomen being bright citron-yellow without markings, 10-11 postnodal nervures present in fore wing and 9 in the hind wing of male. Segment 10 deeply emarginate on dorsum.

Distribution : INDIA : Tripura (W. Tripura, S. Tripura, Agartala dist.) ; Assam, Andhra Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Mizoram, Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal, Nepal, Sri Lanka, Burma, Malaysia, China, Indonesia and Thailand.

Remarks : It is one of the common species recorded occurring in Tripura and mostly inhabits and breeds in weedy ponds and tanks.

***Ceriagrion cerinorubellum* Brauer**

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

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

Distribution : INDIA : Tripura (Agartala, N. Tripura, S. Tripura, W. Tripura) ; Uttar Pradesh, Maharashtra, Kerala, Tamil Nadu, Bihar, Orissa, Assam, Sri Lanka, Burma, Thailand, Malaysia and Indonesia.

Remarks : This species is included on the basis of the literature review. It is known to occur in colonies. It can be distinguished from all other species of the genus by its beautiful, characterstick combination of colours of abdomen.

Genus *Pseudagrion* Selys

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

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

Key to the species of the genus *Pseudagrion*

1. Face and frons and vertex blue or green and marked with black; superior anal appendage smaller only about half of length of abd. 10., ...***australasia* Selys**
—Face and frons and vertex bright reddish orange or dark ochreous, superior anal appendage as long as abd. 10.
.....***rubriceps rubriceps* Selys**

***Pseudagrion australasiae* Selys**

1876. *Pseudagrion microcephalum* race ? *Bull. Acad. Belg. Sci.*, (2) 42 : 506 (pars).

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

1919. *Pseudagrion bengalense*, Laidlaw, *Rec. Indian Mus.*, 16 : 192.

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

Material : 2 MM, N. Tripura, Ambassa, Stn. No. 11, 5.xi. 91, K. K. Ray & party coll.

Diagnosis : Middle lobe of prothorax with a black crown shaped marking on dorsum. Thorax azure blue, the mid dorsum with a broad black band. Abd. 2 with an elongate vase-shaped spot extending from base to apex. Hind wing longer. Abd. 10 with a X-shaped dorsal marking covering most of the dorsum.

Distribution : INDIA : Tripura (N. Tripura); Assam, Manipur, Meghalaya, West Bengal, Indonesia, Thailand, Malaysia and Australia.

Remarks : This species is comparatively rare. It has similarity with *P. microcephalum* but is distinguishable from the same by having vase-shaped spot instead of goblet-shaped on abdomen 2 and in absence of basal spines.

***Pseudagrion rubriceps rubriceps* Selys**

1876. *Pseudagrion rubriceps* Selys, *Bull. Acad. Belg. Sci.*, (2) 42 : 510.

1933. *Pseudagrion rubriceps*, Fraser, *Fauna Brit. India. Odon.*, 1 : 296.

1953. *Pseudagrion rubriceps rubriceps*, Selys : Lieftinck, *Verh. naturf. Ges. Basel*, 64 : 156.

Material : 1 F, Garjee, Udaipur, Stn. No. 10, 7.xi. 74, M. S. Shishodia & party coll.

Diagnosis : Vertex bright orange. Thorax olivaceous green on dorsum, azure blue on sides. Mid dorsal carina finely black and a thicker black line running close to and parallel with it on each side. Segment 8 of abdomen on dorsum with a triangular mark on apical third.

Distribution : INDIA : Tripura (S. Tripura); Assam, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal. Nepal, Burma, Indochina, Malaysia, Indonesia (Java, Sunda Islands), Taiwan and Philippines.

Remarks : It is known commonly perching on twigs or flying along the edges of water. The male can easily be distinguished from all others by the brilliant reddish orange face.

Aciagrion Selys

1876. *Pseudagrion* Selys, *Bull. Acad. Belg. Sci.*, (2) 42 : 529 (pars).

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

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

No key to the species of the genus *Aciagrion* is provided as it is represented by single species in Tripura.

Aciagrion pallidum Selys

1891. *Aciagrion pallidum* Selys, *Ann. Mus., Genova*, (2) 10(30) : 572.

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

Material : 1 M, Ambassa Forest north, Stn. No. 17, 16.xi. 74, M. S. Shishodia coll.; 1 F, Jamaibari, Teliamura, Stn. No. 14, 12.xi. 74, M. S. Shishodia & party coll.; 1 M, Baxarnagar, Stn. No. 2, 23. xi. 91, K. K. Ray & party coll.

Diagnosis : Head, prothorax and thorax pale brown, but some specimens of both sexes vary from the description by Fraser (1933) in having a fine line at base of anterior lobe and a mid-dorsal black spot on posterior lobe of prothorax.

Distribution : INDIA : Tripura (N. Tripura) ; Arunachal Pradesh, Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Assam, Manipur, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal. Nepal and Burma.

Remarks : This species normally inhabits dry areas amongst grasses of forest and other vegetation, where due to its colouration, it easily mingles with background. This species is scattered, colonies, cropping up in widely separated areas.

Genus *Enallagma* Charpentier

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

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

No key to the species of the genus *Enallagma* is provided as it is represented by single species in Tripura namely *E. parvum* Selys.

Enallagma parvum Selys

1876. *Enallagma parvum* Selys, *Bull. Acad. Belg.*, (2) 41 : 537.

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

Material : 1 F, North Tripura, Khowai, Stn. No. 10, 3.xii. 91, K. K. Ray & party coll.; 1 F, Baxarnagar, Stn. No. 2, 23.xi. 91, K. K. Ray & party coll.; 1 F, W. Tripura, Mohanpur, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.; 1 F, Nr. Khowai, Stn. No. 10, 3.xii. 91, K. K. Ray & party coll.

Diagnosis : Labium white, labrum, anteclypeus pale sky blue. Thorax black on dorsum, very broad antehumeral azure blue stripes narrowly bordered outwardly with black. Segment 2 of abdomen with a broad thistle-shaped dorsal spot extending the whole length of segment.

Distribution : INDIA : Tripura (N. Tripura, S. Tripura & W. Tripura); Meghalaya, Karnataka,

Kerala, Maharashtra, Manipur, Punjab, Uttar Pradesh, West Bengal. Nepal, Burma and Sri Lanka.

Remarks : It is a small damselfly, a character which serves to distinguish it from other species of the same genus. It is known fluttering on the weedy tanks throughout the year.

Genus *Agriocnemis* Selys

1869. *Agriocnemis* Selys, *Pollen and van Dam. Fauna Mad. Ins.*, : 24.

1933. *Agriocnemis* : Fraser, *Fauna Brit. India, Odon.*, 1 : 379-380.

Key to the species of the genus *Agriocnemis*

1. Labrum metallic blue, superior anal appendages shorter than inferiors *femina* (Brauer)
—Labrum non-metallic 2
2. Abdomen pale blue proximally, 4 to 10 unmarked with black *lacteola* Selys
—Abdomen blue heavily marked with black specially 3 to 7 with a broad dorsal black stripe *splendidissima* Laidlaw.

Agriocnemis pygmaea (Ramb.)

1842. *Agrion pygmaeum* Rambur, *Hist. nat. Ins. Nevrop.*, : 278.

1877. *Agriocnemis pygmaea*, Selys, *Syn. Agr. Sme. Legion : Agrion (Suite et fin)* : 52.

1933. *Agriocnemis pygmaea*, Fraser, *Fauna Brit. India, Odon.*, 1 : 398.

Material : 1 M, 1 F, N. Tripura, Khowai, Stn. No. 10, 3.xii. 91, K. K. Ray & party coll.; 2 MM, Baxarnagar, Stn. No. 2, 23.xi. 91, K. K. Ray & party coll.; 2 MM, Santibazar, Stn. No. 5, 27.xi. 91, K. K. Ray & party coll.; 3 MM, 1 F, Mohanpur, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.; 3 FF, Teliamura, Stn. No. 9, 19.xi. 91, K. K. Ray & party coll.; 1 F, Sonamura, Stn. No. 3, 24.xi. 91, K. K. Ray & party coll.; 1 M, Santibazar, 11.vi. 90, K. K. Ray & party coll.; 1 M, 1 F, Nr. Khowai, Stn. No. 10, 3.xii. 91, K. K. Ray & party coll.; 2 MM, Baxarnagar, Stn. No. 2, 23.xi. 91, K. K. Ray & party coll., 2 MM, Santibazar, Stn. No. 5, S. Tripura, 27.xi. 91, K. K. Ray & party coll.; 1 F, Mohanpur, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.; 3 FF,

Teliamura, Stn. No. 9, N. Tripura, 14.xi. 91, K. K. Ray & party coll.; 1 F, Sonamura, Stn. No. 3, 24.xi. 91, K. K. Ray & party coll.; 1 M, Santibazar, S. Tripura, 11.vi. 90, G. N. Saha & party coll.; 2 FF, Jatanbari, S. Tripura, 12.vi. 90, G. N. Saha & party coll.; 1 M, 2 FF, Champaknagar, W. Tripura, 26.vi. 90, G. N. Saha & party coll.; 1 M, Belonia, S. Tripura, 13.v. 92, B. C. Das & party coll.; 1 M, Bidhannagar colony, Ambassa, 20.xii. 91, S. Ahmed & party coll.; 1 M, Bishramgonj, Stn. No. 15, W. Tripura, 15.i. 89, R. S. Barman & party coll.; 2 MM, 1 F, Nalchar, Agartala, Stn. No. 20, W. Tripura, 21.i.89, R. S. Barman & party coll.; 1 F, Chericom, Agartala, Stn. No. 15, 19.i. 89, R. s. Barman & party coll.; 1 F, Kalachera, Agartala, Stn. No. 4, 1.i. 89, R. S. Barman & party coll. ; 1 F, Garjee, Stn. No. 4, 23.ii. 91, G. K. Srivastava & party coll.; 1 F, Khowal, W. Tripura, Stn. No. 10, 4.ii. 91, G. K. Srivastava & party coll.; 1 F, Jadurambari Beat, Stn. No. 8, 1.iii. 91, G. K. Srivastava & party coll.

Diagnosis : Labium brilliant metallic blue. Thorax black on dorsum marked with narrow antehumeral apple-green stripes. Laterally apple green paling to yellow, on ventral side a very small black spot on the upper part of post lateral suture. Abd. 2 with a broad thistle-shaped marking which extends the whole length of the segment confluent at apex with a narrow apical ring.

Distribution : INDIA : Tripura (N. Tripura, S. Tripura & W. Tripura); Assam, Himachal Pradesh, Uttar Pradesh, Madras, Malabar, Meghalaya, Manipur, Nicobar, Punjab, Rajasthan, West Bengal. Nepal, Burma, Sri Lanka, China, Singapore, Malaysia, Indonesia, New Guinea, Taiwan, Philippines, Australia, Islands and Seychelles.

Remarks : It is one of the smallest damselfly found in India. It inhabits wide ranging aquatic ecosystems. Male can be distinguished by different colour in Pterostigma of fore and hind wings and by the reddish coloured of end segments of abdomens. In Tripura it is recorded for North, South and West districts.

***Agriocnemis splendidissima* Laidlaw**

1919. *Agriocnemis splendidissima* Laidlaw, *Rec. Indian Mus.*, 16 : 180.
 1933. *Agriocnemis splendidissima*, Fraser, *Fauna Brit. India. Odon.*, 1 : 392.

Material : 1 F, Jamaibari, Teliamura, Stn. No. 14, 12.xi. 74, M. S. Shishodia coll.

Diagnosis : Comma-shaped blue post ocular spots on occiput. Segment 2 of abdomen with a broad dorsal marking shaped like the head of thistle. Superiors long, narrow curved slightly inwards devoid of ventral spines.

Distribution : INDIA : Tripura (Agartala, N. Tripura), Madhya Pradesh, Maharashtra and Kerala.

Remarks : Frequently inhabits beds of streams in shallows where sprutting aquatic vegetation. It can be distinguished from *A. clauseni* by absence of eye spots on dorsum of segment 2 and also by presence of alternating black and blue stripes on abdomen laterally.

***Agriocnemis lacteola* Selys**

1877. *Agriocnemis lacteola* Selys, *Bull. Acad. Belg. Sci.*, (2) 43 : 144.
 1933. *Agriocnemis lacteola*, Fraser, *Fauna Brit. India. Odon.*, 1 : 381.

Distribution : INDIA : Tripura (N. Tripura), Assam, Bihar, Meghalaya, Sikkim, West Bengal.

Remarks : This species is included on the basis of the literature review. It commonly occurs in grassy lands or paddy fields near river or stagnant water masses.

Genus *Ischnura* Charpentier

1940. *Ischnura* Charpentier, *Lib. Europ.*, : 20.
 1933. *Ischnura* : Fraser, *Fauna Brit. India. Odon.* 1 : 346.

No key to the species of the genus *Ischnura* is provided as it is represented by single species namely *I. aurora* (Brauer).

***Ischnura aurora* (Brauer)**

1858. *Agrion delicatum* Hagen, *Verh. Zool.-bot. Ges. Wien.* 8 : 479.

1865. *Agrion aurora*, Brauer, *Verh. Zool.-bot. Ges. Wien.*, 15 : 510.

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

1954. *Ischnura aurora*, Lieftinek, *Treubia*; 22 : 74.

Material : 7 MM, Mohanpur, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.; 4 MM, Sonamura, Stn. No. 3, K. K. Ray & party coll.; 2 MM, W. Tripura, Bisramgonj, Stn. No. 15, R. S. Barman & party coll.; 1 M, S. district, Sepalijala, Stn. No. 5, 21.iii. 91, G. K. Srivastava & party coll.

Diagnosis : Ground colour of male blue or pale grass green. Labium white. Prothorax & thorax bronzed black on dorsum. Thorax laterally grass green. Pterostigma differing in fore and hind wings, rose red for its proximal half and hyaline in distal half. Abdomen 8-10 entirely arzure blue with black quadrate black dorsal spot.

Distribution : INDIA : Tripura (W. Tripura, S. district); Andhra Pradesh, Himachal Pradesh, Maharashtra, Kerala, Arunachal Pradesh, Assam, Meghalaya, Manipur, Orissa, Bihar, Uttar Pradesh, Punjab, Tamil Nadu, West Bengal. Burma, Sri Lanka, Nepal, China, Malaysia, Philippines, Indonesia, Australia, Sondaic Archipelago, New Zealand and Pacific Islands.

Remarks : It is the commonest species throughout India. It commonly inhabit marshy places but during rainy season they are also recorded over grassy fields in the neighbourhood of stagnant water bodies or slow running streams.

Superfamily CALOPTERYGOIDEA

This superfamily is represented by single family in Tripura viz.; Chlorocyphidae under single genus *Libellago* Selys and by only one species namely *L. lineata lineata* (Burmeister), hence no key is provided for above level of taxa.

Genus *Libellago* Selys

1840. *Libellago* Selys, *Mon. Lib. Eur.*, : 200 (parts).
 1934. *Libellago* : Fraser, *Fauna Brit. India, Odon.* 2 : 53.
 1842. *Micromerus* : Rambur, *Hist. nat. Ins. Nevrop.*, : 238.

Libellago l. lineata (Burmeister)

1839. *Calopteryx lineata* Burmeister, *Handb. Ent.* 2 : 826.
 1840. *Libellago lineata*, (Burmeister) Selys, *Mon. Lib. Eur.*, : 200.
 1934. *Libellago l. lineata*, Fraser, *Fauna Brit. India. Odon.*, 2 : 60.

Material : 1 M, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia & Party coll.; 3 MM, 2 FF, Garjee, Udaipur, Stn. No. 10, 7.xi. 74, M. S. Shishodia & party coll.

Diagnosis : Labrum marked with yellow. Anterior facet of epistome blue-black metallic. Frons with two transverse oval yellow spots near middle line. Thorax black marked with citron yellow. The mesepimeron shows triangular invasion of black above.

Distribution : INDIA: Tripura (Agartala, S. Tripura); Assam, Himachal Pradesh, Kerala, Maharashtra, Meghalaya, Tamil Nadu, Uttar Pradesh, West Bengal. Burma, Thailand, Vietnam, Malaysia and Indonesia.

Remarks : The species is commonly found in comparatively open habitat in vicinity of streams or rivers with clear water.

Family CALOPTERYGIDAE

Subfamily CALOPTERYGINAE

This family is represented in Tripura by single subfamily CALOPTERYGINAE and two species under genus *Vestalis* Selys namely *V. g. gracilis* (Rambur) and *V. smaragdina* (Selys). Hence no key is provided for the subfamilies and at generic level. However key to above mentioned 2 species is given under genus.

Genus *Vestalis*

1953. *Vestalis* Selys, *Syn. Cal.*, 24.
 1934. *Vestalis* : Fraser, *Fauna Brit. India. Odon.*, 2 : 124.

Key to the species of the genus Vestalis

1. Wing tinted uniformly with golden yellow ...
*Smaragdina* Selys
 —Wings untinted or only partly so
*g. gracilis* (Rambur)

Vestalis smaragdina Selys

1879. *Vestalis smaragdina* Selys, *Bull. Acad. Belg.* (2) XLvii : 362.
 1934. *Vestalis smaragdina*, Fraser, *Fauna Brit. India. Odon.*, 2 : 133.

Material : 1 M, Bankar, Belonia, Stn. No. 13, 2.x. 77, N. Muralidharan & Party coll.

Diagnosis : Prothorax and thorax metallic emerald-green with blue reflection on dorsum of thorax. Abdomen metallic emerald green on dorsum and sides. Wings hyaline, yellow at base. Segment 10 neither keeled nor spined. Inferior anal appendages about 2/3 the length of superiors, slender and ending in an acute inwardly directed spine.

Distribution : INDIA : Tripura (S. Tripura) ; Assam, Meghalaya, West Bengal. Burma and Tibet.

Remarks : Wings are wholly hyaline but tinted with golden yellow with iridescence of colour of mother of pearl or blue as in *V. gracilis gracilis*.

Vestalis g. 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.
 1939. *Vestalis gracilis gracilis*, Fraser, *Fauna Brit. India. Odon.*, 2 : 126.

Material : 1 F, Jamircheulia, Manu, Stn. No. 25, 2.xi. 74, M. S. Shishodia & party coll.

Diagnosis : Major part of head, on dorsum of thorax and abdomen metallic green. Wings hyaline, iridescent with colours of mother of pearl or blue in some lights, especially central parts of fore wings. Discoidal cell traversed 4-6 times in fore and 3-5 in hind wing. Segment 10 with a robust keel at the apical end.

Distribution : INDIA : Tripura (N. Tripura) Assam, Andhra Pradesh, Gujrat, Karnataka, Kerala, Maharashtra, Meghalaya, Tamil Nadu, West Bengal. Burma, Thailand, Vietnam and Malaysia.

Remarks : They are found commonly along montane and submontane streams. This species is distinguishable from *V. smaragdina* in having untinted wings.

Suborder ANISOPTERA

Superfamily AESHNOIDEA

This superfamily has single representative family namely Gomphidae in Tripura.

No key to the subfamilies of Gomphidae is provided as there is single subfamily represented in Tripura namely Gomphinae under this subfamily only single genus *Paragomphus* Cowley and single species *P. lineatus* (Selys) are known to occur in Tripura.

Genus *Paragomphus* Cowley

1905. *Mesogomphus* Forster, *Jahrb. Narsam ver Naturk., Wiesb.* 59 : 323.

1934. *Mesogomphus* : Fraser, *Fauna Brit. India, Odon.*, 2 : 228.

1934. *Paragomphus* : Cowley, *Entomologist.*, 67 : 201.

No key to the species of the genus *Paragomphus* is provided as the genus has sole representative species *P. lineatus* (Selys) in Tripura.

Paragomphus lineatus Selys

1850. *Comphus lineatus* Selys, *Rev. Odon.* : 386.

1924. *Mesogomphus lineatus*, Fraser, *Rec. Indian Mus.*, 26 : 477.

1934. *Mesogomphus lineatus* : Fraser, *Fauna Brit. India, Odon.*, 2 : 230.

Material : 1 M, Garjee, Udaipur, 4.xi. 74, M. S. Shishodia & party coll.

Diagnosis : Major part of head yellow, occiput raised into a slight point at its centre. Thorax sandy yellow marked with dark brown. A line on the humeral suture and two lateral lines close together these three are parallel. Wings hyaline, costa yellow as far as pterostigma. Abdomen 2 with a sub-dorsal black line on each side enclosing a dorsal bilobed yellow spot; 3-7 with broad black apical ring, 8 & 9 with wide dilations on their sides. Anal appendages sandy yellow.

Distribution : INDIA : Tripura (S. Tripura); Meghalaya, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh West Bengal. Nepal and Burma.

Remarks : These are found near streams and inhabits both lotic and lentic water bodies. It is distinguished from *M. henryi* Laidlaw in anal appendages being dull sandy yellow instead of blackish brown.

Superfamily LIBELLULOIDEA

Family LIBELLULIDAE

This family has been, though, divided in 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 Lahiri (1987). It is, therefore, considered best to treat all representative genera known from Tripura under the family Libellulidae. The family is represented in Tripura by 20 species under 12 genera.

Key to the genera of the family
LIBELLULIDAE

1. Borders of anal loop running on to meet posterior border of wing, apex of loop open. Abdomen broad at base, male with an opalescent white spot in the centre of hind wing *Tholymis* Hagen
—Borders of anal loop converging and meeting before posterior border of wing, apex of loop closed; Abd. not broad at base like above, opalescent white spot absent .2
2. Distal antenodal nervure in forewing complete 3
—Distal antenodal nervure in forewing in complete 5
3. Frons metallic above
..... *Brachydiplax* Brauer
—Frons non-metallic above 4
4. Only 6 antenodal nervures in forewing ; abd. 1-6 dilated, 7-10 abruptly slender and cylindrical *Acisoma* Rambur.

- Never less than 12 antenodal nervures in fore wing; shape of abdomen differs from above ***Orthetrum*** Newman
5. Lobe of prothorax large and fringed with long hairs 6
- Lobe of prothorax small, normally not fringed with long hairs 7
6. Eyes contiguous for a short space; discoidal cell in hindwing entire; frons non-metallic above ***Diplacodes*** Kirby
- Eyes more broadly contiguous ; discoidal cell in hind wing traversed; frons metallic above ***Palpopleura*** Rambur
7. Discoidal field in fore wing with borders covering strongly at wing margin 8
- Discoidal field with borders parallel or widely divergent at wing margin 9
8. Discoidal cell in forewing very narrow; a conspicuous supplementary nervure (IR ii) present between Rii and R iii ***Pantala*** Hagen
- Discoidal cell in forewing broader; no supplementary nervure IRii present between Rii and Riii ***Trithemis*** Brauer
9. Wings coloured amber yellow at base or more broadly dark reddish brown, more than 1 cubital nervure in all wings ***Neurothemis*** Brauer
- Wings usually uncoloured or but a small basal yellow marking in hindwing (except abroad medial fascia of in *Brachythemis*); only 1 cubital nervure in all wings 10
10. Red or ochreous species with basal or medial yellow markings to wings 11
- Variably coloured species; are situated between the first and second antenodal nervures; 2 rows of cells between IRiii and R spl ***Potamarcha*** Karsch
11. Wings with small basal yellow markings, Eye contiguous for short distance; face and frons red; $9\frac{1}{2}$ to $10\frac{1}{2}$ antenodal in forewing ***Crocothemis*** Brauer

—Wings with broad reddish yellow medial fascia, face and abdomen never red; eyes broadly contiguous; $6\frac{1}{2}$ to $7\frac{1}{2}$ antenodal nervure to forewing ***Brachythemis*** Brauer.

Genus *Tholymis* Hagen

1867. *Tholymis* Hagen, *Ent. Ztg.* 28 : 221.

1936. *Tholymis* : Fraser, *Fauna Brit. India, Odon.*, 3 : 410.

No key to the species of the Genus *Tholymis* Hagen is provided as this genus is represented not only in Tripura but India as well by single species namely *T. tillarga* (Fabricius).

Tholymis tillarga (Fabricius)

1798. *Libellula tillarga* Fabricius, *Suppl. Ent. Syst.*, : 285.

1890. *Tholymis tillarga*, Kirby, *Syn. Cat. Neur. Odon.*, : 1.

1936. *Tholymis tillarga*, Fraser, *Fauna Brit. India, Odon.*, 3 : 411.

Material : 1 M, Mainama Manu, 23.xi. 74, M. S. Shishodia & party coll.; 1 M, 1 Km. of Ambassa, F. R. H., Stn. No. 25, 28.x. 77, N. Muraleedharan & party coll.; 2 FF, Gamaibari, Teliamura, Stn. No. 14, M. S. Shishodia & party coll.; 1 M, Dolobari, Ambassa, Stn. No. 19, 18.xi. 74, M. S. Shishodia & party coll.; 1 M, N. Tripura, Teliamura, Stn. No. 9, 2.xii. 91, K. K. Ray & party coll.; 1 F, Tripura, Singer bill, 10.v. 92, B. C. Das & party coll.; 1 F, Tripura, Agartala, Cherikom, Stn. No. 18, 19.i. 89, R. S. Barman & party coll.

Diagnosis : Face and frons olivaceous. Thorax olivaceous with bright reddish suffusion on dorsum. Wings hyaline and with a broad fan-shaped smoky golden brown fascia from node to base of hind wing and this fascia bordered distally by a oval opalescent white spot. With this spot and brown fascia it can be distinguished from all other similiar looking species even in field, specially if they are perching or flying against dark background.

Distribution : INDIA : Tripura (Agartala, N. Tripura); Assam, Bihar, Himachal Pradesh,

Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh, Punjab, West Bengal. Sri Lanka, Burma, Thailand, Indonesia, Malaysia, Australia, Philippines, Taiwan, Africa, Madagascar and Pacific Islands.

Remarks : This species is more commonly known to occur at lower altitude. They are found usually before dusk and swiftly moving over stagnant water body or slow running streams.

Genus *Brachydiplax* Brauer

1868. *Brachydiplax* Brauer, *Verh. Zool. bot. Ges. Wien.*, 18 : 172.

1936. *Brachydiplax* : Fraser, *Fauna Brit. India. Odon.*, 3 : 323.

No key to the species of the genus *Brachydiplax* is provided as it has its sole representative species in Tripura, namely *B. sobrina* (Rambur).

Brachydiplax sobrina (Rambur)

1842. *Libellula sobrina* Rambur, *Hist. nat. Ins. Nevrop.*, : 114.

1893. *Brachydiplax sobrina*, Kirby, *J. Linn. Soc. Zool.* 24 : 551.

1936. *Brachydiplax sobrina*, Fraser, *Fauna Brit. India, Odon.*, 3 : 325.

Material : 1 F, Ambassa forest north, Stn. No. 17, 16.x. 74, M. S. Shishodia & party coll.

Diagnosis : Face and frons creamy white, frons metallic blue above. Vesicle metallic blue. Thorax greenish yellow with metallic markings obscured by thin pruinescence and denser on dorsum. Wings hyaline and uncoloured. Antenodal nervures in fore wing vary from 5 to 7. Abdomen black but marked with yellow in subadults. Conspicuously large and prominent genitalia also distinguishes it, in contrast minute, barely visible of *B. farinosa* Kruger.

Distribution : INDIA : Tripura (N. Tripura); Assam, Meghalaya, Karnataka, Kerala, Himachal Pradesh; Maharashtra, Uttar Pradesh, Orissa, Punjab, West Bengal. Burma, Sri Lanka, Thailand, Vietnam, Nepal and Bangladesh.

Remarks : Teneral males and females of this species known to rest on all trees in close proximity of concerned water body and adult males are plying over water.

Genus *Acisoma* Rambur

1842. *Acisoma* Rambur, *Hist. nat. Ins. Nevrop* : 28.

1936. *Acisoma* : Fraser, *Fauna Brit. India, Odon.*, 3 : 329.

No key to the species of the genus *Acisoma* is provided as this genus is represented not only in Tripura but India also by single species namely *A. panorpoides panorpoides* Rambur.

Acisoma panorpoides panorpoides Rambur

1842. *Acisoma panorpoides* Rambur, *Hist. nat. Ins. Nevrop.*, : 28.

1911. *Acisoma panorpoides panorpoides*, Ris. *Cat. Coll. Selys* 12 : 456.

1936. *Acisoma panorpoides panorpoides*, Fraser, *Fauna Brit. India. Odon.*, 3 : 330.

Material : 1 M, Bhlia, Ayaynagar, Agartala, 31.x. 74, M. S. Shishodia & party coll.; 2 FF, S. Tripura, santibazar, 11.vi. 90, G. N. Saha & party coll.; 1 M, 1 F, W. Tripura, Champaknagar, 27.vi. 90, G. N. Saha & party coll.

Diagnosis : Face and frons palest anzure-blue. Thorax anzure-blue marbled with black. Wings hyaline. Abdomen azure blue marked with black. Segments 1 to 5 with sutures finely & ventral borders broadly black. A speckled strip on sub-dorsum of segments 1 to 4 interrupted irregularly. Superior anal appendage long and acute at apex. Interior very broadly triangular. The shape of abdomen 1-6 conspicuously dilated laterally and dorsoventrally, which at once distinguishes it from other somewhat similar looking species even in field.

Distribution : INDIA : Tripura (Agartala, S. Tripura, W. Tripura); Assam, Arunachal Pradesh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Remarks : This is the smallest species of the genus but conspicuously robust. It inhabits heavily weeded tanks and lakes.

1936. *Orthetrum sabina*, Fraser, *Fauna Brit. India, Odon.*, 3 : 300.

1942. *Orthetrum sabina sabina*, (Drury) : Lieftinck, *Treubia*, 18 : 475.

Material : 1 M, 2 FF, Bhangashala, Agartala, 2.xi. 74, M. S. Shishodia coll.; 1 M, 1 F, Garjee, East Udaipur, 8.xi. 74, M. S. Shishodia & party coll.; 1 M, 3 FF, Kanchannagar, Ambassa, 20.xi. 74, M. S. Shishodia and party coll.; 1 M, Sujan Saia, Garjee, 6.xi. 74, M. S. Shishodia & party coll.; 1 M, 1 F, Jamircheulia, Manu, 25.xi. 74, M. S. Shishodia & party coll.; 1 M, 1 F, Gola Bari, Teliamura, 11.xi. 74, M. S. Shishodia and party coll.; 3 MM, 2 FF, Jamai Bari, Teliamura, 12.xi. 74, M. S. Shishodia & party coll.; 3 MM, 1 F, Kosilong, Teliamura, 13.xi. 74, M. S. Shishodia & party coll.; 3 MM, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia and party coll.; 5 MM, Bhatia Nagar, Agartala, 31.x. 74, M. S. Shishodia & party coll.; 1 M, 1 F, Dabani, Ambassa, 18.xi. 74, M. S. Shishodia and party coll.; 1 M, Jaynagar, Agartala, 30.x. 74, M. S. Shishodia and party coll.; 2 MM Kalachera, Agartala, 20.xi. 74, M. S. Shishodia & party coll.; 2 MM, 1 F, Raja Nagar, Agartala, 30.x. 74, M. S. Shishodia & party coll.; 2 MM, 1 F, Banga Saia, Agartala, 2.xi. 74, M. S. Shishodia & party coll.; 1 M, Garjee Choia Forest, Udaipur, 5.xi. 74, M. S. Shishodia & party coll.; 1 M, Bhalia Avaynagar, Agartala, Stn. No. 4, 31.x. 74, M.S. Shishodia & party coll.; 1 M, 1 F, Mainama, Manu, Stn. No. 23, 23.xi. 74, M. S. Shishodia & party coll.; 1 M, M. B. B. College area, Agartala, Stn. No. 5, M. S. Shishodia & party coll.; 1 M, Mainachera, S. Tripura, Stn. No. 1, 27.ix. 77, N. Muraleedharan & party coll.; 1 F, Netaji palli, Belonia, Stn. No. 14, 3.x. 77, N. Muraleedharan & party coll.; 1 M, Gamartilla, Teliamura, Stn. No. 17, 19.x. 77, N. Muraleedharan & party coll.; 1 M, Bankar, Belonia, Stn. No. 13, 2. x. 77, N. Muraleedharan & party coll.; 1 M, Sonaichhani, S. Tripura, Stn. No. 6, 29.x. 77, N. Muraleedharan & party coll.; 1 M, Sujannaia, S. Tripura, Stn. No. 3, 28.xi. 77, N. Muraleedharan & party coll.; 1 M, Chandrapur, S. Tripura, Stn. No. 17, 7.x. 77, N. Muraleedharan & party coll.; 1 M, Chinibazar Kailash Sahar, 2.x. 77, N. Muraleedharan & party coll.; 2 FF

Khasiamangal, Teliamura, Stn. No. 20, 22.x. 77, N. Muraleedharan & party coll.; 1 M, Kunjaban, Agartala, 9.xi. 69, V. C. Agarwal & party coll.; 1 M, Dhumchera, Manu, Stn. No. 24, 24.xi. 74, M. S. Shishodia & party coll.; 1 M, Bajra Babi, S. Tripura, Stn. No. 16, 6.x. 74, M. S. Shishodia & party coll.; 1 M, Soniachera, S. Tripura, Stn. No. 6, 29.ix. 74, M. S. Shishodia and party coll.; 1 M, 1 F, Tripura, Gargi, Stn. No. 8, 30.xi. 81, K. K. Ray and party coll.; 1 M, 2 FF, Takarjala, Stn. No. 4, 25.xi. 91, K. K. Ray & party coll.; 1 M, 1 F, Tripura, Baxarnagar, Stn. No. 2, 23.xi. 91, K. K. Ray & party coll.; 1 M, Tripura, Ambassa, Stn. No. 12, 5.xii. 91, K. K. Ray & party coll.; 1 F, Simma, Stn. No. 13, 6.xii. 91, K. K. Ray & party coll.; 1 M, S. Tripura, Bagma, 17.vi. 90, G. N. Saha & party coll.; 1 F, Nutan Bazar, 13.vi. 90, G. N. Saha & party coll.; 2 FF, Sonamura, 16.vi. 90, G. N. Saha & party coll.; 1 F, W. Tripura, Mahadebtilla, 22.vi. 90, G. N. Saha & party coll.; 1 F, S. Tripura, Amarpur, 12.vi. 90, G. N. Saha & party coll.; 1 M, Tripura, Udaipur, Chanban, 17.v. 92, B. C. Das & party coll.; 1 M, Belonia, S. Tripura, 13.v. 92, B. C. Das & party coll.; 1 F, Bishramgonj, Agartala, Stn. NO. 15, 6.i. 89, R. S. Barman & party coll.; 1 F, S. Tripura, Belonia, Stn. No. 6, 25.ii. 91, G. K. Srivastava & party coll.

Diagnosis : Face & frons yellowish. Frons very deeply notched so as to form two triangular sacets in front. Thorax greenish yellow marked with black. Sutures of thorax are allfinely black. Abdomen greenish-yellow and marked with black. Abdomen enormously swollen at base and then abruptly slimmed and compressed laterally to the end. Anal appendages with a row of very small black teeth or spines below superiors.

Distribution : INDIA : Tripura (W. Tripura, S. Tripura, N. Tripura, Agartala); Assam, Bihar, Himachal Pradesh, Manipur, Punjab, Uttar Pradesh, West Bengal. Burma, Sri Lanka, Siam and Samoa.

Remarks : This is one of the commonly occuring species ; certainly so among the species of the genus. It is the most predaceous of all dragonflies. It can be distinguished easily from

all other Indian species of genus *Orthetrum* by its enormously swollen basal abdomen segments.

***Orthetrum glaucum* (Brauer)**

1865. *Libellula glauca* Brauer, *Verh. Zool. bot-Ges. Wien.*, 15 : 1012.
 1890. *Orthetrum glaucum*, (Brauer), Kirby, *Syn. Cat. Naur. Odon.*, : 39.
 1936. *Orthetrum glaucum*, Fraser, *Fauna Brit. India, Odon.*, 3 : 307.
 1987. *Orthetrum glaucum* : Lahiri, *Rec. zool. Surv. India, Occ. paper* No. 99 : 179.

Material : 2 FF, Jamir Cheulia, Manu, 25.xi. 74, M. S. Shishodia & party coll.; 1 F, Jamai Bari, Teliamura, 12.xi. 74, M. S. Shishodia & party coll.; 1 F, Brana Nagra, Teliamura, 10.xi. 74, M. S. Shishodia & party coll.; 1 F, Garjee forest, 5.xi. 74, M. S. Shishodia & party coll.; 1 M, Rajnagar, Agartala, 30.xi. 74, M. S. Shishodia & party coll.

Diagnosis : Moderately large species with face black. Whole of the frons glossy black. Abdomen ventrodorsally dilated at segments 1 to 3 and then very slim and of even width to the end. Anal appendages black.

Distribution : INDIA : Tripura (Agartala, N. Tripura, S. Tripura); Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Mizoram, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal. Nepal, China, Sri Lanka, Burma, Thailand, Malaysia, Indonesia, New Guinea and Philippines.

Remarks : This species is strictly montane. It prefers paddy field. It is known to occur upto an altitude of 1500 metres. It differs from *O. triangulare* by having longer and much narrower abdomen, dull-coloured thorax and absence of triangular black mark at base of hind wing.

***Orthetrum b. brunneum* (Fonscolombe)**

1837. *Libellula brumea* Fonscolombe, *Ann. Soc. Ent. Frans*, 6 : 141, pl. 6, fig. 3.
 1872. *Orthetrum brunneum*, Selys, *Ann. Soc. Ent. Belg.* 15, 27.
 1909. *Orthetrum brunneum brunneum*, Ris, *Cat. Coll. Selys. fase.* 9, 178, 188, 191.

1936. *Orthetrum brunneum brunneum*, Fraser, *Fauna Brit. India, Odon.*, : 294.

Material : 1 M, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia & party coll.

Diagnosis : Moderately large species. Face dark brown. Membrane pure white. Vesicle distinctly notched into two tubercles. Prothorax, thorax and abdomen all pruinose blue. Abdomen laterally and dorsoventrally broad at base and tapered gradually to as far as anal end.

Distribution : INDIA : Tripura (Agartala); Meghalaya, Jammu & Kashmir. South Europe, North Africa, Asia, Iraq, Afghanistan, Pakistan and Burma.

Remarks : This species resembles closely in appearance to *O. anceps* but may be distinguished by the double row of cells between IRiii & Rspl and also by the shape of genitalia in which the notch between the curved hamule and broad foliate base is very deep; in contrast to that of *O. anceps*.

Genus *Diplacodes* Kirby

1899. *Diplacodes* Kirby, *Trans. Zool. Soc. London*, 12 : 307.
 1936. *Diplacodes*, Fraser, *Fauna Brit. India. Odon.*, 3 : 331.

No key to the species of the genus *Diplacodes* is provided as it is represented by single species in Tripura namely *D. trivialis* Rambur.

***Diplacodes trivialis* Rambur**

1842. *Libellula trivialis* Rambur, *Hist. nat. 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 : 1 F, Ambassa forest north, Stn. No. 17, 16.xi. 74, M. S. Shishodia & party coll.; 1 F, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia & party coll.; 1 F, Dolobari, Ambassa, 18.xi. 74, M.S. Shishodia & party coll.; 1 F,

Bramachara, Teliamura, 10.xi. 74, M. S. Shishodia & party coll.; 1 F, Kosilong, Teliamura, 13.xi. 74, M. S. Shishodia & party coll.; 1 F, Jaynagar, Agartala, 30.x. 74, M. S. Shishodia & party coll.; 1 M, Rajnagar, Agartala, 30.x. 74, M. S. Shishodia & party coll.; 1 F, Dalamani, Agartala, 18.xi. 74, M. S. Shishodia & party coll.; 1 F, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia & party coll.; 1 M, Bharmishala, Agartala, 2.xi. 74, M. S. Shishodia & party coll.; 1 F, Bhalia Avaynagar, Agartala, Stn. No. 4, 3.xi. 74, M. S. Shishodia & party coll.; 1 M, Kanchannagar, Ambassa, 20.xi. 74, M. S. Shishodia & party coll.; 1 M, Meichera, S. Tripura, 27. ix. 77, N. Muraleedharan & party coll.; 2 MM, 1 Km. S. E. of Belonia, F. R. H. S., Tripura, 1.x. 77, N. Muraleedharan & party coll.; 1M, Kunjmura, Teliamura 14.xi. 74, M. S. Shishodia & party coll.; 1 M, Chanilong, Stn. No. 6, 15.xi. 68, V. C. Agarwal & party coll.; 1 M, Banbar, S. Tripura, 16.x. 74, M. S. Shishodia & party coll.; 1 M, Tripura, Takarjala, Stn. No. 4, 25.xi. 91, K. K. Ray & party coll.; 1 F, Tripura, Kanchannagar, Stn. No. 7, 29.xi. 91, K. K. Ray and party coll.; 1 F, Tripura, Gargi, Stn. No. 8, 30.xi. 91, K. K. Ray & party coll.; 1 F, Baxarnagar, Stn. No. 2, 23.xi. 91, K. K. Ray & party coll.; 1 M, W. Tripura, Mohanpur, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.; 1 F, S. Tripura, Sonamura, 16.vi. 90, G. N. Saha & party coll.; 1 M, Tripura, Mahadebta, 22.vi. 90, G. N. Saha & party coll.; 2 FF, Tripura, Udaipur, Chanhan, 17. v. 92, B. C. Das & party coll.; 1 F, S. Tripura, Belonia, 13.v. 92, B. C. Das & party coll.; 1 F, Kabirajtila, Agartala, Stn. No. 2, 30.xii. 88, R. S. Barman & party coll.

Diagnosis : Face, frons and vesicle palest azure-blue. Thorax greenish yellow with sutures black. Wings uncoloured except base. Anal appendages yellow.

Distribution : INDIA : Tripura (Agartala, N. Tripura, S. Tripura, W. Tripura); Andaman, Andhra Pradesh, Himachal Pradesh, Kerala, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Manipur, Orissa, Uttar Pradesh, Tamil Nadu, W. Bengal. Sri Lanka, Burma, Vietnam, China, Thailand, New China, Malaysia, Indonesia,

Japan, Philippines, Pacific Islands, Australia, Ryudyus, Iraq and Seycheiies.

Remarks : This is the commonest dragonfly found throughout the year near water bodies. Sometimes also seen in the grassy vegetation. It occurs in plains as well as upto an altitude of 2500 metres. This can be differentiated from other species of the genus by the presence of clear wings without apical and basal markings, creamy white anal appendages and deep pruinescence in adult age.

Genus *Palpopleura* Rambur

1842. *Palpopleura* Rambur, *Ins. Nevrop.*, 26, 129.

1936. *Palpopleura* Rambur, Fraser, *Fauna Brit. India. Odon.*, (3) : 316.

No key to the species of the genus *Palpopleura* is provided as it is represented not only in Tripura but India as well by single species namely *P. S. sexmaculata*.

Palpopleura s. 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 : 2 FF, Golobari, Ambassa Stn., alt. 250 m., 18.ii. 74, M. S. Shishodia & party coll.; 1 M, 1 F, Garoe east, Udaipur, 8. xi. 74, M. S. Shishodia & party coll.; 1 F, Jamir cheulia, Manu, 25.xi. 74, M. S. Shishodia & party coll.; 1 F, Ambassa forest, South, 17.xi. 74, M.S. Shishodia & party coll.; 1 M, Ambassa forest, North, 16.xi. 74, M. S. Shishodia & party coll.; 1 F, Pratapgarh, Agartala, Stn. No. 1, 29.x. 74, M. S. Shishodia & party coll.; 1 F, Kanilong, Teliamura, Stn. No. 15, 13.xi. 74, M. S. Shishodia & party coll.; 1 F, Kanchannagar, Ambassa, Stn. No. 21, 20.xi. 74, M. S. Shishodia & party coll.; 1 M, Hathalia Stn. No. 17, 12.v. 69, V.C. Agarwal and party coll.; 1 F, Kalachera, Ambassa, Stn. No. 21, 20. xi. 74, M. S. Shishodia & party coll.; 1 M, Shipur, S. Tripura, 30.ix. 74, M. S. Shishodia & party coll.; 1 M, 1 F, Belonia, Stn. No. 6, 28.xi. 91, K. K.

Ray & party coll.; 1 F, Mahadebtila, W. Tripura, 22.vi. 90, G. N. Saha, & party coll.; 1 F, Selama, N. Tripura, 26.v. 92, B. C. Das & party coll. 1 M, 1 F, Chakma Forest, 6 Km. N. of Teliamura, F. R. H., W. Tripura, Stn. No. 3, 15.xii. 91, S. Ahmed and R. Kulin party coll.; 1 M, Santibazar, S. district, Stn. No. 3, 23.ii. 91, G. K. Srivastava & party coll. 1 M, 2 FF, Khowal, W. Tripura, Stn. No. 10, 4.iii. 91, G. K. Srivastava & party coll.; 1 M, 3 FF, Amarapur, S. Tripura, Stn. No. 11, 5.ii. 91, G. K. Srivastava & party coll.; 1 M, Sepaeijala, S. district, Stn. No. 5, 24.ii. 91, G. K. Srivastava & party coll.; 1M, 1 F, Champaknagar, Stn. No. 13,8.iii. 91, G. K. Srivastava & party coll.

Diagnosis : Small species. Frons and Vesicle brilliant metallic blue. Thorax greenish yellow marked with dark brown and black. Wings hyaline, marked with black. Hind wings tinted with yellow from base to proximal end of pterostigma. A black spot at node of fore wing covering $\frac{1}{2}$ to $1\frac{1}{2}$ cells proximal to node. 3 black streaks in the basal half of wing. These are in the sub-costal space between sector of arc and in the cubital space.

Distribution : INDIA : Tripura (W. Tripura, S. Tripura and N. Tripura, Agartala); Assam, Bihar, Tamil Nadu, Andhra Pradesh, Himachal Pradesh, Kerala, Karnataka, Maharashtra, Manipur, Mezorom, Punjab, Sikkim, Uttar Pradesh, W. Bengal. Nepal, Burma, Malaysia, China, Tibet, Sri Lanka and Vietnam.

Remarks : This species is characterised in having 3 black streaks in the basal half of wing and a black spot at node of fore wing covering $\frac{1}{2}$ to $1\frac{1}{2}$ cells proximal to node. They usually occur in large number near open grassland.

Genus *Pantala* Hagen

1861. *Pantala* Hagen *Syn. Neur. Amer.*, 141.

1936. *Pantala*, Fraser, *Fauna Brit. India, Odon.*, 3 : 413.

No key to the species of the genus *Pantala* is provided as it is represented not only in Tripura but also India as well as by single species namely *P. flavescens* (Fabricius).

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 M, 1 F, Kanchannagar, Ambassa, 20.xi. 74, M. S. Shishodia & party coll.; 1 M, Jamircheulia, Manu, 29.xi. 74, M. S. Shishodia & party coll.; 1 F, Rajnagar, Agartala, 30.x. 74, M. S. Shishodia & party coll.; 1 F, Dhumachera, Manu, 24.xi. 74, M. S. Shishodia & party coll.; 1 M, Rajnagar, Agartala, 30.x. 74, M. S. Shishodia & party coll.; 2 FF, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia & party coll.; 1 M, Chakmaghat, Teliamura, Stn. No. 21, 23.x. 77, N. Muraleedharan & party coll.; 1 F, S. district, Sepalijala, Stn. No. 5, 24. ii. 91, G. K. Srivastava & party coll.

Diagnosis : Large sized species and of robust build labium pale brown. Frons bright golden yellow. Prothorax with a transverse belt of dark brown between anterior and middle lobes. Thorax olivaceous, covered with yellowish hair. Wings hyaline, base of wing pale golden yellow upto anal loop. IRiii and Riii wavy in their length. Abdomen ochreous and dorsum tinted with brick red.

Distribution : INDIA : Tripura (Agartala, N. Tripura, S. district); Himachal Pradesh, Meghalaya, Punjab, Rajasthan, Uttar Pradesh, West Bengal. Nepal, Sri Lanka, Burma, Ceylon, Tibet, Thailand, Indonesia, China and Malaysia.

Remarks : This species is commonly found in large swarms. It is known to inhabit marshes and weedy tanks, specially in submontane areas and among the foothills. Only one row of cells present between IRiii & RSPL in fore wing and two in hind wing.

Genus *Trithemis* Brauer

1868. *Trithemis* Brauer, *Verh. Zool.-bot. Ges. Wien*, 18 : 176.

1936. *Trithemis*, Fraser, *Fauna Brit. India. Odon.*, 3 : 381.

Key to the species of the genus Trithemis

1. Legs very long and spidery; pterostigma bicolorous, body yellow marked with black ...
.....*pallidinerves* (Kirby)
—Legs of ordinary length; pterostigma unicolourous; body colour variable 2
2. Neuration yellow. Thorax and abdomen bright vermilion-red; base of hindwing bright orange
.....*kirbyi kirbyi* Selys
Neuration crimson; thorax and abdomen violaceous, crimson; base of hind-wing with small reddish brown spot
.....*aurora* (Burmeister)

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.

Material : 1 F, W. Tripura, Mohanpur, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.

Diagnosis : Upper surface of frons and vesicle metallic purple. A dark brown triangle on mid-dorsum of thorax and three black stripes on each side. Wings hyaline and a bright amber-yellow basal marking at extreme base of fore-wing. Legs long and spidery pterostigma bicolorous. It can be differentiated from other species of the genus by having bicolorous pterostigma (black with creamy white ends).

Distribution : INDIA : Tripura (W. Tripura); Assam, Meghalaya, Andhra Pradesh, Gujrat, Himachal Pradesh, Bihar, Kerala, Karnataka, Maharashtra, Orissa, Punjab, Nagaland, Uttar Pradesh, West Bengal. Sri Lanka, Nepal, Burma, Tibet, Malaysia, Indonesia, Philippines, Taiwan, Thailand and Singapore.

Remarks : It is the largest species of the genus *Trithemis*. This species is found all the year round. These are known to inhabit stagnant water and marshy zones.

Trithemis kirbyi kirbyi Selys

1886. *Trithemis aurora* Kirby (Pars.), *Proc. Zool. Soc. London* : 327.
1912. *Trithemis kirbyi kirbyi*, Ris, *Cat. Coll. Selys*, 14 : 760.
1936. *Trithemis kirbyi kirbyi*, Fraser, *Fauna Brit. India. Odon.*, 3 : 385.

Material : 1 M, West of F. R. H. at Ambassa, N. Tripura, Stn. No. 8, 21.xii. 91, S. Ahmed and party coll.; 1 M, N. Tripura, West of F. R. H. at Ambassa, 21.xii. 91, S. Ahmed & R. Kulin coll.

Diagnosis : Frons & vesicle yellow. Frons with rosy-red bluish on crest and above. Thorax golden brown tinted with rose-red on dorsal, humeral & metepimeral areas. Wings hyaline and neuration bright red. Base of hind wing bright orange. Abdomen vermillion-red. Anal appendages bright red.

Distribution : INDIA : Tripura (N. Tripura); Karnataka, West Bengal and Sri Lanka.

Remarks : It is one of the commonly occurring species of the genus. Males are known to rest on slab, rock are rare while female settled on bushes far from water. This species can be distinguished from other species of the genus having bright vermillion red thorax and abdomen instead of violaceous-black or crimson and neuration red or yellow instead of black or crimson.

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.

Material : 1 F, Golabari, Teliamura, 11.xi. 74, M. S. Shishodia & party coll.; 1 M, Kanchannagar, Ambassa, 20.xi. 74, M. S. Shishodia & party coll.; 1 F, Bhatia, Avaynagar, Agartala, 16.xi. 74, M.S. Shishodia and party coll.; 1 M, Tripura, Takajala, Stn. No. 4, 25. xi. 91, K. K. Ray & party coll.; 1 F, Tripura, Kanchannagar, Stn. No. 7, 29.xi. 91, K. K. Ray & party coll.; 2 FF, N. Tripura, Salema, 200 m., Stn. No. 7.

Diagnosis : Face and front of frons ochreous. Upper surface of frons metallic violaceous. Prothorax reddish brown. Thorax and abdomen violaceous-crimson. An superior humeral brown stripe and a narrow black stripe on postero-lateral suture and finally a short lower black line at level of spiracle. Beneath marked with a black square, with an angular black line crossing it. Base of hind wing with small reddish brown spot.

Distribution : INDIA : Tripura (Agartala, N. Tripura); Meghalaya, West Bengal. Nepal, Tibet, Sri Lanka, Burma, Pakistan, Vietnam, Malaysia, Indonesia, Taiwan and Philippines.

Remarks : This species is distributed throughout India. They prefer montane streams but are also found near lakes. This species can be determined from all other species of the genus by having general violaceous colour.

Genus *Neurothemis* Brauer

1841. *Polyneura* Rambur, *Ins. Nevrop.*, 26.
1867. *Neurothemis*, Brauer, *Verh. Zool.-bot. Ges. Wien.*, 17 : 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, black basal area edged by with an opalescent white band *tullia tullia* (Drury)
—Bases of wings only with tint of pale or golden yellow ; no opalascnt white band present 2
2. Apex of wings narrowly opaque brown to partly enclose a clear window in each wing at apex *fulvia* (Drury)
—No clear window like enclosed area in wings as above 3
3. Basal yellow area not very sharply marked; costal border of wings pale yellow upto pterostigma; humeral stripe present on thorax, pale brown
..... *intermedia intermedia* (Rambur)

—Basal deep amber yellow area very sharply marked costal border of wings not tinted with yellow, humeral stripe absent on thorax

..... *intermedia atlanta* Ris

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.
1987. *Neurothemis tullia tullia* Lahiri, *Rec. zool. Surv. India, Occ. Paper.* No. 99 : 207.

Material : 1 M, Kanchannagar, Ambassa, 20.xi. 74, M. S. Shishodia & party coll.; 1 M, Sheikhbani, 3.xii. 69, V. C. Agarwal & party coll.; 2 FF, Kagiramgo, 29.xi. 65, S. K. Tandon & party coll.; 1 M, Garjee, Udaipur, 8.xi. 74, M. S. Shishodia & party coll.; 1 M, 1 F, Garjee forest, Udaipur, 8.xi. 74, M. S. Shishodia & party coll.; 4 MM, 4 FF, S. Tripura, Santibazar, 11.vi. 90, G. N. Saha & party coll.; 2 MM, S. Tripura, Jatan bari, 10.vi. 90, G. N. Saha & party coll.; 3 FF, S. Tripura, Jadurambari, 5.ii. 91, G. K. Srivastava & party coll.

Diagnosis : Major part of head is black. Prothorax, thorax and abdomen black. Basal area of wing is black and edged outwardly with an opalescent white band.

Distribution : INDIA : Tripura (S. Tripura, N. Tripura); Assam, Meghalaya, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal. Nepal, Tibet, China, Burma, Sri Lanka, Thailand, Malaysia and Vietnam.

Remarks : These are commonly known to occur in flower gardens and vegetable fields. Adults flutter on aquatic vegetation near swampy areas and weedy tanks. This subspecies can easily be distinguished by black base of wings with opalescent white outer bordering and in female by broad black apices of wings.

Neurothemis fulvia (Drury)

1773. *Libellula fulvia* Drury, *Ill. Exot. Ins.*, 2 : 84.

1889. *Neurothemis fulvia*, Kirby, *Trans. Zool. Soc. Lond.*, 12 : 271.
 1936. *Neurothemis fulvia*, Fraser, *Fauna Brit. India. Odon.*, 3 : 353.

Material : 10 MM, 4 FF, Ambassa forest north Stn. No. 17, 16.xi. 74, M. S. Shishodia & party coll.; 1 F, Ambassa forest south, 17.i. 74, M. S. Shishodia & party coll.; 1 F, Kunjmura, Teliamura, 14.xi. 74, M. S. Shishodia & party coll.; 2 MM, 3 FF, Garjee, Udaipur, Agartala, 4.xi. 74, M. S. Shishodia & party coll.; 1 M, Kanchannagar, Ambassa, 20.ii. 74, M. S. Shishodia & party coll.; 7 MM, 8 FF, Haninchera, Ambassa, 19.xi. 77, M. S. Shishodia & party coll.; 5MM, 2FF, Bhulia, Avay Nagar, Agartala, 31.x. 74, M. s. Shishodia & party coll.; 1 F, Kanchera, Ambassa, 20.xi. 74, M.S. Shishodia & party coll.; 1 M, 1 F, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia & party coll.; 1 M, 4 FF, Bramchaia, Teliamura, 10.xi. 74, M. S. Shishodia and party coll.; 1 M, 1 Km, S. E. of Belonia, F. R. H. Stn., No. 12, 29.xi. 77, N. Muraleedharan & party coll.; 1 M, 1 Km. of Ambassa, F. R. H., Stn. No. 25, N. Tripura, 28.x. 77, N. Muraleedharan & party coll.; 1 M, 2 FF, Jamai Bari, Teliamura, Stn. No. 14, 12.xi. 74, M. S. Shishodia & party coll.; 2 FF, Gamartilla, Teliamura, Stn. No. 17, 19.x. 77, N. Muraleedharan & party coll.; 1 M, Bankar, Belonia, Stn. No. 13, 2.x. 77, N. Muraleedharan & party coll.; 1 M, Chailenja, Manu, 17.xii. 72, V. C. Agarwal & party coll.; 1 M, Bishallgarh, Stn. No. 8, 17.xii. 72, V. C. Agarwal & party coll.; 1 M, Kunjaban, Agartala, 9.xi. 69, V. C. Agarwal & party coll.; 1 F, W. Tripura, 27.vi. 90, G. N. Saha & party coll.; 1 F, S. Tripura, Bagma, 17.vi. 90, G. N. Saha & party coll.

Diagnosis : Frons, vesicle and occiput reddish brown. Prothorax, thorax and abdomen reddish brown. Wings are dark reddish brown from base to about middle of pterostigma. Neuration very close. Apex of wings opaque brown enclosing a clear window in each wing in male.

Distribution : INDIA : Tripura (N. Tripura, S. Tripura, Agartala); Assam, Meghalaya, Bihar, Himachal Pradesh, Madhya Pradesh; Karnataka,

Kerala, Tamil Nadu, Manipur, Uttar Pradesh, West Bengal. Nepal, China, Burma, Bangladesh, Thailand, Vietnam, Malaysia and Indonesia.

Remarks : This species is known to inhabit weedy ponds or marshes and distributed from plains to an altitude of 1000 meters. The clear, uncoloured apices of wing will help to distinguish it from other Indian species and equally the female by uniform golden-amber tint of the ground colour of wings with or without clear hyaline window in fore wings.

Neurothemis i. intermedia (Ramb.)

1842. *Libellula intermedia* Rambur, *Ins. Nevrop.*, : 91.
 1911. *Neurothemis intermedia intermedia*, Ris, *Cat. Coll. Selys. fasc.*, 13 : 563.
 1936. *Neurothemis intermedia intermedia*, Fraser, *Fauna Brit. India. Odon.*, 3 : 357.

Material : 2 MM, 1 F, Garjee, Udaipur, 4.xi. 74, M. S. Shishodia & party coll.; 5 MM, 1 F, Kunj Mura, Telia Mura, 14.xi. 74, M. S. Shishodia & party coll.; 2 MM, 3 FF, Ambassa forest south, 17.xi. 74, M. S. Shishodia & party coll.; 1 M, Jamir chera, Manu, 25.xi. 74, M. S. Shishodia & party coll.; 1 M, 2 FF, Jamai Bari, Teliamura, 12.xi. 74, M. S. Shishodia & party coll.; 2 MM, 1 F, Bramachura, 10.xi. 74, M. S. Shishodia & party coll.; 1 M, Garjee Chura forest, 5.xi. 74, M. S. Shishodia & party coll.; 1 M, 3 FF, Kalitilla, Teliamura, Stn. No. 18, 19.x. 77, N. Muraleedharan & party coll.; 1 F, Jamartila, Teliamura, 19.x. 77, N. Muraleedharan & party coll.; 2 MM, Paratia S. Tripura, Stn. No. 15, 8.x. 77, N. Muraleedharan & party coll.; 1 F, 1 Km. east of Ambassa, F.R.H., N. Tripura, 26.x. 77, N. Muraleedharan & party coll.; 1 M, 1 F, Hathalia, Stn. No. 17, 12.v. 69, V. C. Agarwal & party coll.; 1 F, 1 Km. S. E. of Tripura, F.R.H., Belania, 1.x. 74, M. S. Shishodia & party coll.; 1 F, Mohanpur, W. Tripura, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.; 1 F, Mekaganl vill area, Ambassa, Stn. No. 10, 23.xii. 91, S. Ahmed & R. Kulin coll.; 2 MM, 2 FF, Chhanda Chhara, Ambassa, N. of F.R.H. 19.xii. 91, S. Ahmed & R. Kulin coll.; 1 M, Bidhannagar colony Eastern side of F.R.H. of Ambassa, 20.xii. 91, S. Ahmed

& party coll.; 2 MM, 2 FF, Chakma forest, 6 kms. N. of Teliamura, F.R.H., W. Tripura, Stn. No. 3, 15, xii. 91, S. Ahmed & R. Kulin Coll.; 2 MM, 2 FF, Kalitila, Nr. Teliamura, F.R.H. W. Tripura, Stn. No. 4, 16.xii. 91, S. Ahmed & R. Kulin coll.; 1 M, Mohanpur, Agartala, Stn. No. 5, 2.i. 89, R.S. Barman & party coll.; 1 F, Sonamura (Ulachanban), Stn. No. 14, 14.i. 89, R. S. Barman & party coll. 1 M, Ambassa, Teliamura, Stn. No. 9, 7.i. 89, R. S. Barman & party coll., 1 F, Baramura, Teliamura, Stn. No. 3, 6.i. 89, R. S. Barman & party coll., 1 M, Sepalijala, Agartala, Stn. No. 17, 17.i. 89, R. S. Barman & party coll.; 1 F, Garjee, Stn. No. 4, 23.ii. 91, G. K. Srivastava & party coll.; 2 FF, Salema, 200 m., Stn. No. 7, 28.ii. 91, G. K. Srivastava & party coll.; 3 FF, Amarapur, S. Tripura, Stn. No. 11, 5.ii. 91, G. K. Srivastava & party coll.; 1 F, Jadurambari, S. Tripura, Stn. No. 8, 1.iii. 91, G. K. Srivastava & party coll.

Diagnosis : Labrum, face and frons pale yellow. A pale brown humeral stripe on thorax. Wings hyaline, very palely tinted with yellow and with a broad basal amber yellow marking at base of all wings. 3 or 4 cubital nervures in fore wings, 1 or more in the hind.

Distribution : INDIA : Tripura (N. Tripura, S. Tripura, W. Tripura and Agartala) Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal. Nepal, Sri Lanka and Burma.

Remarks : This species is common in areas at lower and higher altitude. These are commonly found in fields covered with grasses near streams. Wings marking are very much restricted, which differentiate this species from all other species of the genus.

Neurothemis intermedia atlanta Ris.

1916. *Neurothemis intermedia atlans* Ris, *Cat. Coll. Selys*, 16 : 1168.
1936. *Neurothemis intermedia atlanta*, Fraser, *Fauna Brit. India. Odon.*, 3 : 358.

Distribution : INDIA : Tripura, Assam, Kerala, Meghalaya, Sikkim. Nepal, Burma, Siam and Thailand.

Remarks : This species is included on the basis of the literature. It is distinctly smaller than *Neurothemis i. intermedia* Humeral stripe absent on thorax. It can be differentiated from *N. intermedia intermedia* by having yellow area at base of wings very well defined and deep amber-yellow.

Genus *Potamarcha* Karsch

1890. *Potamarcha* Karsch, *Berlin Ent. Zeit.*, 33 : 370.
1936. *Potamarcha*, Fraser, *Fauna Brit. India. Odon.*, 3 : 288.

No key to the species of the genus *Potamarcha* is provided as this genus is represented not only in Tripura but India as well by single species namely *P. obscura* Karsch. (= *P. congener* (Rambur)).

Potamarcha congener (Rambur)

1842. *Libellula obseura* Rambur, *Hist. nat. Ins. Nevrop.*, : 64.
1842. *Libellula congener*, Rambur, *Hist. nat. Ins. Nevrop.*, : 70.
1890. *Potamarcha obseura*, Karsch, *Berlin Ent. Zeit.*, 33 : 371.
1936. *Potamarcha obscura*, Fraser, *Fauna Brit. India. Odon.*, 3 : 289.
1891. *Potamarcha congeur*, Selys, *Anal Soc. Esp. Hist. nat.* 20 : 221.
1971. *Potamarcha congeuer*, Lieftinck, *Ent. Scand. Suppl.*, 1 : 202.

Material : 1 F, Mainama, Manu, 23.x. 74, M. S. Shishodia & party coll.; 2 FF, Golabari, Teliamura, Stn. No. 13, 11.xi. 74, M. S. Shishodia & party coll.; 1 F, Netajipalli, Belonia, Stn. No. 14, 3.x. 77, N. Muraleedharan & party coll.; 1 F, 1 km. E, of Belonia, F.R.H. Stn. No. 10, 19.x. 77, N. Muraleedharan and party coll.; 1 F, Ganga nagar, 5.xi. 72, V.C. Agarwal & party coll.

Diagnosis : Face olivaceous yellow. Frons in adult blackish brown. Thorax black but pruinose more or less densely. Wings long, narrow and reticulation close. Wings hyaline with extreme apices tipped with brown. Only one cubital nervure in all wings. Anal appendages black.

Distribution : INDIA : Tripura (N. Tripura); Andhra Pradesh, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal. Nepal, Burma, Sri Lanka, Philippines, Bangladesh, Thailand, Malaysia, Indonesia, New Guinea, Australia and Taiwan.

Remarks : This is one of the common species throughout India. It inhabits small weedy ponds and stagnant water. It can be distinguished from *Cratilla lineata* (Brauer) by absence of supplementary nervure to the bridge and by the incomplete distal antenodal nervure of fore-wings.

Genus *Crocothemis* Brauer

1868. *Crocothemis* Brauer, *Verh. Zool.-bot. Ges. Wien.*, 18 : 367, 736.
1936. *Crocothemis*, Fraser, *Fauna Brit. India. Odon.*, 3 : 343.

No key to the species of the genus *Crocothemis* is provided as it is represented in Tripura by single species namely *C. s. servilia* (Drury).

Crocothemis s. servilia (Drury)

1770. *Libellula servilia* Drury, *Ill. Ex. Ins.* 1 : 112.
1868. *Crocothemis servilia*, Brauer, *Verh. Zool.-bot. Ges. Wien.* 18 : 737.
1911. *Crocothemis servilia servilia*, Ris, *Cat. Coll. Selys*, 13 : 533.
1936. *Crocothemis servilia servilia*, Fraser, *Fauna Brit. India, Odon.*, 3 : 345.

Material : 1 M, Kanchan Nagar, Ambassa, 20.xi. 74, M. S. Shishodia & party coll.; 2 FF, Bhatianagar, Agartala, 31.x. 74, M. S. Shishodia & party coll.; 1 M, Jamai Bari, Teliamura, 12.xi. 74, M. S. Shishodia & party coll.; 1 M, Raj Nagar, Agartala, 30.x. 74, M. S. Shishodia & party coll.; 2 MM, Bhangashala, Agartala, 2.xi. 74, M. S. Shishodia & party coll.; 1 M, Garjee, Udaipur, 4.xi. 74, M. S. Shishodia & party coll.; 2 FF, 1 F, Jay Nagar, Agartala, 30.xi. 74, M. S. Shishodia & party coll.; 1 F, Kosilong, Teliamura, 13.xi. 74, M. S. Shishodia & party coll.; 1 F, Pratapgarh, Agartala, Stn. No. 1, 29.x. 74, M. S. Shishodia & party coll.; 1 M, Bhalia Avoyngar

Agartala, Stn. No. 4, 31.x. 74, M. S. Shishodia & party coll.; 1 M, Chanamaghat, Teliamura, Stn. No. 21, 23.x. 77, N. Muraleedharan & party coll.; 1 F, Chandmanitala, Agartala, 10.xi. 69, V. C. Agarwal & party coll.; 1 M, M. B. B. College area, Agartala, 1.xi. 74, M. S. Shishodia & party coll.; 1 F, Tripura, Takajala, Stn. No. 4, 25.xi. 91, K. K. Ray & party coll.; 1 M, Tripura, Gargi, Stn. No. 8, 30.xi. 91, K. K. Ray & party coll.; 1 M, 1 F, Tripura, Kanchan nagar, Stn. No. 7, 29.xi. 91, K. K. Ray & party coll.; 3 FF, Tripura, Baxarnagar, Stn. No. 2, 23.xi. 91, K. K. Ray & party coll.; 1 F, Tripura, Mohanpur, Stn. No. 1, 21.xi. 91, K. K. Ray & party coll.; 1 F, N. Tripura, Teliamura, Stn. No. 9, 2.xii. 91, K. K. Ray & party coll.; 1 M, Bislamganj, Agartala, Stn. No. 15, 15.i. 89, R. S. Barman & party coll.; 2 FF, Bisalgarh, Agartala, Stn. No. 16, 16.i. 89, R. S. Barman & party coll.

Diagnosis : Major portion of head of male blood red. Middle lobe of prothorax ridged transversely. The ridge bearing a tuft of stiff reddish hairs. Dorsum of thorax often blood red. Abdomen and Anal appendages blood red. Wings hyaline. Bases of wings marked with rich amber yellow and apices of wings lined narrowly with pale brown.

Distribution : INDIA : Tripura (Agartala, N. Tripura, S. Tripura); Bihar, Himachal Pradesh, Madhya Pradesh, Meghalaya, Manipur, Punjab, Rajasthan, Uttar Pradesh, Nepal, China, Bangladesh, Sri Lanka, Burma, Thailand, Malaysia, Indonesia, Japan, Taiwan, Philippines, Iran and Iraq.

Remarks : This species is very common, occurring in vegetation around aquatic habitats. Adults are found on wing. Teneral males and females are similar in colour but give rise to confusion on account of their pale straw-yellow colour, quite different from adult stage.

Genus *Brachythemis* Brauer

1868. *Brachythemis* Brauer, *Verh. Zool.-bot. Ges. Wien.*, 18 : 736.
1936. *Brachythemis*, Fraser, *Fauna Brit. India. Odon.*, 3 : 363.

No key to the species of the genus *Brachythemis* is provided, as it is not only represented in Tripura but India as well by single species namely *B. contaminata* (Fabricius).

***Brachythemis contaminata* (Fabricius)**

1793. *Libellula contaminata* Fabricius, *Entom. Syst.*, 2 : 382.
 1868. *Brachythemis contaminata*, Brauer, *Verh. Zool.-bot. Ges. Wien.*, 18 : 736.
 1936. *Brachythemis contaminata*, Fraser, *Fauna Brit. India. Odon.*, 3 : 365.

Material : 1 M, Pratapgarh, Agartala, 29.x. 74, M. S. Shishodia & party coll.; 5 MM, Garjee, Udaipur, 7.xi. 74, M. S. Shishodia & party coll.; 2 FF, Dhumachera, Manu, Stn. No. 24, 24.xi. 74, M. S. Shishodia & party coll.; 1 M, 2 FF, Garjee, Udaipur, Stn. No. 10, 7.xi. 74, M. S. Shishodia & party coll.; 1 M, M. B. B. college area, Agartala, Stn. No. 5, 1.xi. 74, M. S. Shishodia & party coll.; 1 M, Joynagar, Agartala, Stn. No. 2, 30.x. 74, M. S. Shishodia & party coll.; 1 M, Kunjaban, Agartala, 9.xi. 69, M. S. Shishodia & party coll.; 1 M, Gamai Bari, Teliamura, Stn. No. 14, 12.xi. 74, M. S. Shishodia & party coll.; 1 M, 1 F, Tripura, Shekherkot, 9.v. 92, B. C. Das & party coll.; 1 F, W. Tripura, Moharchapa, 20.v. 92, B. C. Das & party coll.; 1 M, N. Tripura, 37-41 mile on road to Ambassa, 6.iii. 91, R. S. Barman & party coll.

Diagnosis : Face and frons olivaceous. Prothorax ochreous. Thorax olivaceous-brown. An obscure reddish brown humeral stripe on dorsum and two on sides of thorax. Wings hyaline. Reticulation close and reddish. Wings with broad bright orange fascia from base to 2 to 3 cells of pterostigma but it is absent in female.

Distribution : INDIA : Tripura (Agartala, N. Tripura, W. Tripura, S. Tripura); Madhya Pradesh, Himachal Pradesh, Assam, Bihar, Meghalaya, Punjab, Rajasthan, West Bengal, Burma, Sri Lanka, Singapore, Nepal, China, Bangladesh, Thailand, Malaysia, Indonesia, Japan, Taiwan and Philippines.

Remarks : It is the most common species in India and is common at lower altitude. It inhabits weedy ponds, lakes and slowly moving streams.

CLASSIFIED LIST OF ODONATES FROM TRIPURA

A comprehensive list of Odonates known from Tripura is provided. This includes all known species so far known, including those which are studied on the basis of material present in the National Zoological Collections of Zoological Survey of India, recent material collected by Z.S.I. Survey parties from Tripura. [These are marked with symbol (a); species without such mark are based on literature review species of which type material present examined in National Zoological Collection Zoological Survey of India is marked (+)].

Order ODONATA

Suborder A. ZYGOPTERA

Superfamily 1. COENAGRIONOIDEA

Family 1. COENAGRIONIDAE

Genus (1) *Ceriagrion* Selys

Species 1. *C. cerinorubellum* (Brauer)

Species (a) 2. *C. coromandelianum* (Fabricius)

Species (a) 3. *C. olivaceum* Laidlaw

Genus (2) *Pseudagrion* Selys

Species (a) (+) 4. *P. australasiae* Selys

Species (a) 5. *P. rubriceps* Selys

Genus (3) *Aciagrion* Selys

Species (a) 6. *A. pallidum* Selys

Genus (4) *Enallagma* Charpentier

Species (a) 7. *E. parvum* Selys

Genus (5) *Ischnura* Charpentier

Species (a) 8. *I. aurora* (Brauer)

Genus (6) *Agriocnemis* Selys

Species 9. *A. lacteola* Selys

Species (a) 10. *A. pygmaea* (Rambur)

Species (a) 11. *A. splendidissima* Laidlaw

Superfamily II. CALOPTERYGOIDEA

Family 2. CHLOROCYPHIDAE

Genus (7) *Libellago* SelysSpecies (a) 12. *L. l. lineata* (Burmeister)

Family 3. CALOPTERYGIDAE

Subfamily CALOPTERYGINAE

Genus (8) *Vestalis* SelysSpecies (a) 13. *V. g. gracilis* (Rambur)Species (a) 14. *V. smaragdina* (Selys)

Suborder B. ANISOPTERA

Superfamily III. AESHNOIDEA

Family 4. GOMPHIDAE

Genus (9) *Paragomphus* CowleySpecies (a) 15. *P. lineatus* (Selys)

Superfamily IV. LIBELLULOIDEA

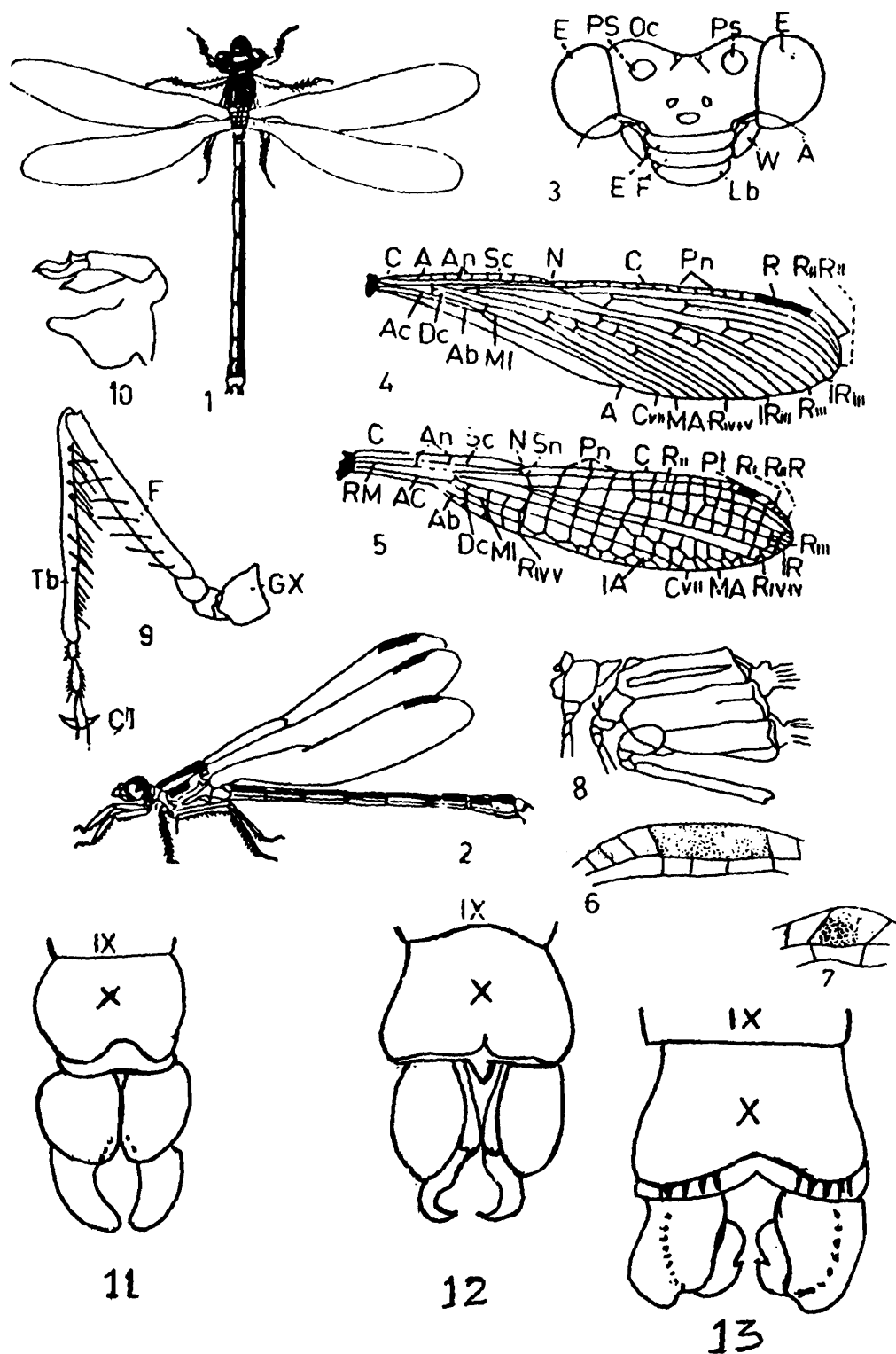
Family 5. LIBELLULIDAE

Genus (10) *Orthetrum* NewmanSpecies (a) 16. *O. b. brunneum* (Fonscolombe)Species (a) 17. *O. glaucum* (Brauer)Species (a) 18. *O. pruinsum neglectum* (Rambur)Species (a) 19. *O. s. sabina* (Drury)Genus (11) *Potamarcha* KarschSpecies (a) 20. *P. congener* (Rambur)Genus (12) *Palpopleura* RamburSpecies (a) 21. *P. s. sexmaculata* (Fabricius)Genus (13) *Brachydiplax* BrauerSpecies (a) 22. *B. sobrina* (Rambur)Genus (14) *Acisoma* RamburSpecies (a) 23. *A. p. Panorpoides* RamburGenus (15) *Brachythemis* BrauerSpecies (a) 24. *B. contaminata* (Fabricius)Genus (16) *Crocothemis* BrauerSpecies (a) 25. *C. s. servilia* (Drury)Genus (17) *Diplacodes* KirbySpecies (a) 26. *D. trivialis* (Rambur)Genus (18) *Neurothemis* BrauerSpecies (a) 27. *N. fulvia* (Drury)Species (a) 28. *N. i. intermedia* (Rambur)Species 29. *N. i. alanta* RisSpecies (a) (+) 30. *N. t. tullia* (Drury)Genus (19) *Trithemis* BrauerSpecies (a) 31. *T. aurora* (Burmeister)Species (a) 32. *T. k. kirbyi* SelysSpecies (a) 33. *T. pallidinervis* (Kirby)Genus (20) *Tholymis* HagenSpecies (a) 34. *T. tillarga* (Fabricius)Genus (21) *Pantala* HagenSpecies (a) 35. *P. flavescens* (Fabricius)

SUMMARY

Present paper deals with the digonastic features, distribution pattern within Tripura, rest of India and elsewhere as well. Affinities with allied taxa and distinguishing features have also been provided for 35 species so far known within the limits of Tripura State. These are represented under 2 suborders, 4 superfamilies, 5 families and 21 genera. Among these family Libellulidae of the Anisopterous Odonates is by far has the maximum number of representative species viz., 20 species under 11 genera. The Zygopterous family Coenagrionidae is next large family having representation by 11 species and 6 genera. Above two family namely Libellulidae and Coenagrionidae together share bulk of Odonata component of Tripura. These are represented together by 31 species (20+11) as against total component of 35 species. This representation, though, is just a small fraction of whole Indian Odonates approximately 1 : 14.11 (35 : 494). Tripura Odonates as compared to other two states by present authors West-Bengal (1993) and Meghalaya (In press) is also relatively in smaller proportion. Tripura, West Bengal and Meghalaya and India Odonates are proportionately thus 35 :

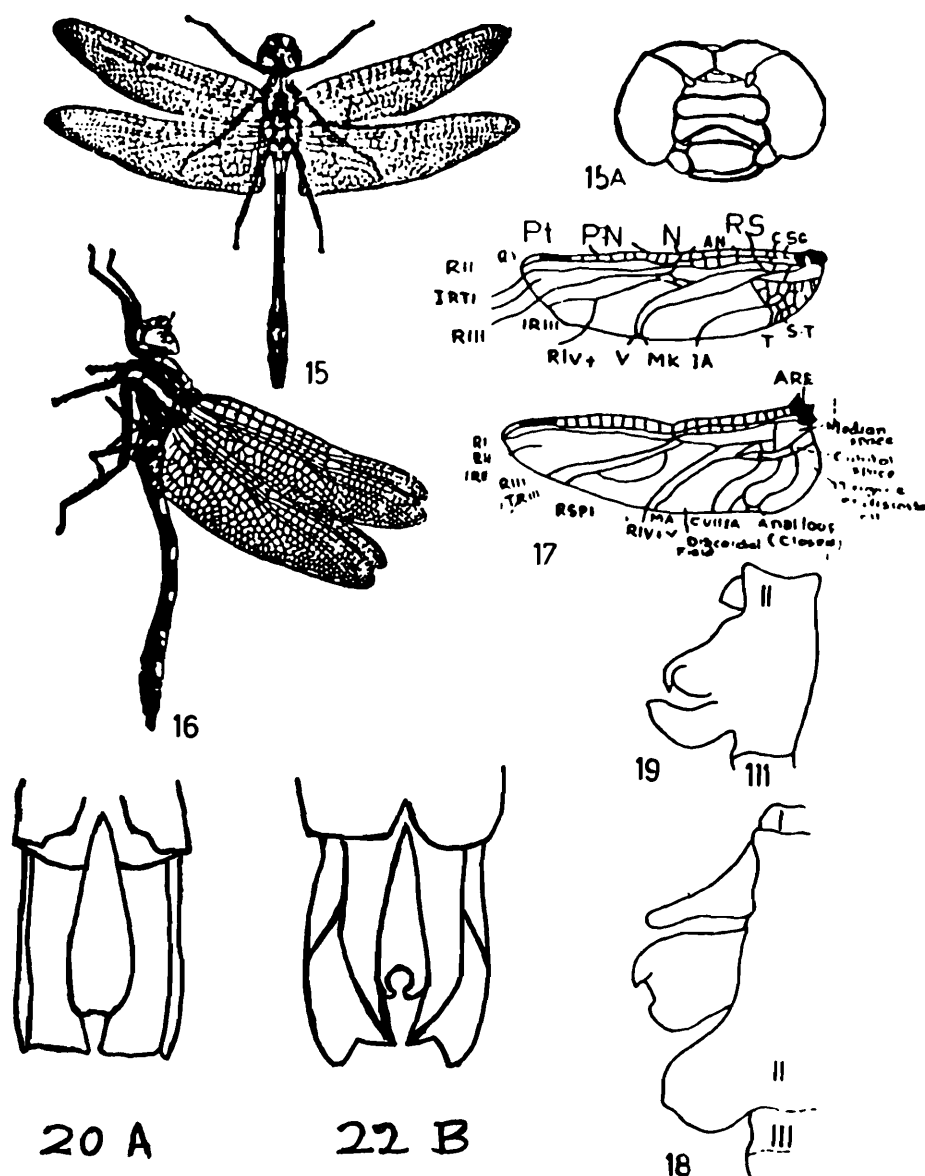
PLATE I



ZYGOPTERA (DAMSELFLY)

1. Zygoptera (dorsal view); 2. Zygoptera (Lateral view); 3. Head of Zygoptera (dorsal view); 4. Wing of Zygoptera — (Coenagrionidae); 5. Wing of Zygoptera—Agriidae; 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; 11-13. Dorsal view of anal appendages of certain Zygoptera : *Ceragrion coromandelianum*, *Ceragrion olivaceum* and *Pseudagrion australasae* respectively.

PLATE II



ANISOPTERA (DRAGONFLY)

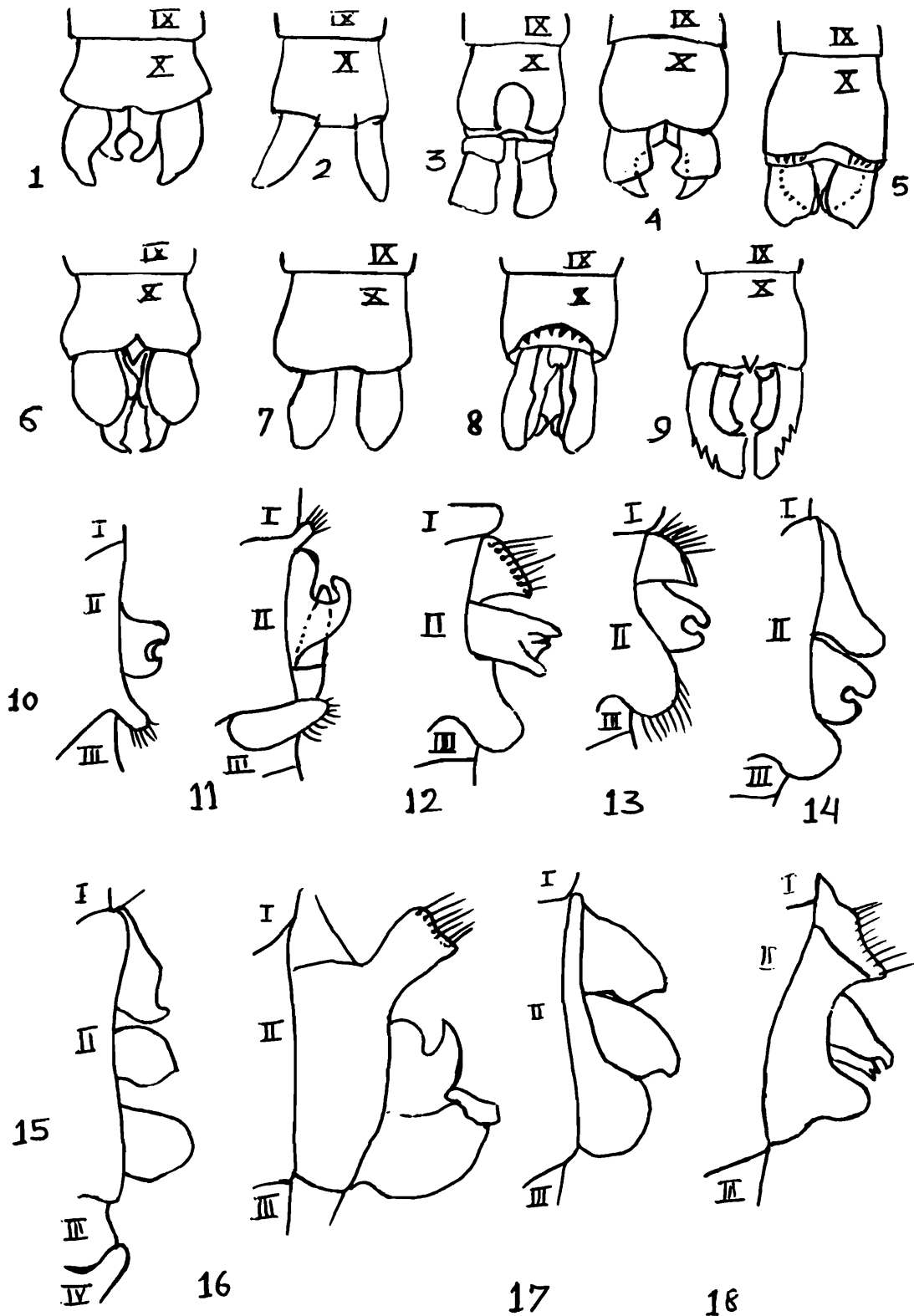
15. Anisoptera (dorsal view); 15A. Head of Anisoptera (dorsal view); 16. Anisoptera (Lateral view); 16A. *Pterostigma* of *Bradinopyga geminata*; 17. Nodal index-Count of Antenodal and postnodal nervure of wings. 18. Male accessory genital structure of Anisoptera.

Orthetrum glaucum 19. Male accessory genital structure of Anisoptera : *Trithemis aurora* 20.A-B. Dorsal view of anal appendages of Anisoptera : *Orthetrum glaucum*, *O. sabina*.

1x. *Explanation of abbreviations* : (Plate I and Plate II)

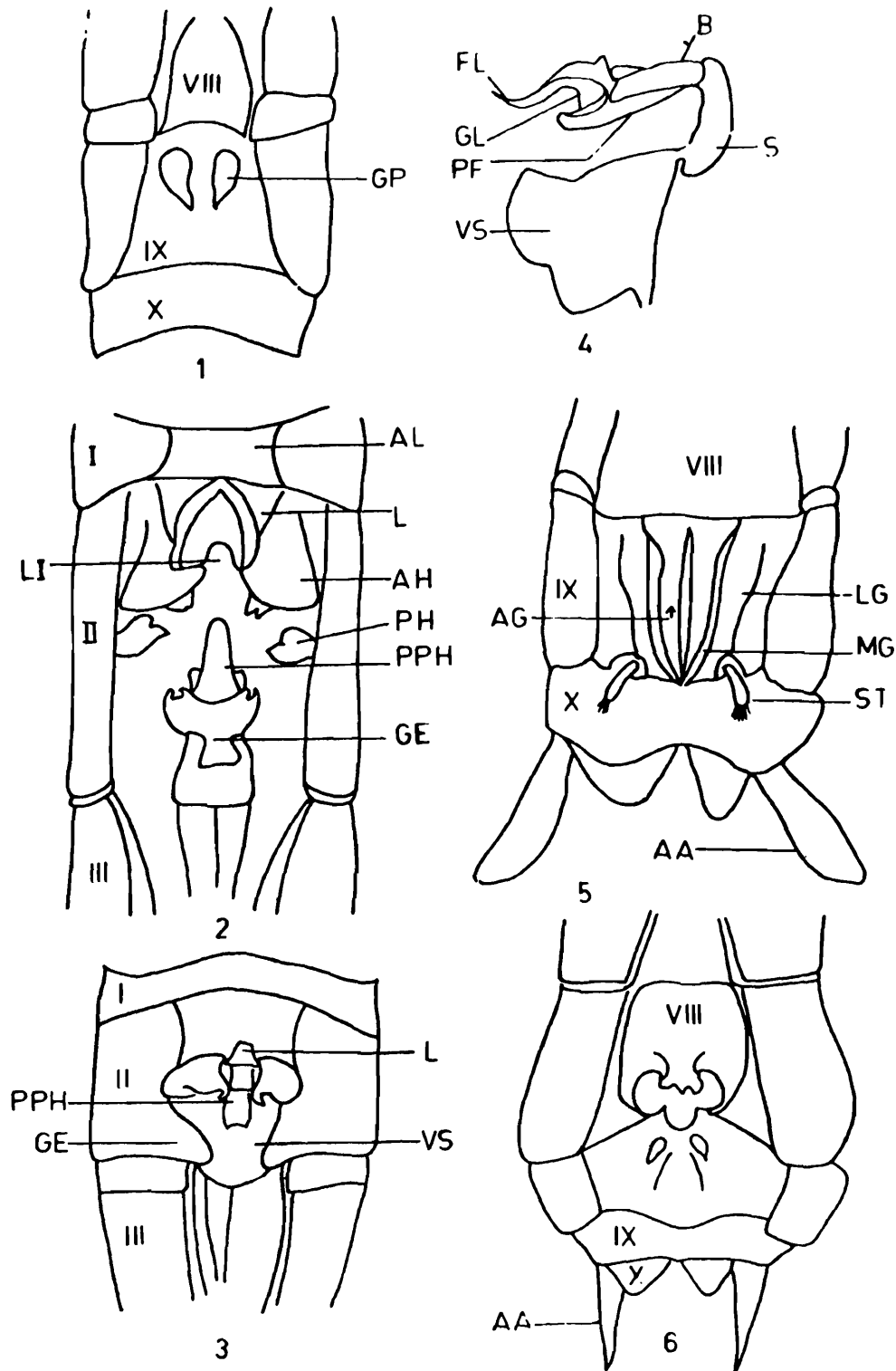
A = (Head) Antennae, A = (Wings) arc, Ab = anal bridge, Ac = Head Anteclypeus, Ac = (Wings) Anal crossing, Al = Anal loop, An = Antenodal nervures, C = (Head) Clypeus, C = (Wings) Costa, Cuii = Second cubitus, Cl = Claw, CS = Cubital space, Cx = Coxa, Do = discoidal cell, Df = Discoidal field, E = Eye, F = c 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 nervures, 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 = Supplementary nervure to radius, SC = Subcosta, Sn = Subnode, S.T = Subtrigone, T = Trigone, Tb = Tibia, Th = Trochanter, Tr = Tarsus.

PLATE-III : Certain representative anal appendages: dorsal view



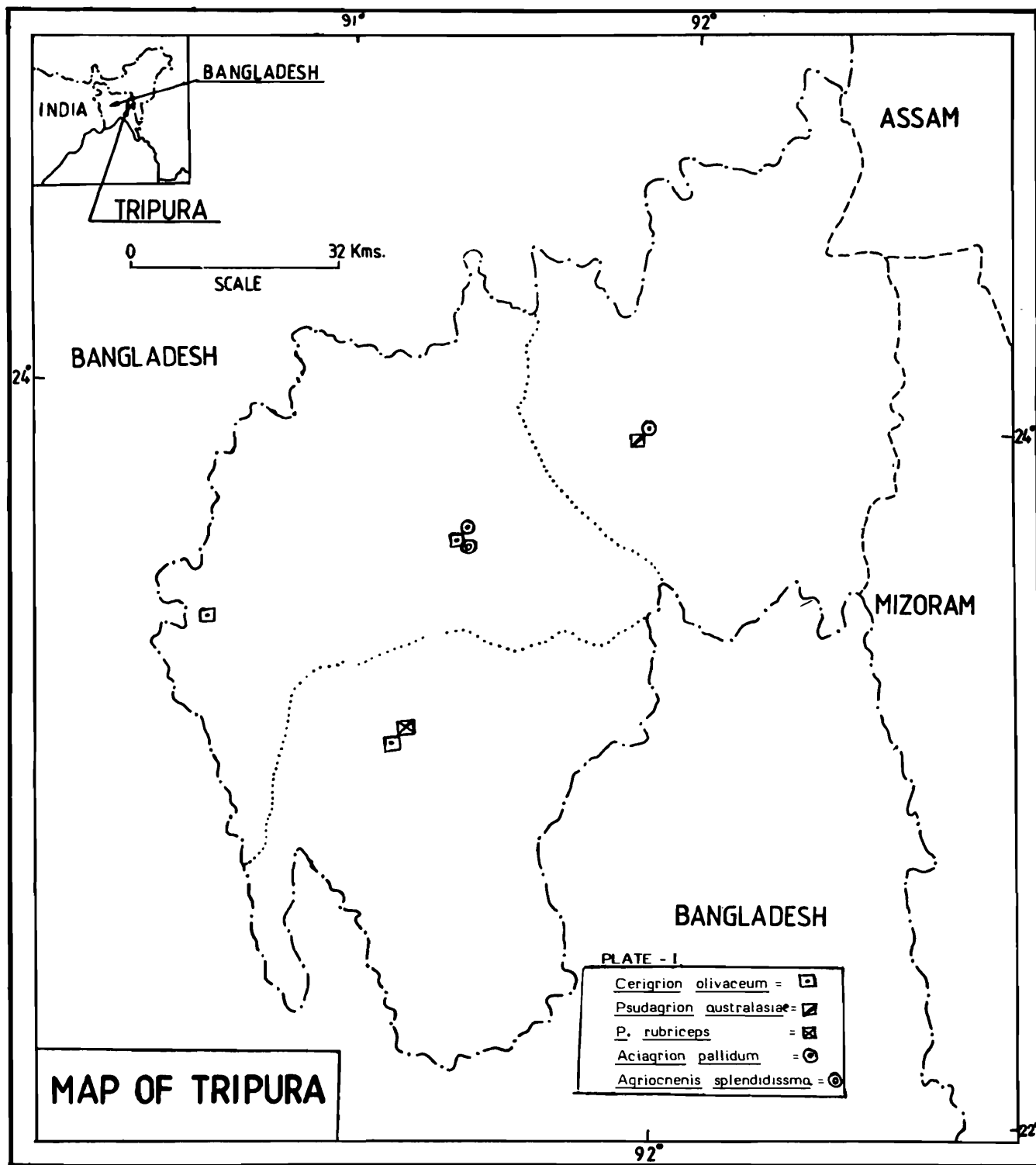
Figs 1 to 9 [Fig. 1-*Aciaagrion pallidum*, 2-*Ischnura aurora* 3- *Enallagma parvum*, 4- *Ceriaagrion coromandelianum*, 5- *Pseudagrion australasiae*, 6-*Ceriaagrion olivaceum* 7-*Agriocnemis pygmaea*, 8- *Pseudagrion rubriceps*, 9- *Vestalis gracilis* Certain representative external genitalia of male, in lateral profile : figs. 10 to 18 [Fig. 10- *Brachydiplax sobrina*, 11- *Acisoma p. panorpoides*, 12- *sabina Orthetrum sabina*, 13-*O. pruinsum neglectum*, 14- *O. glaucum*, 15-*Brachythemis contaminata*, 16-*Trithemis aurora*, 17- *Pantala flavescens*, 18- *Tholymis tillarga*].

PLATE-IV



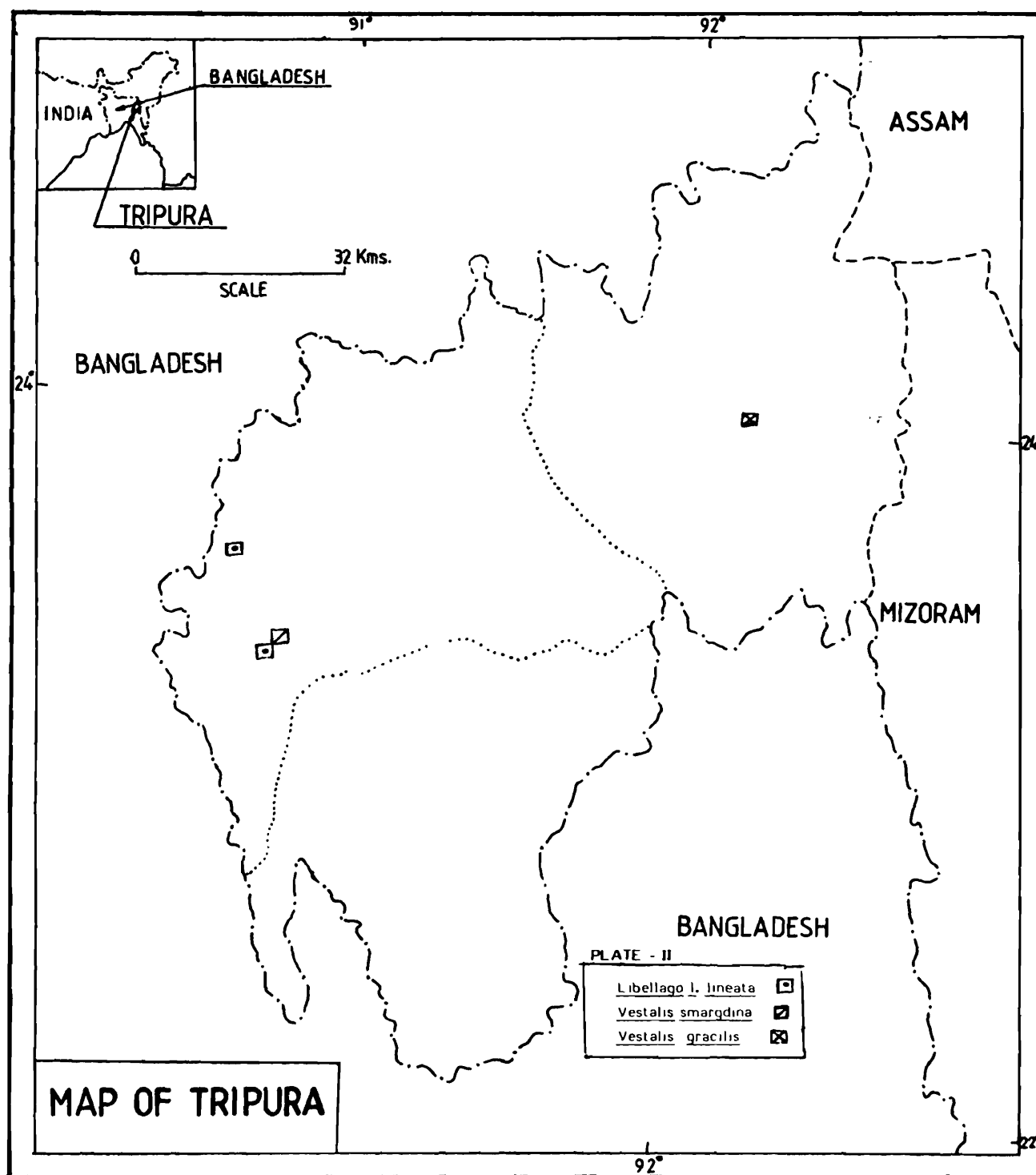
Figs. 1-6 : Genitalia of Odonata-Generalized 1. Primary genitalia of male, ventral view; 2. Secondary accessory genitalia of Male : Zygoptera; 3. Secondary accessory genitalia of male : Anisoptera; 4. Prothallus and vesicula spermalis of Male Anisoptera (Gomphid); 5. Genitalia of a female Anisoptera (Aeshnid) and 6. Genitalia of a female Anisoptera (Libellulid).

Explanation of Abbreviations : AA = Anal appendage; AG = Anterior gonopophyses; AH = Anterior hamule; AL = Anterior lamina; Body-Body; F-Flagella; GE-Genitalia; GL-Glans; GP-Male gonopophyses; L-Lammina, LG-Lateral gonopophyses; LI-Ligula; MG-Median gonopophyses; PF-Preputial fold; PH-Posterior Hamuli; PPH-Prothallus; S-Stem, ST-Stylet; VS-Vesicula seminatis.



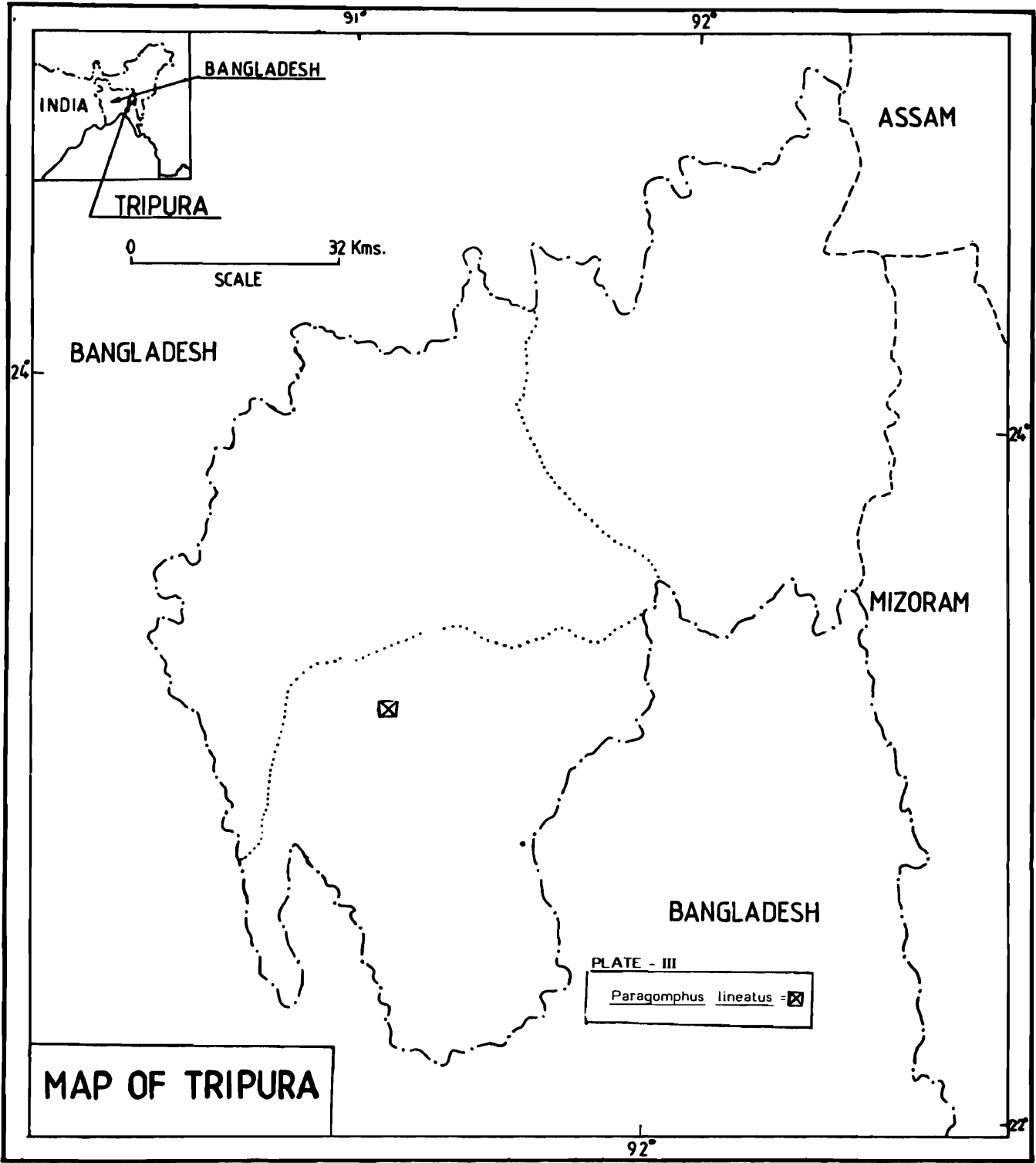
MAP-I : ZYGOPTERA : COENAGRIONIDAE

Cerigrion olivaceum, *Pseudagrion australasiae*, *P. rubriceps*, *Aciagrion pallidum*, *Agriocnemis splendidissima*.

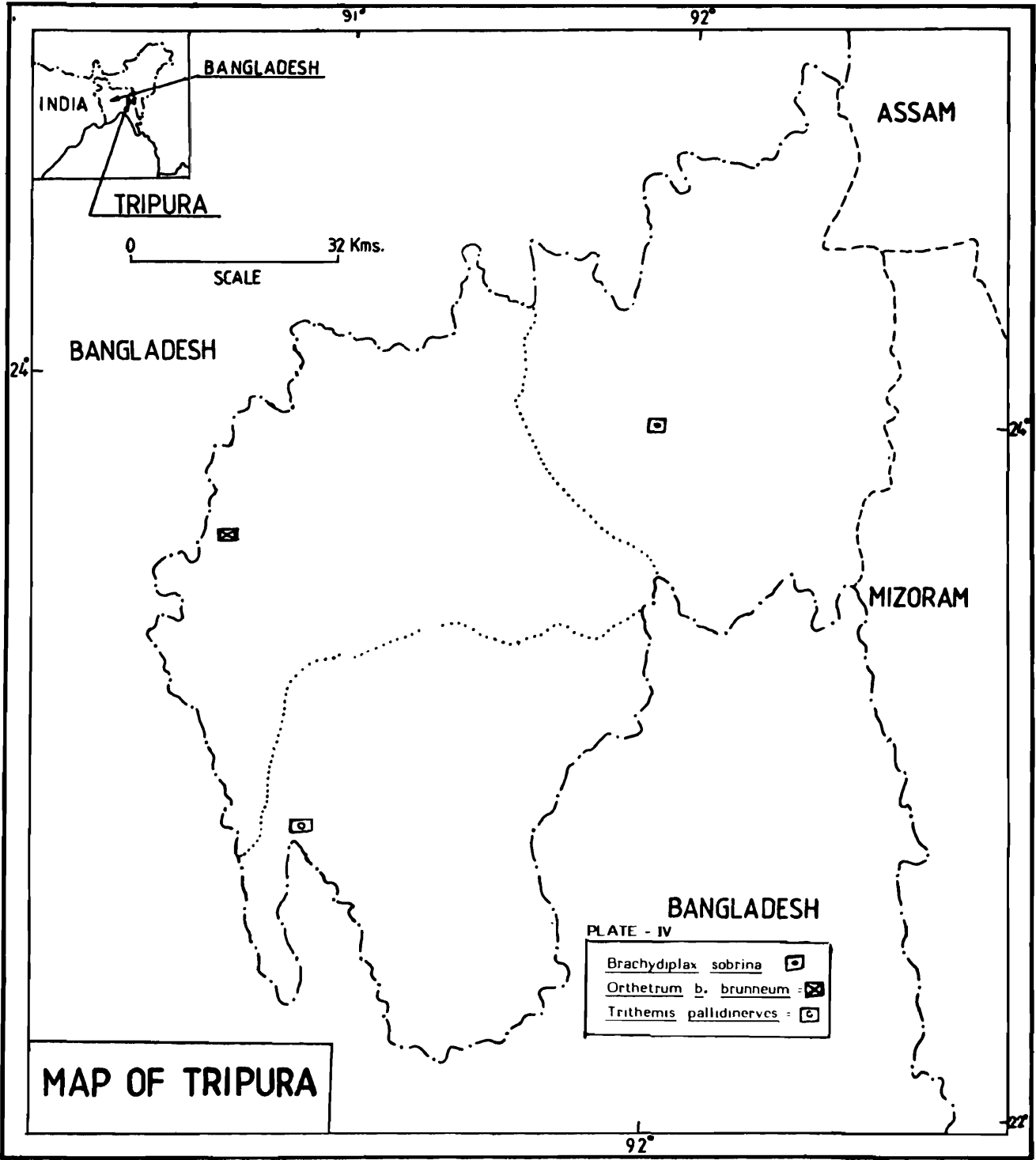


MAP-II : ZYGOPTERA : CHLOROCYPHIDAE

Libellago l. lineata, *Vestalis smaragdina*, *V. gracilis*

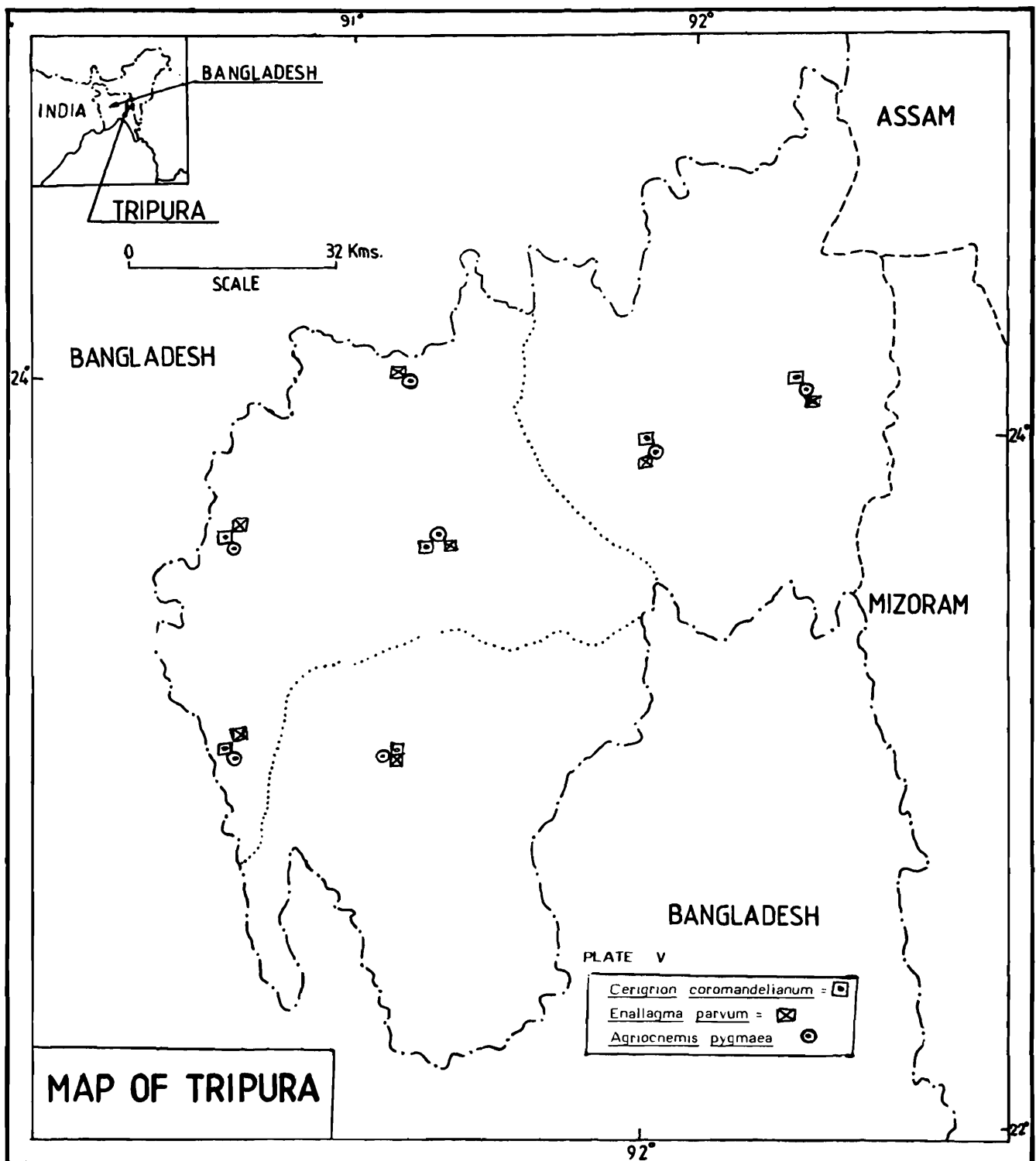


MAP-III : ANISOPTERA : GOMPHIDAE
Paragomphus lineatus



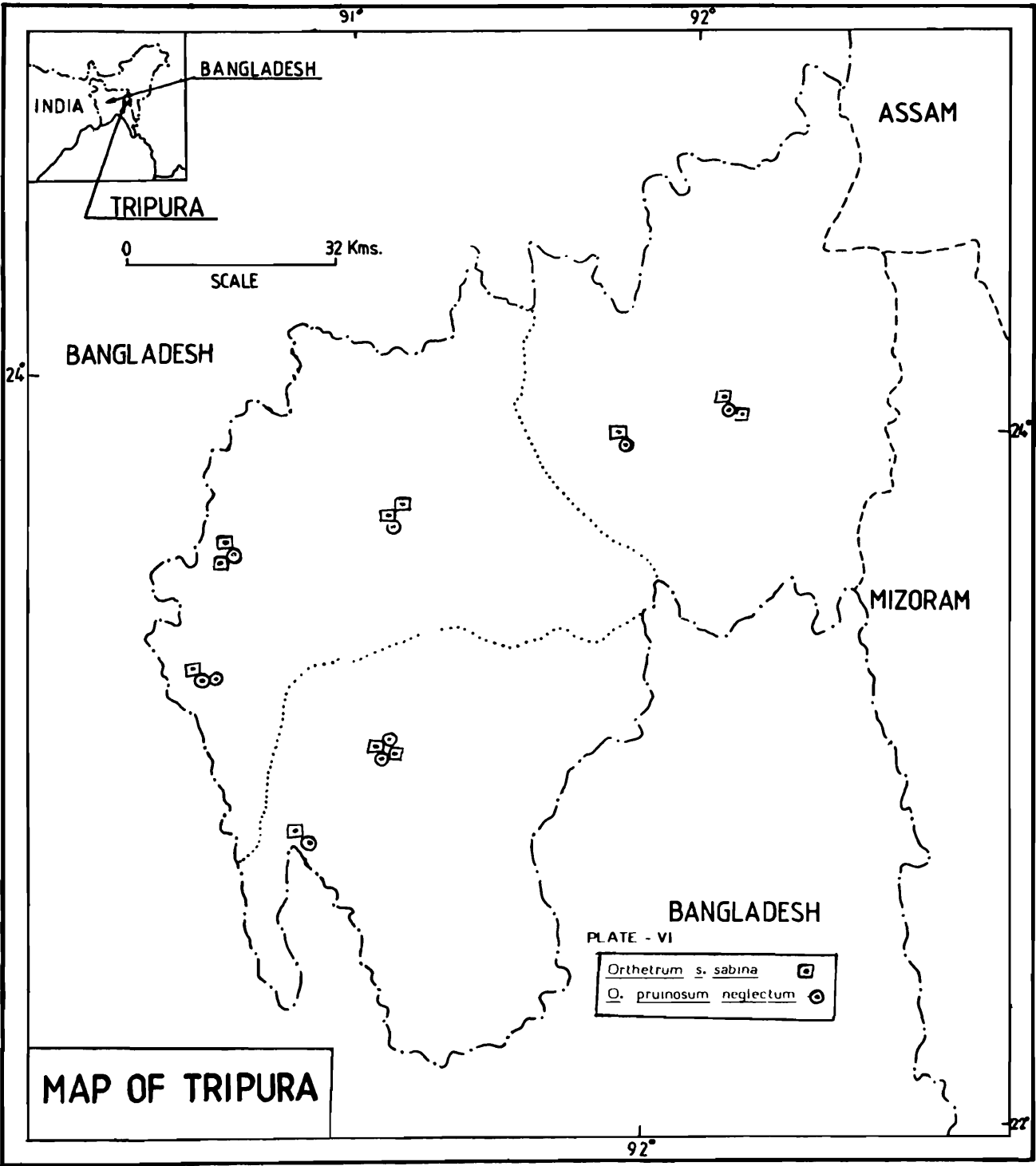
MAP-IV : ANISOPTERA : LIBELLULIDAE

Brachydiplax sobrina, *Orthetrum b. brunneum*, *Trithemis pallidinerves*



MAP-V : ZYGOPTERA : COENAGRIONIDAE

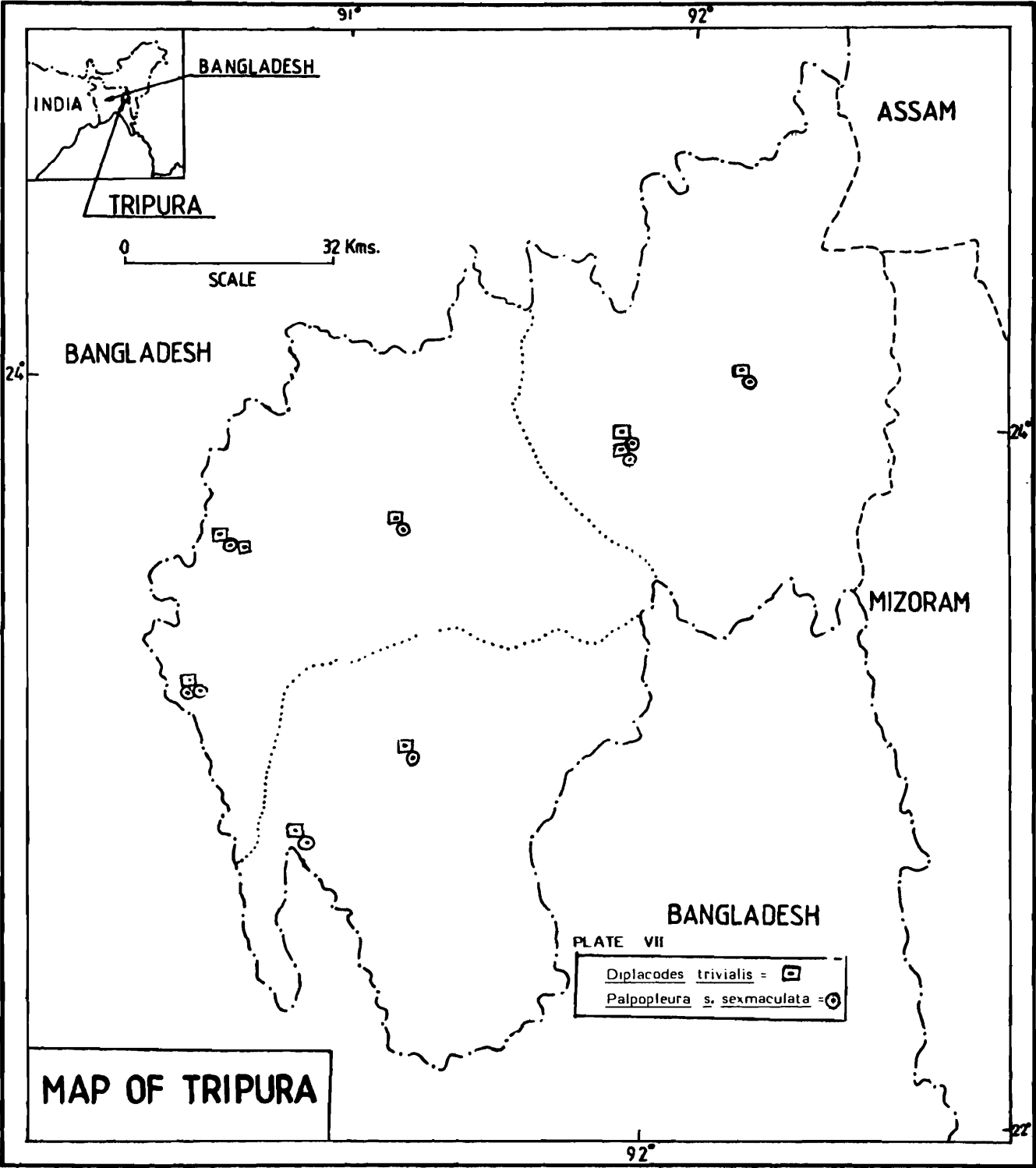
Cerigriion coromandelianum, *Enallagma parvum*, *Agriocnemis pygmaea*



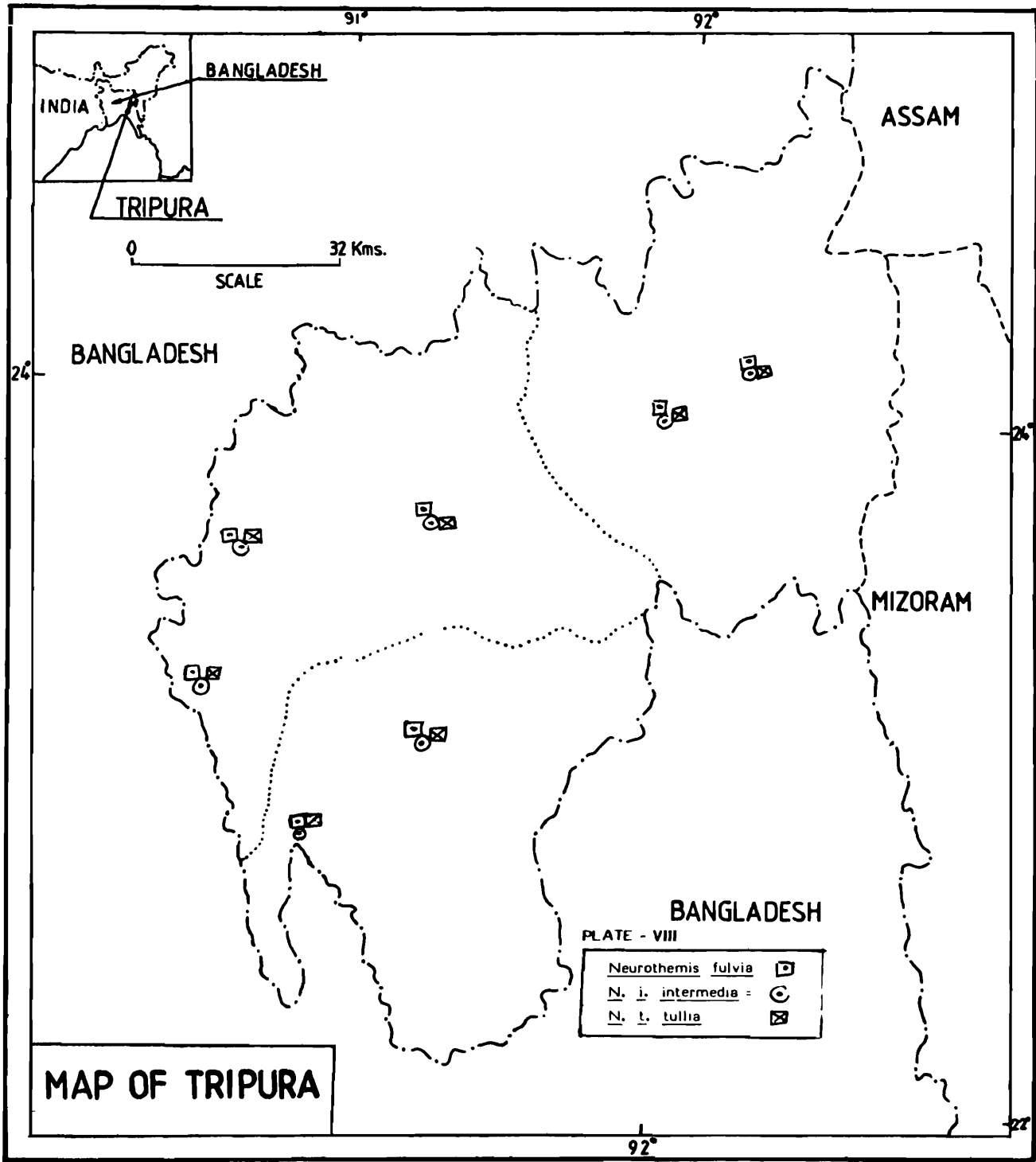
MAP-VI : ANISOPTERA : LIBELLULIDAE

(Genus *Orthetrum*)

Orthetrum pruinostum neglectum, *O. s. sabina*



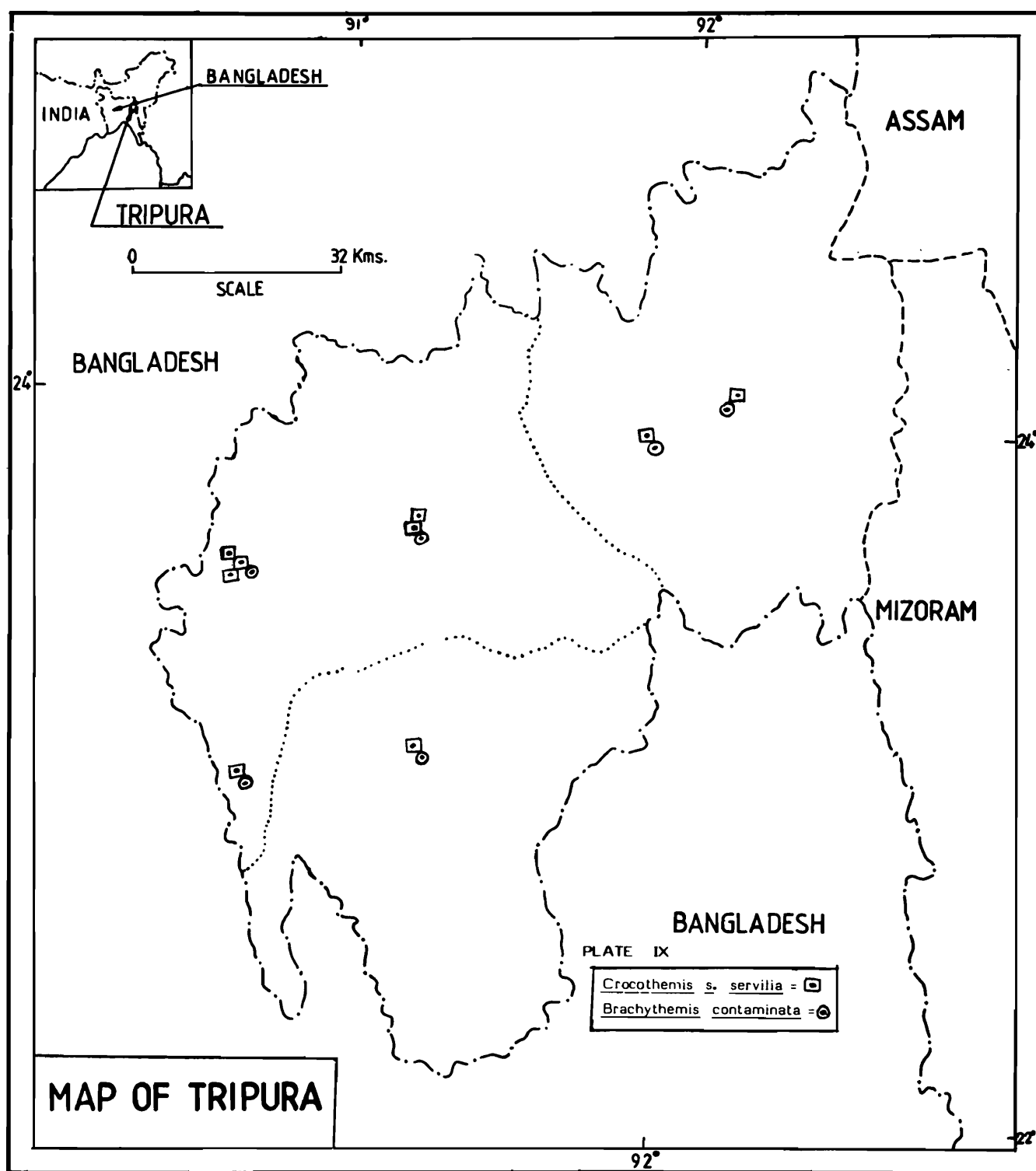
MAP-VII : ANTISOPTERA : LIBELLULIDAE : (Genera : *Diplacodes*, *Palpopleura*)
Diplacodes trivialis, *Palpopleura s. sexmaculata*



MAP-VIII : ANISOPTERA : LIBELLULIDAE

(Genus *Neurothemis*)

Neurothemis tullia tullia, *N. fulvia* *N. i. intermedia*



MAP-IX : ANISOPTERA : LIBELLULIDAE

(Species : *Crocothemis s. servilia*, *Brachythemis contaminata*.)

TABLE—I

Qualitative Composition of Odonata from India : Tripura, Meghalaya and West Bengal

Taxa					TRIPURA		MEGHALAYA		WEST BENGAL	
SF	F	SBF	Species	Genera	Species	Genera	Species	Genera	Species	Genera
COE	Coenagriidae	Amphicneminae	1	1	—	—	—	—	—	—
		Pseudagriorinae	22	2	5	2	—	—	—	—
		Coenagriorinae	3	2	—	—	2	2	2	2
		Ischnurinae	20	4	3	3	17	7	31	9
		Agriocneminae	13	2	3	1	—	—	—	—
		Agriinae	1	1	—	—	—	—	—	—
	Platystictidae	Platystictinae	11	3	—	—	2	2	2	2
	Protonuridae	Protonurinae	6	2	—	—	3	2	—	—
		Disparoneurinae	7	1	—	—	—	—	—	—
		Caconeurinae	10	4	—	—	—	—	1	1
		Platycneminae	6	2	—	—	4	1	4	1
		Calcneminae	10	3	—	—	10	3	4	2
Z	LES	Chlorolestinae	—	—	—	—	—	—	—	—
		Megalestinae	2	1	—	—	2	1	2	1
	Lestidae	Lestinae	19	3	—	—	4	2	4	4
		Synpecmatinae	3	1	—	—	—	—	—	—
	Amphipterygidae	Philoganginae	1	1	—	—	1	1	1	1
	Chlorocyphidae		29	4	1	1	10	2	9	1
	CAL	Euphaeidae	9	4	—	—	6	3	4	2
	Calopterygidae	Caliphaenae	1	1	—	—	1	1	1	1
		Calopteryginae	3	2	2	1	7	4	3	2
	Agriidae	Agriinae	16	6	—	—	—	—	—	—
AZ		Epaliagidae	13	5	—	—	—	—	—	—
	HET	Epiophlebiidae	1	1	—	—	—	—	—	—
CORD	Cordulegasteridae	Cordulegasterinae	6	2	—	—	—	—	—	—
		Chlorogomphinae	9	1	—	—	3	1	1	1

TABLE—I (Contd.)

		Taxa				TRIPURA		MEGHALAYA		WEST BENGAL		
		SF	F	SBF	Species	Genera	Species	Genera	Species	Genera	Species	Genera
		AESH	Gomphidae	Gomphinae	65	15	1	1	20	13	3	2
				Epiogomphinae	24	5	—	—	1	1	4	1
				Ictinogomphinae	10	2	—	—	1	1	23	13
A		Aeshnidae	Gomphaeshninae	3	1	—	—	3	1	3	2	
			Brachtrinae	14	8	—	—	6	4	4	2	
			Anactinae	10	3	—	—	1	1	7	5	
			Aeshninae	4	1	—	—	1	1	4	3	
			Gynacanthaginae	15	2	—	—	3	1	2	1	
			Polycanthaginae	1	1	—	—	—	—	7	1	
				Corduliidae	Corduliinae	1	1	—	—	1	1	1
Macromiinae	15	2			—	—	4	2	1	1		
Epopthalmiinae	22	3			—	—	1	1	6	2		
	LIB	Libellulidae	Libellulinae	86	30	21	12	40	23	52	31	
		Macrodiplactidae		4	4	—	—	—	—	3	3	
3	7	19	32	496	137	36	21	154	82	189	98	

A = Anisoptera, AESH = Aeshnoidea, AZ = Anisozygoptera, CAL = Calopterygoidea, COE = Coenagrionidae, CORD = Cordulegasteridae, F = Family, Het = Heterophlebiodea, LES = Lestoidea, LIB = Libelluloidea, SBF = Subfamily, SF = Superfamily, Z = Zygoptera.

180 : 151 : 494 species (Table I) key have been formulated for various level of taxa concerned, besides providing material, relevent synonymy, bibliography. A comprehensive classified list of Tripura. Odonates is also provided. Maps indicating distribution pattern (both abundant and rare) are also provided so as to give idea of distribution, at a glance, of concerned taxa within Tripura. Besides general labelled diagram of Zygoptera, Anisoptera (PL. I and II) and certain anal appendages and male genitalia (PL III). One table is also provided including species and genera represented in Tripura, West Bengal, Meghalaya and vis-a-vis that of India (Table I).

ACKNOWLEDGEMENTS

The Authors are thankful to Dr. A. K. Ghosh, Ex-Director, Zoological Survey of India for assigning us present work and for providing necessary facilities. Thanks are also due to Dr. R. K. Varshney, Additional Director (Retired), Dr. S. K. Tandon, Scientist—SF (Joint Director) and Dr. J. K. Jonathan, Divisional head for their constant encouragement and support. Authors are also thankful to Dr. J. R. B. Alfred and co-ordinator “Tripura State Fauna” for his valuable suggestions and advise on the format of this paper.

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INSECTA : ORTHOPTERA : ACRIDOIDEA AND EUMASTACOIDEA

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INTRODUCTION

The members of the superfamilies Acridoidea and Eumastacoidea are commonly known as short-horned grasshoppers, locusts, bush-hoppers, surface grasshoppers, monkey hoppers etc. There are about 1,739 genera, and more than 9,000 species of both superfamilies from world (Kevan, 1982). Out of this 168 genera, and 383 species are known from India. The average size of the body varies from 8 mm to 50 mm. They are highly economically important, as some of the species do considerable damage to the crops, vegetable plants, or forest plantation. The well known locust species also belong to these superfamilies.

These grasshoppers are found throughout the world, wherever Orthoptera are found. Though many species have restricted distribution, but majority of the species are tropical, and the group is well represented in temperate climates too. They are found from sea level to very high altitude in Himalayan Region in India.

Notable works like Bolivar (1902, 1914, 1918), Kirby (1914), Uvarov (1921, 1925, 1966, 1977), Dirsh (1954, 1961, 1965), Willemse (1955, 1957), Banerjee & Keven (1960), Keven (1959, 1963), Hollis (1965, 1968, 1971) and Ritchie (1981, 1982) have taxonomically studied the group, but no body has worked out the fauna of the Tripura State, except Tandon and Shishodia (1975) who have recorded *Pseudomorphacris notata* Carl from the area. *Phonogaster cariniventris*, generally found in South India, is also recorded from Tripura, Meghalaya and Sikkim for the first time,

which shows its extension of distribution upto north-eastern India. Five species : *Eucoptacra binghami*, *Eucnemidia charlottae*, *Gonista bicolor*, *Ceracris fasciata* and *Xenerianthus affinis* are recorded for the first time from India.

Present paper reports a total of 50 species distributed under 37 genera and 3 families (36 genera, 49 species under Acridoidea; one genus and one species under Eumastacoidea). Forty-six species are new records for Tripura, and these have been marked with an asterisk (*) in the text. This study is based on materials brought by different survey parties of the Zoological Survey of India. Some of the localities could not be given in the Map (enclosed) because the same are not traceable in the original Map of Tripura.

LIST OF TAXA

Order	ORTHOPTERA
Superfamily	ACRIDOIDEA
Family	ACRIDIDAE
Subfamily	HEMIACRIDINAE
Genus	<i>Gesonula</i> Uvarov
1.	* <i>Gesonula punctifrons</i> (Stål)
2.	* <i>Spathosternum pr. prasiniferum</i> (Walker)
Subfamily	OXYINAE
Genus	<i>Oxya</i> Serville
3.	<i>Oxya h. hyla</i> Serville
4.	* <i>Oxya hyla intricata</i> (Stål)
5.	* <i>Oxya fuscovittata</i> (Marschall)
6.	* <i>Oxya j. japonica</i> (Thunberg)

7. **Oxya velox* (Fabricius)
 8. **Oxya nitidula* (Walker)
 9. **Oxya diminuta* Walker
 Subfamily COPTACRIDINAE
 Genus *Coptacra* Stål
 10. **Coptacra foedata* (Serville)
 Genus *Eucoptacra* Bolivar
 11. **Eucoptacra binghami* Uvarov
 12. **Eucoptacra saturata* (Walker)
 Genus *Epistaurus* Bolivar
 13. **Epistaurus sinetyi* Bolivar
 Genus *Apalacris* Walker
 14. **Apalacris varicornis* Walker
 Subfamily TROPIDOPOLINAE
 Genus *Tristria* Stål
 15. **Tristria pulvinata* (Uvarov)
 Subfamily EYPREPOCNEMIDINAE
 Genus *Choroedocus* Bolivar
 16. **Choroedocus robustus* (Serville)
 Genus *Eucnemidia* Ramme
 17. **Eucnemidia charlottae* Ramme
 Genus *Tylotropidius* Stål
 18. **Tylotropidius varicornis* (Walker)
 Subfamily CATANTOPINAE
 Genus *Catantops* Schaum
 19. **Catantops pinguis innotabilis* (Walker)
 Genus *Stenocatantops* Dirsch & Uvarov
 20. **Stenocatantops splendens* (Thunberg)
 Genus *Xenocatantops* Dirsch & Uvarov
 21. **Xenocatantops h. humilis* (Serville)
 Genus *Bibracte* Stål
 22. **Bibracte* sp.
- Subfamily CYRTACANTHACRIDINAE
 Genus *Chondracris* Uvarov
 23. *Chondracris rosea* (de Geer)
 Genus *Pachyacris* Uvarov
 24. **Pachyacris vinosa* (Walker)
 Genus *Patanga* Uvarov
 25. **Patanga succincta* (Johansson)
 Subfamily ACRIDINAE
 Genus *Acrida* Linné
 26. **Acrida exaltata* (Walker)
 Genus *Phlaeoba* Stål
 27. **Phlaeoba antennata* Brunner
 28. **Phlaeoba infumata* Brunner
 29. **Phlaeoba panteli* Bolivar
 Genus *Gonista* Bolivar
 30. **Gonista bicolor* (de Haan)
 Genus *Ceracris* Walker
 31. **Ceracris nigricornis laeta* (Bolivar)
 32. **Ceracris fasciata* (Brunner)
 Subfamily GOMPHOCERINAE
 Genus *Dnopherula* Karsch
 Subgenus *Aulacobothrus* Bolivar
 33. **Dnopherula (Aulacobothrus) luteipes luteipes* (Walker)
 Genus *Leva* Bolivar
 34. *Leva indica* (Bolivar)
 35. **Leva cruciata* Bolivar
 Genus *Phonogaster* Henry
 36. **Phonogaster cariniventris* Henry
 Subfamily OEDIPODINAE
 Genus *Aiolopus* Fieber
 37. **Aiolopus thalassinus tamulus* (Fabricius)
 Genus *Dittopternis* Saussure
 38. **Dittopternis venusta* (Walker)

- Genus *Heteropternis* Stål
39. **Heteropternis respondens* (Walker)
- Genus *Pternoscirta* Saussure
40. **Pternoscirta cinctifemur* (Walker)
- Genus *Oedaleus* Fieber
41. **Oedaleus abruptus* (Thunberg)
- Genus *Trilophidia* Stål
42. **Trilophidia annulata* (Thunberg)
- Family PYRGOMORPHIDAE
- Genus *Atractomorpha* Saussure
43. **Atractomorpha c. crenulata* (Fabricius)
44. **Atractomorpha burri* Bolivar
45. **Atractomorpha psittacina* (de Haan)
- Genus *Pseudomorphacris* Carl
46. *Pseudomorphacris notata* (Brunner)
- Genus *Chlorizeina* Brunner
47. **Chlorizeina u. unicolor* Brunner
- Genus *Tagasta* Bolivar
48. **Tagasta indica* Bolivar
- Genus *Chrotogonus* Serville
49. **Chrotogonus* (Ch.) tr. *trachypterus* (Blanchard)
- Superfamily EUMASTACOIDEA
- Family CHOROTYPIDAE
- Subfamily ERIANTHINAE
- Genus *Xenerianthus* Descamps
50. **Xenerianthus affinis* (Westwood)

SYSTEMATIC ACCOUNT

Order ORTHOPTERA

Key to superfamilies

1. Antennae longer than front femora
.....ACRIDOIDEA
- Antennae shorter than front femora
.....EUMASTACOIDEA

Superfamily ACRIDOIDEA

Key to families

1. Foveolae lateral or inferior, never forming the tip of the fastigium; stridulatory mechanism present ACRIDIDAE
- Foveolae of the vertex contiguous, superior and forming the extremity of the fastigium; stridulatory mechanism absent
.....PYRGOMORPHIDAE

Family ACRIDIDAE

Key to subfamilies

1. Prosternal tubercle or process usually present 2
- Prosternal tubercle or process absent 8
2. Radial area of tegmen with a series of regular, parallel stridulatory veinlets
.....HEMIACRIDINAE
- Stridulatory veinlets of radial area of tegmen absent 3
3. 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 4
4. 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 5
5. Mesosternal interspace closed
.....TROPIDOPOLINAE
- Mesosternal interspace mostly open 6
6. Mesosternal lobes rounded or obtuse-angular or acute-angular, but not rectangular 7
- Mesosternal lobes rectangular
.....CYRTACANTHACRIDINAE
7. Dorsum of pronotum flat or weakly tectiform, with median and lateral carinae linear (linear

carinae sometimes obliterated); male cercus with strongly compressed, lobiform or subacute, downcurved apex

.....EYPREPOCNEMIDINAE

— Dorsum of pronotum of variable shape; lateral carinae, if present, not linear; male cercus variable, but not as mentioned above

.....CATANTOPINAE

8. Stridulatory file present in posterior femora .

.....GOMPHOCERINAE

— Stridulatory file absent in posterior femora ..

.....9

9. Head with more acute in profile, and with a more acute angle of frons; tegmina without intercalary vein (if present, weak, irregular and not serrated even in male) ACRIDINAE

— Head rounded in profile, face almost vertical, rarely oblique and generally broadly rounded; tegmina always with an intercalary vein in median area (mostly well developed)

.....OEDIPODINAE

Subfamily HEMIACRIDINAE

Key to genera

1. Prosternal tubercle spatulate; fastigium of vertex not much produced before the eyes, parabolic or obtusely angular; pronotum distinctly tricarinate

.....*Spathosternum* Krauss

— Prosternal tubercle conical; fastigium of vertex elongate, projecting far in front of eyes; pronotum not distinctly tricarinate

.....*Gesonula* Uvarov

Genus *Gesonula* Uvarov, 1940

1. **Gesonula punctifrons* (Stål)

(Map 1)

1965. *Gesonula punctifrons* : Mishchenko, *Locusts and grasshoppers of U. S. S. R. and adjacent countries*, Catantopinae, Leningrad : 172.

Material examined : 1 M, Ambassa, 9.ii.1971, V. C. Agrawal coll. ; 1 M, Chailengta, Manu,

17.xii.1972, V.C. Agrawal coll.; 2 MM, 2 FF, Bhatia Avoyanagar, Agartala, 31.x.1974, M. S. Shishodia coll.; 1 M, 2 FF, M. B. B. College campus, Agartala, 1.xi.1974, M. S. Shishodia coll.; 1 M, Bhangashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 4 MM, 2 FF, Garjee, Udaipur, 4, 5, 6, 7.xi.1974, M. S. Shishodia coll.; 2 FF, Brahmachera, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 2 MM, 2 FF, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 2 FF, Kanchanagar, Ambassa, 20.xi.1974, M. S. Shishodia coll.; 2 MM, Dhumachera, Manu, 24.xi.1974, M. S. Shishodia coll.; 2 MM, 2 FF, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.; 4 MM, Anandapur, Agartala, West Tripura, 30.xii.1988, R. S. Barman coll.; 1 M, Kalachera, 1.i.1989, R. S. Barman coll.; 1 M, Bisramgunj, 15.i.1989, R. S. Barman coll.; 1 M, 4 FF, Maharanipur, Teliamura, 18.i.1989, R. S. Barman coll.; 2 MM, 1 F, Sepahijala, South Tripura, 24.ii.1991, G. K. Srivastava coll.; 2 MM, 1 F, Belonia, South Tripura, 25.ii.1991, G. K. Srivastava coll.; 2 MM, 37-41 miles on road to Ambassa, 6.iii.1991, G. K. Srivastava coll.; 3 FF, Champaknagar, 8.iii.1991, G. K. Srivastava coll.; 1 M, Simna, Agartala, 29.x.1991, B. N. Das coll.; 1 M, 1 F, Kumarghat, 29.ii.1992, R. S. Barman coll.; 2 MM, 1 F, Baksanagar, West Tripura, 2.iii.1992, R. S. Barman coll.

Diagnosis : Medium in size; antennae longer than head and pronotum together; pronotum narrow, long and rugose; prosternal tubercle conical; lateral lobes of pronotum wide, anterior margin oblique, antero-ventral angles rounded; supra-anal plate spoon shaped; hind tibiae at apex modified for swimming.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Goa, Kerala, Meghalaya, Orissa, Tamil Nadu; Bangladesh; Borneo; China; Hainan; Japan; Java; Malacca; Myanmar; Philippines; Sri Lanka; Taiwan; Tongking and Thailand.

Remarks : This species occurs near the vicinity of pond, lake or marshy places where the water hyacinth plants are grown.

Genus *Spathosternum* Krauss, 1877

2. **Spathosternum prasiniferum prasiniferum*
(Walker)

(Map 1)

1936. *Spathosternum prasiniferum prasiniferum* : Tinkham,
Lingn. Sci. Journ. Canton, 15 : 51.

Material examined : 2 FF, Chandmari, Agartala, 10.xi.1969, V. C. Agrawal coll.; 1 M, Teliamura, 31. i. 1971, V. C. Agrawal coll.; 1 M, Ambassa, 10.ii.1971, V. C. Agrawal coll.; 1 M, M. B. B. College campus, Agartala, 1.xi.1974, M. S. Shishodia coll.; 8 MM, 13 FF, Garjee, Udaipur, 4, 5, 6, 7, 8.xi.1974, M. S. Shishodia coll.; 5 MM, 5 FF, Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Golabari, Teliamura, 11.xi.1974, M. S. Shishodia coll.; 1 M, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 2 MM, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 3 MM, Dolobari, Ambassa, 18.xi.1974, M. S. Shishodia coll.; 1 F, Harinchera, Ambassa, 19.xi.1974, M.S. Shishodia coll.; 1 F, Kanchanagar, Ambassa, 20.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Garobasti, Ambassa, 21.xi.1974, M. S. Shishodia coll.; 4 MM, Dhumachera, Manu, 24.xi.1974, M. S. Shishodia coll.; 1 M, 5 FF, Jamirchera, 25.xi.1974, M. S. Shishodia coll.; 1 F, Charilam, Agartala, West Tripura, 19.i.1989, R. S. Barman coll.; 2 FF, Buxanagar, South Tripura, 15.vi.1990, G. N. Saha coll.; 1 M, 1 F, Nalchar, 18.vi.1990, G. N. Saha coll.; 2 MM, 1 F, Kunjban, 19.ii.1991, G. K. Srivastava coll.; 1 M, Belonia, South Tripura, 25.ii.1991, G. K. Srivastava coll.; 1 F, Jadurambari Beat, North Tripura, 1.iii.1991, G. K. Srivastava coll.; 1 M, 3 FF, Ambassa, 2.iii.1991, G. K. Srivastava coll.; 1 M, Sonamura, 24.xi.1991, K. K. Ray coll.; 1 M, Zirania, West Tripura, 4.xii.1991, K. K. Ray coll.; 2 MM, Malagarh, West Tripura, 15.ii.1992, R. S. Barman coll.; 2 MM, Sipahijala, 17.ii.1992, R. S. Barman coll.; 3 MM, Udaipur, 19.ii.1992, R. S. Barman coll.; 1 M, 1 F, Kathalbari, 20.ii.1992, R. S. Barman coll.; 2 FF, Kumarpur, 26.2.1992, R. S. Barman coll.; 1 M, Kumarghat, 29.ii.1992, R. S. Barman coll.

Diagnosis : Smaller in size; broad blackish or dark brownish stripe run behind the lower part of eye and below the lateral carinae of pronotum on either side; 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 : This species is distributed throughout in India. It is also recorded from S. E. China, Thailand, Myanmar and Vietnam.

Remarks : It is generally found on either side of road, in pastures and crop fields.

Subfamily OXYINAE

Genus *Oxya* Serville, 1831

Key to species (Male)

1. Supra-anal plate with a tubercle on each side of a median apical process, making the plate appear weakly trilobate.....2
- Supra-anal plate without lateral tubercles ...4
2. Cercus laterally compressed, hardly narrowing towards apex, which is weakly bifurcate
.....*fuscovittata* (Marschall)
- Cercus conical or if compressed then narrowing towards apex, which is obtuse or truncate 3
3. Inner tooth-like pair of lophi of epiphallus usually well developed*hyla hyla* Serville
- Inner tooth-like pair of lophi of epiphallus usually poorly developed
.....*hyla truncata* (Stål)
4. Lower inner area of hind femur and hind tibia bright red; integument more rugulose, giving matt appearance*diminuta* Walker
- Lower inner area of hind femur ochraceous green; tibia bluish green or ochraceous; integument less rugulose, giving shiny appearance 5
5. Supra-anal plate without basal folds.....
.....*velox* (Fabricius)

- Supra-anal plate with well developed basal folds 6
- 6. Epiphallus with short and hook-like outer lophi*japonica japonica* (Thunb.)
- Epiphallus with small and relatively straight outer lophi*nitidula* (Walker)

Oxya Serville, 1831

Key to species (Females)

1. Anterior margin of tegmen with a dense row of short bristles extending from costal bulge almost to apex of tegmen; ovipositor valves with long teeth, the apical ones curved 2
- Anterior margin of tegmen only weakly or not at all spined or bristled; valves of ovipositor with short teeth 2
2. Ventral surface of subgenital plate almost completely flat or weakly concave, appearing to 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, these ridges often toothed.*hyla hyla* Serville
- Ventral surface of subgenital plate without longitudinal ridges or with only slight traces of them apically and they are not at all spined*hyla intricata* (Stål)
4. Lower inner area of hind femur and tibia bright red; integument with more rugulose and matt surface*diminuta* Walker
- Lower inner area of hind femur and tibia bluish green or ochraceous 5
5. Posterior ventral basivalvular sclerite of ovipositor with spines on inner ventral margin 6
- Posterior ventral basivalvular sclerite of ovipositor without spines on inner ventral margin*velox* (Fabr.)

6. Ventral surface of subgenital plate without a median longitudinal concavity posteriorly, posterior margin with a single median spine and a pair of lateral spines*nitidula* (Walker)
- Ventral surface of subgenital plate with a deep median longitudinal concavity posteriorly, posterior margin without median spine between lateral spines*japonica japonica* (Thunberg)

Genus *Oxya* Serville, 1831

3. *Oxya hyla hyla* Serville

(Map 1)

1971. *Oxya hyla hyla* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.) 26 (7) : 282.

Material examined : 1 M, Agartala, 11.xi.1969, V. C. Agrawal coll.; 1 M, Rajnagar, Agartala, 30.x.1974, M. S. Shishodia coll.; 3 MM, Bhangashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 8 MM, Garjee, Udaipur, 4, 5, 6, 7.xi.1974, M. S. Shishodia coll.; 2 MM, Golabari, Teliamura, 11.xi.1974, M. S. Shishodia coll.; 2 MM, Gomaibari, Teliamura, 12.xi.1974, M. S. Shishodia coll.; 2 MM, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 3 MM, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 5 MM, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 3 MM, Dolobari, Ambassa, 18.xi.1974, M. S. Shishodia coll.; 5 MM, Kanchanagar, Ambassa, 20.xi.1974, M. S. Shishodia coll.; 8 MM, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.; 1 M, Subalsingh, 3.viii.1979, K. P. Singh coll.; 1 M, Kanchenchera, 11.viii.1979, K.P. Singh coll.; 2 MM, 1 F, Anandapur, Agartala, 30.xii.1988, R. S. Barman coll.; 3 MM, Simna, Agartala, 31.xii.1988, R. S. Barman coll.; 2 MM, 2 FF, Khowai, 5.i.1989, R. S. Barman coll.; 1 M, Maharanipur, Teliamura, 8.i.1989, R. S. Barman coll.; 2 MM, Bislamgunj, 15.i.1989, R. S. Barman coll.; 1 M, 1 F, Buxanagar, 23.xi.1991, K. K. Ray coll.; 2 FF, Sonamura, 24.xi.1991, K. K. Ray coll.; 1 M, 4 FF, Belonia, 28.xi.1991, K. K. Ray coll.; 1 M, 1 F, Khowai, 3.xii.1991, K. K.

Ray coll.; 1 F, Jirania, W. Tripura, 4.xii.1991, K. K. Ray coll.; 1 M, 1 F, Ambassa, 5.xii.1991, K. K. Ray coll.; 2 MM, Simna, 6.xii.1991, K. K. Ray coll.; 1 M, Champaknagar, 7.xii.1991, K. K. Ray coll.

Diagnosis : Medium in size; body finely rugulose, shiny; antennae longer than head and pronotum together; supra-anal plate trapezoidal with triangular apical projection, a small tubercle present on both sides of supra-anal plate; cercus subacute; subgenital plate, in female, with two longitudinal ridges extending forwards from posterior margin.

Distribution : It is distributed in India, Bangladesh, Pakistan, Nepal, Sri Lanka, Afghanistan, Africa and Persia. However, it is recorded in India from Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

4. **Oxya hyla intricata* (Stål)

(Map 1)

1971. *Oxya hyla intricata* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)* 26 (7) : 287.

Material examined : 1 F, Champaknagar, 11.i.1989, R. S. Barman coll.

Diagnosis : Very similar to the preceding species, except the inner tooth-like pair of lophi of epiphallus usually poorly developed in case of male, and ventral surface of subgenital plate without longitudinal ridges or with only slight traces of them apically and they are not at all spined in case of female.

Distribution : This species is distributed in Oriental region, east of Indo-Myanmar border. It is also available in eastern part of India, specially near the Bangladesh border.

5. **Oxya fuscovittata* (Marschall)

(Map 1)

1971. *Oxya fuscovittata* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)* 26 (7) : 289.

Material examined : 1 F, Chailengta, Manu, 17.xii.1972, V. C. Agrawal coll.; 2 MM, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 6 MM, 4 FF, Bhatia Avoyanagar, Agartala, 31.x.1974, M. S. Shishodia coll.; 3 MM, 1 F, Bhanglashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 1 M, 3 FF, Garjee, Udaipur, 5, 6, 7, 8.xi.1974, M. S. Shishodia coll.; 1 M, 2 FF, Golobari, Teliamura, 11.xi.1974, M.S. Shisodia coll.; 1 F, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 3 MM, 3 FF, Dolobari, Ambassa, 18.xi.1974, M. S. Shishodia coll.; 2 MM, Dhumachera, Manu, 25.xi.1974, M. S. Shishodia coll.; 13 MM, 2 FF, Kalairajtila, Agartala, 30.xii.1988, R.S. Barman coll.; 1 M, Simna, Agartala, 31.xii.1988, R. S. Barman coll.; 1 M, Mohanpur, Agartala, 2.i.1989, R. S. Barman coll.; 2 MM, Brahmachera, 4.i.1989, R. S. Barman coll.; 1 M, Khowai, 5.i.1989, R. S. Barman coll.; 3 MM, Thampujhola, 7.xi.1991, B. N. Das coll.; 1 F, Sonamura, 24.xi.1991, K. K. Ray coll.; 1 M, Khowai, 3.xii.1991, K. K. Ray coll.; 2 MM, 1 F, Zirania, West Tripura, 4.xii.1991, K. K. Ray coll.; 3 MM, 1 F, Ambassa, 5.xii.1991, K. K. Ray coll.; 1 M, 1 F, Simna, 6.xii.1991, K. K. Ray coll.; 2 MM, Champaknagar, 7.xii.1991, K. K. Ray coll.

Diagnosis : Female specimens larger in size than male; integument finely pitted and shiny; supra-anal plate similar to that of *Oxya hyla* but the lateral tubercles are more pronounced and the posterior lobe slightly less developed; male cercus strongly compressed, apex strongly truncate or almost bifid; subgenital plate, in female, with very broadly flattened ventral surface; posterior margin emarginate medially, straight, or with two very small medial spines.

Distribution : It is distributed in Afghanistan, U. S. S. R. (South West), India and Pakistan. However, it is recorded in India from Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

6. **Oxya japonica japonica* (Thunberg)

(Map 1)

1971. *Oxya japonica japonica* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.) **26** (7) : 302.

Material examined : 3 FF, Bhatia Avoynagar, Agartala, 31.x.1974, M. S. Shishodia coll.

Diagnosis : Medium in size; antennae as long as combined length of head and pronotum; supra-anal plate rounded triangular, with very well developed basal folds; ventral surface of subgenital plate, in female, with a deep median longitudinal concavity posteriorly which is bordered on each side by a well developed lateral longitudinal ridge, latter unspined except at most posterior apex.

Distribution : It is distributed in Bangladesh, India, Pakistan, Myanmar China, Taiwan, Japan, Thailand, Vietnam, West Malaysia, Singapore, Sumatra, Java, Bali, Lombok, Sumba, Timor, Philippine Island, Palaus Island, Celebes, Sula Island, Halmahera Island and Hawaii Island.

7. **Oxya velox* (Fabricius)

(Map 1)

1971. *Oxya velox* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.), **26** (7) : 297.

Material examined : 3 MM, Bhatia Avoynagar, Agartala, 31.x.1974, M. S. Shishodia coll.; 2 MM, M. B. B. College campus, Agartala, 2.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Bhangashala, Agartala, 2. xi. 1974, M. S. Shishodia coll.; 1 F, Garobasti, Ambassa, 21.xi.1974, M. S. Shishodia coll.; 1 M, Maharanipur, Teliamura, 8.i.1989, R. S. Barman coll.

Diagnosis : Size small than the preceding species, female larger than the male; supra-anal plate with rounded triangular posterior projection; cercus, in male, conical with subacute apex; subgenital plate of female in posterior half ventrally with a median longitudinal cavity, bordered on each side by a lateral longitudinal ridge.

Distribution : India : Jammu & Kashmir, Rajasthan and West Bengal; Bangladesh; China; Pakistan; Myanmar and Thailand.

8. **Oxya nitidula* (Walker)

(Map 1)

1971. *Oxya nitidula* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.) **26** (7) : 315.

Material examined : 1 F, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.

Diagnosis : Medium in size; tegmina reaching apex of hind femora; supra-anal plate rounded triangular with basal folds; circus conical with truncate apex; ventral surface of subgenital plate with a pair of well developed submargino-lateral spines, posterior margin with a single medial spine and a pair of lateral spines.

Distribution : India : Andhra Pradesh, Karnataka, Goa, Orissa, Rajasthan, Tamil Nadu and West Bengal; Sri Lanka. It may also occur in Kerala.

Remarks : The extent of the species upto Rajasthan is interesting.

9. **Oxya diminuta* Uvarov

1971. *Oxya diminuta* : Hollis, *Bull. Br. Mus. nat. Hist.* (Ent.) **26** (7) : 336.

Material examined : 2 FF, Subalsingh, 4.viii.1979, K. P. Singh coll.

Diagnosis : Size medium; tegmina normally abbreviated and not extending to apex of abdomen; posterior margin of 10th abdominal tergite with a pair of rectangular projections medially; supra-anal plate rounded triangular; cercus conical with subacute apex; ventral surface of subgenital plate of female flate or convex, posterior margin rounded triangular, without spines. The colouration of hind tibiae is completely bright red.

Measurements of female (in mm.) : Length of body 27.5-28.8, pronotum 7.5-8.0, tegmen 16.5-18.0, hind femur 16-16.5, maximum width of hind femur 3.1; mean ratio of length of tegmen to pronotum (E/P) 2.6.

Distribution : India : Andaman, Assam (NE India); China; Cambodia; Laos; Malaysia; Myanmar; Singapore; Sumatra; Thailand and Veitnam.

Remarks : The specimens from Tripura is larger.

Subfamily COPTACRIDINAE

Key to genera

1. Antennae nearly three times as long as the head and pronotum together; eyes rather prominent *Apalacris* Walker
- Antennae less than twice the length of head and pronotum together; eyes not prominent 2
2. Median carina of pronotum well raised, interrupted by the posterior transverse sulcus only *Epistaurus* Bolivar
- Median carina of pronotum low, linear, interrupted by all the three transverse sulci 3
3. Frontal costa or ridge distinctly widened between the antennae and wider than the vertex between eyes *Eucoptacra* Bolivar
- Frontal costa or ridge parallel-sided, not or scarcely wider between antennae *Coptacra* Stål

Genus *Coptacra* Stål, 1873

10. * *Coptacra foedata* (Serville)

1976. *Coptacra foedata* : Tandon, *Rec. zool. Surv. India, Misc. Publ. Occ. Paper No. 3* : 9.

Material examined : 1 M, Subalsingh, 3.viii.1979, K. P. Singh coll.

Diagnosis : Medium in size; antennae yellowish brown, dark brown at apex; pronotum with small rugosities of brown or dark colour; wing hyalinous, posterior part slightly infumated; hind femur brown, area supra with two indistinct brown spots in the middle, area infero externa black, inner area red; hind tibiae red.

Distribution : India : Arunachal Pradesh, Sikkim (doutful); Ambon; China; French Indo-

Cochin (Cochin China, Cambodia); Japan; Java; Myanmar; Philippines and Taiwan.

Genus *Eucoptacra* Bolivar, 1902

Key to species

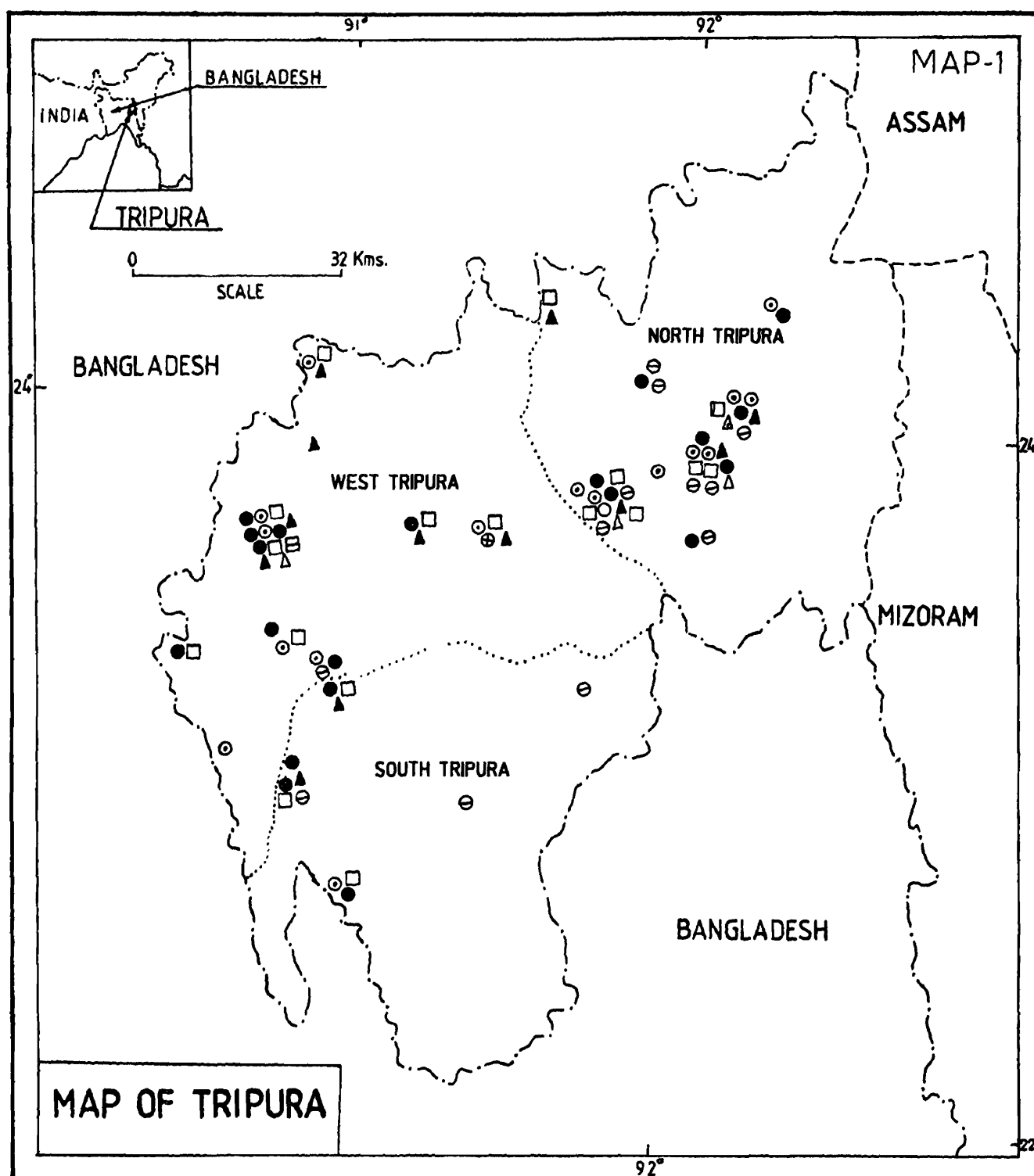
1. Tegmina with a faint indication of a white callous stripe near the middle; hind femur without black spot in or near the middle of externo-superior area *saturata* (Walker)
- Tegmina with an oblique, narrow, callous whitish fascia, formed by irregular venules, a little beyond the middle; femur with a well limited black spot near middle of externo-superior area *binghami* Uvarov

11. **Eucoptacra binghami* Uvarov

(Map 1)

1957. *Eucoptacra binghami* : Willemse, *Publities. naturrh. Genoot. Limburg*, **10** : 443, 444.

Material examined: 1 M, Gomaibari, Teliamura, 12.xi.1974, M. S. Shishodia coll.; 3 MM, 2 FF, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 1 M, 2 FF, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 3 MM, 5 FF, Ambassa forest north, 16.xi.1974, M. S. Shishodia coll.; 7 MM, 5 FF, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 4 MM, 3 FF, Harinchera, Ambassa, 19.xi.1974, M. S. Shishodia coll.; 1 M, Ambassa, Forest Rest House (at light), 20.xi.1974, M. S. Shishodia coll.; 3 FF, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.; 1 M, Ambassa, North Tripura, 21.vi.1988, Dr. V.T. Darlong coll. (Reg. No. 32178); 1 F, Teliamura, 5.i.1989, R. S. Barman coll.; 1 M, Santibazar, South Tripura, 22.ii.1991, G. K. Srivastava coll.; 1 F, Salema, North Tripura, 20.iii.1991, G. K. Srivastava coll.; 3 MM, 2 FF, Jadurambari Beat, North Tripura, 1.iii.1991, G. K. Srivastava coll.; 1 M, 1 F, Ambassa, 2.4.iii.1991, G. K. Srivastava coll.; 1 F, Amarapur, South Tripura, 5.iii.1991, G. K. Srivastava coll.; 1 M, Sonamura, 24.xi.1991, K. K. Ray coll.; 5 MM, 1 F (damaged), Sipahijala, 17.ii.1992, R. S. Barman coll.; 5 MM, 4 FF, (1 M, 1 F, damaged).



Map 1 : ○ *Gesonula punctifrons* ; ● *Spathosternum pr. prasiniferum* ; □ *Oxya h. hyla* ; ⊗ *Oxya hyla intricata* ;
 ▲ *Oxya fuscovittata* ; △ *Oxya velox* ; △ *Oxya nitidula* ; ⊖ *Eucoptacra binghami* ; ⊠ *Oxya j. japonica*.

Lebuchera, 20.ii.1992, R. S. Barman coll.; 1 M, 1 F, Kathalbari, 20.ii.1992, R. S. Barman coll.; 1 F, Manu, 27.ii.1992, R. S. Barman coll.

Diagnosis : Antennae reaching the hind margin of pronotum, feebly flattened and dilated beyond the middle, attenuate apically; frontal ridge flat, between antennae 2-3 times as broad as vertex between eyes; principal sulcus of pronotum placed in the middle; tegmina with an oblique, narrow callous whitish fascia formed by irregular venules, a little beyond the middle; a black spot present before the middle on the outer face of hind femur; subgenital plate of female with the hind margin only slightly, more or less triangularly expanded.

Distribution : Myanmar, Thailand and Tonking.

Remarks : Uvarov (1921) while described the species stated "the Pusa (now Indian Agriculture Research Institute) collection contains one male, without locality" Later on Willemse (1957) recorded this species from Thingannyinaung to Sukli, Dawna Hills 900-2000 ft. He included these localities in India, but these fall in myanmar, not in India. Hence this species is recorded here for the first time from India.

One female of Teliamura has dark brown patches on tegmina, and its body, in general, is dark brown. Another female of Harinchera has dark brown hind femur at ventral surface as well as on externo-inferior area; and the 3/4th hind tibiae is black and rest is red.

12. **Euoptacra saturata* (Walker)

(Map 2)

1921. *Euoptacra saturata* : Uvarov, *Ann. Mag. nat. Hist.*, (9) 7 : 503.

Material examined : 1 M, Indiranagar, Agartala, 11.xi.1969. V. C. Agrawal coll.; 1 M, Jamirchera, North Tripura, 25.xi.1974, M. S. Shishodia coll.

Diagnosis : Medium in size; body rusty red brown; head short, smooth; tip of vertex flat, punctured; prosternal tubercle stout, slightly acute;

hind femur black beneath; hind tibiae red, as long as the hind femur; tegmina a little shorter than the body, with numerous small marks; wings hyaline.

Distribution : India : Assam, Madhya Pradesh, Orissa, Uttar Pradesh and West Bengal.

Genus *Epistaurus* Bolivar, 1889

13. **Epistaurus sinetyi* Bolivar

(Map 2)

1902. *Epistaurus sinetyi* Bolivar, *Annls. Soc. ent. Fr.*, 70 : 623.

Material examined : 1 F, Jamirchera, Manu, 300 M, 25.xi.1974, M. S. Shishodia coll.; 1 M, 2 FF, Kanchenchera, 11.viii.1979, K. P. Singh coll.; 2 MM, Nalchar Bazar, West Tripura, 18.vi.1990. G. N. Saha coll.; 1 F, Sipahijala, 17.ii.1992, R. S. Barman coll.; 1 M, Lebuchera, 20.ii.1992, R. S. Barman coll.; 1 M, Narkelbagan, South Tripura, 21.ii.1992, R. S. Barman coll.

Diagnosis : Small in size; median carina of vertex indistinct; pronotum convex, rather roof-like, median carina cut by 3rd sulcus only; lateral carinae absent; abdomen red, with a row of spots on the back interrupted by the median line; hind femora obliquely trifasciated with brown, inner side red at the base.

Distribution : India : Orissa, Tamil Nadu and West Bengal.

Genus *Apalacris* Walker, 1870

14. **Apalacris varicornis* Walker

(Map 2)

1870. *Apalacris varicornis* Walker, *Cat. Derm. Salt. Br. Mus.*, 4 : 642.

Material examined : 1 M, Harinchera, Ambassa, 19.xi.1974, M. S. Shishodia coll.; 2 MM, Jamirchera, Manu, 300 m, 25.xi.1974, M. S. Shishodia coll.

Diagnosis : Medium in size; general colouration brownish or olivaceous green; antennae brown, basal and apical joints light coloured; lateral lobe of pronotum with a broad

yellow spot along the posterior margin, reaching the humeral angle; pronotum with median carina only; prosternal tubercle pointed; wings light bluish, apex infumate; hind femur with two oblique transverse black bands, these bands sometimes incomplete; hind tibiae red.

Distribution : India : Arunachal Pradesh, Assam, West Bengal; Annam; Bangladesh; Borneo; China; Japan; Yunnan; Tonkin; Perak; Malacca Peninsula; Malaya; Myanmar; Sumatra; West Java; Veitnam.

Remarks : This species, generally, lives in dense vegetation.

Subfamily TROPIDOPOLINAE

Genus *Tristria* Stål, 1873

15. **Tristria pulvinata* (Uvarov)

(Map 2)

1929. *Tristria pulvinata* : Uvarov, *Revue Suisse zool.*, **36** : 559.

Material examined : 2 FF, (nymph), Sipahijala, 17.ii.1992, R. S. Barman coll.; 1 M (nymph), Lebuchera, South Tripura, 20.ii.1992, R. S. Barman coll.; 1 F (nymph), Atharomura, 25.ii.1992, R. S. Barman coll.; 1 M (nymph), Manu, North Tripura, 27.ii.1992, R. S. Barman coll.; 3 MM, 2 FF (nymph), Kumarghat, North Tripura, 29.ii.1992, R. S. Barman coll.

Diagnosis : A little larger than *Eucoptacra*; fastigium of vertex parabolic; antennae filiform; prosternal tubercle curved backwards, strongly widened and concave apically; tegmina and wings well developed; male cercus at apical third incurved, downcurved and laterally flattened; male subgenital plate almost linear, compressed, knife-like, in female it is angular on the posterior margin on either side of mid line.

Distribution : India : Assam, Bihar, Delhi, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal; Sri Lanka.

Subfamily EYPREPOCNEMIDINAE

Key to genera

1. Prosternal tubercle bilobed at apex 2

— Prosternal tubercle simple, not bilobed at apex*Choroedocus* Bolivar

2. Tegmina rudimentar, lateral, not touching each other in the middle*Eucnemidia* Ramme

— Tegmina and wings well developed*Tylotropidius* Stål

Genus *Choroedocus* Bolivar, 1914

16. **Choroedocus* (?) *robustus* (Serville)

(Map 2)

1921. *Choroedocus* (?) *robustus* : Uvarov, *Trans. ent. Soc. Lond.*, : 109.

Material examined : 1 F, Ambassa forest north, 16.xi.1974, M. S. Shishodia coll.; 1 F, Subalsingh, 5.viii.1979, K. P. Singh coll.; 1 M, Vijayanagar, 5.viii.1979, K. P. Singh coll.; 1 F, Kanchenchera, 11.viii.1979, K. P. Singh coll.

Diagnosis : Moderately large in size; antennae filiform, median segments almost twice as long as wide; median carina of pronotum cut by all the three transverse sulci; prosternal tubercle gradually tapering apically, weakly incurved and pubescent; supra-anal plate tongue shaped, apex broadly rounded; subgenital plate gradually tapering, apex truncate; cercus wide, thick, strongly compressed, incurved and downcurved.

Distribution : India : Arunachal Pradesh, Assam, West Bengal; Bangladesh.

Remarks : Generally found in NE India.

Genus *Eucnemidia* Ramme, 1941

17. **Eucnemidia charlottae* Ramme

(Map 2)

1941. *Eucnemidia charlottae* Ramme, *Mitt. zool. Mus. Berlin*, **25** : 210.

Material examined : 1 M, Brahmachera, 10.xi.1974, M. S. Shishodia coll.; 1 F, Gomaibari, Teliamura, 12.xi.1974, M. S. Shishodia coll.; 2 FF, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 2 MM, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Subalsingh, 3.viii.1979, K. P. Singh coll.; 2 MM,

Sonamura, South Tripura, 16.vi.1990, G. N. Saha coll.; 4 MM, 1 F (nymph), Nalchar bazar, West Tripura, 18.vi.1990, G. N. Saha coll.; 2 MM, Golaghat, 20.vi.1990, G. N. Saha coll.; 2 MM, Ampa, 23.vi.1990, G. N. Saha coll.; 1 M, Champaknagar, West Tripura, 27.vi.1990, G. N. Saha coll.

Diagnosis : Moderately large in size; general colouration of body brown or light brown, blackish brown from below; antennae with a light colour pre-apical ring; margins of frontal ridge, below the median ocelli, with streaks of blackish brown. Rest of the characters resemble with the description provided by Ramme (1941) and Willemse (1957), except some variations.

Distribution : Myanmar.

Remarks : Recorded for the first time from India.

Genus *Tylotropidius* Stål

18. **Tylotropidius varicornis* (Walker)

(Map 2)

1914. *Tylotropidius varicornis* : Kirby, *Fauna Brit. India*, Orthopt. (Acridiidae) : 265.

Material examined : 1 M, Sepapijala, 17.i.1989, R. S. Barman coll.; 1 F, Bagma, South Tripura, 5.xi.1991, B. N. Das coll.

Diagnosis : General colouration yellowish to greenish-yellow; pronotum with four dark brown patch on lateral margin which are broken between 1st and 2nd sulcus by a brown colour; dorsum of pronotum in the middle dark brown throughout; lateral pronotal lobe with one mule mark of brown colour, otherwise dark brown except the inferior margin which is oblique, and has a whitish streak; prosternal tubercle compressed, truncate and bilobed/bifid at apex; tegmina and wings not reaching upto the posterior femoral apex; tegmina with a row of triangular whitish spots upon the radial stripe in the costal area; hind femora thickened at the base, very slender towards the tip; hind tibiae brown to red-brown towards apex instead of dull blue; supra-anal plate of male elongate-triangular and sulcated.

Distribution : India : Andhra Pradesh, Goa, Himachal Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu; Myanmar and Sri Lanka.

Subfamily CATANTOPINAE

Key to genera

1. Body stout; median carina and transverse sulci of pronotum nearly obsolete; hind femora stout *Bibracte* Stål
- Body slender; median carina present, transverse sulci rather indistinct; hind femora normal 2
2. Pronotum not constricted in the middle 3
- Pronotum at least slightly constricted in the middle *Xenocatantops* Dirsh
3. Prosternal tubercle not compressed laterally or slightly antero-posteriorly compressed, with rounded apex *Catantops* Schaum
- Prosternal tubercle more or less compressed laterally, in profile, broad and curved backwards *Stenocatantops* Dirsh

Genus *Catantops* Schaum, 1853

19. **Catantops pinguis innotabilis* (Walker)

(Map 2)

1953. *Catantops pinguis innotabilis* : Dirsh & Uvarov, *Tijdschr. Ent.*, 96 (3) : 233.

Material examined : 2 MM, Garjee, Udaipur, 100 m, 4.xi.1974, M. S. Shishodia coll.; 2 MM, Golobari, Teliamura, 150 m, 11.xi.1974, M. S. Shishodia coll.; 3 MM, 3 FF, Kunjmura, Teliamura, 150 m, 14.xi.1974, M. S. Shishodia coll.; 1 M, 6 FF, Harinchera, Ambasaa, 200 m, 19.xi.1974, M. S. Shishodia coll.; 2 FF, Mainma, Manu, 300 m, 23.xi.1974, M. S. Shishodia coll.; 2 MM, 2 FF, Dhumachera, Manu, 300 m, 24.xi.1974, M. S. Shishodia coll.; 2 FF, Karamchera, 11.viii.1979, K. P. Singh coll.; 3 MM, 2 F, Sindupara, 12.viii.1979, K. P. Singh coll.; 1 F, Pachasetal, N. Tripura, 17.vi.1988, Dr. V. T. Darlong (Reg. No. 32125) coll.; 1 M, Atharomura, 25.ii.1991, R. S. Barman coll.; 2 MM, 1 F, Salema, N. Tripura, 28.ii.1991, G. K.

Srivastava coll.; 1 M, 3 FF, 37-47 mile on road to Ambassa, 6.iii.1991, G. K. Srivastava coll.

Diagnosis : Medium in size; 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 crinula; male cercus more upcurved, with more broadened apex and more projecting upper apical angle.

Distribution : India : Arunachal Pradesh, Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Laccadive Islands, Madhya Pradesh, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh & West Bengal; Java; Indo-China; Malaya; Myanmar; New Guinea; Philippines; Sri Lanka; Sumatra; S. Tibet; Thailand, Yunnan.

Remarks : Specimens from Dhumachera have variations : Left hind tibia completely black, right tibia also black but it is red at apex.

Genus *Stenocatantops* Dirsh & Uvarov, 1953

20. **Stenocatantops splendens* (Thunberg)

(Map 2)

1953. *Stenocatantops splendens* : Dirsh & Uvarov, *Tijdschr. Ent.*, **96** (3) : 237.

Material examined : 1 M, 1 F, Harinchera, Ambassa, 200-250 m, 19.xi.1974, M. S. Shishodia coll.; 1 F, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.

Diagnosis : Size a little large than *Catantops* Schaum; body slender; pronotum slightly narrowing forwards; prosternal tubercle strongly compressed laterally, in profile, apical three quarters strongly broadened and curved backwards; hind femur slender; subgenital plate acutely conical; cercus slightly broadened at base, narrowing and incurved towards apex.

Distribution : India : Arunachal Pradesh, Andaman & Nicobar Islands, Assam, Delhi, Kerala, Maharashtra, Madhya Pradesh, Orissa,

Tamil Nadu and West Bengal; Myanmar; China; Nepal; Korea; Hainan; Philippines; Borneo; Celebes; Sumatra; Java; Moluccas; Taiwan and Veitnam.

Genus *Xenocatantops* Dirsh & Uvarov, 1953

21. **Xenocatantops humilis humilis* (Serville)

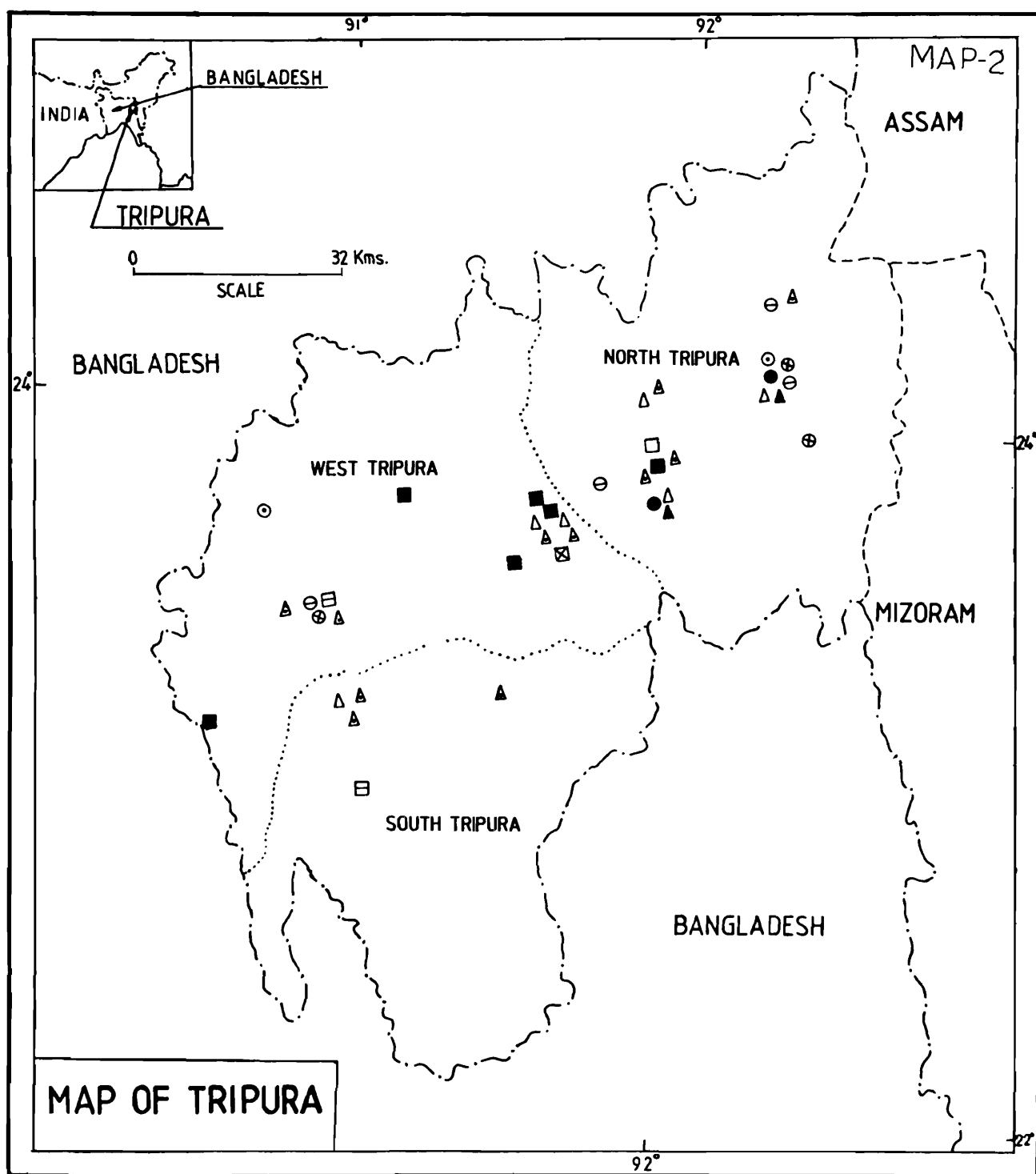
(Map 2)

1953. *Xenocatantops humilis humilis* : Dirsh & Uvarov, *Tijdschr. Ent.*, **96** (3) : 237.

Material examined : 3 FF, Charilam, 15, 18.xi.1969, V. C. Agrawal coll.; 2 MM, Gomaibari, Teliamura, 150 m, 12.xi.1974, M. S. Shishodia coll.; 3 FF, Kunjmura, Teliamura, 150 m, 14.xi.1974, M. S. Shishodia coll.; 4 FF, Ambassa forest south, 200 m, 17.xi.1974, M. S. Shishodia coll.; 4 FF, Subalsing, 3, 6.viii.1979, K. P. Singh coll.; 1 F, Vizaynagar, 5.viii.1979, K. P. Singh coll.; 1 F, Golaghati, 20.vi.1990, G. N. Saha coll.; 1 M, 1 F, Garjee, South Tripura, 23.ii.1991, G. K. Srivastava coll.; 3 FF, Jadurambari Beat (Abhanga), 1.iii.1991, G. K. Srivastava coll.; 5 MM, 1 F, Ambassa, 2.iii.1991, G. K. Srivastava coll.; 1 M, Amarpur, 5.iii.1991, G. K. Srivastava coll.; 2 MM, 4 FF, Sipahijala, South Tripura, 17.ii.1992, R. S. Barman coll.; 1 F, Udaipur, 19.ii.1992, R. S. Barman coll.; 1 F, Lebuchera, 20.ii.1992, R. S. Barman coll.; 1 M, 1 F, Atharomura, 25.ii.1992, R. S. Barman coll.; 1 F, Kumarghat, North Tripura, 29.ii.1992, R. S. Barman coll.

Diagnosis : Medium in size; antennae nearly as long as pronotum and twice the length of head together; pronotum slightly constricted, metazona divergent posteriorly; prosternal tubercle acutely conical; tegmina projecting hind knee for more than half pronotal length; external disc of hind femur yellowish with two brown fasciae, broadening towards the lower margin and fused with the brown lower margin of femur; male cercus simple with round apex.

Distribution : Widely distributed species in India, but it is not occurring in Sikkim beyond Rangpo towards north. However it is also available in Bangladesh, Borneo, Java, Kei Island,



Map 2 : $\odot$ *Eucoptacra saturata* ; $\bullet$ *Apalacris varicornis* ; $\square$ *Choroedocus (?) robustus* ; $\boxplus$ *Tylotropidius varicornis* ; $\blacktriangle$ *Stenocatantops splendens* ; $\boxtimes$ *Bibracte* sp. ; $\otimes$ *Epistaturus sinetyi* ; $\ominus$ *Tristria pulvinata* ; $\blacksquare$ *Eucnemidia charlottae* ; $\triangle$ *Catantops pinquus innotabilis* ; $\triangle$ *Xenocatantops h. humilis*.

Lombok, Malaya, Myanmar, Philippines, Sri Lanka, Thailand, S. Tibet and Veitnam.

Genus *Bibracte* Stål, 1878

1878. *Bibracte* Stål, *Bih. Svensk. Acad. Handl.*, 5 (4) : 27, 71.

1914. *Bibracte* : Kirby, *Fauna British India*, Orthopt. (Acridiidae) : 193, 235.

22. **Bibracte* sp.

(Map 2)

Material examined : 1 F, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.

Diagnosis : Body stout; fastigium of vertex projecting considerably between antennae, face sloping; antennae long, pointed at apex; pronotum with the median carina and the transverse sulci nearly obsolete; hind femora moderately stout.

Distribution : Indo-Malayan region. In India, it is available in southern part of India.

Remarks : The specimen under study is damaged, therefore its specific identification is not possible.

Subfamily CYRTACANTHACRIDINAE

Key to genera

1. Prosternal tubercle strongly curved backwards, touching or almost touching mesosternum, inflated in middle, with conical apex
..... *Chondracris* Uvarov
- Prosternal tubercle straight, vertical or slightly incurved backward but far from reaching mesosternum, conical or compressed 2
2. Tegmina with oblique venation in apical part, transverse veins situated obliquely to principal veins; hind tibiae with 7 spines on outer dorsal margin; prosternal tubercle conical; male cercus conical with acuminate apex; male subgenital plate acuminate, apex pointed
..... *Pachyacris* Uvarov
- Tegmina with straight venation in apical part, transverse veins forming almost right angle

with principal veins; hind tibiae with 8 spines on outer dorsal margin; prosternal tubercle almost cylindrical with rounded apex; male subgenital plate long, curved, apex pointed..

..... *Patanga* Uvarov

Genus *Chondracris* Uvarov, 1923

23. *Chondracris rosea* (de Geer)

1976. *Chondracris rosea* : Tandon, *Rec. zool. Surv. India, Misc. Publ., Occ. paper No. 3* : 21.

Material examined : 1 M, Subalsing, 5.viii.1979, K. P. Singh coll.

Diagnosis : Large in size, body robust, coarsely punctured; uniformly green in colour; fastigium of vertex strongly sloping; median carina of pronotum moderately raised in prozona, straight in metazona, metazona feebly tectiform, disc forming distinct angles with the lateral lobes; tegmina exceeding the hind knee by one fourth of their total length; wings hyaline, with the base rose colour; hind tibiae and tarsi red.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Manipur, Orissa, Sikkim, Tamilnadu, Tripura, Uttar Pradesh, West Bengal; Bangladesh; Bhutan; China; Hainan Islands; Indonesia; Japan; Korea; Manchuria; Philippines; Taiwan; Thailand and Veitnam.

Genus *Pachyacris* Uvarov, 1923

24. **Pachyacris vinosa* (Walker)

(Map 3)

1923. *Pachyacris vinosa* : Uvarov, *Ann. Mag. nat. Hist.*, (9) 11 : 478.

Material examined : 1 F, Santibazar, 5.viii.1979, K. P. Singh coll.

Diagnosis : Large in size; fastigium of vertex almost flat; tegmina surpassing the tip of hind femora by a distance distinctly less than the length of pronotum, with oblique venation in apical part and transverse veins situated obliquely to principal vein; wings infumate, rosy at base; male cercus elongate conical with acuminate apex.

Distribution : India : Assam, Bihar, Goa, Himachal Pradesh, Mizoram; Orissa, Uttar Pradesh, West Bengal; China; Myanmar; Nepal.

Genus *Patanga* Uvarov, 1923

25. **Patanga succincta* (Johansson)

1923. *Patanga succincta* : Uvarov, *Ann. Mag. nat. Hist.*, (9) 12 : 364.

Material examined : 1 M, Kanchenchera, 11.viii.1979, K. P. Singh coll.

Diagnosis : General colouration pale with grey, brown or more or less uniformly greyish or brownish; vertex in the middle with a broad yellow or reddish brown band continuing on pronotum; pronotum obtuse to rectangular at hind margin; supero-median area of hind femur with fewer and more spaced serrulations; cerci in male stouter and broader in lateral view, more incrassately compressed.

Distribution : India : Arunachal Pradesh, Delhi, Goa, Himachal Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal; S. Arabian desert; China; Hainan Islands; Japan; S. E. Asia; Myanmar; Sri Lanka; Taiwan.

Subfamily ACRIDINAE

Key to genera

1. Head conically ascending; hind femora with a spine on the dorso-external and dorso-internal genicular lobes *Acrida* Linné
- Head not ascending; hind femora with rounded dorso-external and dorso-internal genicular lobes 2
2. Antennae filiform *Ceracris* Walker
- Antennae ensiform or sword shaped 3
3. Apex of tegmina and wings usually sharpened, rarely rounded *Gonista* Bolivar
- Apex of tegmina and wings usually rounded *Phlaeoba* Stål

Genus *Acrida* Linné, 1758

26. **Acrida exaltata* (Walker)

(Map 3)

1954. *Acrida exaltata* : Dirsh, *Bull. Soc. Fouad. Entom.*, 38 : 149.

Material examined : 1 M, Nandnagar, Agartala, 3.xi.1969, V. C. Agarwal coll.; 1 F, Chandmari tila, Agartala, 10.xi.1969, V. C. Agarwal coll.; 3 MM, 1 F, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 3 MM, 2 FF, Garjee, Udaipur, 6, 7, 8.xi.1974, M. S. Shishodia coll.; 1 M, Golobari, Teliamura, 11.xi.1974, M. S. Shishodia coll.; 5 MM, 3 FF, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Dhumachera, Manu, 24.xi.1974, M. S. Shishodia coll.; 1 M, Subalsing, 5.viii.1979, K. P. Singh coll.; 1 F, Kathalbagan, 9.viii.1979, K. P. Singh coll.; 1 M, Sipahijala, 17.i.1989, R. S. Barman coll.; 1 M, Salema, North Tripura, 26.v.1992, B. C. Das coll.

Diagnosis : Head conically ascending, basal part narrow; fastigium of vertex broad, laminate and truncate at extremity; transverse sulcus of pronotum placed near the middle of disc; male subgenital plate, in profile, comparatively long, with more elongated part, the upper margin with a small projection; tegmina without pointed apex, a little produced beyond the hind knees; wings slightly shorter than tegmina.

Distribution : India : Arunachal Pradesh, Bihar, Goa, Himachal Pradesh, Madhya Pradesh, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal; Afghanistan; Bangladesh; Iran; Pakistan; Saudi Arabia; SE Tibet; Yemen; West Aden.

Genus *Phlaeoba* Stål, 1860

Key to species

1. Wings more or less fuscous at apex; pronotum very little or not rugulose 2
- Wings hyaline at apex; pronotum very rugulose *panteli* Bolivar
2. Antennae unicolorous; subgenital plate in the male with the apex pointed *infumata* Brunner
- Antennae ringed or tipped with obscure yellow; subgenital plate of male short, obtuse at apex *antennata* Brunner

27. **Phlaeoba antennata* Brunner

(Map 3)

1914. *Phlaeoba antennata* : Kirby, *Fauna British India*, Orthopt. (Acridiidae) : 102.

Material examined : 1 M, Indranagar, Agartala, 11.xi.1969, V. C. Agrawal coll.; 1 M, Plantation Centre Charilam, 22.xi.1969, V. C. Agrawal coll.; 1 M, Ampu, 24.i.1971, V. C. Agrawal coll.; 1 M, Bhangashala, Agartala, 25 m, 2.xi.1974, M. S. Shishodia coll.; 5 MM, 2 FF, Garjee, Udaipur, 100 m, 4, 5, 7, 8.xi.1974, M. S. Shishodia coll.; 9 MM, 6 FF, Brahmachera, Teliamura, 150 m, 10.xi.1974, M. S. Shishodia coll.; 2 MM, Gomaibari, Teliamura, 150 m, 12.xi.1974, M. S. Shishodia coll.; 2 MM, Korilong, Teliamura, 150 m, 13.xi.1974, M. S. Shishodia coll.; 17 MM, 10 FF, Kunjmura, Teliamura, 150 m, 14.xi.1974, M. S. Shishodia coll.; 28 MM, 9 FF, Ambassa forest north, 16.xi.1974, M. S. Shishodia coll.; 8 MM, 3 FF, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 17 MM, 11 FF, Harinchera, Ambassa, 19.xi.1974, M. S. Shishodia coll.; 2 FF, Kanchanagar, Ambassa, 200 m, 20.xi.1974, M. S. Shishodia coll.; 2 MM, 1 F, Garobasti, Ambassa, 21.xi.1974, M. S. Shishodia coll.; 2 MM, Jamirchera, Manu, 300 m, 25.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Santibazar, 24.viii.1978, S. K. Chanda coll.; 1 F, Ambassa, 27.viii.1978, S. K. Chanda coll.; 3 MM, 2 FF, Subalsing, 3, 4.viii.1979, K. P. Singh coll.; 1 M, Kanchenchera, N. Tripura, 11.vi.1988, V. T. Darlong coll.; 2 MM, Simna, West Tripura, 6.vi.1990, G. N. Saha coll.; 3 MM, 2 FF, Amarpur, South Tripura, 12.vi.1990, G. N. Saha coll.; 3 MM, 4 FF, Nutanbazar, South Tripura, 13.vi.1990, G. N. Saha coll.; 1 M, 1 F, Sonamura, South Tripura, 16.vi.1990, G. N. Saha coll.; 6 MM, 6 FF, Bagma, South Tripura, 17.vi.1990, G. N. Saha coll.; 1 M, Kanchannagar, 29.xi.1991, K. K. Ray coll.; 4 MM, 3 FF, Sipahijala, 17.ii.1992, R. S. Barman coll.; 1 M, Kamalpur, 26.ii.1992, R. S. Barman coll.

Diagnosis : Olive-brown, with a broad yellow band running from the vertex to the end of 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, infuscated towards the tip; subgenital plate rounded at apex; posterior tibiae dirty blue.

Distribution : India : Arunachal Pradesh, Kerala, Rajasthan, West Bengal; Annam; Bangladesh; Borneo; China; Hainan Island; Isle of Penang; Malaya Peninsula; Myanmar; Perak; Tonking; Sumatra.

28. **Phlaeoba infumata* Brunner

(Map 3)

1914. *Phlaeoba infumata* : Kirby, *Fauna British India*, Orthopt. (Acridiidae) : 103.

Material examined : 7 MM, 5 FF, Garjee, Udaipur, 100 m, 4, 5, 8.xi.1974, M. S. Shishodia coll.; 1 M, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 1 M, Ambassa forest north, 16.xi.1974, M. S. Shishodia coll.; 1 F, Ambassa, Forest Rest House, 19.xi.1974, M. S. Shishodia coll. (at light); 2 MM, Dhumachera, Manu, 24.xi.1974, M. S. Shishodia coll.; 1 M, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.; 2 MM, 1 F, Abhaya, 22.viii.1978, S. K. Chanda coll.; 3 MM, 1 F, Subalsing, 3, 5.viii.1979, K. P. Singh coll.; 1 F, Vizaynagar, 5.viii.1979, K. P. Singh coll.; 1 M, Shantibazar, 8.viii.1979, K. P. Singh coll.; 2 FF, Kathalbagan, 9.viii.1979, K. P. Singh coll.; 1 M, Kanchenchera, 600 ft. North Tripura, 11.vi.1988, V. T. Darlong coll.; 1 M, Hatipara, Agartala, 29.xii.1988, R. S. Barman coll.; 3 MM, Brahmachera, Teliamura, 4.i.1989, R. S. Barman coll.; 1 M, Baramura, Teliamura, 5.i.1989, R. S. Barman coll.; 1 M, Maharaniipur, Teliamura, 8.i.1989, R. S. Barman coll.; 1 M, Sonamura, 14.i.1989, R. S. Barman coll.; 2 MM, Bairagibazar, 22.i.1989, R. S. Barman coll.; 1 F, Golaghati, West Tripura, 20.vi.1990, G. N. Saha coll.; 3 MM, 2 FF, Kunjban, Agartala, 19.ii.1991, G. K. Srivastava coll.; 1 M, 1 F, Santibazar, South Tripura, 22.ii.1991, G. K. Srivastava coll.; 2 MM, 2 FF, Salema, North Tripura, 28.ii.1991, G. K. Srivastava coll.; 1 M, Jadurambari Beat (Abhanga), 1.iii.1991, G. K.

Srivastava coll.; 1 M, Ambassa, 2.iii.1991, G. K. Srivastava coll.; 2 MM, 2 FF, Khowai, 4.iii.1991, G. K. Srivastava coll.; 4 MM, 6 FF, Amarpur, 5.iii.1991, G. K. Srivastava coll.; 1 F, Sonamura, North Tripura, 6.xi.1991, B. N. Das coll.; 1 M, 2 FF, Gorkhabasti, West Tripura, 13.ii.1992, R. S. Barman coll.; 3 MM, Sipahijala, 17.ii.1992, R. S. Barman coll.; 3 MM, 2 FF, Lebuchera, South Tripura, 20.ii.1992, R. S. Barman coll.; 1 M, 1 F, Manu, 27.ii.1992, R. S. Barman coll.; 1 M, Teliamura, 2.iii.1992, R. S. Barman coll.; 1 M, Amarpur, 5.iii.1992, R. S. Barman coll.

Diagnosis : Brownish testaceous in colour; fastigium of vertex above with a continuous median carina extending along the head and pronotum; antennae ensiform, as long as the head and pronotum together; pronotum rugose, with a rudimentary carina on each side between median and lateral carinae; wings fusco-hyaline, infumated towards apex; subgenital plate acute at apex.

Distribution : India : Arunachal Pradesh, Bihar, Delhi, Haryana, Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan; Tamil Nadu, West Bengal; S. China; Hainan Island; S. & N. Kuangtung; Kwangsi; Malacca; Myanmar; Nepal; Yunnan.

29. **Phlaeoba panteli* Bolivar

(Map 3)

1921. *Phlaeoba panteli* : Uvarov, *Ann. Mag. nat. Hist.*, (7) 9 : 486.

Material examined : 2 MM, Kunjban, Agartala, 19.ii.1991, G. K. Srivastava coll.

Diagnosis : Ferruginous brown, with scattered black dots; antennae ensiform and shorter than head and pronotum together, brown at apex; pronotum truncated in front, obtusely angulated behind; head and pronotum very rugose, the callosities being irregularly striated; wings narrow, bluish hyaline, with many of the nervures greenish.

Distribution : India : Andhra Pradesh, Bihar, Himachal Pradesh, Meghalaya, Madhya Pradesh, Tamil Nadu and West Bengal; Afghanistan.

Genus *Gonista* Bolivar, 1898

30. **Gonista bicolor* (de Haan)

(Map 3)

1951. *Gonista bicolor* : Willemse, *Publities naturrh. Genoot. Limburg*, Reeks 4 : 108.

Material examined : 2 MM, 1 F, Garjee, 27.xi.1969, V. C. Agrawal coll.

Diagnosis : Body elongated; head small, much shorter than pronotum; vertex concave, with distinct median carina; antennae sword-shaped; tegmina extending beyond the middle of hind tibiae, narrow, apex sharp; wings also narrow, shorter than tegmina, apex pointed

Distribution : China; Japan; Islands of Malayan Archipelago.

Remarks : Recorded first time from India.

Genus *Ceracris* Walker, 1870

Key to speices

1. Face and pronotum coarsely punctured; hind femora externally with a narrow, but always distinct blackish fascia just before the pre-apical pale ring; tegmina brown, with the anal field green, or brownish-green *nigricornis* (Bolivar)
- Face and pronotum smooth, or only minutely punctured in metazona; hind femora without a blackish fascia before the pale ring; the whole pre-radial part of tegmina green, anal area also green *fasciata* (Brunner)

31. **Ceracris nigricornis laeta* (Bolivar)

(Map 3)

1925. *Ceracris nigricornis laeta* : Uvarov, *Ent. Mitt. Berl.*, 14 : 14-15.

Material examined : 1 M, Gomaibari, Teliamura, 12.xi.1974, M. S. Shishodia coll.; 1 M, Ambassa forest north, 17.xi.1974, M. S. Shishodia coll.; 1 M, Harinchera, Ambassa, 19.xi.1974, M. S. Shishodia coll.

Diagnosis : Medium in size; body elongated, larger than *Ceracris n. nigricornis* Walker (not

discussed here); face and pronotum coarsely punctured; hind femora externally with a narrow but always distinct blackish fascia just before the pre-apical pale ring; tegmina with the anal field green or brownish-green.

Distribution : India : Haryana, Sikkim, West Bengal; China; Taiwan, Tonkin.

Remarks : This subspecies is more larger than *Ceracris n. nigricornis* Walker.

32. **Ceracris fasciata* (Brunner)

1989. *Ceracris fasciata* : Ingrisch, *Spixiana*, 11 (3) : 235.

Material examined : 1 F, Golaghati, West Tripura, 20.vi.1990, G. N. Saha coll.

Diagnosis : General colouration dark-brown; antennae with white tips; tegmina dark-brown or blackish, except radial and anal areas; hind femora dark-brown with black knees and a pale pre-apical ring; hind tibiae black at base, followed by a white ring, rest blackish-blue to dark-brown.

Lateral carinae of pronotum broken, slightly diverging anteriorly in prozona, and strongly divergent in metazona. Rest of the characters are similar to Ramme (1941) and Ingrisch (1989).

Measurements (in mm) : Body length 26.0, antennae pronotum 5.0, tegmen 19.0, hind femur 15.0.

Distribution : South China; Myanmar and Thailand.

Remarks : Uvarov (1925) and Ingrisch (1989) have pointed out regarding its highly variability. I have also noticed the same thing here when studied a large number of specimens from Meghalaya and Manipur. However, this species is recorded here for the first time from India.

Subfamily GOMPHOCERINAE

Key to genera

1. Body long, slender; head broad, lamellated, longer than pronotum; antennae ensiform; head and pronotum with numerous parallel carinae; wings abbreviated.....*Phonogaster* Henry

— Body not long and slender; head not broad and lamellated; antennae filiform; head and pronotum without lateral parallel carinae; wings well developed 2

2. Fastigium with acute apex; frontal ridge with obtuse lateral carinulae*Leva* Bolivar

— Fastigium with truncate apex; frontal ridge without lateral carinulae
.....*Aulacobothrus* Bolivar

Genus *Dnopherula* Karsch, 1896

Subgenus *Aulacobothrus* Bolivar, 1902

33. **Dnopherula (Aulacobothrus) luteipes luteipes* (Walker)

(Map 3)

1921. *Aulacobothrus luteipes* : Uvarov, *Ann. Mag. nat. Hist.*, (9) : 7 : 482.

1993. *Dnopherula (Aulacobothrus) luteipes luteipes* : Ingrisch, *Ent. Scand.*, 24 : 3 : 321.

Material examined : 1 M, Garjee, Udaipur, 4.xi.1974, M. S. Shishodia coll.; 1 M, Mainma, Manu, 23.xi.1974, M. S. Shishodia coll.; 1 M, Mohanpur, 2.i.1989, R. S. Barman coll.; 2 MM, Charilam, 19.i.1989, R. S. Barman coll.; 1 F, Bagma, South Tripura, 17.vi.1990, G. N. Saha coll.

Diagnosis : Small in size; antennae filiform; fastigium of vertex almost trapezoidal, with truncate apex, concave, and with transverse basal furrow; fastigial foveolae not visible from above; pronotum with nearly parallel lateral carinae which are weakly concave in the middle part, posterior margin obtusely angulate, median carina distinct; hind femora with three black bands on the dorsal surface and with a black one at distal end; hind tibiae reddish in the apical part.

Distribution : India : Assam, Bihar, Delhi, Karnataka, Tamil Nadu, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Orissa, Sikkim, Tamil Nadu and West Bengal; N. Amercia; China; Europe; Japan; Myanmar and Pakistan.

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-prozonal excurved and also divergent in metazona to make it 'X' shaped
.....*cruciata* Bolivar

34. *Leva indica* (Bolivar)

(Map 3)

1921. *Leva indica* : Uvarov, *Ann. Mag. nat. Hist.*, (9) 7 : 485.

Material examined : 1 M, M. B. B. College campus, Agartala, 8.ix.1975, B. C. Roy coll.

Diagnosis : Small in size; antennae filiform, basal segments slightly depressed; fastigium of vertex long, angular with acute apex; foveolae not visible from above; lateral carinae of pronotum parallel in prozona, divergent in metazona; median carina cut by 3rd sulcus in metazona.

Distribution : India : Bihar, Delhi, Orissa, Tamil Nadu, Tripura and West Bengal.

Remarks : This species is an inhabitant of open fields and largely available in India.

35. **Leva cruciata* Bolivar

(Map 3)

1929. *Leva cruciata* : Uvarov, *Revue suisse Zool.*, 36 : 450.

Material examined : 3 MM, Mohanpur, 7.vi.1990, G. N. Saha coll.; 2 MM, Kunjban, Agartala, 19.ii.1991, G. K. Srivastava coll.

Diagnosis : Pale yellowish or dull reddish brown; fastigium angularly produced, in female subtransverse; foveolae not visible from above; dorsum of pronotum constricted, truncated anteriorly, obtusely angulate posteriorly; median carina of pronotum normal, lateral carinae excurved in prozona and metazona to form 'X' shaped marking.

Distribution : India : Bihar, Karnataka, Orissa, Tamil Nadu, and West Bengal; Sri Lanka.

Genus *Phonogaster* Henry, 194036. **Phonogaster cariniventris* Henry

(Map 3)

1940. *Phonogaster cariniventris* : Henry, *Trans. R. ent. Soc. Lond.*, 90 (19) : 510.

Material examined : 2 FF, Jadurambari Beat (Abhanga), 1.iii.1991, G. K. Srivastava coll.

Diagnosis : Body-form slender; basal segments of antennae strongly tricarinate, remaining segments cylindrical; dorsum of head behind middle of eye, with 7 carinae including the strong median one; dorsum of pronotum with two other carinae besides the median and lateral carinae; tegmina extending beyond the fully extended hind leg; wings less than half tegminal length, acutely pointed; abdomen with tergites 3-6 hollow and tympanate, tergites 3-5 each with a pair of sharp, longitudinal ridges on each side in the lower part; hind femur with inner face provided with a row of stridulatory pegs; supra-anal plate triangular; cerci short, conical; ovipositor short.

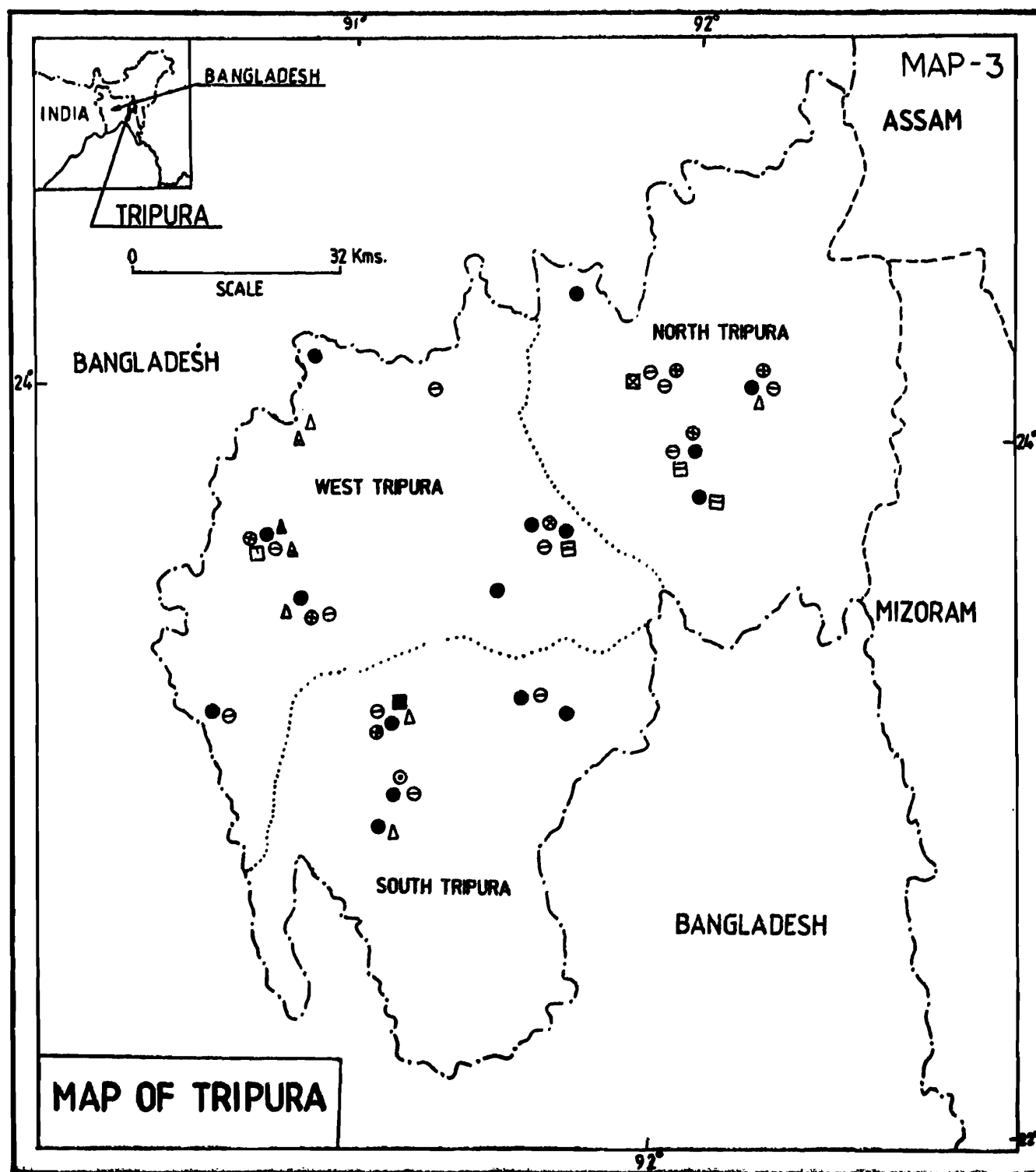
Distribution : India : South India.

Remarks : This species is available among coarse grasses with a thin shade of small trees (Henry, 1940 : 511). We have also collected the specimens from long grasses with sharp edges.

Subfamily OEDIPODINAE

Key to genera

1. Median carina of pronotum cut by two or three suti *Trilophidia* Stål
- Median carina of pronotum complete or cut by one sulcus only 2
2. Wings without well marked fascie 3
- Wings with well marked fascie (pronotum with pale marks arranged so as to form X-shaped) *Oedaleus* Fieber
3. Transverse veins in apical part of tegmina erect, the cells square or oblong 4



Map 3 : ● *Pachyacris vinosa*; ⊕ *Acrida exaltata*; ● *Phlaeoba antennata*; ⊖ *Phlaeoba infumata*; ⊠ *Phlaeoba panti*; ■ *Gonista bicolor*; ⊡ *Ceracris nigricornis laeta*; △ *Dnopherula (Aulacobothrus) luteipes*; ▲ *Leva indica*; ▲ *Leva cruciata*; ⊞ *Phonogaster cariniventris*.

— Transverse veins in apical part of tegmina oblique, arranged zig zag
.....*Pternoscirta* Saussure

4. Internal calcaria of posterior tibiae unequal—the lower one longer than the other and hooked at apex*Heteropternis* Stål

— Internal calcaria of posterior tibiae more or less equal 5

5. Wings hyaline, yellow at the base, with a curved band beyond
.....*Dittopternis* Saussure

— Wings generally subhyaline, without curved band beyond the middle.....*Aiolopus* Fieber

Genus *Aiolopus* Fieber, 1853

37. **Aiolopus thalassinus tamulus* (Fabricius)
(Map 4)

1968. *Aiolopus thalassinus tamulus* : Hollis, *Bull. Br. Mus. nat. Hist. (Ent.)* 22 (7) : 347.

Material examined : 1 M, Sydabari, 29.xii.1972, V. C. Agrawal coll.; 1 M, 5 FF, Ambassa, 2.i.1973, V. C. Agrawal coll.; 1 M, 2 FF, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 1 M, 2 FF, Rajnagar, Agartala, 30.x.1974, M. S. Shishodia coll.; 1 F, Bhatia Avoyanagar, Agartala, 31.x.1974, M. S. Shishodia coll.; 1 M, 1 F, M.B.B. College campus, Agartala, 1.xi.1974, M. S. Shishodia coll.; 2 FF, Bhangashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 6 MM, 8 FF, Garjee, Udaipur, 7, 8.xi.1974, M. S. Shishodia coll.; 1 F, Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 1 F, Golabari, Teliamura, 11.xi.1974, M. S. Shishodia coll.; 1 F, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 1 M, Dolobari, Ambassa, 18.xi.1974, M. S. Shishodia coll.; 1 M, Dhumachera, Manu, 24.xi.1974, M. S. Shishodia coll.; 1 F, Kanchenchera, North Tripura, 11.vi.1988, V. T. Darlong coll. (E. R. S., Shillong, Reg. No. 52045); 2 MM, Kukichera, North Tripura, 13.vi.1988, V. T. Darlong coll. (E. R. S., Shillong); 1 M, Khowai, 5.i.1989, R. S. Barman coll.; 4 MM, 1 F, Bisramgunj, Agartala, 15.i.1989, R. S. Barman coll.; 1 F, Sepahijala, 4.xi.1991, B. N. Das coll.

Diagnosis : Medium in size; fastigium with forward angle more acute; foveolae narrowly trapezoid, about twice as long as wide; frontal ridge gradually narrowing and almost angular towards fastigial end, sharply punctured; hind femur unicolorous, without any oblique fascia; posterior tibiae usually with red colouration in apical fourth and broadly separated from black band by a wide bluish grey band.

Distribution : India : Andaman & Nicobar Islands, Bihar, Delhi, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Orissa, Punjab, Rajasthan, West Bengal; Australia, Bangladesh, Borneo; Burma; China; Hainan, Japan; Java; Malaya; Myanmar; New Guinea; Singapore; Sri Lanka; Sumatra and Taiwan.

Remarks : It is one of the serious pest of agricultural crops.

Genus *Dittopternis* Saussure, 1884

38. **Dittopternis venusta* (Walker)
(Map 4)

1921. *Dittopternis venusta* : Uvarov, *Ann. Mag. nat. Hist.* (9) 7 : 488.

Material examined : 1 F, Santibazar, 24.viii.1978, S. K. Chanda coll.; 1 F, Ambassa, 27.viii.1978, S. K. Chanda coll.; 1 F, Subalsingh, 3.viii.1979, K. P. Singh coll.; 3 MM, Kathalbagan, 9.viii.1979, K. P. Singh coll.; 2 MM, Kanchenchera, 11.viii.1979, K. P. Singh coll.; 1 M, Bagma, South Tripura, 17.vi.1990, G. N. Saha coll.

Diagnosis : Medium in size; vertex with four diverging rows of pale granules running backwards from between the eyes; a blackish band runs backwards from each eye over the occiput and part of pronotum, bordered above and below by a faint yellow line; pronotum strongly carinated, cut by principal sulcus before the middle, obtusely angulated behind; tegmina with a basal half brown; wings hyaline, without well marked fascia; hind tibiae blue at base, followed by a light yellow band, then blue.

Distribution : India : Karnataka, Madhya Pradesh, Orissa, Tamil Nadu, West Bengal; Sri Lanka.

Genus *Heteropternis* Stål, 1873

39. **Heteropternis respondens* (Walker)

(Map 5)

1914. *Heteropternis respondens* : Kirby, *Fauna Brit. India*, Orthopt. (Acridiidae) : 141.

Material examined : 1 M, Santibzar, 24.viii.1978, S. K. Chanda coll.; 2 MM, Sindupara, 12.viii.1979, K. P. Singh coll.; 1 M, Bagma, South Tripura, 17.vi.1990, G. N. Saha coll.; 1 M, 1 F, Jadurambari Beat (Abhanga), 1.iii.1991, G. K. Srivastava coll.

Diagnosis : Medium in size; head smooth; antennae filiform; hind margin of pronotum rectangular, rounded at apex in middle; basal half of tegmina opaque, transverse veins in apical part erect, the cells square or oblong; wings without well marked fascia; hind tibiae red, with 9-10 small black tipped spines.

Distribution : India : Arunachal Pradesh, Bihar, Karnataka, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal; China; Java; Malacca; Myanmar; Nepal; Sri Lanka; Sumatra.

Genus *Pternoscirta* Saussure, 1884

40. **Pternoscirta cinctifemur* (Walker)

(Map 5)

1914. *Pternoscirta cinctifemur* : Kirby, *Fauna Brit. India*, Orthopt. (Acridiidae) : 134.

Material examined : 1 M, Bagma, South Tripura, 17.vi.1990, G. N. Saha coll.; 1 F, Golaghati, West Tripura, 20.vi.1990, G. N. Saha coll.; 1 F, Mahadebtala, West Tripura, 22.vi.1990, G. N. Saha coll.

Diagnosis : Medium in size; head short and somewhat rugose; antennae filiform; tegmina brown, varied with paler markings on the basal half, then with a subhyaline patch, and more or less varied with brown and subhyaline beyond, the cells being arranged in oblique quadrilaterals, angulated towards each other at the longitudinal nervures; wings often rose coloured at base, with no central black band; hind tibiae black, banded with yellow at base and blue beyond.

Distribution : India : Goa, Meghalaya, Tamil Nadu, Uttar Pradesh and West Bengal; Nepal; Sri Lanka.

Genus *Oedaleus* Fieber, 1853

41. **Oedaleus abruptus* (Thunberg)

(Map 4)

1929. *Oedaleus abruptus* : Uvarov, *Revue suisse Zool.*, 36 : 545.

Material examined : 1 M, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 1 M, Garjee, Udaipur, 4.xi.1974, M. S. Shishodia coll.; 1 F, Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Golobari, Teliamura, 11.xi.1974, M. S. Shishodia coll.; 1 F, Santibazar, South Tripura, 24.viii.1978, S. K. Chanda coll.; 1 F, Santibazar, South Tripura, 8.viii.1979, K. P. Singh coll.; 1 F, Sipahijala, Agartala, 17.i.1989, R. S. Barman coll.; 1 F, Ambassa, 2.iii.1991, G. K. Srivastava coll.

Diagnosis : Small in size; fastigium of head almost flat; pronotum short, with incomplete white cruciform marks, strongly carinated, and entire, posterior margin pointed; wings with a broad black transverse band curving inwards to anal angle; hind tibiae red, with a yellow ring at the base.

Distribution : India : Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal; Bangladesh; Burma; China; Indo-China; Myanmar; East Nepal; Pakistan; Sri Lanka; Thailand.

Remarks : The distribution of the species in Tripura is very limited, inspite of the fact that it is a pest of various kinds of agricultural crops.

Genus *Trilophidia* Stål, 1873

42. **Trilophidia annulata* (Thunberg)

(Map 4)

1965. *Trilophidia annulata* : Hollis, *Trans. R. ent. Soc. Lond.*, 117 (8) : 251.

Material examined : 1 F, Chandmari, Agartala, 10.xi.1969, V. C. Agrawal coll.; 1 M, 1 F, Charilam, 18.xi.1969, V. C. Agrawal coll.; 1 M, Ampi, 17.i.1971, V. C. Agrawal coll.; 2 FF, Kanchanpur, 16, 19.ii.1971, V. C. Agrawal coll.; 1 F, Saydabari, 29.xii.1971, V. C. Agrawal coll.; 2 FF, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 2 MM, M. B. B. College campus, Agartala, 1.xi.1974, M. S. Shishodia coll.; 23 MM, 14 FF, Garjee, Udaipur, 4, 5, 6, 7, 8.ix.1974, M. S. Shishodia coll.; 2 FF, Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 2 FF, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 2 MM, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 3 MM, 1 F, Harinchera, Ambassa, 19.xi.1974, M. S. Shishodia coll.; 1 M, 2 FF, Garobasti, Ambassa, 21.xi.1974, M. S. Shishodia coll.; 1 M, Dhumachera, Manu, 24.xi.1974, M. S. Shishodia coll.; 2 FF, Subalsingh, 2, 5.viii.1978, K. P. Singh coll.; 2 MM, 2 FF, Bagma, 7.viii.1978, K. P. Singh coll.; 1 M, 2 FF, Abhaya, Agartala, 23, 23.viii.1978, S. K. Chanda coll.; 4 MM, 2 FF, Ambassa, 26, 27.viii.1978, S. K. Chanda coll.; 1 M, 2 FF, Kanchenchera, 11.viii.1979, K. P. Singh coll.; 1 M, Sindupara, 12.viii.1979, K. P. Singh coll.; 3 MM, 1 F, Kanchenchera, 11.vi.1988, Dr. V. T. Darlong, coll.; 1 M, Brahmachera, Teliamura, 4.i.1989, R. S. Barman coll.; 1 F, Sonamura, South Tripura, 16.vi.1990, G. N. Saha coll.; 1 M, Bagma, South Tripura, 17.vi.1990, G. N. Saha coll.; 2 MM, Golaghati, West Tripura, 20.vi.1990, G. N. Saha coll.; 3 MM, 4 FF, Mahadebtala, West Tripura, 22.vi.1990, G. N. Saha coll.; 2 MM, Kunjban, Agartala, 19.ii.1991, G. K. Srivastava coll.; 1 M, Santibazar, South Tripura, 22.ii.1991, G. K. Srivastava coll.; 2 MM, 2 FF, Ambassa, 2.iii.1991, G. K. Srivastava coll.; 3 MM, 2 FF, Khowai, North Tripura, 4.iii.1991, G. K. Srivastava coll.; 3 MM, Sepahijala, 4.xi.1991, B. N. Das coll.; 1 M, 1 F, Sepahijala, 17.ii.1992, R. S. Barman, coll.; 20 MM, 21 FF, Lebachura, South Tripura, 20.ii.1992, R. S. Barman coll.; 2 MM, 1 F, Narkelbagan, South Tripura, 21.ii.1992, R. S. Barman coll.; 6 MM, 2 FF, Atharomura, West Tripura, 25.ii.1992, R. S. Barman coll.; 2 MM,

Kamalpur, 26.ii.1992, R. S. Barman coll.; 3 MM, 5 FF, Baksanagar, West Tripura, 2.iii.1992, R. S. Barman coll.

Diagnosis : Medium in size; brown or dark-brown or grey with black markings, pubescent beneath; pronotum rugose, with a high median carina, forming two teeth in front, and with lateral carinae; tegmina normal; wings yellow at base and black beyond; hind tibiae brown, with a pale band towards the base, and with a faint narrow pale band beyond the middle.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Bihar, Goa, Kerala, Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal; Bangladesh; Borneo; Hongkong; Japan; Korea; Malaya; Mongolia; Myanmar; Pakistan; Sarawak; Singapore; Sri Lanka; Sumatra and Taiwan.

Remarks : Widely distributed in India, and is a major pest of pasture. It is also injurious to agricultural crops etc.

Family PYRGOMORPHIDAE

Key to genera

1. Anterior margin of pronotum strongly reflexed and dilated *Chrotogonus* Serville
- Anterior margin of pronotum neither reflexed nor dilated 2
2. Antennae placed in front of the ocelli; body more fusiform and slender
..... *Atractomorpha* Saussure
- Antennae near or below the ocelli 3
3. Eyes round in shape; tegmina not reaching beyond the tip of abdomen, apex rounded ...
..... *Chlorizeina* Brunner
- Eyes oval or elongated but not as above; tegmina extended beyond the tip of abdomen and acute at apex 4
4. Body short; lateral lobe of pronotum at posterior margin obtuse; tegmina with a black spot at the base *Tagasta* Bolivar
- Body large and robust; lateral lobe of pronotum at posterior margin acute; tegmina with a

black spot with orange tinge nearby
*Pseudomorphacris* Carl

Genus *Atractomorpha* Saussure, 1862

Key to species

1. Body-form comparatively broad, stout, and rather short; lateral pronotal lobe always without a membranous area in metazona
*burri* Bolivar
- Body-form more slender and elongate; lateral pronotal lobe often with a membranous area near posterior margin 2
2. General body-form very slender; fastigium of vertex very long; apex of male abdomen rather acute; majority of specimens with a membranous area near the posterior margin of the lateral pronotal lobe
*psittacina* (de Haan)
- Body-form not exceptionally slender; fastigium of vertex comparatively rather shorter; male abdomen with apex more obtuse; lateral pronotal lobe always with a well developed membranous area near the posterior margin .
*crenulata* (Fabricius)

43. **Atractomorpha crenulata* (Fabricius)

(Map 4)

1960. *Atractomorpha crenulata* : Banerjee & Kevan, *Treubia*, 25 : 184.

Material examined : 1 M, 1 F, Syadabari, 29.xii.1972, V. C. Agrawal coll.; 1 M, Bhatia Avoyanagar, 31.x.1974, M. S. Shishodia coll.; 15 MM, 4 FF, Garjee, Udaipur, 4, 5, 6, 7, 8.xi.1974, M. S. Shishodia coll.; 2 MM, 1 F, Brahmachera, 10.xi.1974, M. S. Shishodia coll.; 2 FF, Golobari, Teliamura, 11.xi.1974, M. S. Shishodia coll.; 1 M, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.; 1 M, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 4 MM, Ambassa forest north, 16.xi.1974, M. S. Shishodia coll.; 3 MM, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 3 MM, 6 FF, Dolobari, Ambassa, 18.xi.1974, M. S. Shishodia coll.; 1 M, Harinchera, Ambassa, 19.xi.1974,

M. S. Shishodia coll.; 1 M, Jarulchera, Manu, 20.xi.1974, M.S. Shishodia coll.; 3 MM, 3 FF, Kanchanagar, Ambassa, 20.xi.1974, M. S. Shishodia coll.; 3 MM, 2 FF, Dhumachera, Manu, 24.xi.1974, M. S. Shishodia coll.; 3 MM, 3 FF, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.; 1 F, Kathalbagan, 9.viii.1979, K. P. Singh coll.; 1 M, Kanchenchera, North Tripura, 11.vi.1988, Dr. V. T. Darlong coll.; 2 MM, Simna, Agartala, 30.xii.1988, R. S. Barman coll.; 1 F, Mohanpur, West Tripura, 2.i.1989, M. S. Shishodia coll.; 4 MM, 2 FF, Khowai, 5.i.1989, R. S. Barman coll.; 1 M, 1 F, Maharanipur, Teliamura, 8.i.1989, R. S. Barman coll.; 1 F, Jirania, Agartala, 10.i.1989, R. S. Barman coll.; 1 F, Champaknagar, Agartala, 11.i.1989, R. S. Barman coll.; 2 MM, Bishramgunj, Agartala, 15.i.1989, R. S. Barman coll.; 1 M, Nalchar, Agartala, 21.i.1989, R. S. Barman coll.; 4 MM, 2 FF, Salema, North Tripura, 28.ii.1991, G. K. Srivastava coll.; 1 M, 1 F, Gorkhabasti, West Tripura, 13.ii.1992, R. S. Barman coll.; 1 M, Kalikapur, 16.ii.1992, R. S. Barman coll.; 1 F, Narkelbagan, 21.ii.1992, R. S. Barman coll.; 1 M, Teliamura, 2.iii.1992, R. S. Barman coll.

Diagnosis : Medium in size, body elongated; lateral pronotal lobe always with a membranous area near posterior margin; pronotal carinae ill-defined; tegmina pointed, extending for one-fourth of their length beyond the hind femora; wings red at base; abdomen smooth, rosy.

Distribution : India : Andaman & Nicobar Islands, Andhra Pradesh, Bihar, Goa, Jammu & Kashmir, Karnataka, Kerala, Lakshadweep Islands, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal; Bangladesh; Myanmar; Pakistan; Sri Lanka; N. W. Sumatra; S. Vietnam.

44. **Atractomorpha burri* Bolivar

(Map 4)

1960. *Atractomorpha burri* : Banerjee & Kevan, *Treubia*, 25 : 177.

Material examined : 3 FF, Garjee, Udaipur, 5.xi.1974, M. S. Shishodia coll.; 3 FF,

Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 1 F, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 3 FF, Ambassa forest north, 16.xi.1974, M. S. Shishodia coll.; 1 F, Kathalbagan, 9.viii.1979, K. P. Singh coll.; 1 F, Nalchar bazar, 18.vi.1990, G. N. Saha coll.; 1 M, Golaghati, West Tripura, 20.vi.1990, G. N. Saha coll.; 1 F, Champaknagar, West Tripura, 27.vi.1990, G. N. Saha coll.; 1 M, 3 FF, Santibazar, South Tripura, 22.ii.1991, G. K. Srivastava coll.; 1 F, Sabroom, South Tripura, 6.i.1992, M. Dutta Coll.; 1 M, Lebuchera, 20.ii.1992, R. S. Barman coll.; 1 F, Kumarghat, North Tripura, 29.ii.1992, R. S. Barman coll.

Diagnosis : Medium in size, body-form comparatively broad, rather short; head and pronotum relatively short; fastigium of vertex almost triangular, about as long as the eye; lateral lobe of pronotum without membranous area posteriorly; tegmina not pointed at apex; hind wings hyaline or rosy at base; outer face of femur convex and strongly keeled; dorsal ovipositor valves stout.

Distribution : India : Arunachal Pradesh, Assam, Meghalaya, Orissa, West Bengal; Bangladesh; Bhutan; S. W. China; Indo-China; Malaya; Upper Myanmar; Nepal; Mergui Archipelago and Thailand.

45. **Atractomorpha psittacina* (de Haan)

(Map 4)

1960. *Atractomorpha psittacina* : Banerjee & Kevan, *Treubia*, **23** : 187.

Material examined : 2 FF, Garjee, Udaipur, 4, 8.xi.1974, M. S. Shishodia coll.; 1 F, Abhaya, 22.viii.1978, S. K. Chanda coll.

Diagnosis : Body-form very slender; fastigium of vertex narrower and longer; pronotal lobe with a membranous area near the posterior margin; hind wings normally comparatively long in relation to tegmina; male subgenital plate somewhat pointed in profile; aedeagal valves generally rather more strongly curved upwards.

Distribution : India : Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Meghalaya,

Rajasthan and West Bengal; Bangladesh; Indo-China and South-China; Indonesia; Myanmar; Philippines.

Genus *Pseudomorphacris* Carl, 1916

46. *Pseudomorphacris notata* (Brunner)

(Map 4)

1963. *Pseudomorphacris notata* : Kevan, *Ent. Monthly Mag.*, **98** (1962) : 208, 209.

Material examined : 1 M, Kunjmura, Teliamura, 14.xi.1974, M. S. Shishodia coll.

Diagnosis : Body-form longer and stouter than *Atractomorpha* Saussure and *Tagasta* Bolivar; head somewhat narrower at base; tegmina at rest reaching approximately to hind knees or so; hind wings distinctly purplish, not falling far short of tegmina when at rest; hind tibiae pink; male cerci, in lateral view, less strongly curved or bent.

Distribution : Bangladesh to Myanmar. In India, it is recorded from Tripura only.

Remarks : Kevan (1963) states that "*P. notata* probably also occurs in Assam" Tandon & Shishodia (1975) recorded this species from Tripura for the first time.

Genus *Chlorizeina* Brunner, 1893

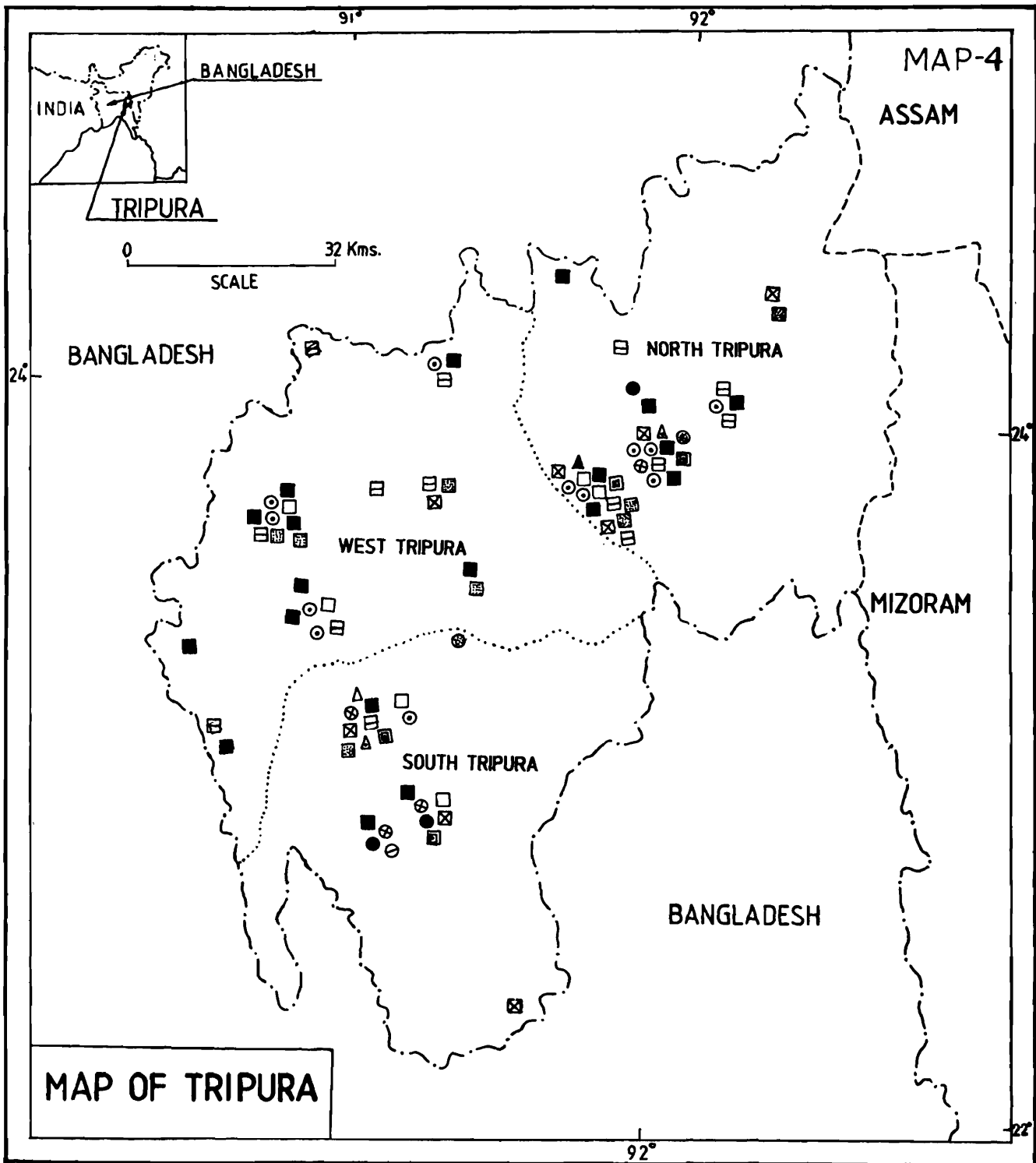
47. **Chlorizeina unicolor unicolor* Brunner

(Map 4)

1969. *Chlorizeina unicolor unicolor* : Kevan, *Trans. Amer. ent. Soc.*, **94** : 369.

Material examined : 2 MM, Garjee, Udaipur, 4, 5, 6.xi.1974, M. S. Shishodia coll.; 1 M, Kanchanagar, Ambassa, 200 m, 20.xi.1974, M. S. Shishodia coll.

Diagnosis : Medium in size; fastigium of vertex parabolic, pronotum not wide posteriorly; tegmina not usually so short, generally extending beyond the fourth abdominal tergum; wings more than half as long as tegmina; hind femora usually distinctly red on the ventral and lower parts of the inner faces; hind tibiae usually dark blue, dull blue or sometimes dull reddish; male supra-anal



Map 4 : ○ *Aiolopus thalassinus tamulus* ; ⊗ *Dittopternis venusta* ; □ *Oedaleus abruptus* ; ■ *Irilophidia annulata* ; ▤ *Atractomorpha c. crenulata* ; ⊠ *Atractomorpha burri* ; △ *Atractomorpha psittachina* ; ▲ *Pseudomorphacris notata* ; ⚡ *Chlorizeina u. unicolor* ; ⊞ *Tagasta indica*.

plate narrower, dorso-lateral lobes of tenth abdominal tergum more acute, the median excision between them deeper; male cerci longer, more strongly incurved, expanded apically, aedeagal valves with longer apical process which are more distinctly curved upwards in lateral view.

Distribution : India : Eastern Assam Hills, Manipur (Modbung, near Imphal); Laos; Upper Myanmar and Thailand.

Genus *Tagasta* Bolivar, 1902

48. **Tagasta indica* Bolivar

(Map 4)

1905. *Tagasta indica* Bolivar, *Bol. Soc. Espan. Hist. Nat.*, 5 : 112, 113.

Material examined : 1 M, Garjee, Udaipur, 4.xi.1974, M. S. Shishodia coll.; 1 M, Harinchera, Ambassa, 200 m, 19.xi.1974, M. S. Shishodia coll.; 1 M, Gomaibari, Teliamura, 150 m, 12.xi.1974, M. S. Shishodia coll.; 2 MM, Santibazar, 24.viii.1978, S. K. Chanda coll.; 1 M, Sindupara, 12.viii.1979, K. P. Singh coll.

Diagnosis : Medium in size, olivaceous in colour, 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 carinae wholly obsolete; tegmina nearly as long as the hind femora, tip narrowly obtuse, with a brown spot at the base; wings one-fifth shorter than tegmina.

Distribution : India : Arunachal Pradesh, Meghalaya, Sikkim, West Bengal; Bhutan.

Genus *Chrotogonus* Serville, 1839

49. **Chrotogonus (Ch) tr. trachypterus*
(Blanchard)

(Map 5)

1959. *Chrotogonus (Chrotogonus) trachypterus trachypterus* : Kevan, *Publçoes cult. Co. Diam. Angola*, No. 43 : 147.

Material examined : 2 FF, Kunjban, Agartala, 9.xi.1969, V. C. Agrawal coll.; 1 F, Ampri,

19.i.1971, V. C. Agrawal coll.; 1 F, Teliamura, 29.i.1971, V. C. Agrawal coll.; 1 F, Bank of Khowai river, Teliamura, 2.ii.1971, V. C. Agrawal coll.; 1 F, Garjee, Udaipur, 4.xi.1974, M. S. Shishodia coll.; 1 M, Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 1 F, M. B. B. College campus, Agartala, viii-ix. 1975, B. C. Das coll.; 8 MM, 16 FF, Agartala, 5.i.1989, R. S. Barman coll.; 1 F, Champaknagar, Agartala, 11.i.1989, R. S. Barman coll.; 2 MM, 2 FF, Kumarghat, 29.ii.1992, R. S. Barman coll.

Diagnosis : Medium to small in size; wings hyaline or occasionally 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 : Bihar, Madhya Pradesh, Orissa, Meghalaya, Rajasthan, Uttar Pradesh, West Bengal; Bangladesh; Nepal; Pakistan. In general, it is widely distributed in the northern parts of India.

Remarks : Generally, it is found in dry condition on a bare sandy ground, and is a pest of various crops.

Superfamily EUMASTACOIDEA

Family CHOROTYPIDAE

Subfamily ERIANTHINAE

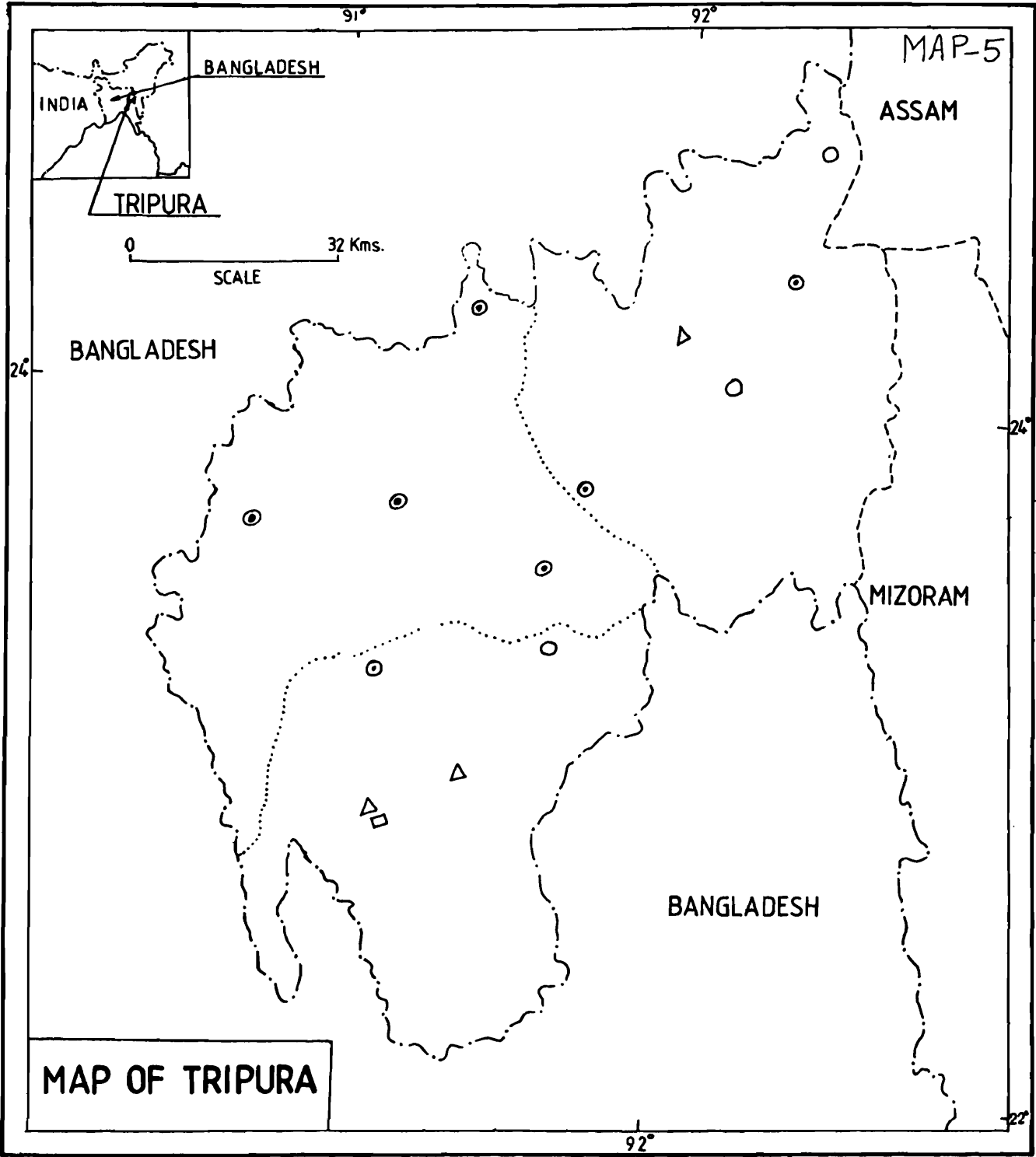
Genus *Xenerianthus* Descamps, 1975

50. **Xenerianthus affinis* (Westwood)

(Map 5)

1975. *Xenerianthus affinis* : Descamps, *Ann. Soc. ent. Fr. (N. S.)*, 11 (1) : 95.

Material examined : 1 M, 1 F, Subalsingh, 3.8.viii.1979, K. P. Singh coll.; 1 M, 1 F, Kanchenchera, North Tripura, 11.vi.1988, Dr. V. T. Darlong coll.; 1 F, Sindhu Kumar para, 19.vi.1988, Dr. V. T. Darlong coll.; 1 F, Amarpur, 12.vi.1990, G. N. Saha coll.; 1 F, (nymph), Ambassa, North Tripura, 2.iii.1991, G. K. Srivastava coll.; 3 MM, 2 FF, Amarpur, 5.iii.1991, G. K. Srivastava coll.; 1 F, Choraibari, North Tripura, 27.v.1992, B. Mitra coll.



Map 5 : ● *Chrotogonus (Ch.) tr. trachypterus* ; ○ *Xenerianthus affinis* ; △ *Heteropternis respondens* ; □ *Pernoscirta cinctifemur*.

Diagnosis : Medium in size; body colour brown to dark brown; fastigium of vertex erect, broad, more or less bifid at extremity; pronotum rugose, with a high irregular median carina; tegmina reddish-brown, male has a small white spot towards the apex; wings distinctly with yellow-ochraceous colour; hind femora with three white transverse bands, and the upper carina terminating in a sharp triangular tooth; anterior part of lateral lobes of subgenital plate black ventrally.

Distribution : Bangladesh; Myanmar.

Remarks : Westwood (1843), Burnner (1893) and Kirby (1914) have included Sylhet in Assam (India), whereas it is situated in Bangladesh. The species under discussion, is recorded here for the first time from India.

SUMMARY

Fifty species are discussed here, of which forty six are new record for Tripura. Five species are reported for the first time from India.

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INSECTA : ORTHOPTERA : TETRIGOIDEA

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INTRODUCTION

The members of the superfamily Tetrigoidea are commonly known as grouse locusts, ground-hoppers or pygmy grasshoppers. They are characterized by the absence of arolia between the tarsal claws; anterior and middle tarsi two segmented; posterior tarsi three segmented; pronotum greatly extending backwards upto or beyond the abdomen, and sometimes projected forward to a greater or lesser degree over the head; lateral lobes are small and often ending in acute points or spines; fore wings (when present) abbreviated, oval, lateral and with reduced venation; hind wings (when present), for the most part concealed below the pronotum; stridulatory organs absent, and phallic structure lacking an epiphallus.

The grouse locusts are predominant in the tropics, specially in the Indo-Malayan-papuan Region. The majority of the species live on the ground and thus are geophilous. However, some examples of *Bolivaritettix sculptus* (Bol.) were collected from crevices of tree barks at Manu, Tripura. They are commonly found to occur in meadows or swamps, or on wet rocks along the sides of streams and pools, or on wet walls invaded by algae, while a few species are found on or around crops. Tree climbing by tetrigids is rare. They are small insects, seldom exceeding 2 cm, and usually greyish or brownish in colour, or sometimes blackish or variegated, but never green. Most species are cryptically coloured, but some closely mimic dead vegetation, lichens etc. They feed on small fragments of vegetation and

probably on microscopic algae. The economic importance of the group is negligible, although there have been a few reports stating them as pest. Most of the species of grouse locusts are phototropic. Polymorphism is also found in some species, e.g. *Hedotettix gracilis* (De Haan).

There are about 185 genera and nearly 1,000 known species distributed throughout the world (Keven, 1982), of which 36 genera and 135 species are recorded from India. The present paper deals with 25 species, which are distributed under 10 genera and two families. Five species have been recorded for the first time from the State, and are marked with asterisk (*). The material for study has been received from different Survey parties of the department, including collections by author. The identified collections are deposited in the National Zoological Collection.

SYSTEMATIC ACCOUNT

Order	ORTHOPTERA
Infra Order	TETRIGIDEA
Superfamily	TETRIGOIDEA

Key to families of TETRIGOIDEA

1. Antennae generally shorter (less than 16 segments), which may be occasionally flattened in form or curiously expanded apically; anterior femora keeled; anterior margin of pronotum, except in some, does not commonly project forward over the head, and dorsum generally not tectiform *Tetrigidae*

- Antennae always filiform, and with 16 to 22 segmented; anterior femora grooved; anterior margin of pronotum project forward to a greater or lesser degree over the head, dorsum always more or less tectiform

.....*Batrachideidae*

Family TETRIGIDAE

Genus *Criotettix* Bolivar, 1887

1. *Criotettix bispinosus* (Dalman)

(Map 1)

1818. *Acrydium bispinosus* Dalman, *Kongl. Vet. Akadl.* : 77.
1887. *Criotettix bispinosus*, Bolivar, *Annls. Soc. ent. Belg.*, **31** : 185, 223, 226.
1938. *Criotettix bispinosus*, Günther, *Stettin. ent. Ztg.*, **99** : 134.

Material examined : 1 F, Agartala (at light), 11.xi.1969, V. C. Agrawal coll.; 1 F, Charilam, 16.xi.1969, V. C. Agarwal coll.; 1 M, Teliamura (at light), 10.xi.1974, M. S. Shishodia coll.; 1 F, Ambassa (at light), 16.xi.1974, M. S. Shishodia coll.; 1 M 3 FF, Ambassa, 25.vi.1978, J. K. Jonathan coll.; 1 M, Malagarh, Agartala, 20.i.1989, R.S. Barman coll.; 1 M, Mohanpur, W. Tripura, 12.xii.1991, S. Ahmad coll.

Diagnostic characters : Head not exserted above the pronotal surface; vertex distinctly broader than an eye, slightly narrower in front; antennae filiform, and located on the inferior margin of eyes; pronotum truncate anteriorly, subulate posteriorly, and extends beyond the apices of posterior femora, dorsum granulose and rugulose; posterior angles of lateral lobes of pronotum dilated and laminated, apex of anterior margin provided with a sharp pointed spine which is directed backwards.

Distribution : India (Tripura, Arunachal Pradesh, Assam, Meghalaya, Manipur, West Bengal, Bihar, Madhya Pradesh); Borneo; Myanmar; China; Hainan; Hongkong; Java; Luzon; Malaya; Sulawesi; Sumatra; Taiwan; Thailand and Vietnam.

Genus *Loxilobus* Hancock, 1904

Key to species of *Loxilobus*

1. Pronotum with numerous rugulae
.....*brunneri* Günther
— Pronotum without such rugulae
.....*assamus* Hancock

2. *Loxilobus assamus* Hancock

(Map 1)

1907. *Loxilobus assamus* Hancock, *Trans. R. ent. Soc. Lond.*, : 223.
1991. *Loxilobus assamus*, Shishodia, *Rec. zool. Surv. India*, Occ. Paper No. **140** : 47.

Material examined : 1 M, 1 F, Ambassa forest north, 16.xi.1974, M. S. Shishodia coll.; 1 M, Ambassa forest south, 17.xi.1974, M. S. Shishodia coll.; 1 F, Kanchanagar, 20.xi.1974, M. S. Shishodia coll.; 3 MM, 2 FF, Malagarh, 20.i.1989, R. S. Barman coll.

Diagnostic characters : Head not exserted above the pronotal surface; vertex a little narrower than an eye, more narrowed in front; pronotum extending upto the hind femoral knees; lateral lobes of pronotum little laminated outwards and subtriangular, obliquely truncated; 3rd pulvillus of first tarsal segment longer than the first & second pulvilli. First and second pulvilli acute at apices.

Distribution : India (Tripura, Arunachal Pradesh, Assam, Sikkim, Manipur, Nagaland and West Bengal).

3. **Loxilobus brunneri* Günther

(Map 1)

1893. *Criotettix rugosus* Brunner, *Annali Mus. civ. Stor. nat. Giacomo Doria*, Genova, **33** : 105.
1938. *Loxilobus brunneri* Günther, *Stettin. ent. Ztg.*, **99** : 214.
1970. *Loxilobus brunneri*, Steinmann, *Acta zool. hung.*, **16** : 223.
1992. *Loxilobus brunneri*, Blackith, *Cat. of S. E. Asia*, Tetrigidae : 105.

Material examined : 1 M, 1 F, Anandapur, Agartala, 30.xii.1988, R. S. Barman coll.; 1 F,

Brahmachera, Teliamura, 4.i.1989, R. S. Barman coll.; 1 M, Khowai, 5.i.1989, R. S. Barman coll.; 2 FF, Malagarh, 20.i.1989, R. S. Barman coll.; 1 M, Jadurambari Beat (Abhanga), N. Tripura, 1.iii.1991, G. K. Srivastava coll.; 1 M, Malagarh, 15.ii.1992, R. S. Barman coll.

Diagnostic characters : Shoulder broad; head not raised above the pronotal surface; vertex narrow towards front; antennae long, inserted immediately above the lower margin of eyes; superior ocelli situated on the middle of eyes; pronotum short, with low blunt granules on shoulder region; lateral carinae of prozona converging towards behind; lateral lobe of pronotum broadly triangular at apex; tegmina narrow; wings 3-4 times as long as tegmina and not reach upto pronotal apex; hind tibiae with 8 on outside and 6 on inner side spines; hind metatarsus longer than the claw segment.

Distribution : India; Myanmar.

Genus *Thoradonta* Hancock, 1908

Key to species of *Thoradonta*

1. Vertex narrower (0.64-0.75 mm); posterior femora with a series of prominent nodules on the upper marginal and medial areas
..... *nodulosa* (Stål)
- Vertex wider (0.75-0.86 mm); posterior femora with less conspicuous nodules on the upper marginal and medial areas 2
2. Spine of upper lobe of posterior angles of lateral lobes of pronotum not sinuated margins in front, directed posteriorly
..... *apiculata* Hancock
- Spine of upper lobe of posterior angles of lateral lobes of pronotum with deep constricted or sinuated margins in front, directed transversely *lativertex* Günther

4. **Thoradonta apiculata* Hancock

(Map 1)

1915. *Thoradonta apiculata* Hancock, *Rec. Indian Mus.*, 11 : 81-82.

1991. *Thoradonta apiculata*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No.* 140 : 27.

Material examined : 1 M, Manu, N. Tripura, 27.ii.1992, R. S. Barman coll.

Diagnosis : Vertex wider than an eye, narrowed in front; paired ocelli located below the middle of eyes; antennae inserted on the inferior margin of eyes; pronotum extended beyond the apex of hind femora; posterior angles of lateral lobes of pronotum slightly dilated and laminated, upper lobe produced into a sharp spine with a wide base, directed posteriorly.

Distribution : India (Orissa, Tamilnadu, West Bengal, Assam, Meghalaya, Arunachal Pradesh); Myanmar.

5. *Thoradonta nodulosa* (Stål)

(Map 1)

1861. *Tettix nodulosa* Stål, *Svensk. Fregat. Eugen. Resa Jorden Virgin*, : 348.

1915. *Thoradonta nodulosa*, Hancock, *Rec. Indian Mus.*, 11 : 82.

1992. *Thoradonta nodulosa*, Blackith, *Cat. Tetrigidae (Insecta; Orthoptera) of South East Asia*, : 189.

Material examined : 1 F, Ampa, 19.i.1971, V. C. Agrawal coll.; 1 M, Garjee, S. Tripura, 6.xi.1974, M. S. Shishodia coll.; 1 F, Ambassa, N. Tripura, 17.xi.1974, M. S. Shishodia coll.; 1 M, Kanchanagar, Ambassa, 20.xi.1974, M. S. Shishodia coll.; 1 M, 2 FF, Anandapur, Agartala, 30.xii.1988, R. S. Barman coll.; 1 M, Kalyanpur, Agartala, 2.i.1989, R. S. Barman coll.; 1 M, 1 F, Khowai, N. Tripura, 3.xii.1991, K. K. Ray coll.; 1 F, 37-41 mile on road to Ambassa, N. Tripura, 6.iii.1991, G. K. Srivastava coll.

Diagnostic characters : Head not exserted above the pronotum; vertex generally wider than the width of an eye; paired ocelli placed slightly below the middle of eyes; antennae filiform, situated on the inferior margin of eyes; pronotum extended a little beyond the apices of posterior femora; upper lobe of lateral lobes of pronotum produced into a sharp spine which is directed posteriorly, lower lobe obliquely produced with a

pointed apex; posterior femora stouter, crassate and with a series of nodules on the upper marginal and medial areas.

Distribution : India (Madhya Pradesh, West Bengal, Assam, Meghalaya, Manipur, Sikkim and Tripura); Sri Lanka; Borneo; Sumatra; Java; Singapore; Hainan and Sumba.

6. *Thoradonta lativertex* Günther

(Map 1)

1938. *Thoradonta lativertex* Günther, *Stettin. ent. Ztg.*, **99** : 128-129.

1992. *Thoradonta lativertex*, Blackith, *Cat. Tetrigidae (Insecta : Orthoptera) of South-East Asia*, : 189.

Material examined : 1 M, Korilong, Teliamura, 13.xi.1974, M. S. Shishodia coll.

Diagnostic characters : Vertex wider than an eye; paired ocelli placed slightly below the middle of eyes; antennae placed below the inferior margin of eyes; pronotum extended beyond the apices of posterior femora; upper lobe of lateral lobes of pronotum produced into a moderately transversely sharp spine with deeply constricted front margin, lower lobe obliquely cut and with obtuse apex.

Distribution : India (Himachal Pradesh, Assam and Tripura). Chamba and Daramsala (Dharamsala) are in Himachal Pradesh, not in Punjab, as stated by Blackith (1992).

Subfamily METRODORINAE

Genus *Bolivaritettix* Günther, 1939

7. *Bolivaritettix sculptus* (Bolivar)

(Map 1)

1887. *Mazarredia sculpta* Bolivar, *Annls. Soc. ent. Belg.*, **31** : 238.

1939. *Bolivaritettix sculptus*, Günther, *Abh. Mus. Tierk. Völkerk. Dresden* 20 (A) Zool. (N.F.) BD I : 59.

Material examined : 1 M, 2 FF, Teliamura, 12.xi.1974, M. S. Shishodia coll.; 5 MM, 5 FF, Jamirchera, Manu, 25.xi.1974, M. S. Shishodia coll.

Diagnostic characters : Large in size (10-14.5 mm), body robust; vertex equal or a little broader than an eye; antennae inserted on the inferior margin of eyes; pronotal surface rough, usually granulose with linear tubercles and fossae behind the shoulders; posterior angles of lateral lobes of pronotum turned downwards, dilated and apex truncated; wings extend upto the apex of pronotal process.

Distribution : India (West Bengal, Assam, Arunachal Pradesh and Tripura); Myanmar; Indonesia; Cambodia.

Remarks : All the 10 specimens found at Jamirchera, Manu, were collected from the crevice of tree barks infested probably by algae. The forest was very thick, trees were long and the floor was clear. The sun rays were unable to reach the floor.

Subfamily TETRIGINAE

Key to 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 scarcely placed below the middle of eyes 3
2. Vertex narrower than an eye and truncated; frontal costa arcuately produced between the middle of eyes; antennae inserted below the middle of eyes; median carina of pronotum not undulated; posterior femora without conspicuous nodosities on external medial area*Euparatettix* Hancock
- Vertex more narrower than an eye; antennae inserted distinctly below the inferior margin of eyes; median carina of pronotum a little or very well undulated; posterior femora with distinct nodosities on external medial area ...*Ergatettix* Kirby
3. Body generally smooth or a little granulose; vertex equal to or a little narrower than an eye, generally expanded, subtransverse or

triangularly carinated in front; abbreviated carinae distinctly present; median carina of pronotum percurrent, not at all interrupted ...

.....*Hedotettix* Bolivar

— Body generally granulose or tuberculose; vertex not expanded in front; abbreviated carinae indistinctly visible; median carina of pronotum not percurrent 4

4. Vertex narrower and more narrowed in front; the frontal carinulae interrupted internally or recurved; dorsum of pronotum a little rugose, often bearing round or linear tubercles; median carina very fine and wavy or not

.....*Coptotettix* Bolivar

— Vertex narrower or equal or rarely wider than an eye, but not narrowed in front, with a concavity on either side; median carina a little raised but not wavy*Paratettix* Bolivar

Genus *Euparatettix* Hancock, 1904

Key to 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 slender; head exserted; pronotum narrow between shoulders; median carina of pronotum substraight percurrent.....

.....*tenuis* Hancock

— Stature more robust; head a little exserted; pronotum moderately dilated between shoulders; median carina of pronotum arcuate forward, often little undulate before the shoulders, low on shoulders and straight behind

.....*histricus* (Stål)

8. *Euparatettix personatus* (Bolivar)

(Map 1)

1887. *Paratettix personatus* Bolivar, *Annls. Soc. ent. Belg.*, 31 : 278.

1904. *Euparatettix personatus*, Hancock, *Spolia zeylan.*, 2 : 145.

1991. *Euparatettix personatus*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No.* 140 : 130.

Material examined : 1 M, Charilam, S. Tripura, 16.xi.1969, V. C. Agrawal coll.; 2 FF, Bishalgarh, S. Tripura, 20.xi.1969, V. C. Agrawal coll.; 1 F, Garjee, S. Tripura, 25.xi.1969, V. C. Agrawal coll.; 4 MM, Barpathari (Abhoya), 4.xii.1969, V. C. Agrawal coll.; 1 M, Hathalia, 5.xii.1969, V. C. Agrawal coll.; 1 M, Ampa, 20.i.1972, V. C. Agrawal coll.; 1 M, Saydabari, N. Tripura, 29.xii.1972, V. C. Agrawal coll.; 1 M, 3 FF, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 1 M, Bhangashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 1 M, Garjee, S. Tripura, 5.xi.1974, M. S. Shishodia coll.; 7 MM, 4 FF, Teliamura, N. Tripura, 14.xi.1974, M. S. Shishodia coll.; 1 F, Kanchanagar, Ambassa, 20.xi.1974, M. S. Shishodia coll.; 3 MM, 3 FF, Ambassa N. Tripura, 25.v.1978, J. K. Jonathan coll.; 4 MM, Anandapur, Agartala, 30.xii.1988, R. S. Barman coll.; 1 M, Rajbari compound, Agartala, 1.i.1989, R. S. Barman coll.; 1 F Bisramganj, Agartala, 15.i.1989, R. S. Barman coll.; 1 M, 1 F, Nalchar, W. Tripura, 20.i.1989, R. S. Barman coll.; 1 M, Udaipur, S. Tripura, 10.iv.1990, G. N. Saha coll.; 1 F, Malagarh, W. Tripura, 15.ii.1992, R. S. Barman coll.

Diagnostic characters : Medium in size (6-9 mm); general colour variable; dark brown spot of variable size present behind the shoulders; vertex subequal than an eye, a little narrowed forward; frontal sulcus narrow; paired ocelli placed between the middle of eyes; pronotum extend beyond the apex of posterior femora; median carina depressed in front; abbreviated carinae not distinct; hind tibiae dense black with one or two white or light yellow annulations just behind knees and another one at the apical third of hind tibiae; first segment of posterior tarsi a little longer than the third; first and second pulvilli short and acute, third longer than the first two.

Distribution : India (West Bengal, Assam, Tripura, Meghalaya, Manipur, Arunachal Pradesh); Bangladesh; Pakistan; Sri Lanka; Myanmar; Java; Philippines; Taiwan.

Remarks : Bolivar (1887) distinguished *Paratettix personatus* from *P. variabilis* by the latter's short intercalary carinae (probably abbreviated carinae) between shoulders, on either side of the median carina. Hancock (1915) brought both species under the genus *Euparatettix* and separated them on the basis of colour pattern of hind tibiae (not hind femora as stated by Blackith, 1988). Blackith (1988) discarded both the characters and stated that *E. variabilis* has peiority over *E. personatus*, hence is a valid species. But *Paratettix variabilis* Bolivar has already been synonymised with *Pseudoparatettix lineatus* by Steinmann (1970). *Euparatettix personatus* and *E. tenuis* are quite different species, which can be easily identified by the colour pattern of hind tibiae and body stature (body being very slender, and hind tibiae not densely coloured in case of *E. tenuis*).

9. *Euparatettix tenuis* Hancock

(Map 1)

1912. *Euparatettix tenuis* Hancock, *Mem. Dep. Agric. India, ent. Ser.*, 4 : 153.

1991. *Euparatettix tenuis*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 133.

Material examined : 1 F, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll., 1 M, M.B.B. College campus, Agartala, 1.xi.1974, M. S. Shishodia coll., 1 M, Bhangashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 1 M, Ambassa, N. Tripura, 19.xi.1974, M. S. Shishodia coll.; 1 M, Belonia, S. Tripura, 25.ii.1991, G. K. Srivastava coll.; 1 F, Ambassa, N. Tripura, 5.xii.1991, K. K. Ray.

Diagnostic characters : Medium in size (6.5-8.5 mm), very slender species; head and eyes exserted; vertex narrower than an eye; frontal costa moderately sulcated; antennae placed on the lower margin of eyes; pronotum extend beyond the middle of posterior tibiae; dorsum a little or not at all convex between the shoulders; median carina nearly straight, percurrent, a little low on hind process of pronotum; wings extend beyond the pronotal apex.

Distribution : India (Uttar Pradesh, Bihar, West Bengal, Assam, Sikkim, Tripura, Manipur, Meghalaya, Arunachal Pradesh); Bangladesh; Myanmar.

Remarks : Though Blackith (1988 : 105) has synonymised this species with *Euparatettix variabilis*, which itself is in doubtful position. *E. tenuis* is a valid species in my opinion.

10. *Euparatettix histricus* (Stål)

(Map 1)

1860. *Tetrix histrica* Stål, *Freg. Eugenes Resa Orth.*, : 347.

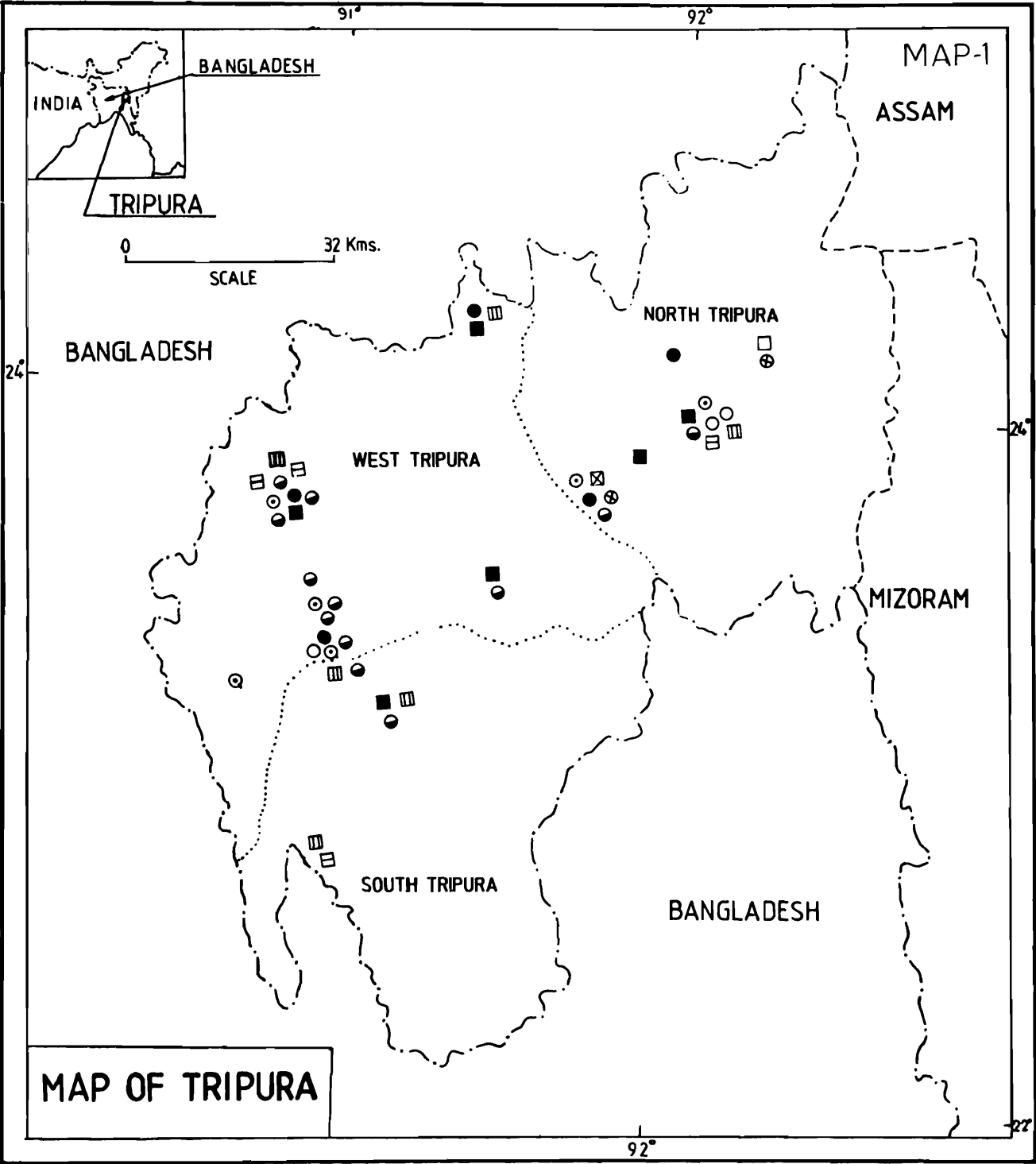
1887. *Paratettix histricus*, Bolivar, *Annls. Soc. ent. Belg.*, 31 : 188, 271, 279.

1991. *Paratettix histricus*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 135.

Material examined : 2 MM, 4 FF, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 1 M, Bhangashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 2 FF, Garjee, S. Tripura, 4 & 6.xi.1974, M. S. Shishodia coll.; 3 FF, Ambassa, N. Tripura, 25.v.1978, J. K. Jonathan coll.; 2 MM, Khowai, N. Tripura, 5 & 8.i.1989, R. S. Barman coll.; 1 M, Udaipur, S. Tripura, 10.vi.1990, G. N. Saha coll.; 1 M, Belonia, S. Tripura, 25.ii.1991, G. K. Srivastava coll.

Diagnostic characters : Size a bit larger than the preceeding two species (7-11 mm); body stature a bit more robust; head a little exserted; vertex narrower than an eye; paired ocelli placed in the middle of eyes; antennae situated on the border of eyes; pronotum extend beyond the middle of hind tibiae; dorsum smooth, convex and wide between shoulders; median carina distinct, but low and depressed in front of shoulders.

Distribution : India (Maharashtra, Madhya Pradesh, Orissa, Andhra Pradesh, Tamilnadu, West Bengal, Bihar, Assam, Meghalaya, Tripura, Manipur, Arunachal Pradesh); Pakistan; Nepal; Myanmar; Sri Lanka; Java; Philippines; Malaya Island; N. Caledonia; Celebes; Mindanao; Borneo; Sumatra; South China; Taiwan; Queensland;



Map 1 : ⊙ *Criotettix hispinosus* (Dalman); ● *Loxilobus brunneri* Günther; ■ *Thoradonta nodulosa* (Stål); ⊗ *Bolivaritettix sculptus* (Bol.); ▤ *Euparatettix tenuis* Hancock; ○ *Loxilobus assamus* Hancock; □ *Thoradonta apiculata* Hanc.; ◻ *Thoradonta lativertex* Günther; ● *Euparatettix personatus* (Bol.); ▨ *Euparatettix histricus*;

North Australia; Holland; E. Africa; E. Afghanistan; Iran; Saudi Arabia; Indonesia.

Remarks : *Euparatettix histricus* (stål) has been recorded from Formosa (now Taiwan) by Günther (1941). Steinmann (1970) brought it under *Pseudoparatettix* Günther (1937). Shishodia (1991) treated the species as *Euparatettix histricus*.

Genus *Paratettix* Bolivar, 1887

Key to species of *Paratettix*

1. Tegmina minute; wings abbreviated or absent
.....*hancockus* (Shishodia & Varshney)
- Tegmina medium; wings not abbreviated but extended upto or beyond the pronotal apex 2
2. Pronotum not extended beyond the apex of posterior femoral apices. (frontal costa widely sulcated; dorsum deplanate)
.....*curtipennis* Hancock
- Pronotum extended beyond the apex of posterior femoral apices 3
3. Median carina of pronotum compressed, raised and generally arched in front
.....*cingalensis* Hancock
- Median carina of pronotum not compressed or raised as in above, not arched in front 4
4. Vertex wider than an eye; dorsum wide between the shoulders*hirsutus* Brunner
- Vertex equal or slightly narrower than an eye; dorsum not wide between shoulders
.....*tricarinatus* Bolivar

11. *Paratettix hancockus* (Shishodia & Varshney)

(Map 2)

1912. *Coptotettix parvulus* Hancock, *Mem. Dep. Agric. India, ent. Ser.*, 4 : 145-146.
1987. *Coptotettix hancockus* Shishodia & Varshney, *J. Bombay nat. Hist. Soc.*, 84 (1) : 167.
1987. *Paratettix hancockus*, Shishodia, *Bull. zool. Surv. India*, 8 (1-3) : 132.

Material examined : 5 MM, 4 FF, Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 1 M, Gomaibari, Teliamura, 12.xi.1974, M. S. Shishodia coll.; 1 F, Ambassa, N. Tripura, 17.xi.1974, M. S. Shishodia coll.; 1 M, 1 F, Sonamura, South Tripura, 16.vi.1990, G. N. Saha coll.; 1 F, Golaghati, West Tripura, 20.v.1990, G. N. Saha coll.

Diagnostic characters : Small in size (6.5-8.5); brown or dark brown spot or band present on either side behind the shoulders; head a little or not exserted above the pronotum; vertex as broad as or slightly narrower than an eye, fossulate on either side of median carinula; frontal costa narrowly sulcated between paired ocelli and widely in front; pronotum extend upto the middle of hind femora (not reaching upto the apex of abdomen), apex widely rounded; wings abbreviated or absent; posterior femora very stout, crassate and finely crenulate on superior margin with one angular lobe before the knees; hind tibiae fuscous with yellow band.

Distribution : India (Bihar, West Bengal, Assam, Tripura, Sikkim, Arunachal Pradesh, Manipur); Bangladesh.

Remarks : Blackith (1992) restored Hancock's name *parvulus*, stating "By transfer of *hancockus* to the genus *Paratettix*, the original name becomes available again under the 1985 edition of the International Rules" This is a wrong interpretation. As Shishodia & Varshney (1987) have shown *parvulus* Hancock, 1912, is a "primary homonym" which has been rejected permanently and replaced by new name *hancockus*. Primary homonyms are not restored, according to the International Code of Zoological Nomenclature 1961 as well as 1985 edition.

12. **Paratettix curtipennis* (Hancock)

(Map 2)

1912. *Coptotettix curtipennis* Hancock, *Mem. Dep. Agric. India, ent. Ser.*, 4 : 146.
1915. *Paratettix curtipennis*, Hancock, *Rec. Indian Mus.*, 11 : 113.
1991. *Paratettix curtipennis*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No.* 140 : 144.

Material examined : 1 M, Barpathari (Abhoya), 4.xii.1969, V. C. Agrawal coll.; 2 MM, 1 F, Khowai, N. Tripura, 5.i.1989, R. S. Barman coll.; 1 M, Ambassa, N. Tripura, 5.xii.1991, K.K. Roy coll.

Diagnostic characters : Size medium (8.8-11 mm), body robust; always with a dark spot on either side behind the shoulders; vertex narrower than an eye; frontal costa widely sulcated; pronotum extend upto the apex of abdomen or a little surpass; middle femora wide, hirsute below; posterior femora stout, crassate, distal half margin serrulate with angular point before the knees; first article of posterior tarsi longer than the third; third pulvilli of posterior tarsi longer than the first.

Specimens collected from Abhoya has less wide frontal sulcus posteriorly, dorsum of pronotum not depressed behind the shoulders but convex, and the 3rd pulvilli of posterior tarsi not much longer than the first two.

Distribution : India (West Bengal, Assam, Meghalaya, Sikkim, Arunachal Pradesh); Myanmar; South China; Taiwan; Laos and Vietnam.

13. **Paratettix cingalensis* (Walker)

(Map 2)

1871. *Tettix cingalensis* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 : 827.

1914. *Paratettix cingalensis*, Kirby, *Fauna Brit. India*, Orthopt. 63.

1991. *Paratettix cingalensis*, Shishodia, *Rec. zool. Surv. India*, Occ. Paper No. 140 : 146.

Material examined : 1 F, Golaghati, W. Tripura, 20.vi.1990, G.N. Saha coll.

Diagnostic characters : Size medium (7.5-9.5); head a little exserted; vertex equal to or a little broader than an eye, a little elevated in front, not narrowed anteriorly, frontal carinae truncate, lateral carinulae prominent upto one-fourth the distance of eyes; frontal costa bifurcate before the paired ocelli; antennae placed below the middle of eyes; pronotum extend beyond the

hind femoral apices; median carina compressed, a little or well raised, and generally arched in front.

Distribution : India (Madhya Pradesh, Maharashtra, Kerala, Tamilnadu, Orissa, Assam, Meghalaya, Sikkim, Manipur and Arunachal Pradesh); Sri Lanka; Taiwan; Hainan; Sumatra; Borneo; Malaya; Mindanao.

14. *Paratettix hirsutus* Brunner

(Map 2)

1893. *Paratettix hirsutus* Brunner, *Annali Mus. civ. Stor. nat. Giacomo Doria*, 33 : 110.

1991. *Paratettix hirsutus*, Shishodia, *Rec. zool. Surv. India*, Occ. Paper No. 140 : 148.

Material examined : 1 M, M.B.B. College campus, Agartala, 1.xi.1974, M. S. Shishodia coll., 2 FF, Ambassa, N. Tripura, 25.v.1978, J. K. Jonathan coll.,

Diagnostic characters : Medium in size (9-11 mm), body moderately stout; head not exserted; vertex as wide as or a little more than an eye; frontal costa moderately sulcated; pronotum extend beyond the apices of posterior femora; median carina of pronotum not undulate; anterior and middle femora hirsute; posterior femora strongly serrulate towards the apices, with an acute elevated denticle.

Distribution : India (Tripura, Assam and Meghalaya); Myanmar.

15. *Paratettix tricarinatus* Bolivar

(Map 2)

1887. *Paratettix tricarinatus* Bolivar, *Annls. Soc. ent. Belg.*, 31 : 28.

1991. *Paratettix tricarinatus*, Shishodia, *Rec. zool. Surv. India*, Occ. Paper No. 140 : 152.

Material examined : 1 F, Charilam, 18.xi.1969, V. C. Agrawal coll.; 1 M, Garjee, S. Tripura coll.

Diagnostic characters : Medium in size (5.6-8 mm); head a little or not exserted above the pronotum; vertex narrower than an eye, and more narrowed forward; median carinula distinct and

extend behind upto the end of fossulae; antennae situated below the middle of eyes; pronotum extend beyond the apices of posterior femora; one indistinct oblique line present on either side of shoulders which meet the lateral carinae anteriorly.

Distribution : India (Tripura and West Bengal); Philippines; Taiwan; Mindanao; Sulawesi; Sumatra; Malaya; and Papua.

Genus *Coptotettix* Bolivar, 1887

Key to species of Coptotettix

1. Pronotum with the dorsum deplanate, subsmooth, minutely granose
.....*annandalei* Hancock
- Pronotum with the dorsum deplanate, but with more or less distinct rugulae or tubercles
.....2
2. Dorsum barely subtectiform forward when viewed from behind, elevated forward; median carina percurrent, subdepressed in front of shoulders, very low subundulate backward, tegmina large; Pronotum of male & female 11-13 mm*indicus* Hancock
- Dorsum distinctly convex between the shoulders, lightly granulose-tuberclose, and provided with two short indistinct lineate carinae; hind process bearing minute, irregular lineate tubercles; male and female pronotum 12-14 mm*conspersus* Hancock

16. *Coptotettix annandalei* Hancock

(Map 2)

1915. *Coptotettix annandalei* Hancock, *Rec. Indian Mus.*, 11 : 119.
1991. *Coptotettix annandalei*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 165.

Material examined : 1 F, Brahmachera, Teliamura, 10.xi.1974, M. S. Shishodia coll.; 2 MM, 2 FF, Ambassa, 16 & 17.xi.1974, M. S. Shishodia coll.; 2 MM, 1 F, Sonamura, S. Tripura, 16.vi.1990, G. N. Saha coll.; 1 M, Mahadebtala, W. Tripura, 22.vi.1990, G. N. Saha coll.; 1 M,

Mongiabari, W. Tripura, 24.vi.1990, G. N. Saha coll.; 1 M, Champaknagar, W. Tripura, 27. vi. 1990, G. N. Saha coll.; 1 M, Ambassa, N. Tripura, 2.iii.1991, G. K. Srivastava coll.; 1 F, Manu, N. Tripura, 27.ii.1991, R. S. Barman coll.

Diagnostic characters : Size medium (7.8-10.8 mm); head not exerted above the pronotum; vertex a little narrower than an eye, more narrowed forward; frontal costa arcuately produced, slowly divergent anteriorly; pronotum truncate anteriorly, extend upto the last abdominal segment posteriorly; median carina undulate.

Distribution : India (West Bengal, Assam, Sikkim, Manipur, Tripura, Arunachal Pradesh and Karnataka); Myanmar.

17. *Coptotettix conspersus* Hancock

(Map 2)

1915. *Coptotettix conspersus* Hancock, *Rec. Indian Mus.*, 11 : 119-120.
1915. *Coptotettix artolobus* Hancock, *Rec. Indian Mus.*, 11 : 121.
1991. *Coptotettix conspersus*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 170.

Material examined : 1 M, Agartala, 11.xi.1969, V. C. Agrawal coll.; 1 F, Bhangashala, Agartala, 2.xi.1974, M. S. Shishodia coll.; 1 M, Ambassa, 16.xi.1974, M. S. Shishodia coll.; 1 F, Dhumachera, Manu, N. Tripura, 24.xi.1974, M. S. Shishodia coll.; 1 M, 2 FF, Ambassa, N. Tripura, 25.v.1978, J. K. Jonathan coll.; 1 M, Simna, W. Tripura, 6.vi.1990, G. N. Saha coll.; 1 M, 1 F, Nalcharbazar, W. Tripura, 18.vi.1990, G. N. Saha coll.

Diagnostic characters : Moderately large (8-12 mm); vertex narrower than an eye, and more narrowed forward; frontal costa bifurcate just behind the paired ocelli, more wide between antennae; pronotum extend beyond the hind femoral apices posteriorly; dorsum with abbreviated curved carinae, which is broken and indistinct in some cases, finely granulose with **rugulae** and tubercle specially at posterior process.

Distribution : India (West Bengal, Assam, Uttar Pradesh, Meghalaya, Arunachal Pradesh, Tripura and Manipur); Sri Lanka.

18. **Coptotettix indicus* Hancock

(Map 2)

1912. *Coptotettix indicus* Hancock, *Mem. Dep. Agric. India, ent. Ser.*, 4 : 144-145.

1992. *Coptotettix indicus*, Blackith, *Cat. S. E. Asian Tetrigidae*, : 28.

Material examined : 1 F, Amarpur, S. Tripura, 12.vi.1990, G. N. Saha coll.

Diagnostic characters : Body minutely rugose granulate; antennae inserted between the eyes; head not at all exserted; vertex as broad as an eye, narrowed forward, fossulate on each side; dorsum of pronotum rugulose, granulose and subtuberculose on the process; two abbreviated carinae present on either side of shoulders; humeral angles widely obtuse; lateral carinae indistinctly percurrent on the shoulders; median carina scarcely elevated between sulcus forward; hind process extend beyond femoral knees (2.5 mm).

Distribution : India (Maharashtra, Arunachal Pradesh and S. India).

Genus *Hedotettix* Bolivar, 1887

Key to species of *Hedotettix*

1. Vertex angulate in front; frontal costa strongly produced before the eyes; front of head oblique; median carina of pronotum very low, a little compressed*costatus* Hancock
- Vertex not angulate in front; frontal costa not produced as above; median carina of pronotum not very low 2
2. Frontal costa widely sulcate, the rami more or less abruptly widened between the antennae; median carina of pronotum more or less compresso-arcuate forwards before the shoulders, highest at 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, low arcuate forward.....3

3. Moderately large; frontal costa strongly arcuate; blades of ovipositor generally long; 2nd and 3rd pulvilli of the first joint of hind tarsi more or less equal in length*grossus* Hancock

— Moderate; frontal costa less strongly arcuate; 2nd and 3rd pulvilli of the first joint of hind tarsi not equal in length
.....*attenuatus* Hancock

19. *Hedotettix costatus* Hancock

(Map 2)

1912. *Hedotettix costatus* Hancock, *Mem. Dep. Agric. India, ent. Ser.*, 4 : 147-148.

1991. *Hedotettix costatus*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 155.

Material examined : 1 M, Ambassa, N. Tripura, 5.i.1973, V. C. Agrawal coll.; 1 M, Garjee, S. Tripura, 7.xi.1974, M. S. Shishodia coll.; 1 M, Teliamura, N. Tripura, 10.xi.1974, M. S. Shishodia coll.; 1 F, Ambassa, 19.xi.1974, M. S. Shishodia coll.; 1 F, Khowai, N. Tripura, 5.i.1989, R. S. Barman coll.

Diagnostic characters : Size medium (7-10 mm); interocular distance equal or less; frontal costa narrowly sulcated; vertex obtusely angulate in front; median carina of pronotum low.

Distribution : India (Uttar Pradesh, Bihar, West Bengal, Assam, Tripura and Sikkim); Bangladesh.

20. *Hedotettix gracilis* (De Haan)

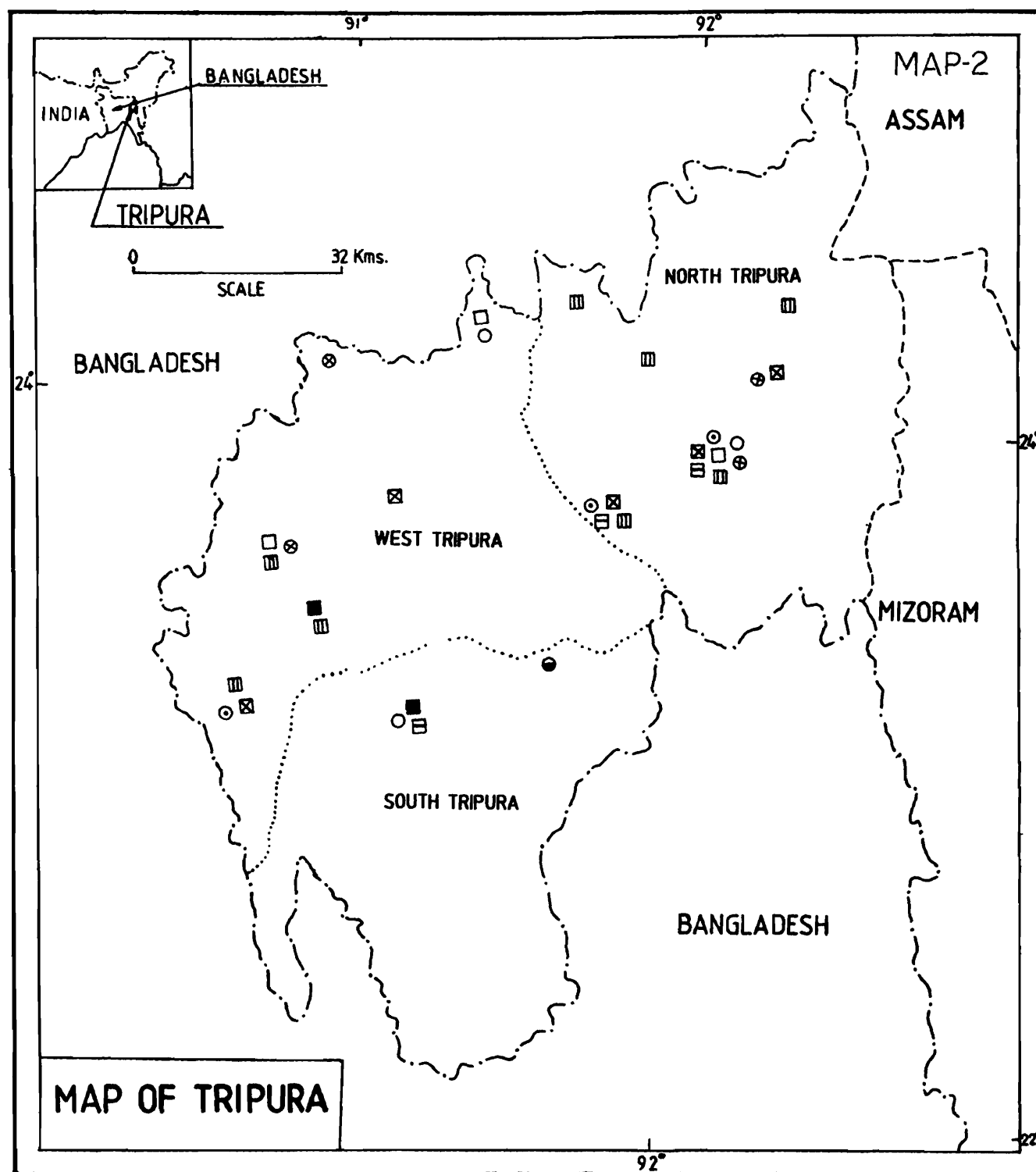
(Map 2)

1842. *Acridium (Tetrix) gracile* De Haan, *Temminck, Verhandel.*, Orth. : 167.

1887. *Hedotettix gracilis*, Bolivar, *Annl. Soc. ent. Belg.*, 31 : 284.

1991. *Hedotettix gracilis*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 157.

Material examined : 1 F, Charilam, 16.xi.1969, V. C. Agrawal coll.; 1 F, Agartala, 31.x.1974, M. S. Shishodia coll.; 1 F, Teliamura, N. Tripura,



Map 2 : ⊙ *Paratettix hancockus* (Shishodia & Varshney); ○ *Paratettix curtippennis* (Hancock); ● *Paratettix cinglaensis* (Walker); □ *Paratettix hirsutus* Brunner; ■ *Paratettix tricarinatus* Bolivar; ⊠ *Coptotettix annandalei* Hancock; ⊗ *Coptotettix conspersus* Hancock; ● *Coptotettix indicus* Hancock; □ *Hedotettix costatus* Hancock; ■ *Hedotettix gracilis* (De Haan)

11.xi.1974, M. S. Shishodia coll.; 1 M, Golobari, Teliamura, 14.xi.1974, M. S. Shishodia coll.; 2 FF, Ambassa, N. Tripura, 25.v.1978, J. K. Jonathan coll.; 1 M, Mohanpur, Agartala, 2.ii.1989, R. S. Barman coll.; 1 M, Kamalpur, N. Tripura, 26.ii.1992, R. S. Barman coll.; 1 F, Kumarghat, N. Tripura, 29.ii.1992, R. S. Barman coll.; 1 M, Salema, N. Tripura, 26.v.1992, B. C. Das coll.

Diagnostic characters : Size medium (7.5-10 mm); head not exserted above the pronotum, crown convex; vertex equal to or slightly narrower than an eye, front margin rounded; frontal costa widely sulcated, the rami widened between the antennae; pronotum extend upto or beyond the hind femora; dorsum smooth or finely granulose; median carina percurrent; abbreviated cainnae on shoulders distinct or not; tegmina and wings show dimorphism.

Distribution : India (West Bengal, Tripura, Assam, Arunachal Pradesh, Manipur, Meghalaya and Sikkim); Bangladesh; Pakistan; Sri Lanka; Myanmar; Thailand; Sumatra; Java; Celebes; Vietnam and Taiwan.

Remarks : Micro and macropterous forms are available in the same locality.

21. *Hedotettix attenuatus* Hancock

(Map 3)

1904. *Hedotettix attenuatus* Hancock, *Spolia zeylan.*, 2 : 108, 149, 151.

1991. *Hedotettix attenuatus*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 162.

Material examined : 1 M, Saydabari, N. Tripura, 29.xii.1972, V. C. Agrawal coll.; 1 M, Simna, W. Tripura, 6.vi.1990, G. N. Saha coll.; 1 M, 2 FF, Udaipur, S. Tripura, 10.vi.1990, G. N. Saha coll.; 1 F, Khowai, N. Tripura, 3.xii.1991, K. K. Ray coll.; 1 M, Champaknagar, W. Tripura, 7.xii.1991, K. K. Ray coll.

Diagnostic characters : Size medium (8-10.5 mm), body slender; vertex narrower than an eye; frontal sulcus gently wide; abbreviated carinae distinct between shoulders. The remaining characters are similar to preceding species.

Distribution : India (Orissa, Assam, Meghalaya, Manipur, Tripura and Arunachal Pradesh); Sri Lanka.

Remarks : This species shows dimorphism in the length of pronotum and wings.

22. *Hedotettix grossus* Hancock

(Map 3)

1915. *Hedotettix grossus* Hancock, *Rec. Indian Mus.*, 11 : 124.

1991. *Hedotettix grossus*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 161.

Material examined : 1 F, Agartala, 11.xi.1969, V. C. Agrawal coll.; 1 F, Pratapgarh, Agartala, 29.x.1974, M. S. Shishodia coll.; 1 F, Ambassa, N. Tripura, 25.v.1978, J. K. Jonathan coll.

Diagnostic characters : Stature moderately large (10-12 mm); head not exserted above the pronotum; vertex a little narrower than an eye; frontal costa strongly arcuate, not widened between the antennae. The remaining characters more or less are resembling with *Hedotettix gracilis*.

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

Genus *Ergatettix* Kirby, 1914

Key to species of *Ergatettix*

1. Median carina of pronotum distinctly undulate; lateral carinae with small dilated lobes on the hind process of pronotum; median femora sufficiently flattened, margins lobate; hind femora strongly tuberculate on externo-medial surface *güntheri* Steinmann
- Median carina of pronotum indistinctly or distinctly undulate but not like above; lateral carinae without dilated lobes on the hind process of pronotum; median femora less flattened, margins indistinctly or a little lobate; hind femora with less protuberant tubercles on externo-medial surface *dorsifera* (Walker)

23. *Ergatettix dorsifera* (Walker)

(Map 3)

1871. *Tettix dorsifera* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 : 825.
 1929. *Ergatettix dorsifera*, Hebard, *Revue suisse Zool.*, 36 : 588.
 1991. *Ergatettix dorsifera*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 178.

Material examined : 1 M, 1 F, Ambassa, N. Tripura, 4.ii.1971, V. C. Agrawal coll.; 2 MM, 2 FF, Saydabari, 29.xii.1972, V. C. Agrawal coll.; 1 M, Fatik Boy, 29.xii.1972, V. C. Agrawal coll.; 1 M, 1 F, Rajnagar, Agartala, 30.x.1974, M.S. Shishodia coll.; 5 MM, 1 F, Garjee, S. Tripura (at light), 4.xi.1974, M. S. Shishodia coll.; 3 MM, 2 FF, Teliamura (at light), 10.xi.1974, M. S. Shishodia coll.; 9 MM, 3 FF, Ambassa (at light), 16 & 19.xi.1974, M. S. Shishodia coll.; 2 MM, 2 FF, Manu, N. Tripura (at light), 23 & 14.xi.1974, M. S. Shishodia coll.; 5 FF, Ambassa, N. Tripura, 25.v.1978, J. K. Jonathan coll.; 1 M, Teliamura, N. Tripura, 2.xi.1991, B. N. Das coll.; 1 M, Champaknagar, W. Tripura, 7.xii.1991, K. K. Ray coll.

Diagnostic characters : Size medium (6-9 mm); head distinctly exserted; vertex narrower than an eye, carinated in the middle; paired ocelli placed below the middle of eyes; antennae situated below the inferior margin of eyes; eyes raised above the vertex; pronotum extend beyond the apex of posterior femora; median and lateral carinae without dilated lobes on hind pronotal process; dorsum of pronotum with two black spot behind shoulders which may or may not unite to form a complete band; hind femora with less protuberant tubercles on externo-medial surface.

Distribution : India (Uttar Pradesh, Maharashtra, Madhya Pradesh, Karnataka, Kerala, Tamilnadu, Orissa, Bihar, West Bengal, Tripura, Assam, Meghalaya, Manipur, Sikkim, Arunachal Pradesh); Bangladesh; Afghanistan; Iran; Turkmenia; Central Asia; Sri Lanka, Java; Myanmar; Sumatra; South China; Taiwan; Greater Sunda Island and Sumba (Indonesia).

24. *Ergatettix g  ntheri* Steinmann

(Map 3)

1912. *Euparatettix nodulosus* Hancock, *Mem. Dep. Agric. India, ent. Ser.*, 4 : 155.
 1970. *Ergatettix g  ntheri* Steinmann, *Acta zool. hung.*, 16 (1-2) : 234.
 1991. *Ergatettix g  ntheri*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 175.

Material examined : 2 MM, 5 FF, Ambassa, N. Tripura, 25.v.1978, J. K. Jonathan coll.; 1 F, Nutanbazar, S. Tripura, 13.vi.1990, G. N. Saha coll.

Diagnostic characters : Size medium (6.8-9 mm); similar to the preceeding species except the median carina of pronotum distinctly undulate; lateral carinae with small dilated lobes on the hind process of pronotum; hind femora with strongly developed tubercles on externo-medial surface.

Distribution : India (Tripura, Uttar Pradesh, Madhya Pradesh, Maharashtra, Bihar, Orissa, West Bengal, Assam, Meghalaya, and Arunachal Pradesh); Bangladesh; Nepal; Sri Lanka.

Family BATRACHIDEIDAE

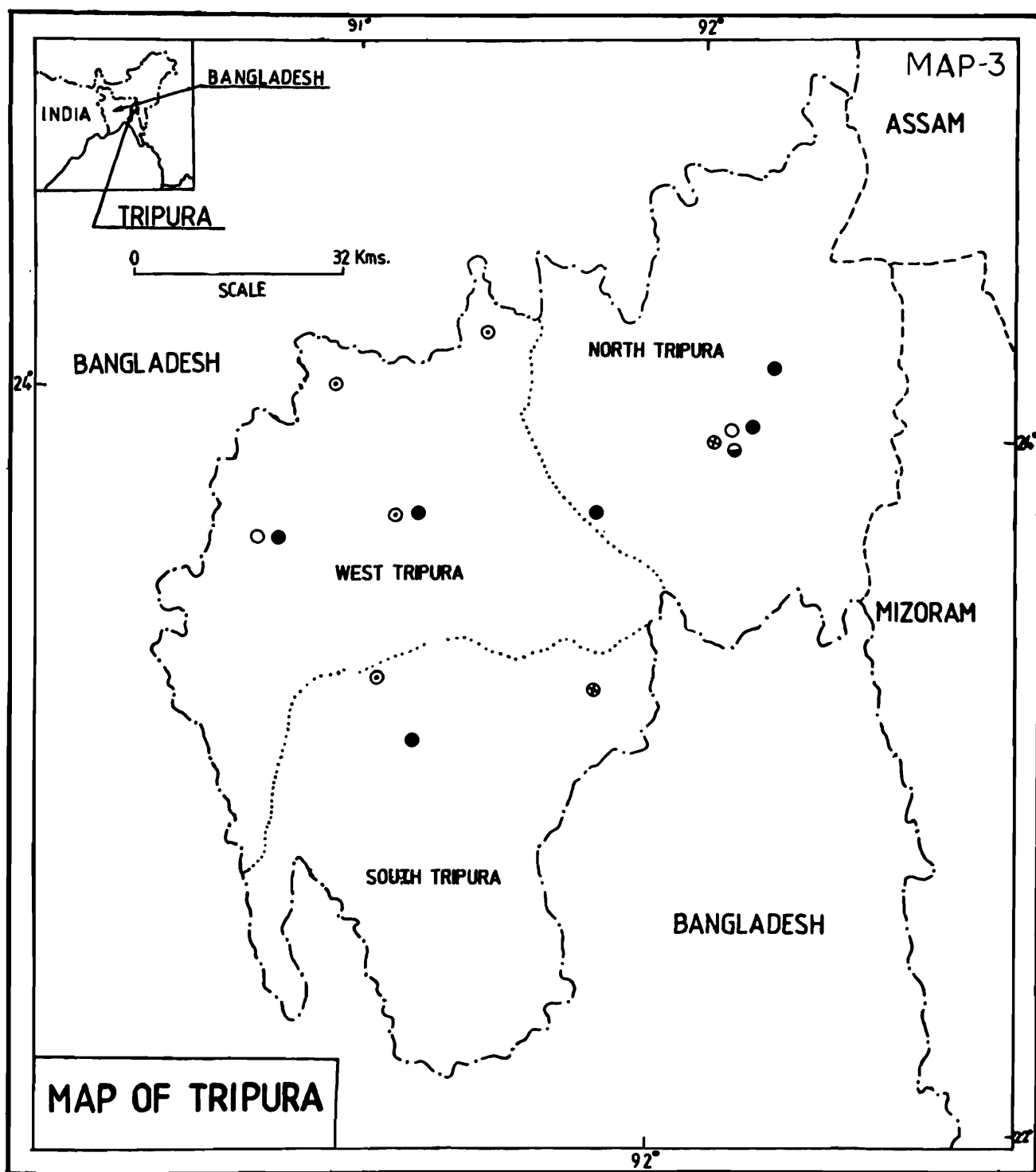
Genus *Saussurella* Bolivar, 188725. *Saussurella cornuta* (De Haan)

(Map 3)

1842. *Acridium (Tetrix) cornutum* De Haan, *Temminck, Verhandel.*, Orth. : 166, 167.
 1887. *Saussurella cornuta*, Bolivar, *Annls. Soc. ent. Belg.* 31 : 303.
 1991. *Saussurella cornuta*, Shishodia, *Rec. zool. Surv. India, Occ. Paper No. 140* : 183.

Material examined : 3 MM, Ambassa, N. Tripura, 16.xi.1974, M. S. Shishodia coll.; 1 F, Golaghati, W. Tripura, 20.vi.1990, G. N. Saha coll.

Diagnostic characters : Size a little larger (12.5-13 mm), body moderately elongated; general colour brown, mottled with dark brown; head not exserted; vertex wider than an eye; face oblique,



Map 3 : ○ *Hedotettix attenuate* Hancock ; ○ *Hedotettix grossus* Hancock ; ● *Ergatettix dorsifera* (Walker) ; ⊗ *Ergatettix guntheri* Steinmann ; ● *Saussurella cornuta* (De Haan).

frontal costa bifurcate behind the paired ocelli and depressed, widely sulcated in front of ocelli; pronotum produced over the head in front with a straight median carina as a narrow strong horn-like process, and extends beyond the apex of posterior femora; subgenital plate of female trilobate apically, middle lobe shorter and angular.

Distribution : India (Tripura); Myanmar; South China; China; South Vietnam and Java.

Remarks : Specimens from Ambassa were collected from the wild grass and creeper plants surrounding a tree, near the Forest Rest House.

This tree was located on a mound where a number of other trees were growing among grass and bushes.

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INSECTA : ORTHOPTERA : GRYLLOIDEA AND TRIDACTYLOIDEA

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INTRODUCTION

Crickets and pigmy-mole-crickets are included under the superfamilies Grylloidea and Tridactyloidea of the order Orthoptera. These insects are readily distinguished by structure of their antennae, tarsal segments and hind legs. The average size of the body varies from 4 mm. to 50 mm. in length. They exhibit sexual dimorphism (except pigmy-mole-crickets), with the tegminal venation modified in the males in majority of the species to form a sound-producing organ. The females tegmina may be either well developed, or reduced, or totally absent. In some species both sexes are apterous. A number of species are crop pests, and under specific circumstances, their population sporadically increases with devastating results. There are records of about 2,300 described species of Grylloidea and 163 species of Tridactyloidea from all over the world, of which 225 species of Grylloidea and 16 species of Tridactyloidea are reported from India.

Though in the past, many authors like Walker (1869, 1871), Chopard (1924, 1928, 1935 and 1969), Bhowmik (1967-1985), Tandon & Shishodia (1972, 1974), Shishodia & Tandon (1977, 1993), Bhargava (1976, 1981) and Vasanth (1993) have studied crickets of India, but nobody has worked out the Grylloidea fauna of Tripura State. Recently, Shishodia & Tandon has published a preliminary report of Grylloidea of Tripura. Present work is an attempt to report the crickets and pigmy-mole-crickets of Tripura State. A total of 25 species have been worked out, of

which 8 are new records for Tripura which are marked by single asterisk (*). This study is based on the collections brought by different Survey parties of the Zoological Survey of India. The distribution of each species in Tripura is depicted in some maps.

SYSTEMATIC ACCOUNT

Order ORTHOPTERA

Key to suborders of ORTHOPTERA

1. Antennae about as long or longer than body, many segmented; tympanal organs, when present, on fore tibiae.....ENSIFERA
- Antennae shorter, with less than 30 segments or fewer segments; tympanal organs, when present, at the base of abdomen. CAELIFERA

Suborder ENSIFERA

Key to families of ENSIFERA

1. Anterior legs short, presenting a special conformation for digging*Gryllotalpidae*
- Anterior legs normally formed 2
2. Second segment of tarsi compressed, minute. 3
- Second segment of tarsi depressed. 4
3. Posterior tibiae without denticles between the spines.*Gryllidae*
- Posterior tibiae serrulated at base and between the spines (head lengthened, horizontal, body slender with feebly swollen posterior femora).*Oecanthidae*

4. 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

(Map 1)

1805. *Gryllotalpa africana* Beauvois, *Ins. Afr. Amer.*, : 229

1967. *Gryllotalpa africana* : Chopard, *Orthopterorum Catalogus*, Part 12 : 449.

Material examined : 1 M, Ampa, 17. i. 1971, coll. V. C. Agrawal; 1 M, 1 F, Forest Rest House, Teliamura, 10, 12. xi. 1974, coll. M. S. Shishodia; 1 M, Golobari, Teliamura, 150m, 11. xi. 1974, coll. M. S. Shishodia; 1 M, Korilong, Teliamura, 13. xi. 1974, coll. M. S. Shishodia; 1 M, Ambassa, North Tripura, 16. xi. 1974, coll. M. S. Shishodia; 2 F, P.W.D. Bungalow, Udaipur, South Tripura, coll. K. K. Roy.

Diagnostic characters : Medium in size (25-35 mm); colour rufous-brown; ocelli oval, eyes reduced; anterior tibiae armed with 4 dactyls; wings caudate; pseudepiphallus narrowly cordiform and the hooks rather short, acute (Fig. 1); ovipositor completely aborted.

Distribution : India : Andaman & Nicobar Islands, Arunachal Pradesh, Bihar, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Meghalaya, Orissa, Pondicherry, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Africa, Tropical Asia, Australia, Bangladesh, Bhutan, Iran, Madagascar, Malaya, Myanmar, Nepal, Pakistan and Singapore.

Remarks : It causes serious damage to potato, paddy and tea plantation.

2. **Gryllotalpa hirsuta** Burmeister

(Map 1)

1838. *Gryllotalpa hirsuta* Burmeister, *Handb. Ent.*, 11 : 739.

1969. *Gryllotalpa hirsuta* : Chopard, *Fauna of India*, Orthoptera, 2 Grylloidea, : 12.

Material examined : 1 F, Kumarghat, 26. xii. 1972, coll. V. C. Agarwal.

Diagnostic characters : Size large (38-45 mm); tegmina extending to the apex of 5th or 6th abdominal tergite, veins curved at base only, then straight and parallel; wings caudate.

Distribution : India : Tripura.

Elsewhere : Borneo, Java, Malaya, Selangor, Singapore and Sumatra.

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 genera of subfamily GRYLLINAE

1. Posterior femora, long, usually as long as tibia and tarsus together; ocelli disposed in a straight line; body almost glabrous.
..... **Brachytrupes** Saussure
- Posterior femora no longer than tibia and metatarsus together; ocelli disposed as a triangle; body usually more or less pubescent. 2
2. Both sexes with convex face. 3
- Face more or less flattened in the male 6
3. Head with narrow frontal rostrum (head somewhat flattened above).
..... **Gryllodes** Saussure
- Head with wide frontal rostrum 4
4. Median line of the bridge of epiphallus entire.
..... **Modicogryllus** Chopard
- Median line of the bridge of epiphallus not entire. 5
5. 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

6. Male with flattened or somewhat concave face, but forehead without any prolongation; frontal rostrum convex.
..... *Velarifictorus* Randell

— Face of the male strongly flattened and forehead more or less strongly prolonged; frontal rostrum of male projecting but simply angular. *Loxoblemmus* Saussure

Genus *Brachytrupes* Serville, 1839

3. **Brachytrupes portentosa* (Lichtenstein)

(Map 1)

1796. *Acheta portentosa* Lichtenstein, *Cat. Mus. zool. Hamburg*, 3 : 86.

1967. *Brachytrupes portentosa* : Chopard, *Orthopterorum Catalogus*, Part 10 : 42.

Material examined : 1 M, Ambassa, North Tripura, 25. v. 1992, coll. B. C. Das.

Diagnostic characters : Size large (37-44 mm); colour reddish yellow to brown; body shining; pronotum strongly punctate, distinctly widening in front; chord vein of male tegmina join the diagonal vein at 2 places on the anterior side, and at 4 places on the posterior side; mirror longer than wide, a curved vein emerge from the antero-lateral margin of mirror and ends at the posterior margin of mirror; 4 oblique veins; apical field with 9 veins, cells more or less square.

Measurements (in mm) : Body length 37.0; pronotum 8.0; posterior femora 23.0

Distribution : India : Arunachal Pradesh, Assam, Bihar, Karnataka, Maharashtra, Meghalaya, Mizoram, Nagaland, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : China, Java, Malaya, Myanmar, Pakistan, Philippines, Singapore, Sumatra and Taiwan.

Remarks : It is known to damage the citrus, jute, paddy and tea plantations.

Genus *Teleogryllus* Chopard, 1961

4. **Teleogryllus mitratus* (Burmeister)

(Map 1)

1838. *Gryllus mitratus* Burmeister, *Handb. Ent.*, 2 : 734.

1964. *Teleogryllus mitratus* : Randell, *Can. Ent.*, 96 (12) : 1596.

Material examined : 1 F, Sonamura, South Tripura, 16. vi. 1990, coll. G. N. Saha; 1 M, 1 F, Ambassa, North Tripura, 25. v. 1992, coll. B. C. Das.

Diagnostic characters : Size large (21-28 mm); body colour light testaceous; head with a yellow band along the internal margin of eyes; tegmina extending to the apex of abdomen, wings longer than tegmina; mirror broader than long, divided in the middle by a curved vein, 4 oblique veins and 2 small ones in the angle of the stridulating vein; genitalia with large superior part, sinuated sides, and feebly acute at apex (Fig. 5).

Distribution : India : Andaman Islands, Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Borneo, Indo-China, Java, Malaya, Myanmar, Pahang, Sri Lanka and Sumatra.

Genus *Modicogryllus* Chopard, 1961

5. *Modicogryllus confirmatus* (Walker)

(Map 1)

1859. *Acheta confirmata* Walker, *Ann. Mag. nat. Hist.*, (3) 4 : 221.

1964. *Modicogryllus confirmatus* : Randell, *Can. Ent.*, 96 (12) : 1584.

Material examined: 1 M, Kumarghat, 29. xii. 1972, coll. V. C. Agarwal; 1 M, Ambassa, 1. i. 1993, coll. V. C. Agrawal; 1 M, Garjee, Udaipur, 7. xi. 1974, coll. M. S. Shishodia; 2 F, Forest Rest House, Teliamura, 10. xi. 1974, coll. M. S. Shishodia; 1 F, Amarpur, South Tripura, 12. vi. 1990, coll. G. N. Saha; 1 F, Golaghati, 20. vi. 1990, coll. G. N. Saha; 1 M, 4 F, Selama, N. Tripura, 26. v. 1992, coll. B. C. Das.

Diagnostic characters : Size medium (10-15 mm) ; head brown with narrow yellow band connecting the lateral ocelli ; occiput with 6 short yellowish lines ; male tegmina extending almost to the apex of abdomen ; mirror longer than wide, divided or not by a curved vein ; 2 oblique veins ; lateral field nearly transparent, presenting 4 veins, the two anterior ones being strongly curved and separated (Fig. 4), in female less curved ; wings usually caudate ; genitalia with the superior bridge deeply and rather widely notched, forming two rather acute, erect lateral lobes ; inferior pieces presenting a more or less developed erect tooth, ovipositor long, with apical valves acute.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Bihar, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh, Indo-China, Israel, Malaya, Myanmar, Nepal, Philippines, Sri Lanka and Thailand.

Genus *Plebeigryllus* Chopard, 1964

6. **Plebeigryllus guttiventris* (Walker)

(Map 1)

1871. *Gryllus guttiventris* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 : 6.

1964. *Plebeigryllus guttiventris* : Randell, *Can. Ent.*, 96 (12) : 1598.

Material examined : 1 F, Selama, N. Tripura, 26. v. 1992, coll. B. C. Das.

Diagnostic characters : Size medium (13.5-17.5 mm) ; general shape short and depressed ; head blackish above with 6 short light lines on the occiput ; posterior femora short and thick, feebly striated with brown ; tegmina extending almost to the apex of abdomen ; mirror as broad as long, divided behind the middle by a curved vein ; 4 or 5 oblique veins ; wings caudate ; genitalia formed of a large piece with sinuated sides, ending in small, blunt point (Fig. 3) ; ovipositor long, straight, apical valves acute.

Distribution : India : Bihar, Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Orissa, Pondicherry, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Myanmar and Sri Lanka.

Genus *Loxoblemmus* Saussure, 1871

Key to species of *Loxoblemmus* (Male)

1. Size small (11-12 mm) ; first joint of antennae with or without a short dentiform projection. *equestris* Saussure
- Size medium (14-18 mm) ; first joint of antennae plain. 2
2. Labial palpi very long. *longipalpis* Chopard
- Labial palpi of normal length. *detectus* (Serville)

7. *Loxoblemmus equestris* Saussure

(Map 1)

1877. *Loxoblemmus equestris* Saussure, *Mem. Soc. Genève*, 25 : 252.

1969. *Loxoblemmus equestris* : Chopard, *Fauna of India*, Orthoptera, 2, Grylloidea : 122.

Material examined : 1 M, Garjee, Udaipur, 4. xi. 1974, coll. M. S. Shishodia ; 1 M, Forest Rest House, Teliamura, 11. xi. 1974, coll. M. S. Shishodia ; 1 M, 1 F, Ambassa, 16, 19. xi. 1974, coll. M. S. Shishodia.

Diagnostic characters : Size medium (11-13) ; head brown above, with 6 yellow lines on the occiput and a transverse yellow band at top of frontal rostrum ; tegmina extending to the apex of abdomen ; mirror lozenge-shaped, rounded posteriorly, undivided ; 2 oblique veins ; apical field long, with 5 veins ; lateral field with distant veins ; wings caudate ; ovipositor long, apical valves acute at apex.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Bihar, Jammu & Kashmir, Karnataka, Madhya Pradesh, Manipur, Meghalaya, Orissa, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Celebes, China, Japan, Java, Malaya, Myanmar, Pahang, Perak and Sri Lanka.

8. **Loxoblemmus longipalpis* Chopard

(Map 1)

1928. *Loxoblemmus longipalpis* Chopard, *Spol. zeylan.*, 14 : 200.

Material examined : 1 M, Ambassa, N. Tripura, 25. v. 1992, coll. B. C. Das ; 2 F, Selama, N. Tripura, 26. v. 1992, coll. B. C. Das.

Diagnostic characters : Size medium (18.00 mm) ; similar to *L. detectus*, but more robust ; palpi yellowish, a little darkened at apex ; maxillary palpi rather long, especially 3rd and 5th joints ; antennae with first joint plain ; tegmina extending to the apex of abdomen ; mirror rhomboidal, undivided ; 2 oblique veins ; wings caudate.

Distribution : India : Arunachal Pradesh.

Elsewhere : Sri Lanka.

9. *Loxoblemmus detectus* Saussure, 1871

(Map 1)

1839. *Platyblemmus detectus* Serville, *Ins. Orth.*, : 356.

1969. *Loxoblemmus detectus* : Chopard, *Fauna of India*, Orthoptera, 2, Grylloidea : 123.

Material examined : 1 M, Brahmachera, Teliamura, 10. xi. 1974, coll. M. S. Shishodia ; 1 F, Kunjmura, Ambassa, 14. xi. 1974, coll. M. S. Shishodia ; 1 F, Forest Rest House, Ambassa, 16. xi. 1974, coll. M. S. Shishodia ; 1 M, Jamirchera, Manu, 25. xi. 1974, coll. M. S. Shishodia.

Diagnostic characters : Size medium (15-17 mm.) ; occiput adorned with 4 yellow lines ; face flattened and slightly concave ; first joint of antennae without any denticulation ; tegmina extending to the apex of abdomen, with a brown humeral band ; mirror divided behind the middle, 2 oblique veins ; wings caudate ; ovipositor straight, narrow, with acute apical valves.

Distribution : India : Andaman Islands, Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Mizoram, Sikkim, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : China, Java, Johore, Kuala Lumpur, Malaya, Pahang, Singapore, Sri Lanka, Sumatra and Taiwan.

Genus *Gryllodes* Saussure, 1874

10. **Gryllodes sigillatus* (Walker)

(Map 1)

1869. *Gryllus sigillatus* Walker, *Cat. Derm. Salt. Brit. Mus.*, 1 : 46.

1969. *Gryllodes sigillatus* : Chopard, *Fauna of India*, Orthoptera, 2, Grylloidea : 85.

Material examined : 1 M, 37-41 mile on road to Ambassa, West Tripura, 6. iii. 1991, coll. G. K. Srivastava.

Diagnostic characters : Size medium (15-18 mm) ; head small, a little flattened ; frontal rostrum much narrower ; tegmina of male not over reaching the middle of abdomen, truncated at apex ; wings absent.

Distribution : India : Andaman Islands, Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Malaya, Pakistan and Sri Lanka.

Subfamily NEMOBIINAE

Genus *Pteronemobius* Jacobson & Bianchi, 1905

Key to species of *Pteronemobius*

1. Posterior femora adorned with blackish bands. 2
- Posterior femore unicolorous. 3
2. Maxillary palpi very dark at base, 4th and 5th joints nearly white ; lateral lobes of pronotum blackish. *fascipes* (Walker)
- Maxillary palpi testaceous, a little darkened at apex ; lateral lobes of pronotum for the most part rufotestaceous. *csikii* (Bolivar)
3. Lateral lobes of pronotum and lateral field of tegmina blackish, contrasting with the upper

part which is testaceous.....
*taprobanensis* (Walker)

— Lateral lobes of pronotum and lateral field of tegmina of the same colour as the upper part.
4

4. Size larger (7-8 mm) ; ovipositor longer (5.0 mm) and straighter,.....*indicus* (Walker)

— Size smaller (4-7 mm) ; ovipositor shorter (2.5-3 mm), gently curved. 5

5. Posterior tibiae with 3 external spines.
*novarae* (Saussure)

— Posterior tibiae with 4 spines on each margin.
*concolor* (Walker)

11. *Pteronemobius fascipes* (Walker)

(Map 2)

1869. *Eneoptera fascipes* Walker, *Cat. Derm. Salt. Brit. Mus.*, 1 : 67.

1969. *Pteronemobius fascipes* : Chopard, *Fauna of India*, Orthoptera, 2, Grylloidea : 164.

Material examined : 1 M, Chandmari, Agartala, 10. xi. 1969, coll. V. C. Agrawal; 1 F, Ampai, 17. i. 1971, coll. V. C. Agrawal; 1 F, M. B. B. college campus, Agartala, coll. V. C. Agrawal; 1 F, Sikari bari, N. Tripura, 24. v. 1992, coll. B. C. Das.

Diagnostic characters : Size small (5.0 mm.) ; head blackish with 4 pale lines on the occiput ; anterior and median femora whitish in their basal half, brownish in the apical half ; posterior tibiae with 3 external and 4 internal spines in male, 3 on each margin in female.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : China, Java, Malaya, Myanmar, Philippines and Sri Lanka.

12. **Pteronemobius csikii* (Bolivar)

(Map 2)

1901. *Nemobius csikii* Bolivar, *Zichy zool. Ergebn.*, 2 : 243.

1969. *Pteronemobius csikii* : Chopard, *Fauna of India*, Orthoptera, 2 : 165.

Material examined : 1 F, Khowai, N. Tripura, 4. iii. 1991, coll. G. K. Srivastava.

Diagnostic characters : Similar to the preceding species, but differs from it in having the 4th and 5th joints of maxillary palpi testaceous-brownish, the posterior femora marked with brown at base; ovipositor longer and more strongly denticulated at apex and posterior tibiae with 4 internal spines.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Haryana, Karnataka, Rajasthan, Tamil Nadu and Uttar Pradesh.

Elsewhere : Bhutan, China, Myanmar and Sri Lanka.

13. *Pteronemobius taprobanensis* (Walker)

(Map 2)

1869. *Trigonidium taprobanensis* Walker, *Cat. Derm. Salt. Brit. Mus.*, 1 : 102.

1969. *Pteronemobius taprobanensis* : Chopard, *Fauna of India*, Orthoptera, 2 Grylloidea : 163.

Material examined : 1 M, Dak bungalow, Agartala, 11. xi. 1969, coll. V. C. Agrawal ; 1 F, Forest Rest House, Agratala, 31. x. 1974, coll. M. S. Shishodia : 1 M, 2F, Garjee, Udaipur, 4. xi. 1974, coll. M. S. Shishodia ; 5 M, 7 F, F. R. H., Teliamura, 10, 11, 14. xi. 1974, coll. M. S. Shishodia; 2 M, F. R. H., Ambassa, 16, 19. xi. 1974, coll. M. S. Shishodia ; 1 M, Garo basti, Ambassa, 21. xi. 1974, coll. M. S. Shishodia ; 1 F, Sikari bari, 24. v. 1992, coll. B. C. Das.

Diagnostic characters : Size small (5-5.3 mm) ; body colour testaceous above, dark-brown on the sides of pronotum and lateral field of tegmina; head with 4 lines on the occiput; last joint of maxillary palpi almost black ; ovipositor

straight and apical valves scarcely wider than the stem.

Distribution : India : Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Bangladesh, China, Indo-China, Java, Malacca, Malaya, Myanmar, Perak, Sri Lanka, Sumatra and Vietnam.

14. *Pteronemobius concolor* (Walker)

(Map 2)

1871. *Eneoptera concolor* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 Suppl. : 10.

1969. *Pteronemobius concolor* : Chopard, *Fauna of India*, Orthoptera, 2 Grylloidea : 160.

Material examined : 1 M, 5 F, Garjee, Udaipur, 4. xi. 1974, coll. M. S. Shishodia; 4 M, 2 F, F. R. House, Ambassa, 16, 19. xi. 1974 coll. M. S. Shishodia; 1 M, Manu, 23. xi. 1974, coll. M. S. Shishodia; 1 M, 1 F, Sikari bari, 24. v. 1992, coll. B. C. Das.

Diagnostic characters : Size small (6-7.5 mm); head with 4 feebly marked pale lines; posterior tibiae armed with 4 spines on each margin in both sexes, the first internal of male tuberculiform; mirror divided posteriorly into two cells; wings caudate; ovipositor short and little curved.

Distribution : India : Arunachal Pradesh, Assam, Goa, Great Nicobar Islands, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Afghanistan, Malaya, Myanmar, Perak, Sri Lanka and Turkistan.

15. *Pteronemobius indicus* (Walker)

(Map 2)

1869. *Nemobius indicus* Walker, *Cat. Derm. Salt. Brit. Mus.*, 1 : 58.

1969. *Pteronemobius indicus* : Chopard, *Fauna of India*, Orthoptera, 2 Grylloidea : 159.

Material examined : 2 F, Garjee, Udaipur, 4. xi. 1974, coll. M. S. Shishodia; 2 M, Forest Rest House, Teliamura, 10. xi. 1974, coll. M. S. Shishodia; 2 M, 1 F, Forest Rest House, Ambassa, 16, 19, 20. xi. 1974, coll. M. S. Shishodia; 1 M, Selama, N. Tripura, 26. v. 1992, coll. B. C. Das.

Diagnostic characters : Size small (7.5-8.5 mm); body colour uniformly pale testaceous; head with feebly marked pale lines; posterior tibiae with 4 spines on each margin in both sexes, the first internal of male tuberculiform; wings caudate; ovipositor long, straight, apical valves narrow, superior margin finely denticulated.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Goa, Maharashtra, Meghalaya, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Malaya, Myanmar, Pahang, Sri Lanka and Taiwan.

16. *Pteronemobius novarae* (Saussure)

(Map 2)

1877. *Nemobius novarae* Saussure, *Mem. Soc. Genève*, 25 : 83.

1969. *Pteronemobius novarae* : Chopard, *Fauna of India*, Orthoptera, 2 Grylloidea : 162.

Material examined : 1 F, Ambassa, 1. i. 1973, coll. V. C. Agrawal.

Diagnostic characters : Size small (4-4.2 mm); body colour brown; pronotum narrowing a little in front; posterior tibiae armed with 3 external and 4 internal spines in male, 3 on each margin in female; tegmina light brown with a wide humeral yellowish band; wings caudate; ovipositor short, straight, lanceolate, superior margin feebly denticulated.

Distributed : India : Madhya Pradesh.

Elsewhere : Java, Malaya (Kuala Lumpur) and Thailand (Bankok).

Family OECANTHIDAE

Genus *Oecanthus* Serville 183117. *Oecanthus indicus* Saussure

(Map 2)

1878. *Oecanthus indicus* Saussure, *Mem. Soc. Genève*, 25 : 454.1969. *Oecanthus indicus* : Chopard, *Fauna of India*, Orthoptera, 2 : 267.*Material examined* : 1 F, Fatik Roy, 29. xii. 1972, coll. V. C. Agrawal.

Diagnostic characters : Size medium (14.0 mm); very slender insects of a pale whitish, greenish or yellowish colouration; head directed forwards; pronotum long, narrowing in front; first two antennal joints without black markings; glandular pit of metanotum of male presenting large angular projection ending in a big rounded bud; anterior tibiae strongly dilated at base, with very large oval tympanum; posterior tibiae serrulated and armed with a certain number of small spines; tegmina larger than abdomen; wings longer than tegmina; ovipositor short.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Amboine, China, Japan, Malaysia, Philippines, Sri Lanka and Sumatra.

Family TRIGONIDIIDAE

Key to genera of *Trigonidiidae*

1. Tegmina glabrous or almost glabrous. 2
- Tegmina covered with an abundant fine pubescence. (male with distinct mirror).
..... *Cyrtoxiphoides* Chopard
2. Tegminal venation quite different in both sexes; showing always in the male a very neat anal field and mirror. 3
- Tegminal venation similar or almost similar in both sexes. 4
3. Pronotum narrowing and rounded in front; tegmina presenting in 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 the female. (tegmina membranaceous in both sexes, feebly convex in female)
..... *Anaxipha* Saussure

4. Tegmina presenting false veins between the principal veins. *Trigonidium* Rambur
- Tegmina without false veins between the principal veins
..... *Metioche* Stål (not discussed)

Genus *Cyrtoxiphoides* Chopard, 195118. *Cyrtoxiphoides* sp.

(Map 2)

1951. *Cyrtoxiphoides* Chopard, *Rec. S. A. Mus.*, 9, 473.

Material examined : 1 F, Ambassa, N. Tripura, 16. xi. 1974, coll. M. S. Shishodia.

Diagnostic characters : General shape rather short; eyes horizontally lengthened; 5th joint of maxillary palpi very short, funnel-shaped; tegmina pubescent; wings slightly longer than tegmina.

Distribution : India : Tripura.

Elsewhere : Tropical Africa, Australia and Sri Lanka.

Genus *Homoeoxipha* Saussure, 187419. *Homoeoxipha lycoides* (Walker)

(Map 2)

1869. *Phyllopalpus lycoides* Walker, *Cat. Derm. Salt. Brit. Mus.*, 1 : 71.1969. *Homoeoxipha lycoides* : Chopard, *Fauna of India*, Orthoptera, 2 Grylloidea : 275.

Material examined : 2 M, 1 F, Garjee, Udaipur, 6. xi. 1974, coll. M. S. Shishodia; 1 F, Dumachera, Manu, 24. xi. 1974, coll. M. S. Shishodia.

Diagnostic characters : Size small (5-5.3 mm); head blackish or dark rufous-brown; palpi black, last joint of maxillary palpi longer than the

preceding, triangular ; antennae yellowish with three first joints black ; pronotum rufous ; tegmina long and narrow, with 4 large blackish spots ; mirror longer, diagonal vein short, sinuated ; wings caudate.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Bihar, Karnataka, Lakshadweep Island, Meghalaya, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Australia, Bangladesh, China, Malaysia, Maldives Island, Myanmar, Perak, Queensland, Singapore, Sri Lanka and Taiwan.

Genus *Anaxipha* Saussure, 1874

20. *Anaxipha tripuraensis* Tandon & Shishodia

(Map 3)

Anaxipha tripuraensis Tandon & Shishodia, *Rec. zoo. Surv. India* 1990, **87**(2) : 103.

Material examined : 3 M, 2 F, Forest Rest House, Teliamura, 10. xi. 1974, coll. M. S. Shishodia (Holotype & Paratypes).

Diagnostic characters : Size small (5.5 mm) ; head yellowish brown, a little wider than the anterior margin of pronotum ; 5th joint of maxillary palpi triangular ; antennae yellow ; eyes protruding, rounded ; frontal rostrum a little narrower than the first antennal segment ; anterior femora perforated on both sides ; posterior femora with 3 spines on each margin ; tegmina reaching almost to the apex of abdomen ; mirror almost twice as long as a wide ; lateral field with 3 veins ; genitalia as figured (Fig. 6 & 7).

Distribution : India : Tripura.

Genus *Trigonidium* Rambur, 1839

Key to species of Trigonidium

1. Tegmina strongly convex ; wings short ; anterior tibiae unperforated.
.....*cicindeloides* Rambur

- Tegmina longer and less convex ; wings usually caudate ; anterior tibiae perforated.
.....*humbertianum* (Saussure)

21. *Trigonidium cicindeloides* Rambur

(Map 3)

1839. *Trigonidium cicindeloides* Rambur, *Faune Andal.*, **2** : 39.

1969. *Trigonidium cicindeloides* : Chopard, *Fauna of India*, Orthoptera, **2** Grylloidea : 304.

Material examined : 8 M, 6 F, Fatikroy, 29. xii. 1972, coll. V. C. Agrawal ; 1 M, 2 F, Ambassa, 4, 5. i. 1973, coll. V. C. Agrawal ; 1 M, 1 F, M. B. B. College campus, Agartala, 1. xi. 1974, coll. M. S. Shishodia ; 4 M, 6 F, Garjee, Udaipur, 5, 6, 7. xi. 1974, coll. M. S. Shishodia ; 3 M, Brahmachera, Teliamura, 10. xi. 1974, coll. M. S. Shishodia ; 1 M, 1 F, Ambassa, 16. xi. 1974, coll. M. S. Shishodia ; 4 M, 7 F, Manu, 23. xi. 1974, coll. M. S. Shishodia ; 1 M, Khowai, N. Tripura, 3. xii. 1991, coll. K. K. Roy ; 1 F, Zirania, 4. xii. 1991, coll. K. K. Roy.

Diagnostic characters : Size small (4.5-5.0 mm) ; colouration black, shining, with posterior legs yellowish, cerci yellow ; anterior tibiae unperforated ; tegmina bluish-black, strongly convex, as long as abdomen, false veins between the principal veins ; wings abortive.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Bihar, Goa, Himachal Pradesh, Karnataka, Maharashtra, Manipur, Meghalaya, Mizoram, Orissa, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Tropical Africa, Malaya, Madagascar, Mauritius Island, Mediterranean region, Myanmar, Nepal and Sri Lanka.

22. *Trigonidium humbertianum* (Saussure)

(Map 3)

1878. *Homoeoxiphus humbertianus* Saussure, *Mem. Soc. Genève*, **25** : 468.

1969. *Trigonidium humbertianum* : Chopard, *Fauna of India*, Orthoptera, **2** Grylloidea : 305.

Material examined : 1 M, Chailengta, Manu, 23. xii. 1972, coll. V. C. Agrawal ; 2 M, 2 F, Fatikroy, 29. xii. 1972, coll. V. C. Agrawal ; 3 M, Agartala, 31. x. 1974, coll. M. S. Shishodia ; 2 M, 2 F, Ambassa, 16. xi. 1974, coll. M. S. Shishodia ; 1 M, Sikaribari, 24. v. 1992, coll. B. C. Das.

Diagnostic characters : Similar to the preceding species ; tegmina less convex and more longer ; anterior tibiae perforated ; wings usually caudate.

Distribution : India : Assam, Bihar, Kerala, Orissa, Tamil Nadu, Tripura and West Bengal.

Elsewhere : Malaya and Sri Lanka.

Family ENEOPTERIDAE

Subfamily PODOSCIRTINAE

Key to genera of Podoscirtinae

1. Tegmina of male with well developed mirror.
.....*Madasumma* Walker
- Tegmina with similar venation in both sexes
.....*Euscyrtus* Guér

Genus *Madasumma* Walker, 1869

1869. *Madasumma* Walker, *Cat. Derm. Salt. Brit. Mus.*, 1 : 64.

23. **Madasumma* sp.

(Map 3)

Material examined : 1 F, Harinchera, Ambassa, 200m. N. Tripura, 19. xi. 1974, coll. M. S. Shishodia.

Diagnostic characters : The genus *Madasumma* is close to *Calyptotrypus* Saussure. The tegminal venation gives some specific characters in female, but these characters are not sufficient to identify the species.

Distribution : South Asia, Australia, Madagascar, Philippine Islands.

Remarks : Being a female specimen it could not be identified upto the specific level.

Genus *Euscyrtus* Guérin, 1844

24. *Euscyrtus hemelytrus* (Haan)

(Map 3)

1842. *Gryllus (Eneoptera) hemelytrus* Haan, *Temminck Verhandel*, Orthoptera : 231.

1969. *Euscyrtus hemelytrus* : Chopard, *Fauna of India*, Orthoptera, 2, Grylloidea : 392.

Material examined : 1 M, 1 F, Agartala, 2. xi. 1974, coll. M. S. Shishodia ; 5 F, Brahmachera, Teliamura, 10. xi. 1974, coll. M. S. Shishodia ; 1 M, 1 F, Garobasti, Ambassa, 21. xi. 1974, coll. M. S. Shishodia ; 2 M, 4 F, Buxanagar, S. Tripura, 15. vi. 1990, coll. G. N. Saha ; 3 M, Champaknagar, W. Tripura, 27. vi. 1990, coll. G. N. Saha ; 1 M, 1 F, Udaipur, 23. ii. 1991, coll. G. K. Srivastava ; 1 M, 1 F, Jaduram bari beat (Abhanga), 1. iii. 1991, coll. G. K. Srivastava ; 1 M, 2 F, Khowai, N. Tripura, 4. iii. 1991, coll. G. K. Srivastava ; 1 M, 3 F, Teliamura, 2. xii. 1991, coll. K. K. Roy ; 2 M, 2 F, Ziranania, 4. xii. 1991, coll. K. K. Roy ; 5 M, 6 F, Sikaribari, N. Tripura, 24. v. 1992, coll. B. C. Das.

Diagnostic characters : Size medium (8-10 mm) ; frontal rostrum as wide or almost as wide as the first antennal joint ; head adorned above with 4 broad longitudinal brown bands ; anterior ocellus placed almost at apex ; tegmina short, rounded at apex ; wings as long as tegmina or very long ; genitalia very small, rounded at apex, with two spinulose lobes at base (Fig. 8) ; ovipositor long, sinuate in the shape of 'S'

Distribution : India, Tropical Asia, Philippines and N. Australia.

Remarks : Macropterous condition is found in this species.

Suborder CAELIFERA

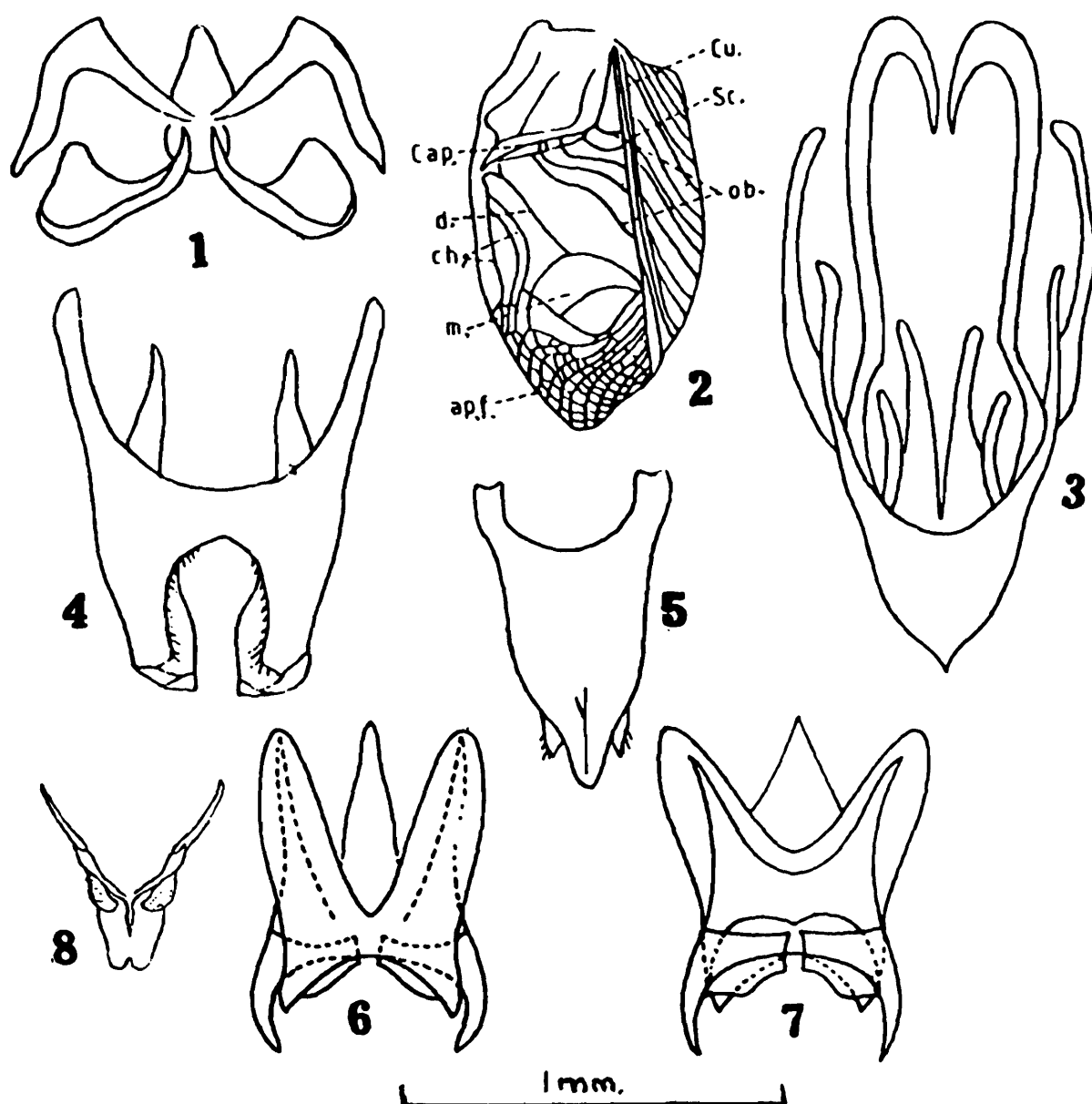
Superfamily TRIDACTYLOIDEA

Family TRIDACTYLIDAE

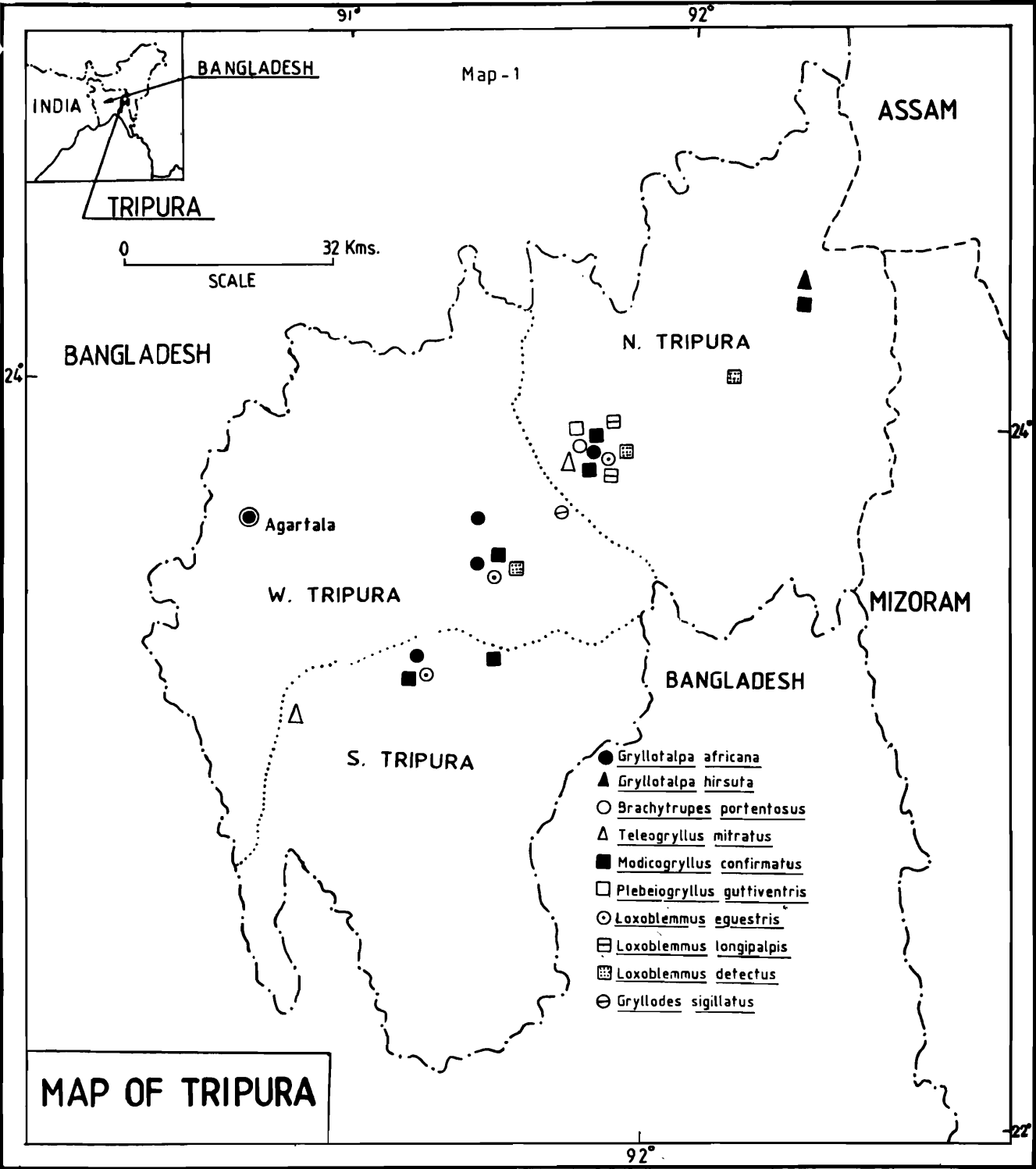
Tarsi 1 or 2 segmented ; antennae short, with 12 or fewer segments ; hind legs saltatorial with enlarged femora.

Genus *Xya* Latrielle, 1809

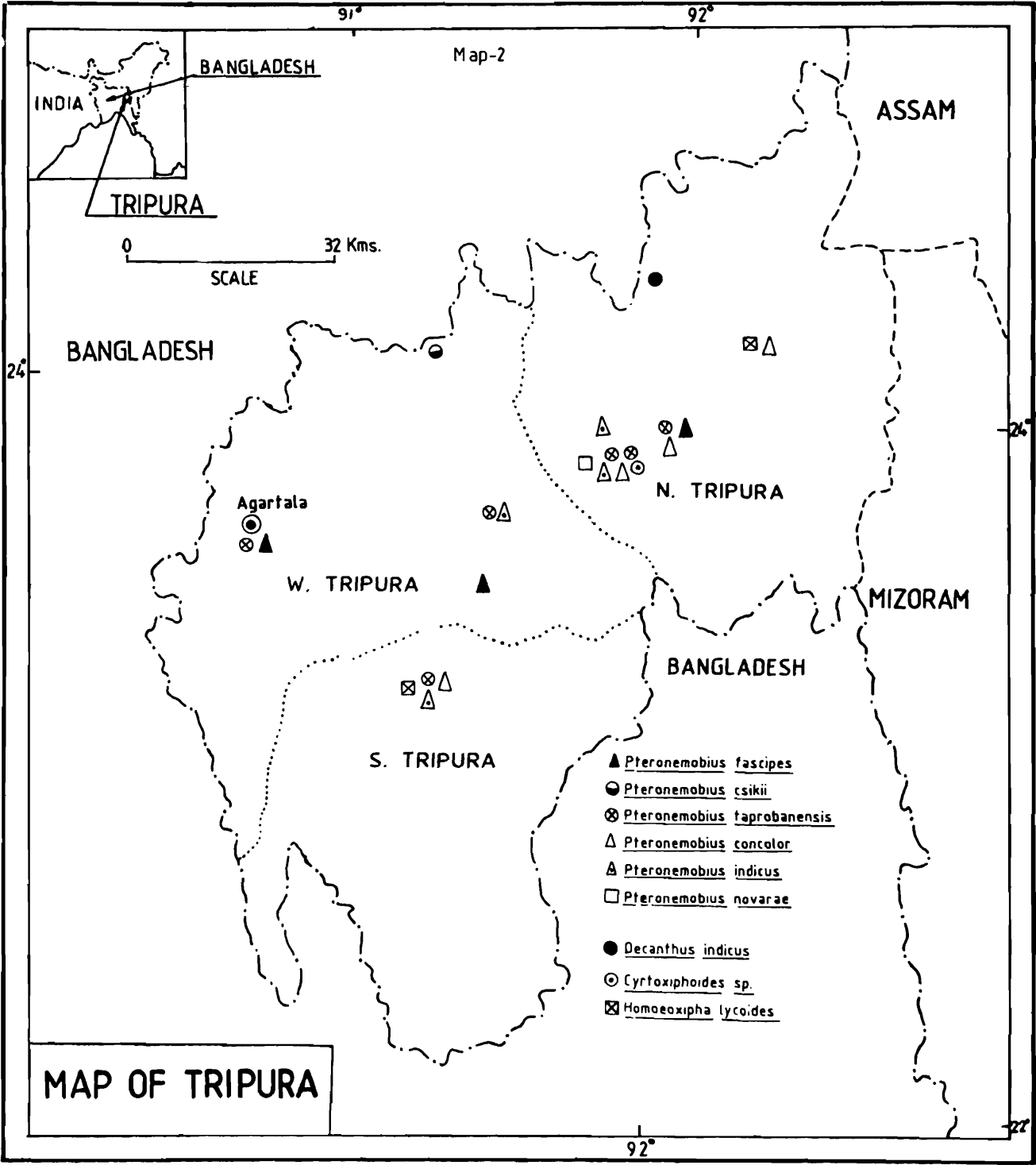
1809. *Xya* Latrielle, *Gen. Crust. Ins.*, 4 : 383.

PLATE 1**Fig. 1 :** Pseudepiphallus of *Gryllotalpa africana***Fig. 2 :** Male tegmen of a cricket**Fig. 3 :** Genitalia of *Plebeiogryllus guttiventris***Fig. 4 :** Genitalia of *Modicogryllus confirmatus***Fig. 5 :** Genitalia of *Teleogryllus mitratus***Fig. 6 & 7 :** Genitalia of *Anaxipha tripuraensis* Tandon & Shishodia**Fig. 8 :** Genitalia of *Euscyrus hemelytrus*

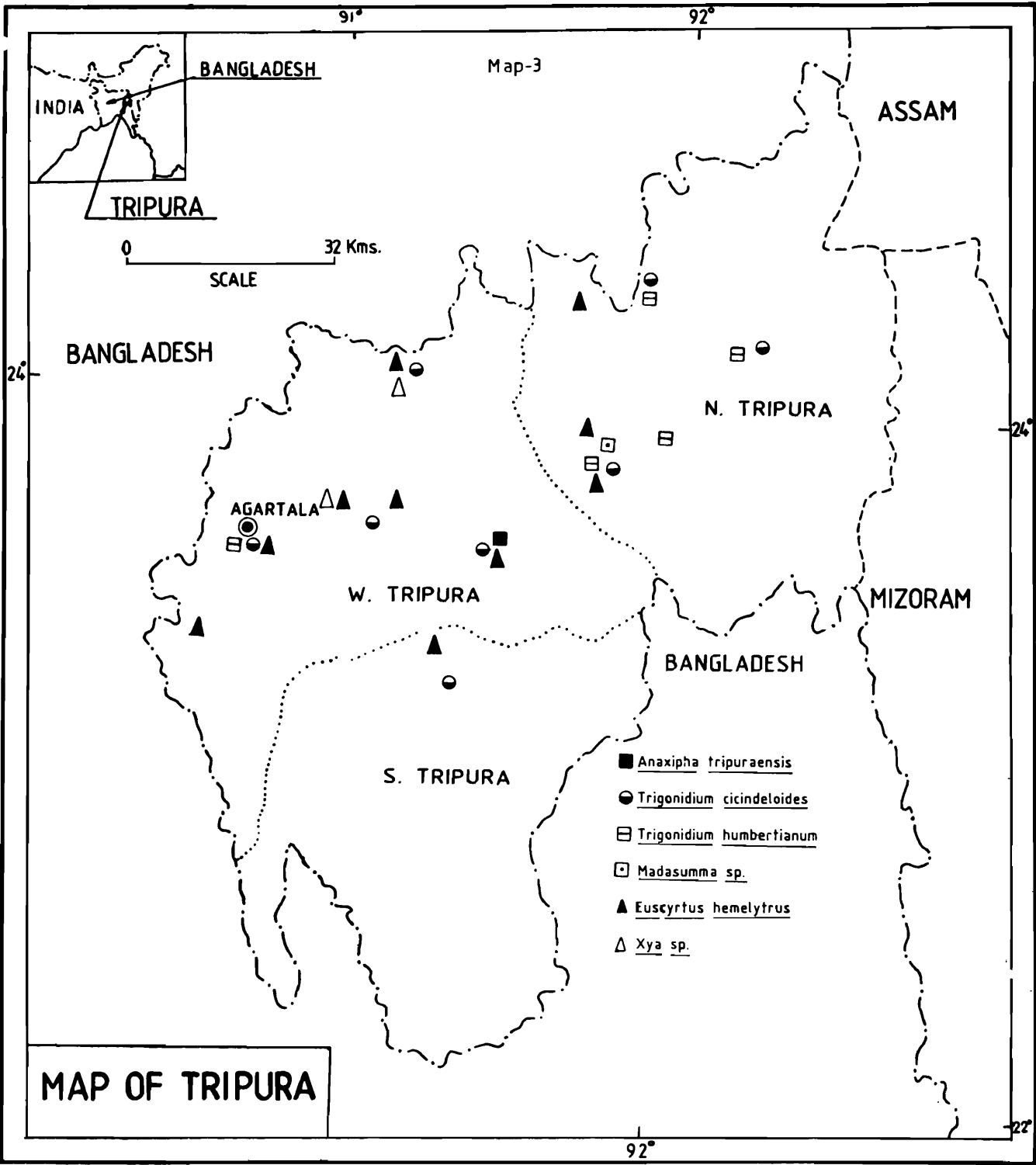
Sc., subcostal vein ; Cu., cubital vein ; Cap., posterior branch of the cubital ; ob., oblique veins ; ch., chords ; m., mirror ; ap. f., apical field ; d., diagonal vein.



Map 1



Map 2



Map 3

25. *Xya sp.
(Map 3)

Material examined : 1 example, Khowai, N. Tripura, 3. xii. 1991, coll. K. K. Roy ; 2 exs., Zirania, W. Tripura, 4. xii. 1991, coll. K. K. Roy.

Diagnostic characters : Tarsi of hind leg rudimentary, much shorter than the subapical spur, without terminal tooth ; dorsal margin of hind tibiae dentated.

SUMMARY

The present paper deals with 25 species of Grylloidea and Tridactyloidea. Eight species are being recorded for the first time from Tripura.

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Table-I. Distributional records of species of Grylloidea in Tripura—District-wise

Name of species	W. Tripura	N. Tripura	S. Tripura
1. <i>Gryllotalpa africana</i>	+	+	+
2. <i>Gryllotalpa hirsuta</i>	–	+	–
3. <i>Brachytrupes portentosus</i>	–	+	–
4. <i>Teleogryllus mitratus</i>	–	+	+
5. <i>Modicogryllus confirmatus</i>	+	+	+
6. <i>Plebeiogryllus guttiventris</i>	–	+	–
7. <i>Loxoblemmus equestris</i>	+	+	+
8. <i>Loxoblemmus longipalpis</i>	–	+	–
9. <i>Loxoblemmus detectus</i>	+	+	–
10. <i>Gryllodes sigillatus</i>	+	–	–
11. <i>Pteronemobius fascipes</i>	+	+	–
12. <i>Pteronemobius csikii</i>	–	+	–
13. <i>Pteronemobius taprobanensis</i>	+	+	+
14. <i>Pteronemobius concolor</i>	–	+	+
15. <i>Pteronemobius indicus</i>	+	+	+
16. <i>Pteronemobius novarae</i>	–	+	–
17. <i>Oecanthus indicus</i>	–	+	–
18. <i>Cyrtoxiphoides</i> sp.	–	+	–
19. <i>Homoeoxipha lycoides</i>	–	+	+
20. <i>Anaxipha tripuraensis</i>	+	–	–
21. <i>Trigonidium cicindeloides</i>	+	+	+
22. <i>Trigonidium humbertianum</i>	+	+	–
23. <i>Madasumma</i> sp.	–	+	–
24. <i>Euscyrtus hemelytrus</i>	+	+	+
25. <i>Xya</i> sp.	+	+	–

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INSECTA : ORTHOPTERA : TETTIGONIIDAE

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INTRODUCTION

Tripura is a small hilly state and mostly covered with hillocks. Sal, sagoon, agarbati, rubber and bamboo are the predominant plantation and also tea, jackfruit, pineapple, wild orchids are common. In between hillocks, there are paddy and other crop fields. Few of the hillocks like Sepahijala, Melaghar, Atharomara, Bishalgarh, Baramura etc. are with dense forest. The main rivers are Howrah, Gumati, Khowai. Tripura is bounded by Bangladesh in West, Assam by North.

Tettigoniidae long horned grass hopper, a family under order Orthoptera, Sub-order—Ensifera, Superfamily—Tettigoniioidea, which are very attractive in appearance. Very few species are found in India, a few have been considered as agricultural pests. The most important characters of this family are as follows : antenna longer than the body, tarsi 4 segmented and ovipositor sword-shaped.

Though it is the first detailed report of the family from the state, it includes only 8 species under 8 genera. All these species are new records from the state. Intensive survey may reveal many more species.

SYSTEMATIC ACCOUNT

Family TETTIGONIIDAE

Key to subfamilies

- 1. Male subgenital plate with a pair of styles...
.....2
- Male subgenital plate without styles
.....PHANEROPTERINAE

- 2. Fore tibia with long movable spine
.....LISTROSCELINAE
- Fore tibia without apical spine 3
- 3. Fore and mid femora spined beneath
.....COIPHORINAE
- Fore and mid femora unspined beneath 4
- 4. Male subgenital plate devided almost from base CONOCEPHALINAE
- Male subgenital plate bifurcated at about the middle MECOPODINAE

Subfamily PHANEROPTERINAE

Key to genera of Phaneropterinae

- 1. Antennae slender, about double the length of body, elytron very narrow and thickly reticulated....*Letana* Walker (1 species only)
- Antenna not so long 2
- 2. Hind margin of pronotum circular 3
- Hind margin of pronotum truncate, epiproct subconical.....*Elimaea* Stal (1 species only)
- 3. Radius sector 2 arises from the middle of elytron, ovipositor serrate
.....*Pelerinus* Bolivar (1 species only)
- Radius sector 2 arises from before the middle of elytron, ovipositor not serrate
.....*Holochlora* Stal (1 species only)

Genus 1. *Letana* Walker

Letana Walker, 1869, Cat. Derm. Salt. B. M. 11 : 277.

Type-species : *Letana despecta* (Brunner).

1. *Letana despecta* (Brunner)

1878. *Pyrhicea despecta* Brunner, Mon. Phan. : 115.

1906. *Letana despecta* Kirby, Syn. Cat. Orthopt., 2 : 400.

Material examined : South Tripura Dist. 1 M, Lebuchara, 20.11.1992. 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, rod shaped, slightly bend and bears a spine at apex; ovipositor curved.

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

Remarks : The species were recorded by the present author from Meghalaya and West Bengal. Here it is being recorded for the first time from Tripura.

Genus 2. *Elimaea* Stal

Elimaea Stal, 1874. *Recens. Orth.* ii : 11, 27.

Type-species : *Elimaea securigera* Brunner.

2. *Elimaea securigera* Brunner

1891. *Elimaea securigera* Brunner, Verh. Zool. Bot. Ges. Win. Viena, 40 : 47.

Material examined : South Tripura Dist. Lebuchara, 20.ii.1992, coll. R. S. Barman; West Tripura. 1 M, Abhoya, Agartala, 22.viii.1978, coll. S. K. Chanda.

Diagnosis : Medium sized species; fastigium con-shaped, poorly developed; posterior margin of pronotum semicircular; both edge of elytron straight, male subgenital plate with profuse tiny spines arranged inner side, ovipositor hook-shaped, epiproct with acute apex.

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

Remarks : The species was recorded by the author from Meghalaya and West Bengal. Here it is being recorded for the first time from Tripura.

Genus 3. *Pelerinus* Bolivar

Type-species : *Pelerinus alienus* (Brunner)

Allodapa Brunner, 1878, Mon. Phan. : 23, 221.

Pelerinus Bolivar, 1906, Bol. Soc. Espan, Hist. Nat., 6 : 393.

Pelerinus : Henry, 1940, Proc. R. ent. Soc. Lond. (B) 9 (1) : 7.

3. *Pelerinus alienus* (Brunner)

1878. *Allodapa aliena* Brunner, Mon. Phan. : 222.

1940. *Pelerinus alienus* : Henry, Proc. R. ent. Soc. Lond. (B) 9 (1) : 15.

Material examined : South Tripura Dist. 1 F, Narikelbagan, 21.ii.1992, Coll. R. S. Barman, West Tripura Dist. 2 F, Sepahijala, 19.ii.1992, Coll. R. S. Barman; North Tripura Dist. 1 F, Sindhukumar para, 19.vi.1992, Coll. V. T. Darling.

Diagnosis : Fastigium conically produced; posterior margin of pronotum circular, both edge of elytron almost straight, bristles in hind tibia well developed and predominant than other tibia; ovipositor curved; apical region serrate; apex of male subgenital plate deeply notched inside.

Distribution : India : Tripura (North Tripura Dist., South Tripura Dist. and West Tripura Dist.); Assam, Meghalaya, Tamil Nadu and West Bengal. Also known from Ceylon; Penang (?).

Remarks : The species was recorded from Meghalaya and West Bengal by the present author. Here it is being recorded for the first time from Tripura.

Genus 4. *Holochlora* Stal

Holochlora Stal, 1873, Ofv. Vet. Akad. Forth., 30 (4) : 42.

Type-species : *Holochlora indica* Kirby.

Holochlora indica Kirby

1906. *Holochlora indica* Kirby, Syn. Cat. Orthop., 2 : 430.

Material examined : North Tripura Dist. 1 M, Ambasa, 25.v.1992, Coll. B. C. Das.

Diagnosis : Fastigium conically 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 bear 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 : Tripura (North Tripura Dist.), Meghalaya, Orissa, Tamil Nadu and West Bengal.

Remarks : The species was recorded by the present author from Meghalaya and West Bengal. It is being recorded here first time from Tripura.

Subfamily LISTROSCELINAE

Genus 5. *Euhexacentrus* (Stal)

Euhexacentrus (Stal), 1877, *Ofv. K. Ventensk. Akad. forth.* No. 10 p. 46.

Type-species : *Euhexacentrus annulicornis* Stal.

5. *Euhexacentrus annulicornis* Stal

1922. *Euhexacentrus annulicornis* Hebard, *Proc. Acad. Nat. Sci. Philade* 74 : 271.

Material examined : North Tripura Dist. 1 F, Abhoya, Agartala, 22.viii.1978, Coll. S. K. Chanda; 1 F, Sepahijala, 17.ii.1992, 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 the body.

Distribution : India : Tripura (North Tripura Dist. and West Tripura Dist.), Assam, Maharashtra, Meghalaya and West Bengal. Also known from Phillipine.

Remarks : The species was recorded from Meghalaya and West Bengal by the present author. This species is being recorded here for the first time from Tripura.

Subfamily MECOPODINAE

Genus 6. *Mecopoda* Serville

Mecopoda Serville, 1831, *Ann. Sci. Nat.*, 22 : 154.

Type-species : *Mecopoda elongata* (Linn.).

6. *Mecopoda elongata* (Linn.)

1922. *Mecopoda elongata* Hebard, *Proc. Acad. Nat. Sci. Phila.* 74 : 182.

Material examined : North Tripura Dist. 1 F, Ambasa, 2.iii.1991, Coll. G. K. Srivastava.

Diagnosis : Brownish species, Fastigium 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 : Tripura (North Tripura Dist.), Andaman Islands, Assam, Karnataka, Maharashtra, Meghalaya, Orissa, Uttar Pradesh and West Bengal.

Remarks : The species was recorded from Meghalaya and West Bengal by the present author. The species is being recorded here for first time from Tripura.

Subfamily COIPHORINAE

Genus 7. *Euconocephalus* Karny

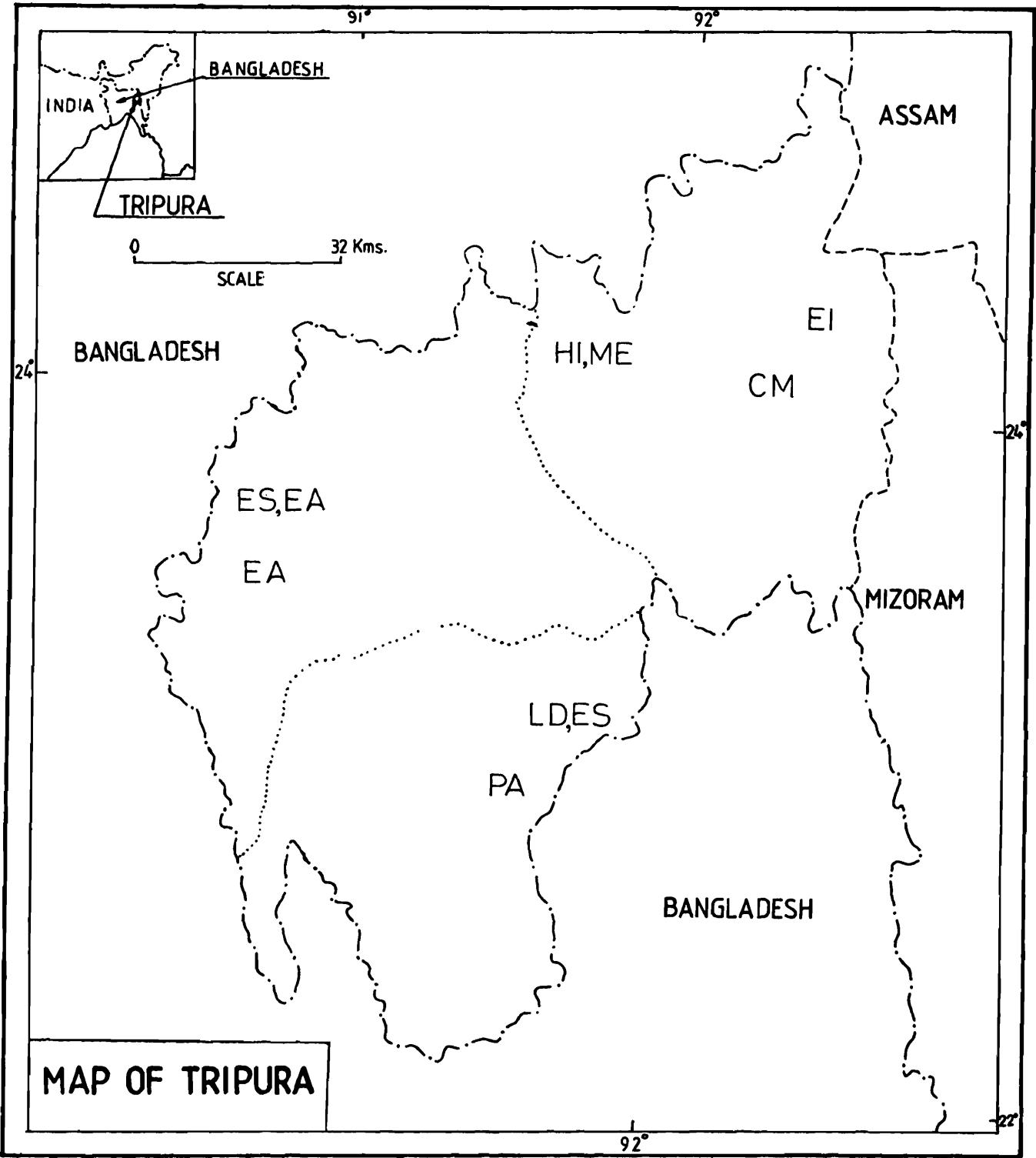
Euconocephalus Karny, 1907, *Aleh. Zool. bot. Ges. Wien.* 4 (3) : 39.

Type-species : *Euconocephalus incertus* (Walker).

7. *Euconocephalus incertus* (Walker)

1869. *Conocephalus incertus* Walker, *Cat. Derm. Salt. Brit. Mus.* 2 : 320.

1912. *Euconocephalus incertus* Kirby, *Gen. insectorum* 2 (139) : 35.



Map 1 : (For Districts)

1. (O) West Tripura 2. (X) South Tripura 3. () North Tripura
(For Localities)

1. Lebuchara 2. Abhoya (Agartala) 3. Narikel Bagan 4. Sepahijala 5. Sindhu Kumarpara 6. Ambasa 7. Manu 8. Kandra Chara
(For species of Tettigoniidae)

Letana despecta LD *Elimaca securigera* ES *Pelerinus alienus* PA *Holochlora indica* HI *Euhexacentrus annulicarnis* EA
Mecopoda elongata ME *Euconocephalus incertus* EI *Conocephalus (Xiphidion) maculatus* CM

Material examined : North Tripura Dist. 1 F, Manu, 27.ii.1993, Coll. R. S. Barman.

Diagnosis : Greenish species, vertex conically produced, pronotum broadly rounded at posterior margin; radius sector 2 arises much before middle of wing; male subgenital plate bears two styles at apex; style bifurcated at apex; ovipositor subequal to the length of body.

Distribution : India : Tripura (North Tripura Dist.); Meghalaya, Orissa, and West Bengal.

Remarks : The species was recorded by the present author from Meghalaya and West Bengal. It is being recorded here first time from Tripura.

Subfamily CONOCEPHALINAE

Genus 8. *Conocephalus* Thunberg

Conocephalus Thunberg, 1815, *Mem. Acad. St. Petersberg* 5 : 214.

Type-species : *Conocephalus (Xiphidion) maculatus* (Le Gouillou).

8. *Conocephalus (Xiphidion) maculatus* (Le Gouillou)

1841. *Xiphidion maculatus* Le Gouillou *Rev. Zool.* : 294.

1922. *Conocephalus (Xiphidion) maculatus* (Le Gouillou) : *Proc. Acad. Nat. Sci. Philad.*, 74 : 243.

Material examined : North Tripura Dist. 1 F, Kandrachara, 11.vi.1988, Coll. V. T. Darlon; South Tripura Dist. 1 F, Narikelbagan, 21.ii.1992, Coll. R. S. Barman.

Diagnosis : Presence of suffused and interrupted brown band between median and ulner veins of the tegmina.

Distribution : India : Tripura (North Tripura Dist. and South Tripura Dist.).

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

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I am grateful to Dr. A. K. Ghosh, Ex-Director of Zoological Survey of India, Calcutta for permission to carry out this work. I am also thankful to Dr. S. K. Tandon, Scientist 'SF' (Retd.), Dr. M. S. Shishodia, Scientist-B, for their constant encouragement. Mr. P. Parui and Dr. R. P. Barman helped in the preparation of this manuscript in various way and for which I am indebted to them.

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INSECTA : DERMAPTERA

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INTRODUCTION

Srivastava and Roychoudhury (1975) recorded for the first time six species (excluding one species determined up to generic level) from the area. In the present work altogether 14 species are recorded including one new species viz. *Namaxas sakaii*.

Proreus simulans (Stal) was reported earlier by Srivastava and Roychoudhury (l.c.) on a female which belongs to *Proreus abdominalis* Kamamurthi.

A key to various taxa represented is provided besides giving diagnostic characters for all the species.

Most of the species dealt with are distributed in the other parts of North Eastern India which is quite natural since the state forms integral part of this area.

Key to various taxa (on males) from Tripura

- 1(4). 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 the apical margin of prosternum; male genitalia with two functional distal lobes (PYGIDICRANIDAE)
- 2(3). Antennal segments 4-5 transverse, 25-segmented or more (PYGIDICRANINAE) *Cranopygi* sp.
- 3(2). Antennal segments 4-5 longer than broad, 20-segmented or less (ECHINOSOMATINAE) *Echinosoma convolutum* Hincks
- 4(1). Neck forficuloid type, i.e., anterior and posterior cervical sclerites fused and hind margin of latter joined with anterior margin of prosternum; male genitalas with one or two functional distal lobe
- 5(12). Male genitalia with paired distal lobes
- 6(9). Male genitalia, if virga present, at base not wider and without sinuous inner tube; otherwise denticulated pads present on distal lobes (ANISOLABIDIDAE)
- 7(8). Apterous; male parameres about as long as broad, or slightly longer, quadrate, external apical angles convex
..... *Euborellia annulipes* (Lucas)
- 8(7). Elytra present as narrow, ovate lateral flaps; wings absent; male parameres three times longer than broad, narrowed apically with tip acute
..... *Apolabis aborensis* (Burr)
- 9(6). Male genitalia with a distinct virga, dilated at base with inner sinuous tube.
..... (LABIDURIDAE)
- 10(11). Elytra with a sharp ridge along the costal margin; legs relatively shorter, posterior femora not longer than pronotum
..... (NALINAE) *Nala lividipes* (Dufour)
- 11(10). Elytra without any sharp ridge along the costal margin; legs longer, posterior

- femora longer than pronotum
(LABIDURINAE) *Labidura riparia*
 (Pallas)
- 12(5). Male genitalia with a single median lobe
- 13(18). Second tarsal segment simple i.e.,
 compressed (neither lobed nor projecting
 as narrow lobe below 3rd tarsal segment)
(SPONGIPHORIDAE)
- 14(17). Hind second tarsal segment longer than
 broad
 (SPONGIPHORINAE) *Spongovostox*
 Burr
- 15(16). Build slender, size shorter (4.8-5.6 mm);
 forceps slender with a triangular tooth
 internally near base and genitalia with
 parameres broad at base, narrowed
 apically with tip pointed
*S. mucronatus* (Stal)
- 16(15). Build stout; size larger (7.4-13.5 mm);
 forceps stout, at base internally dilated in
 the form of a blunt tooth and genitalia
 with parameres sigmoid
*S. semiflavus* (Bormans)
- 17(14). Hind second tarsal segment broader than
 long or about as long as broad
(LABIINAE) *Circolabia curvicauda*
 (Motschulsky)
- 18(13). Second tarsal segment produced below
 the third as narrow lobe
(CHELISOCHIDAE)
- 19(24). Elytra and wings smooth and glabrous;
 genitalia with parameres four to five times
 longer than broad, occasionally feebly
 dilated in middle or emarginate apically,
 a little before apex
- 20(21). Head strongly depressed; pronotum
 quadrate; legs with tarsi short; genitalia
 with parameres feebly emarginate
 apically, a little before apex
(*Laprophorella* Mjöberg)
*L. kervillei* Burr
- 21(20). Head comparatively less depressed;
 pronotum longer than broad and generally
 dilated posteriorly; legs with tarsi long;
 genitalia with parameres long and narrow;
 sometimes gently dilated at about middle
*Proreus* Burr
- 22(23). Elytra yellow with a fuscous band
 laterally; wings well developed; ultimate
 tergite with two pairs of compressed
 tubercles in the posterior median
 depression; forceps long (2.9-7.2 mm)
 and slender, internal margin with several
 small and large teeth
*P. abdominalis* Ramamurthi
- 23(22). Elytra unicolorous; wings wanting;
 ultimate tergite with two pairs of tubercles
 on posterior margin; forceps short (1.5-
 2.5 mm), stout, internal margin at base
 with a sharp triangular tooth, otherwise
 unarmed
*P. tezpurensis* (Srivastava)
- 24(19). Elytra and wings punctured and
 pubescent; genitalia with parameres twice
 as broad as long, greatly dilated in middle
*Hamaxas* Burr
- 25(26). Pygidium rounded posteriorly with two
 triangular projections laterally; forceps
 internally with two small teeth in basal
 half; parameres with external apical
 portion prominent forming a sort of
 rounded lobe*H. sakaii* sp.n.
- 26(25). Pygidium declivious either transverse
 with hind margin straight or concave in
 middle having two triangular lobes and
 lateral margin convex; forceps either at
 base with dorsal and ventral tooth,
 afterward margin serrated terminating into
 a triangular tooth or with a large blunt
 tooth at middle followed by a blunt
 projection and parameres with external
 apical portion forming a triangular lobe
*H. melanocephalus* (Dohrn)

SYSTEMATIC ACCOUNT

Family PYGIDICRANIDAE

Subfamily PYGIDICRANINAE

Cranopygia sp.

Material examined : India : Tripura : West Tripura dist., Kolabagan, 75 m., 16 Km., E of Agartala, 1 nymph, 20.ii.1991, ex under bark of a log (G. K. Srivastava).

Remarks : In the absence of an adult male it is not possible to identify up to specific level.

Subfamily DIPLATYINAE

Genus *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 species : *Forficula coriaceus* Kirby, 1891).
 1986. *Lobodiplatys* (*Epidiplatys*) Steinmann, *Acta zool. hung.*, **32** (1-2) : 178 (Type-species : *Diplatys gladiator* Burr, 1905).
 1986. *Lobodiplatys* (*Heterodiplatys*) Steinmann, *Acta zool. hung.*, **32** (1-2) : 177 (Type-species : *Labia bicolour* Dubrony, 1879).
 1992. *Paradiplatys* Srivastava, *Rec. zool. Surv. India*, **92** (1-4) : 49. (above synonymy proposed).

Paradiplatys gladiator (Burr)

(Fig. 1-2)

1905. *Diplatys gladiator* Burr, *J. Asiat. Soc. Beng.*, **1** : 28 (Male : India, Calcutta).
 1923. *Diplatys bicoloripes* Hebard, 1923, *Mem. Dept. Agric. India, Ent. Ser.*, **7** : 196 (Male : India, Nagpur, Central Province).
 1982. *Lobodiplatys gladiator*; 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.
 1988. *Paradiplatys gladiator*; Srivastava, *Fauna of India, Dermaptera*, Pt. 1 : 5, 99, figs. 112-116.
 1992. *Paradiplatys gladiator*; Srivastava, *Rec. zool. Surv. India*, **92** (1-4) : 50.
 1993. *Paradiplatys gladiator*; Srivastava, *State Fauna series 3; Fauna of West Bengal*, Pt. 4 : 375, figs. 11-12.

Material examined : India : Tripura : South Tripura dist., Udaipur 1 male, 1 female (brachyapterous) and 1 nymph, 21. iii. 1991, at light, crawling on wall (G.K. Srivastava).

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. 2.

Measurements : Male : Length : body-8.5-9.2 mm., forceps 1.2-1.5 mm.; Female : Length : body 8.3-10.4. forceps 1.2-1.6 mm.

Distribution : India : Tripura (Udaipur, South Tripura dist.); West Bengal, Bihar, Orissa, Maharashtra and Tamil Nadu.

Remarks : The present material contains one male with microlabic forceps and possess abbreviated elytra.

Macropterous male has been reported from Maharashtra (Srivastava, 1988).

Subfamily ECHINOSOMATINAE

Genus *Echinosoma* Serville

1839. *Echinosoma* Serville, *Hist. nat. Orth.* : **34** (Type-species : *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, Dermaptera* : 216 (Indian species).

Echinosoma convolutum Hincks

(Figs. 3-4)

1888. *Echinosoma sumatranum* (part); Bormans, *Annali Mus. civ. Stor. nat. Giacoma Doria*, (2) **6** : 433 (Burma).
 1900. *Echinosoma sumatranum* (part); Bormans and Krauss, *Das Tierreich*, **11** : 26, 28 (Burma).

1910. *Echinosoma sumatranum* (part); Burr, *Fauna of British India, Dermaptera* : 70 (Burma).
1959. *Echinosoma convolutum* Hincks, *Syst. Mono. Dermaptera*, 2 : 152 (Male, Female; Burma and Tonkin (Vietnam)).
1974. *Echinosoma garoensis* Lahiri and Ghosh (pars) in : Biswas, Lahiri and Ghosh, *Orient. Ins.*, 8(4) : 421 (1 Females with truncate pygidium posteriorly; India : Meghalaya).
1988. *Echinosoma convolutum*; Srivastava, *Fauna of India, Dermaptera* : 226, figs. 326-331.
1983. *Echinosoma trileniatum* (nec Borelli); Steinmann, *Rev. suisse zool.*, 90(3) : 543 (specimens from Meghalaya).

Material examined : India : Tripura : West Tripura dist., Mongaibari, 37th to 41st mile on road to Ambassa, 2 Males (1 ex, without hind portion), 1 nymph, 6.iii.1991, ex under bark of a dead tree (G. K. Srivastava).

Diagnostic characters : Male : General colour ashy brown; often abdominal tergites reddish or blackish brown; sides of pronotum, mouth parts and two basal antennal segments yellow.

Head as long as broad, antennae 25-segmented. Pronotum transverse, quadrate. Elytra and wings well developed, former rugulose, clad with thick setae.

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 portion sigmoid.

Female : Pygidium about as long as broad, hind margin truncate with a faint emargination.

Measurements : Male : Length : body-9.5-12.6 mm, forceps-1.5-2.2 mm; Female : Length : body-8.4-14.5 mm., forceps-1.6-2.8 mm.

Distribution : India : Tripura (West Tripura dist., Mongaibari) ; Meghalaya, Assam, Arunachal Pradesh and West Bengal.

Also known from Myanmar and Vietnam.

Family ANISOLABIDIDAE

Subfamily ANISOLABIDINAE

Genus *Euborellia* Burr

1909. *Borellia* Burr, *Deut. Ent. Z.*, 190 : 325 (Type-species : *Anisolabis moesta* (Gene) In Serville, 1839).
1910. *Euborellia* Burr, *Proc. U. S. natn. Mus.*, 38 : 448, Foot note (New name for *Borellia* Burr, 1909 preoccupied by *Borellia* Rehn, 1906, Orthoptera).

Euborellia annulipes (Lucas)

(Figs. 5-6)

1847. *Forficesila annulipes* Lucas, *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. *Forcinella annulipes*; Dohrn, *Stettin 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. *Anisolabis (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 : West Tripura dist. : Kolabagan, 16 km. E. of Agartala, 4 males, 20. ii. 1991, ex under bark of log; Khowai, 1 female, 4. iii. 1991, ex under bark of rotten wood; South Tripura dist. : Amarpur, 1 male, 2 females, 5. iii. 1991, ex rotten wood; North Tripura dist. : Jadurambari Beat (Abhanga), 1 female, 1. iii. 1991, ex rotten bamboo; (G. K. Srivastava); Unakoti, Dharamnagar, 9 males 11 females, 2 nymphs, 9. xii. 1988 (R. C. Basu).

Diagnostic characters : General colour shining blackish brown to dark brown; antennae with basal and one or two anteapical segments and sides of pronotum yellow and legs yellow but femora banded with black.

Male abdominal segments 6th to 9th on sides acute angled posteriorly, striate and carinate; penultimate sternite with hind margin briefly rounded; parameres about as broad as long, flat, external apical angle rounded; distal lobes with denticulated chitinous pads.

Measurements : Male : Length : body—9.5-10.5 mm, forceps 1.9-1.2 mm; Female : Length : body-11.5-13.6 mm, forceps—2.6-3.1 mm.

Distribution : India : Tripura : West, South and North Tripura dists.

It is distributed all over the World.

Genus *Apolabis* Burr

1915. *Apolabis* Burr *J. R. micr. Soc.*, **1915** : 538 (Type-species : *Forcinella hottentota* Dohrn, 1867).

Apolabis aborensis (Burr)

(Figs. 7-9)

1913. *Euborellia aborensis* Burr (pars), *Rec. India Mus.*, **8**(2) : 137 (Male, Female ; Arunachal Pradesh, Siang dist., Rotung, 1 nymph and 1 female, Janakmukh (excluding 1 male; Assam, Dibrugarh).
1975. *Paralabis aborensis*; Srivastava and Roychoudhury, *Newsl. zool. Surv. India*, **1**(2) : 22 (Male, Female : India Tripura).
1986. *Paralabis aborensis*; Srivastava, *Rec. zool. Surv. India.*, **83** (1 & 2) : 10, figs. 21-25.

Material examined : India : Tripura : West Tripura dist., Brama Chara, Teliamura, 1 male, 2 females and 2 nymphs, 10. xi, 1974 (M. S. Shishodia) -det. by G. K. Srivastava.

Diagnostic characters : Male : General colour reddish brown, often shaded with black; antennae, sides of pronotum and legs yellowish brown. Pubescent.

Head as long as broad, sutures fine, hind margin straight. Eyes shorter than post-ocular area; antennae 15-segmented, 1st stout, 3rd long & slender, 4th & 5th shorter than 3rd. Pronotum slightly longer than broad, lateral and hind margin straight. Elytra present as narrow, ovate, lateral flaps; wings wanting. Abdominal tergites convex, punctulate, sides of segments 7th to 9th acute angled posteriorly, carinate & rugose. Penultimate sternite rounded posteriorly. Genitalia with parameres three times longer than broad, narrowed apically with tip acute.

Female : forceps simple and straight.

Measurements : Male : Length : body-12.3-14.9 mm., forceps-2.0-2.5 mm; Females : Length : body-12.0-15.9 mm., forceps-2.0 mm.

Distribution : India : Tripura (West Tripura dist.).

This species is known from mountains of N. E. India including Arunachal Pradesh.

Remarks : Strongly pubescent body makes it easily distinguishable from other species of the genus.

Family LABIDURIDAE

Subfamily NALINAE

Genus *Nala* Zacher

1910. *Nala* Zacher, *Ent. Rdsch.*, **1910** : 29 (Type-species : *Labidura lividipes* "H. Luc." = *Forficula lividipes* Dufour, 1828).
1910. *Paralabidura* Burr, *Trans. R. ent. Soc. Lond.*, **1910** : 184 (Type-species : *Forficula lividipes* Dufour, 1928).

Nala lividipes (Dufour)

(Figs. 10-11)

1820. *Forficula pallipes* Dufour, *Ann. gener. des Phys. Bruxelles*, **4** : 316, pls. 116, fig. 7, 7a and 7b (Male, Female; 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. *Paralabidura lividipes*; Burr, *Trans. R. ent. Soc. Lond.*, **1910** : 184.
1911. *Nala lividipes*; Burr, *Genera Insect.*, **122** : 36.
1975. *Nala lividipes*; Srivastava & Roychoudhury, *Newsl. zool. Surv. India*, **1**(2) : 22 (Male, Female ; India : Tripura).
1976. *Nala lividipes*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, **2** : 41.

Material examined : India : Tripura : North Tripura dist., Ambassa, 2 males, 2 females, 2. ii. 1973 (V. C. Agrawal, R. K. Kacker and party)—det. by G. K. Srivastava.

Diagnostic characters : Male : General colour brownish black to black or extremely variable.

Eyes shorter than post-ocular length; pronotum longer than broad, rounded posteriorly. Elytra

and wings well developed, former with a ridge along the costal margin. Penultimate sternite triangular, emarginate in middle posteriorly. Ultimate tergite and forceps and genitalia as seen in figs. 10-11.

Female : Ultimate tergite narrowed posteriorly and forceps simple and straight.

Measurements : Male : Length : body—6.1-8.7 mm., forceps 1.5-2.6 mm; Female : Length : body—6.0-9.0 mm., forceps-1.5-1.6.

Distribution : India : Tripura (North Tripura dist.).

It occurs all over the World.

Genus *Labidura* Leach

1815. *Labidura* Leach, *Edin. Encyl.*, 9(1) : 48 (Type-species : *Forficula riparia* Pallas, 1773).

Labidura riparia (Pallas)

(Figs. 12-13)

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.
1975. *Labidura riparia*; Srivastava & Roychoudhury, *Newsl. zool. Surv. India* 1 (2) : 22 (Male, Female; India : Tripura).
1976. *Labidura riparia*; Srivastava, *Rec. zool. Surv. India.*, *Occ. pap.*, 89 : 4.

Material examined : India : Tripura : West Tripura dist., Teliamura, ex bank of River Khowai, 1 female, 2. ii. 1971; Ampa, 1 male, 17. i. 1973, Nand Nagar, Agartala, 1 female, 13. xi. 1969 (V. C. Agrawal & party)—det. G. K. Srivastava.

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 epimrite

at apex, internally. Ultimate tergite and forceps and genitalia of males as seen figs. 12-13.

Measurements : Male : Length : body—14.0-24.0 mm., forceps 8.4-10.0 mm; Female : Length : body—12.0-19.00 mm, forceps-3.0-5.0 mm.

Distribution : India : Tripura (West Tripura dist.); throughout India.

Distributed all over the world.

Family SPONGIPHORIDAE

Subfamily SPONGIPHORINAE

Genus *Spongovostox* Burr

1911. *Spongovostox* Burr, *Dt. ent. natn. Biblthk.*, 1911 : 59 (Type-*Forficula quadrimaculata* Stal, 1855).

Spongovostox mucronatus (Stal)

(Figs. 14-16)

1860. *Forficula mucronata* Stal, *Eug. Resa Zool. Ins.* : 303 (Male not Female; Java).
1863. *Labia mucronata*; Dohrn, *Stettin ent. Ztg.*, 25 : 403.
1957. *Sphingolabis indumathiae* Fernando, *Ceylon J. Sci. (Bio. Sci.)*, 25 : 303.
1971. *Spongovostox mucronatus*; Brindle, *Ent. Tidskr.*, 92 (1-2) : 18.

Material examined : India : Tripura : West Tripura dist., Kolabagan, 75 m., 16 km. E. of Agartala, 2 males, 4 females & 2 nymphs, 20. ii. 1991, ex under bark of a log; South Tripura dist., Garjee, 1 female, 1 nymph, 23. ii. 1991, ex under bark of a log; Shantibazar, 35 km. S. of Udaipur, 1 female, 22. ii. 1991, ex under bark of a log (G. K. Srivastava).

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.

Male : Antennae 15-segmented; 1st stout, narrowed basally, shorter than the distance between antennal bases, others long 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. 14-16.

Female : Forceps internally crenulate in basal two thirds, afterwards unarmed.

Measurements : Male : Length : body—3.6-4.2 mm., forceps 1.0-1.25 mm; Female : Length : body—3.1-3.9 mm., forceps—0.9-1.4 mm.

Distribution : India : Tripura (West and South Tripura dists.), Assam, West Bengal (Darjeeling dist.) and Arunachal Pradesh.

Also known from Sri Lanka, Myanmar, China, Sumatra, Java, East Sumba, West Flores, Philippines Isls, Mauritius and New Guinea.

Spongovostox semiflavus (Bormans)

(Figs. 17-18)

1894. *Spongophora semiflava* Bormans, *Annali Mus. civ. Stor. nat. Giacomo Doria*, (2) **14** : 385 (Male, Female; Burma).
 1900. *Spongiphora 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.
 1993. *Spongovostox semiflavus* ; Srivastava, *Annali Mus. civ. Stor. nat. Giacomo Doria*, **89** : 233, figs. 26-32 (Type male alongwith genitalia figured).

Material examined : India : Tripura : North Tripura dist., Ambassa, 200 m., 2 males, 4 females, 2. iii. 1991, ex under bark of a log ; South Tripura dist., Garjee, 16 km. S. of Udaipur, 3 females, 23. iii. 1991, ex under bark of a log (G. K. Srivastava).

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 band along the internal margin ; pygidium and forceps blackish brown.

Male : Antennae 17-segmented, basal segment shorter than the distance between antennal bases ; eyes prominent, about as long as the post-ocular area. 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. 18.

Female : Forceps straight, contiguous, internally crenulate throughout.

Measurements : Male : Length : body—5.6-10.0 mm., forceps—1.8-3.5 mm; Female : Length : body—6.8-9.7 mm., forceps—1.7-2.6 mm.

Distribution : India : Tripura (North and South Tripura dists.), West Bengal (Darjeeling and Koch Bihar dists.), Karnataka and Tamil Nadu.

Also occurs in Sri Lanka, Bhutan, Myanmar, Vietnam, Borneo, Philippine Isls, Sumatra, Sumba and Taiwan.

Subfamily LABIINAE

Genus *Circolabia* Steinmann

1987. *Circolabia* Steinmann, *Acta zool. hung.*, **33** : 178 (Type-species : *Labia arcuata* Scudder, 1876).
 1987. *Spirolabia* Steinmann, *Acta zool. hung.*, **33** : 179 (Type-species : *Labia pilicornis* Motschulsky, 1865).
 1990. *Paralabella* Steinmann, *Das Tierraich*, **106** : 470 (Type species : *Forficula annulata* Fabricius, 1793).
 1995. *Circolabia* ; Srivastava, *Rec. zool. Surv. India*, **95** (1-2) : 101 (Above synonymy proposed).

Circolabia curvicauda (Motschulsky)

(Figs. 19-20)

1863. *Forficesila curvicauda* Motschulsky, *Bull. Soc. Nat. Moscou.*, **36** : 2, pl. 2., fig. 1 (Male, Female; Nura Illia Mountains, Ceylon).
 1864. *Labia curvicauda*; Dohrn, *Stettin ent. Ztg.*, **25** : 428.
 1867. *Platylabia guineensis* Dohrn, *Stettin ent. Ztg.*, **28** : 348 (Male ; Principe Island).

1867. *Platylabia dimidiata* Dohrn, *Stettin ent. Ztg.*, **28** : 348 (Male; Luzon).
1903. *Labia flavicollis* Bormans in Burr, *Ann. Mag. nat. Hist.*, (7) **11** : 235 (Male; Samoa).
1904. *Platylabia camerunensis* Borg, *Ark Zool.*, **1** : 570, pl. 26, fig. 4 (Male; Cameroon).
1907. *Platylabia dimidiata* var. *guineensis*; Borelli, *Annali Mus. civ. Stor. nat. Giacomo Doria*, **43** : 382.
1926. *Labia curvicauda* var. *flavicollis*; Borelli, *Treubia*, **8** : 263.
1976. *Labia curvicauda*; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, **2** : 32.
1989. *Paralabella curvicauda*; Steinmann, *Das Tierreich*, **106** : 497, figs. 920-922.
1993. *Paralabella curvicauda*; Srivastava, *Zool. Surv. India, State Fauna series 3 : Fauna of West Bengal*, **4** : 408.
1995. *Paralabella curvicauda*; Srivastava, *Zool. Surv. India, State Fauna Series 4 : Fauna of Meghalaya*, **3** : 324.
1995. *Circolabia curvicauda*; Srivastava, *Rec. zool. Surv. India*, **95** (1-2) : 102.

Material examined : India : Tripura : South Tripura dist., Shantibazar, 3 males, 1 female, 22. ii. 1991, ex under bark of a log; Amarpur, 2 males, 5 males, 5. iii. 1991, ex rotten banana stem; Garjee, 1 female, 23. ii. 1991, ex rotten banana stem; North Tripura dist., Salema, 200 m., 4 males., 28. iii. 1991, ex rotten banana stem; Jadurambari Beat (Abhanga), 1 female, 1. iii. 1991, ex rotten banana stem; Ambassa, 1 male, 1 female, 2. iii. 1991, ex rotten banana stem; West Tripura dist., Agartala, Kunjban, 1 female, 19. ii. 1991, ex rotten banana stem, 1 female, 20. ii. 1991, ex under bark of a log; Khowai, 1 male, 4. iii. 1991, Mongaibari, 37 to 41 mile on road to Ambassa, 1 male, 1 female, 6. iii. 1991, ex rotten banana stem (*G. K. Srivastava*).

Diagnostic characters : Colour black or brown; head, elytra and wings black; abdomen and forceps reddish brown often shaded with black in parts; antennae blackish or reddish brown with one or two ante-apical segments pale. Size small, form depressed.

Male : Head convex, hind margin emarginate; eyes small, shorter than post-ocular length. Elytra and wings well developed, covered with dense microscopic hairs. Penultimate sternite with hind

margin rounded. Pygidium transverse, declivent in basal half, hind margin straight. Ultimate tergite and forceps and genitalia as seen in figs. 19-20.

Female : Pygidium narrower and more prominent and forceps simple and straight.

Measurements : Male : Length : body—5.6-6.8 mm., forceps—0.5-1.1 mm.; Female : Length body—5.9-7.2 mm., forceps—0.9-1.5 mm.

Distribution : India : Tripura (West, South and North Tripura dists.); occurs throughout India.

World wide in distribution.

Family CHELISOCHIDAE

Subfamily CHELISOCHINAE

Genus *Laprophorella* Mjöberg

1911. *Lamprophorus* Burr, *Genera Insect.*, **122** : 66 (Type-*Mecomera kervillei* Burr, 1905).
1924. *Laprophorella* Mjöberg, *Ark. Zool.*, **16** (21) : 10 (as foot note—new name for *Lamprophorus* Burr, 1911 since name preoccupied for *Lamprophorus* Gemminger and Harold, 1869, Coleoptera).

Laprophorella kervillei (Burr)

(Figs. 21-24)

1905. *Mecomera kervillei* Burr, *Ann. Mag. nat. Hist.*, (7) **16** : 489 (Male; 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 (Male, Female; India : Arunachal Pradesh).
1924. *Laprophorella kervillei*, Mjöberg, *Ark. Zool.*, **16**(21) : 10, pl. 1, fig. 2d.
1993. *Laprophorella kervillei*; Srivastava, *Zool. Surv. India, State Fauna series 3, Fauna of West Bengal*, **4** : 418.
1993. *Laprophorella kervillei*; Srivastava and Kovac, *Rec. zool. Surv. India*, **93** (1-2) : 263, figs. 33-39 (Male; Malaya).

Material examined : India : Tripura : West Tripura dist., Khowai, 3 males, 2 females, 4. iii. 1991, ex bamboo scales (*G. K. Srivastava*); Agartala, 1 male (genitalia mounted between two coverslips and pinned with the specimen), 10.xi. 1969 (*V. C. Agrawal*).

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. 21) 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. 22-24.

Measurements : Male : Length : body—10.0-13.7 mm., forceps 2.5-3.0 mm; Female : Length : body—9.0-11.7 mm., forceps—2.9-4.5 mm.

Distribution : India : Tripura (West Tripura dist.); West Bengal, Assam and Arunachal Pradesh.

Also recorded from Malaya and Java.

Remarks : Some variation in the length of forceps and its basal inner armature is recorded.

It generally occurs in the bamboo stem scales and leaf axils of certain plants. Sometimes it is attracted to light.

Genus *Proreus* Burr

1907. *Proreus* Burr, *Trans. R. ent Soc. Lond.*, **1907** : 129 (Type-species : *Forficula simulans* Stal, 1860).
 1910. *Proreus* ; Burr, *Fauna British India, Dermaptera* : 136.
 1911. *Proreus* ; Burr, 1911. *Genera Insect.*, **122** : 64.
 1968. *Proreus* ; Popham and Brindle, *Entomologist*, **101** : 133.

Proreus abdominalis Ramamurthi

(Figs. 25-27)

1965. *Proreus abdominalis* Ramamurthi, *Ann. Mag. nat. Hist.*, (13)**8** : 61, figs. 8-10 (Male; India : Tamil Nadu).
 1975. *Proreus simulans* ; Srivastava (nec Stal), *Newsl. zool. Surv. India*, **1**(2) : 22 (Female ; Tripura).
 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 simulans abdominalis* ; Srivastava, *Zool. surv. India, State Fauna Series*, **1**, *Fauna of Orissa*, **2** : 164 figs. 32-34.

1993. *Proreus abdominalis* ; Srivastava, *Zool. surv. India, State Fauna Series*, **3**, *Fauna of West Bengal*, **4** : 416 (considered as independent species).

Material examined : India : Tripura : North Tripura dist., Salema, 200 m., 1 male, 2 females, 28. ii. 1991, ex rotten banana stem (G. K. Srivastava) ; West Tripura dist., Teliamura, Brama Chara, 1 female, 10.xi.1974 (M. S. Shishodia)—det. as *Proreus simulans* (Stal) by G. K. Srivastava.

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. 26-27.

Measurements : Male : Length : body—9.6-13.2 mm., forceps—4.1-7.2 mm.; Female : Length : body—10.3-12.4 mm., forceps—3.0-4.0 mm.

Distribution : India : Tripura (North and West Tripura dist.), practically all over India.

Remarks : It commonly occurs in rotten banana stem, bamboo scales, leaf crown of sugar cane and leaf axils of certain plants.

It is attracted to light also.

Proreus tezpurensis (Srivastava)

(Figs. 28-29)

1969. *Hamaxas tezpurensis* Srivastava, *Zool. Anz.*, **182** : 136, figs. 1-3 (Male, Female; India : Assam, Tezpur).
 1970. *Hamaxas tezpurensis* ; Srivastava, *Newsl. zool. Surv. India*, **1**(2) : 23 (Male, Female ; India, Tripura, Barma Chara, Teliamura).
 1976. *Proreus tezpurensis* ; Srivastava, *Rec. zool. Surv. India, Occ. pap.*, **2** : 50.
 1993. *Proreus tezpurensis* ; Srivastava, *Zool. surv. India, State Fauna Series* **3** : *Fauna of West Bengal*, **4** : 416.
 1995. *Proreus tezpurensis* ; Srivastava, *Zool. Surv. India, State Fauna Series* **4**, *Fauna of Meghalaya*, **3** : 332, figs. 100-101.

Material examined : India : Tripura : South Tripura dist., Belonia, 1 male, 2 females and 1 nymph, 25. iii. 1991, ex sugar cane sheath (G. K. Srivastava); West Tripura dist., Brama Chara, Teliamura, 8 males, 1 female and 3 nymphs, 10. xi. 1974 (*M. S. Shishodia*)—det. G. K. Srivastava.

Diagnostic characters : Head, antennae dark brown, pronotum dark brown with sides pale ; legs light brown and abdomen and forceps blackish brown. Form depressed and pilose.

Elytra abbreviated with axillary angle rounded off to show a small scutellum ; wings obsolete. 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. 28-29.

Measurements : Male : Length : body—8.5-9.1 mm., forceps—1.5-2.6 mm.; Female : Length : body—10.1-11.5 mm., forceps—2.0-2.8 mm.

Distribution : India : Tripura (South and West Tripura dists.), West Bengal and Assam.

Genus *Hamaxas* Burr

1907. *Hamaxas* Burr, *Trans. R. ent. soc. Lond.*, **1907** : 133 (Type-species : *Chelisoches feae* Bormans, 1894).

Hamaxas melanocephalus (Dohrn)

(Figs. 30-32)

1865. *Lobophora melanocephala* Dohrn, *Stettin ent. Ztg.*, **26** : 75 (Male, Female; India, Tranquebar).

1876. *Chelisoches melanocephalus* ; Scudder, *Proc. Boston nat. Soc.*, **18** : 308.

1907. *Proreus melanocephalus* ; Burr, *Trans. R. ent. soc. Lond.*, **1907** : 130.

1923. *Proreus melanocephalus* ; Hebard, *Mem. Dep. Agric. India, ent. Ser.*, **7** : 220.

1927. *Hamaxas melanocephalus*, Hebard, *Proc. Acad. nat. Sci. Philad.*, **79** : 44.

1975. *Hamaxas melanocephalus* ; Srivastava, *Newsl. zool. Surv. India*, **1(2)** : 23 (Female ; Tripura).

Material examined : India : Tripura : West Tripura dist., Teliamura, Brama Chara, 1 female, 10.xi.1974 (*M. S. Shishodia*)—det. by G. K. Srivastava.

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) feebly tumid above bases of forceps and the area in between strongly 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 and genitalia as seen in figs. 31-32.

Measurements : Male : Length : body—7.7-9.6 mm., forceps—1.4-2.7 mm ; Female : Length : body—6.7-9.8 mm ; forceps—1.4-1.9 mm.

Distribution : India : Tripura (West Tripura dist.) ; West Bengal, Bihar, Uttar Pradesh and Tamil Nadu.

Also recorded from Myanmar and Java.

Remarks : The record of this species from Tripura rests on a female determined by Srivastava and Roychoudhury (1975). It agrees well with other specimens available in the National Collections at the Zoological Survey of India, Calcutta.

However, in the absence of a male, it may be treated with reserve.

Hamaxas sakaii sp. n.

(Figs. 33-38)

Male : General colour shining yellowish brown ; head black ; antennae black with 3rd to 5th segments yellowish brown. Form depressed, pilose.

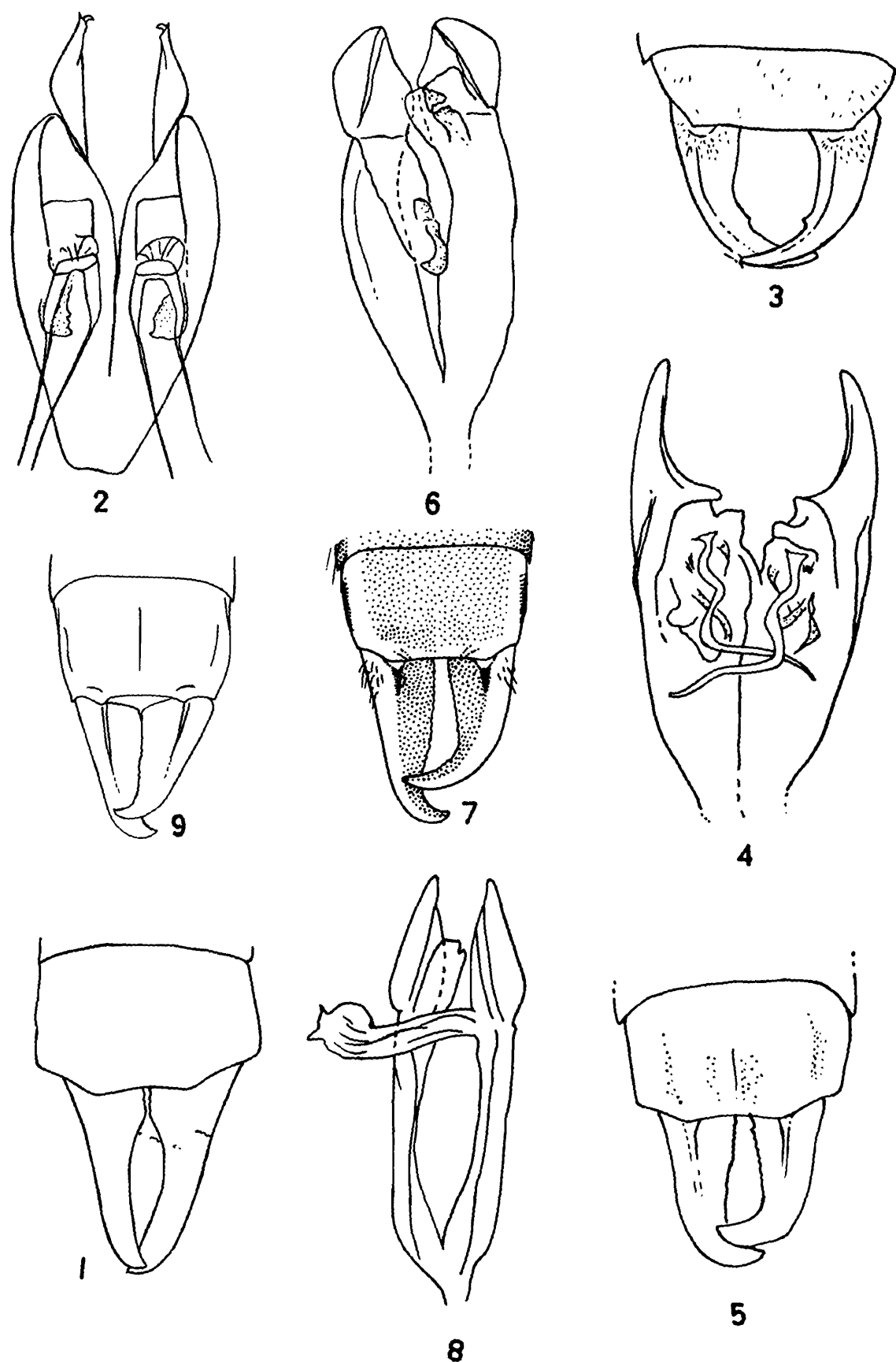
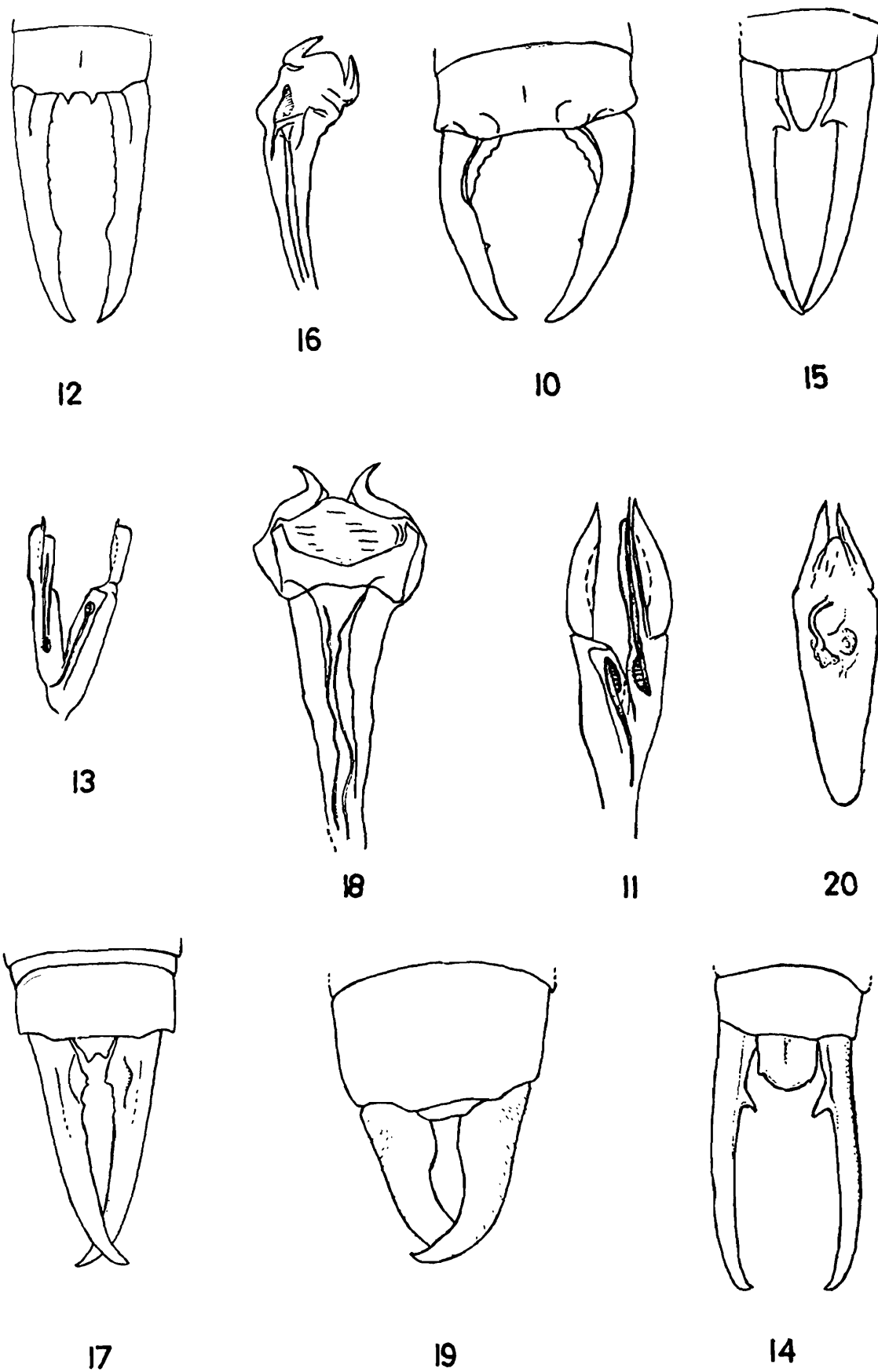
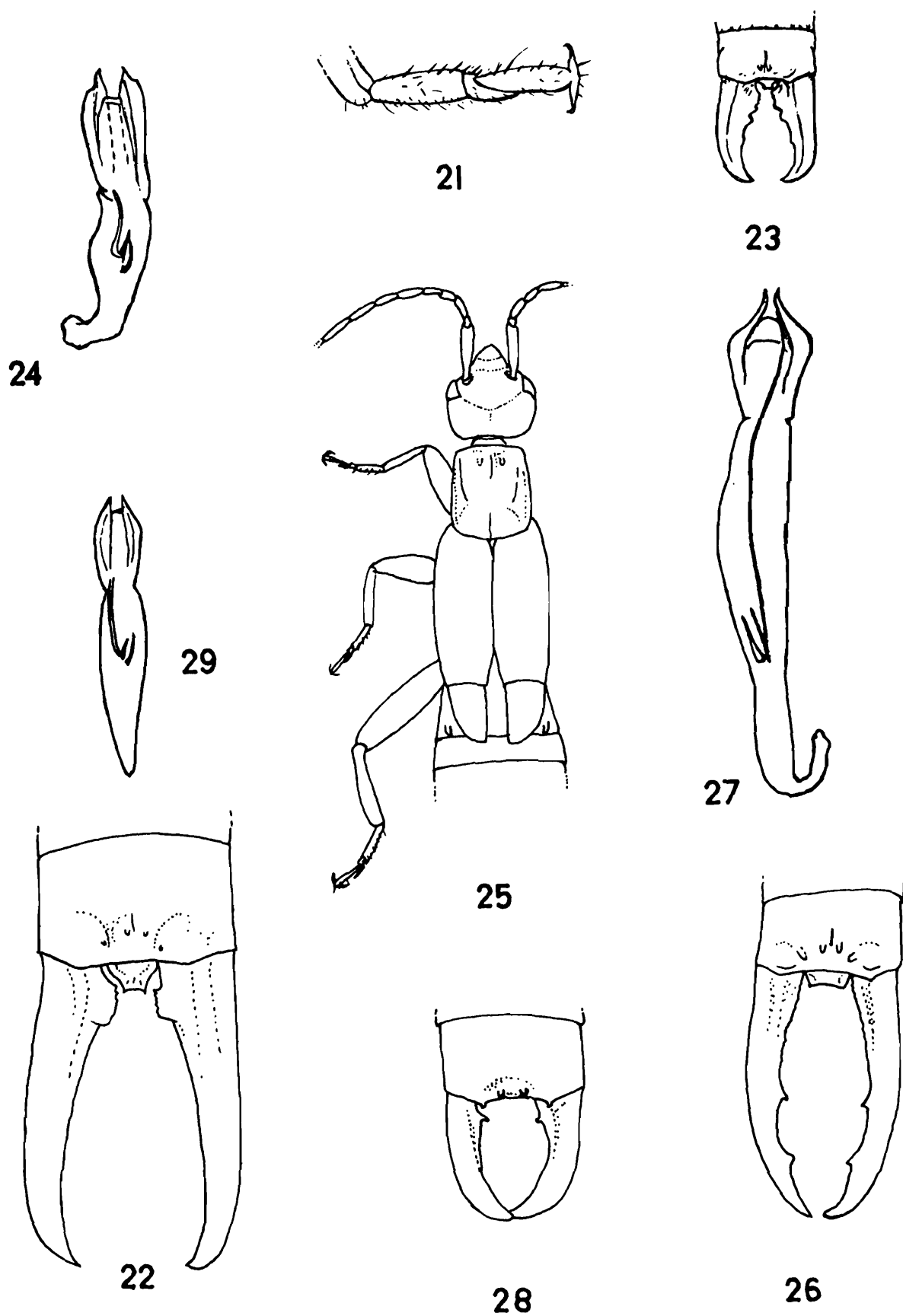


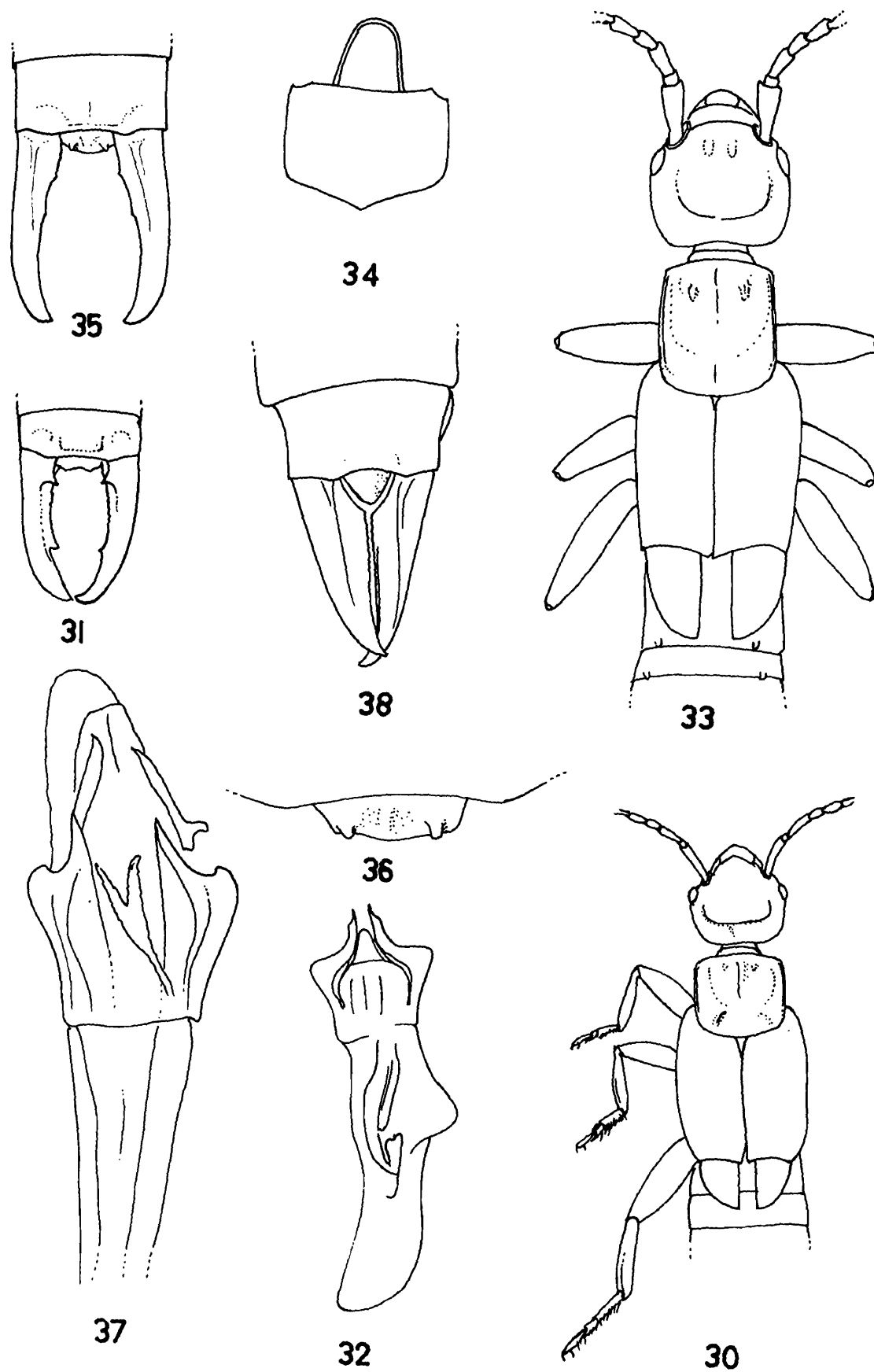
Fig. 1-9 : *Paradiplatys gladiator* (Burr), Male, 1. Ultimate tergite and forceps, 2. Genitalia; *Echinosoma convolutum* Hincks, Male, 3. Ultimate tergite and forceps, 4. Genitalia; *Euborellia annulipes* (Lucas), Male 5. Ultimate tergite and forceps, 6. Genitalia; *Apolabis aborensis* (Burr), Male, 7. Ultimate tergite and forceps, 8. Genitalia, Female, 9. Ultimate tergite and forceps.



Figs. 10-20 : *Nala lividipes* (Dufour), Male, 10. Ultimate tergite and forceps, 11. Genitalia; *Labidura riparia* (Pallas), Male, 12. Ultimate tergite and forceps, 13. Genitalia; *Spongovostox mucronatus* (Stal), Male, 14-15. Ultimate tergite and forceps, 16. Genitalia; *Spongovostox semiflavus* (Bormans), Male, 17. Ultimate tergite and forceps, 18. Genitalia; *Circolabia curvicauda* (Motschulsky), Male, 19. Ultimate tergite and forceps, 20. Genitalia.



Figs. 21-29 : *Laprophorella kervillei* (Burr), Male, 21. Hind tarsi, 22-23. Ultimate tergite and forceps, 24. Genitalia ; *Proreus abdominalis* Ramamurthi, Male, 25. Anterior portion of body, 26. Ultimate tergite and forceps, 27. Genitalia ; *Proreus tezpurensis* (Srivastava), Male, 28. Ultimate tergite and forceps, 29. Genitalia.



Figs. 30-38 : *Hamaxas melanocephalus* (Dohrn), Male, 30. Anterior portion of body, 31. Ultimate tergite and forceps, 32. Genitalia ; *Hamaxas sakaii* sp. n., Holotype Male, 33. Anterior portion of body, 34. Penultimate sternite, 35. Ultimate tergite and forceps, 36. Pygidium, enlarged, 37. Genitalia, Paratype Female, 38. Ultimate tergite and forceps.

Head cordiform, slightly longer than broad, frons depressed, occiput weakly raised, sutures obsolete, hind margin gently emarginated in middle. Antennae partly broken (on the right 7 and on the left 11 segments remaining), 1st stout, about as long as the distance between antennal bases; 2nd about as long as broad; 3rd long & cylindrical; 4th slightly shorter than preceding & stouter; 5th about as long as 3rd and remaining gradually increasing in length distally. Eyes small, about half as long as post-ocular area. Pronotum longer than broad, sides straight, parallel, hind margin briefly rounded, prozona and metazona weakly differentiated, median sulcus faintly marked in anterior half only. Legs typical of the genus; hind femora sulcate in apical half. Elytra and wings well developed, coriaceous, smooth. Abdomen long, hardly enlarging in middle, tergites convex, almost impunctate, lateral folds on 3rd & 4th tergites weakly marked. Penultimate sternite transverse, almost impunctate, hind margin in middle with a faint convexity; manubrium twice as long as broad, shorter than the sternite in length. Ultimate tergite transverse, smooth, disc moderately convex, gently depressed in middle posteriorly, convex above the bases of forceps, hind margin concave in middle, oblique laterally above roots of forceps. Pygidium rounded, convex, laterally above with a triangular protuberance. Forceps with branches somewhat depressed, stout at base, tapering apically, almost straight in basal half, afterwards gently incurved near apices, internal margin with two teeth in basal half. Genitalia with parameres flat, preputial sac with accessory chitinous rods.

Female : Agrees with males in most characters except that antennal segments (15 segmented) are yellowish brown from 3rd to 5th, 13th and 14th; pronotum gently widened posteriorly; penultimate sternite obtuse posteriorly; ultimate tergite narrowed posteriorly; pygidium declivent, narrowed posteriorly and forceps simple and straight.

Measurements (in mm) :

	Holotype male	Paratype female
Length of body	7.0	7.5
Length of forceps	1.5	1.7

Material examined : India : Tripura, North Tripura, Jadurambari Beat (Abhanga), Holotype male (genitalia mounted between two coverslips and pinned with the specimen), Paratype one female, 1. iii. 1991, ex bamboo leaf sheath (G. K. Srivastava coll.); deposited in the Zoological Survey of India, Calcutta.

Remarks : The described species comes very close to *Hamaxas melanocephalus* (Dohrn) from the Oriental Region but differs by the shape of males pygidium being rounded with two triangular projections above laterally (vs declivent, transverse with hind margin straight or transverse with hind margin concave with two triangular lobes, laterally margin convex in *H. melanocephalus*); forceps internally with two small points or teeth in basal half (vs. with a ventral and dorsal tooth at base and afterwards margin serrated, terminating into a triangular tooth or with a large blunt tooth at middle followed by a blunt projection) and parameres with apical external lobe more prominent forming a sort of rounded lobe (vs less prominent, somewhat triangular).

SUMMARY

Altogether 14 species (excluding one determined upto generic level) belonging 11 genera are dealt with. It includes a new species, *Hamaxas sakaii*. A key to all the taxa, based on males and diagnostic characters for all the species are provided.

ACKNOWLEDGEMENTS

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INSECTA : DICTYOPTERA : BLATTARIAE

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INTRODUCTION

The order Blattariae constitute one of the unique orders of insects. These are commonly known as 'cockroach'. The name 'cockroach' has been derived from Spanish Cucaracha. These insects exhibit a number of unique specialisation along with certain primitive features. This ancient group of insect is source of origin of the majority of Hemimetabolous orders, which can fold their wings at rest and is further characterised by a jugal field with many veins, and usually possessing many Malpighian tubules.

Cockroaches are small to medium sized (5-53 mm) insects. The body is strongly depressed, antennae variable filiform, the head is bent downward and mostly or completely covered above by a large shield like pronotum, mouth parts mandibulate, legs similar to each other, coxae large and closely approximated, ocelli usually represented by fanestreae, tarsi 5 segmented. They are usually four winged, in some cases they may be wing less or tegmina and wings mutilated leaving only the basal wings. Female with reduced ovipositor which is concealed by large 7th abdominal sternum. Male genitalia asymmetrical and largely concealed by 9th sternum which bears a pair of styles. Cerci many segmented, and without stridulatory and auditory organs.

Blattariae are spread all over the world, but attain their maximum development in terms of numbers in tropical and subtropical parts of the world. Some of the species are semi-aquatic (Shelford, 1909). These insects do not fly well as

the wings of many species are reduced or absent, specially in females. Both nymphs and adults are found among fallen leaves on the surfaces of soil, under stones, in thick grass, among low vegetation, debris and inside buildings. Some of the species are cave dwellers and a few are myrmecophilous. The majority are nocturnal, but the tree and bush species are diurnal in habit. A few species are household pests. The food consists of dead animals (even their own kind) and vegetable matter. The household species feed on starchy material, such as bread crumbs and other articles of human food. *Panesthia* and *Cryptocerus* (Cleveland, 1934) feed on dead wood. The economic importance of the group is not much, but they are medically important as they mechanically transmit any food or garbage or water borne diseases.

Blatta orientalis is used in preparation of the homoeopathic medicines, which is used in asthma.

The knowledge on Blattariae fauna of India is very meagre and limited to early workers like Kirby (1903, 1904), Shelford (1906, 1910), Hanitsch (1915, 1923, 1929) and Chopard (1922). Later on Princes (1960, 1965, 1966, 1967 and 1969) has done a notable work on the group. Rehn (1951) has published a revisionary studies on the Blattariae, on the basis of wings, upto generic level. Roth (1979a) and (1979b) has revised the subfamily panesthinae. The Blattariae include about 3,500 species (Imms, 1963) from whole world of which 156 species are recorded from India.

The present study deals with 10 species which are distributed under 8 genera, 5 subfamilies and

6 families. Ten species recorded for the first time from this State. This study is based on the collection brought by different survey parties of the Zoological Survey of India, from all the districts of Tripura, during 1989 to 1994, as well as earlier materials present in the National Zoological Collection.

The specimens were collected from various ecological niches as far as possible. They were captured by sweeping with the help of butterfly net, hand picking and on light trap.

The classification is followed after Rehn (1951) and Princis (1960).

Consolidated list of Blattariae species of Tripura

- Suborder BLATTOIDEA
 Family BLATTIDAE
 Subfamily BLATTINAE
1. *Periplaneta americana* (Linnaeus)
 2. *Homalophilpha ustulata* (Burmeister)
 3. *Homalophilpha decorata* (Serville)
 4. *Neostylopyga rhombifolia* (Stål)
- Suborder EPILAMPROIDEA
 Family EPILAMPRIDAE
 Subfamily EPILAMPRINAE
5. *Stictolampra plicata* (Navas)
- Family ECTOBIDAE
 Subfamily THEGANOPTERYGINAE
6. *Hemithyrsochera vittata* (Brunner)
- Family BLATTELLIDAE
7. *Blattella germanica* (Linnaeus)
 8. *Blattella humbertiana* (Saussure)
- Family PYCNOSCELIDAE
 Subfamily PYCNOSCELINAE
9. *Pycnoscelus surinamensis* (Linnaeus)

Suborder BLABEROIDEA

Family PANESTHIDAE

Subfamily PANESTHINAE

10. *Salganea raggei* Roth

SYSTEMATIC ACCOUNT

Order BLATTARIAE

Key to suborders of Blattariae

1. Anteroventral margin of the middle and hind femora without spine, rarely 1-4 small spines on fore and hind margin, ninth sternite of male variable BLABEROIDEA
- Anteroventral margin of the middle and hind femora with spine, ninth sternite of male specialized or unspecialized 2
2. Subgenital plate of male symmetrical with 2 styles, female with valve divided longitudinally BLATTOIDEA
- Subgenital plate of male more specialized, female without valve EPILAMPROIDEA

Suborder BLATTOIDEA

Family BLATTIDAE

Subfamily BLATTINAE

Key to the genera of Blattinae

1. Tegmina of both sexes: fully developed or absent; hind wings present or vestigial 2
- Tegmina short, in the form of lateral pads; hind wings absent*Neostylopyga* Shelford
2. Pronotum broad behind the middle, sides deflexed*Periplaneta* Burmeister
- Pronotum broad before the middle, its sides not deflexed*Homalophilpha* Stål

Genus *Periplaneta* Burmeister, 1838

1. *Periplaneta americana* (Linnaeus)

(Map 1)

1758. *Blatta americana* Linnaeus, *Syst. naturae*, (10th Ed.)
 1 : 424.

1868. *Periplaneta americana* : Walker, *Cat. Blatt. Brit. Mus.*, London : 124.

1924. *Periplaneta americana* : Chopard, *Rec. Indian Mus.*, 26 : 173.

1966. *Periplaneta americana* : Princis, *Orthopt. Catalog.*, Part 7 : 405.

Material examined : North Tripura district : 1 F, Ambassa, 4.xi.1971, coll. V.C. Agrawal; 2 MM (nymph), Ambassa, 6.iii.1991, coll. G. K. Srivastava; 1 F, Teliamura, 9.v.1992, coll. S. K. Chakraborty.

Diagnostic features : Male : Size large. Head with vertex exposed, ocelli small, compound eyes well developed, interocular space smaller than the distance between antennal sockets. Pronotum flattened, smooth, sides deflexed, wide behind the middle and all angles broadly rounded. Tegmina and wings fully developed. Femora armed with strong spines, posterior metatarsus longer than the remaining joints, tarsal claws symmetrical. Male supra-anal plate symmetrical and with a V-shaped excavation at the posterior margin. Subgenital plate with a pair of similar, elongate, cylindrical styles, situated laterodistad on the subgenital plate.

Colour : A heavily pigmented reddish brown speices. Pronotum with a yellow narrow band at lateral margin and another broad at posterior margin. Tegmina uniformly reddish brown.

Female : Supra-anal plate with a dep acute median emargination. Subgenital plate with mesodistal portion valvular.

<i>Measurements</i> (in mm) :	<i>Male</i>	<i>Female</i>
Total body length	28-33	27-32
Pronotum length	7.4-9	8-9
Pronotum width	9-10.8	10-11
Tegmen length	27-29	27-30

Distribution : A cosmopolitan species.

Remarks : Common name of this species is ship-cockroach or Bombay canary or American cockroach. This species is the principal pest of

the kitchen. It is a native of Mexico and Central America but now it has been distributed throughout the world. It is thrives in tropical and subtropical climates all over the world. It is recorded first time from this state.

Genus *Homalosilpha* Stål, 1874

Key to the species of Homalosilpha

- 1. Supra-anal plate of male with deep emarginate at the posterior margin
.....*ustulata* (Burmeister)
- Supra anal plate of male with a small notch at the posterior margin*decorata* (Serville)

2. *Homalosilpha ustulata* (Burmeister)

(Map 1)

1838. *Periplaneta ustulata* Burmeister, *Handb. Ent. Berlin*, 2 (2) : 503.

1915. *Homalosilpha ustulata* : Hanitsh, *J. Straits Br. R. Asiat. Soc.*, 1 : 467.

1966. *Homalosilpha ustulata* : Princis, *Orthopt. Catalog.* part 8 : 458-459.

Material examined : West Tripura district : 1 M and 1 F (nymph), Agartala, 14.ii.1992, coll. R. S. Barman.

Diagnostic features : Male : Size large. Head with vertex exposed, ocelli small. Pronotum discoidal, greatest width before the middle, all angles broadly rounded. Anteroventral margin of front femur with a row of stout spines, largest near the middle, tarsal claws symmetrical, arolia relatively large. Supra-anal plate small, with a deep emarginate apex. Subgenital plate symmetrical, stout with concave apex; styles elongate and slender.

Colour : Bark reddish. Pronotum yellow on all sides, disc with two black curved longitudinal stripes in the middle.

Distribution : India (Tripura, Andaman Islands, Arunachal Pradesh, Assam, Orissa, Sikkim and West Bengal); Borneo, Celebes, Java, Malayasia, Sumatra.

3. *Homalosilpha decorata* (Serville)

(Map 1)

1839. *Blatta decorata* Serville, *Hist. nat. Ins. Orth.* paris : 99.
 1906. *Epilampra decorata* : Shelford, *Trans. ent. Soc.* London : 270.
 1915. *Homalosilpha decorata* : Hanitsch, *J. Straits Br. R. Asiat. Soc.*, 1 : 467.
 1966. *Homalosilpha decorata* : Princis, *Orthopt. Catalog.* part 8 : 458.

Material examined : West Tripura district : 1 M, Teliamura, 9.v.1992, coll. S. K. Chakraborty.

Diagnostic features : Size medium. Head with vertex exposed, ocelli small, interocular space smaller than the distance between the antennal sockets, Pronotum with greatest width before the middle, all angles broadly rounded, anterior margin obtusely rounded and posterior margin a little convex in shape. Anteroventral margin of front femur with a row of stout spines, largest near the middle. First abdominal terga short, abdominal terga with tooth-like appearance. Supra-anal plate small, a shallowly concave at the posterior margin. Subgenital plate slightly irregular, and posterior margin shallowly concave. Cerci long and extended beyond the 1/2 of the subgenital plate.

Colour : Body brightly shiny blackish brown, concolorous head and legs. Pronotum with a fine yellow colour, arched towards its lateral margin, originated from anterior margin and not reaching completely to the posterior margin. Tegmen concolorous. First abdominal terga with deep brown shining tinge.

<i>Measurements</i> (in mm) :	<i>Male</i>	<i>Female</i>
Total length of the body	24-28	25-28.5
Length of pronotum	6.5-8.6	6.7-7.8
Width of pronotum	7.5-8.6	10-10.5
Length of Tegmen	23-30	27-31

Distribution : India (Tripura, Meghalaya); Borneo, Java, Sarawak, Sumatra.

Remarks : This species is newly recorded from this state. It is closely resembles to

Periplaneta americana but the pronotum is discoidal and maximum width before the middle. It is easily recognised by its remarkable pronotal design.

Genus *Neostylopyga* Shelford, 1911

4. *Neostylopyga rhombifolia* (Stål)

(Map 1)

1813. *Blatta rhombifolia* Stål, *Repres. exact. Colorée d'après sa nature. Spectres etc.*, 2 : 5, 4.
 1915. *Stylopyga rhombifolia* : Hanitsch, *J. Straits Br. R. Asiat.*, 69 : 105, 163.
 1948. *Neostylopyga rhombifolia* : Bruijning, *Zool. Medded.*, 29 : 113-114.
 1965. *Neostylopyga rhombifolia* : Princis, *Orthop. Catalogus*, part 8 : 534-536.

Material examined : North Tripura district : 2 MM, Ambassa, 6.iii.1991, coll. G. K. Srivastava.

Diagnostic features : *Male* : Size medium. Head with vertex a little exposed. pronotum with anterior margin a little convex or entire, posterior margin truncate. Tegmina reduced to squamiform lobes. Wings absent. Posteriolateral corner of last tergite a little indented. Anteroventral margin of front femora armed with strong spines, tibial spines of outer aspect triserately arranged, posterior metatarsus longer than the forward joints, its pulvilli small and apical. Supra-anal plate triangular with deeply notched medially, right and left paraproct similar. Subgenital plate compressed with obtuse apex. Style thin and slender.

Colour : Head ventrally brownish-yellow and dorsally yellow, with a transverse stripe between the eyes. Anterior end of vertex black. Reddish yellow spots present from 5th terga laterally and 6th to last terga black.

Female : Anterior margin of pronotum a little concave or entire medially. Posterior margin with maximum width. Supra-anal plate slightly depressed medially.

Nymph : Supra-anal plate small, anterior margin slightly notched.

Measurements (in mm): *Male* *Female* *Nymph*

Total body length	24-32	22-27.5	17-20
Pronotum length	8-10.6	7.5-8.6	3.5-4.5
Pronotum breadth	9-10.5	8.5-9.5	5.0-5.8
Tegmen length	0.5-0.7	0.3-0.4	—

Distribution : India (Tripura, Andaman and Nicobar Islands, Andhra Pradesh, Bihar, Madhya Pradesh, Meghalaya, Orissa, Uttar Pradesh and West Bengal); Malaysia; Sarawak, Sumatra.

Remarks : This species is newly recorded from Tripura. No adult specimen of this species has been found during the present study.

Suborder EPILAMPROIDEA

Key to the families of EPILAMPROIDEA

- 1. Pronotum and tegmen always distinct, instead of less darker punctation; tegmen flat instead of deep convex; sub-costa provided rami anteriorly EPILAMPRIDAE
- Pronotum and tegmen may not with darker punctation; tegmen flat, hardly deep convex; subcosta rarely with rami anteriorly 2
- 2. Posterior wings of the most part lacking apical triangle between Cu₁ and 3A. Subgenital plate with most distinct shape but never ectoboidem type.....BLATTELLIDAE
- Posterior wings continuously single apical triangle between Cu₁ and 3A; subgenital plate always ectoboidem type ECTOBIIDAE

Family EPILAMPIDAE

Subfamily EPILAMPRINAE

Antennae setaceous, never pulmose, occasionally incrasate. Pronotum variable in form. Tegmina coriaceous, fully developed or reduced or absent. Supra-anal plate of male more or less quadrate with obtuse angles. Femora with sparsely or strongly spined beneath. Middle metatarsus longer, tarsal joint insignificant.

Genus *Stictolampra* Hanitsch, 1930

5. *Stictolampra plicata* (Navas)

(Map 1)

1904. *Opisthoplata plicata* Navas, *Bol. Soc. Aragon. cienc. nat.* 3 : 130.

1910. *Rhcnoda plicata* : Shelford, *Gen. Ins.* 101 : 9

1967. *Stictolampra plicata* : Princis, *Orthopt. Catalog.* part 11 : 683.

Material examined : South Tripura district : I M N, Udaypur, 23.ii.1991, coll. G.K. Srivastava.

Diagnostic features : *Nymph* : Head with vertex covered by pronotum. Pronotum broader than long, anterior margin truncated or slightly convex, lateral sides obtusely angular. Tegmina and wings absent. Anteroventral margin of front femur with equal shaped strong spines and distally bristle shaped spines arranged serially. Supra-anal plate symmetrical. Subgenital plate with anterior margin convex, posterior margin more or less straight.

Colour : Brownish testaceous.

<i>Measurements</i> (in mm) :	<i>Nymph</i>
Total body length	1-2.5
Pronotum length	4.5-7

Distribution : India (Tripura, Meghalaya, Orissa and West Bengal); Borneo, Java, Malaysia.

Remarks : No adult specimen of this species has been found during the present study. According to Hebard (1929), majority of the Malayan species are referable to early stages of the other Epilampridae.

Family ECTOBIDAE

Subfamily THEGANOPTERYGINAE

Genus *Hemithyrsocera* Saussure, 1893

Antennae more or less incrassated and pilose, anterior ulner vein of the tegmina bifurcated, branches of posterior ulner vein angulate. Ulner vein of the wings simple or bifurcated, a conspicuous triangular apical field. Femora

strongly spined in some species. Supra-anal plate more or less produced and triangular.

6. *Hemithysocera vittata* (Brunner)

(Map 1)

1865. *Thysocera vittata* Brunner, *Nouv. Syst. Blatt. Wien* : 119.
 1869. *Pseudomops vittata* Walker, *Cat. Derm. Salt. Brit. Mus.* London : 195.
 1904. *Hemithysocera lateralis* Kirby, *Syn. Cat. Orth.*, 1 : 77.
 1915. *Hemithysocera lateralis* Hanitsch, *J. Straits Br. R. Asiat.*, 69 : 28.
 1971. *Hemithysocera* Princis, *Orthopt. Catalogus*, Part 14 : 1125.

Material examined : North Tripura district : 4 MM, 1 F, Choribari, 23.v.1992, coll. B. Mitra and S. K. Chakraborty.

Diagnostic features : **Male** : Size small, moderately slender body. Head not very broad, vertex slightly exposed, ocellar spots forming an angle with the intervening area, face with lateral margin decidedly converging ventrad. Inter-ocular space less than the distance between the antennal sockets. pronotum suboval with anterior margin slightly convex, outer lateral margin rounded and posterior margin obtusely rounded. Tegmen and wings fully developed and showing a tendency apically angular or apical angulation, costal area shorter than the anal area and subcostal vein branching in the middle. Anteroventral margin of front femur with a row of heavy spines which generally decrease in size laterally. Supra-anal plate rounded, smooth and emarginate at apex.

Colour : Pronotum black with golden yellow margin round about the pronotum. Elytra black, flat in the middle laterally in the middle golden yellow in both the side. Legs black. Abdomen black.

<i>Measurements</i> (in mm) :	<i>Male</i>	<i>Female</i>
Total length of the body	13-16	14.5
Pronotum length	4.2-4.5	4.2-4.5
Pronotum width	4.8-5.0	4.9
Tegmen length	14	14

Distribution : India (Tripura, Orissa); Burma.

Remarks : The record is from Orissa only. So, here it is recorded for the first time from the state.

Family BLATTELLIDAE

Head with vertex more or less exposed. Tegmen and wings absent or present. Legs, long, slender. Anterior femur with a row of spines followed by a row of spines or spine like setae at the apex. Tarsal claws symmetrical. Cerci short, not projecting much beyond the supra-anal plate.

Genus *Blattella* Caudell, 1903

Small narrow species, the head long but almost covered by pronotum, eyes well-separated, interocular space not flattened. Tegmina narrow but exceeding the abdomen, wings hyaline. Antero-ventral margin of front femur armed on basal half with longer spines followed by much shorter spines, apically with three longer unequal spines near apex, tarsal segments elongate, arolia very small. Subgenital plate of male symmetrical, of female large, convex and truncate at apex.

7. *Blattella germanica* (Linnaeus)

(Map 1)

1767. *Blatta germanica* Linnaeus, *Syst. naturae* 1 (2) (ed. 12) : 688.
 1895. *Phyllodromia germanica* : Tepper, *Trans. R. Soc. S. Austral.*, 19 : 150.
 1969. *Blattella germanica* : Princis, *Orthopt. Catalog.* part 13 : 807-823.

Material examined : North Tripura district : 1 F, Jadurambari beat, 1.iii.1991, coll. G. K. Srivastava; 1 M, 2.iii.1991, coll. G.K. Srivastava; South Tripura district : 2 MM, Garjee, 25.ii.1969, coll. V.C. Agarwal; 1 F, Debipur, 9.ix.1992, coll. B.N. Das; 1 F, 14.ix. West Tripura district : 1 M, Teliamura, 10.xi.1974, coll. M.S. Shishodia.

Diagnostic features : **Male** : Size small. Head with vertex slightly exposed, interocular space

3/5th distance between antennal sockets. Pronotum **transeverse**, gradually rounding laterally. Tegmina **and** wings narrow but exceed the abdomen, the **subcosta** is shorter than anal field, discoidal vein forked before the median point. Anteroventral margin of front femur spined on basal half with longer spines followed by much shorter spine apically and with three longer unequal spines near apex, arolia very small. 2 to 7th abdominal tergites with latero-caudal portion produced as lobes, 7th and 8th tergite narrowly visible. Supra-anal plate semi-circular or subtraingular, lateral **margin** moderately conergent, weakly convex at the posterior region. Subgenital plate with **posterior** margin forming a large broad rounded lobe, styles simple, small and symmetrical.

Colour : General colour testaceous. A narrow yellowish white stripes longitudinally present in the middle of pronotum.

Female : Interocular space less than 3/5th distance between the antennal sockets. Supra-anal plate moderately traingular, apex obtusely **emarginate**. Subgenital plate large.

Colour : Female more darker than male.

Measurements (in mm) :	Male	Female
Total body length	10.5-11.5	10.2-12.5
Pronotum length	0.3	0.3
Tegmen length	10.7	12.5

Distribution : C  smopolitan.

Remarks : The so-called German Cockroach is a cosmopolitan species which has been able to establish itself almost every where, but the species prefers warm and moist conditions. It is also one of the most common pest of household, grocery, restaurants, dinning halls, bath, bakeries, etc. and also found in the fields. It is new record from Tripura.

8. *Blattella humbertiana* (Saussure)

(Map 1)

1863. *Polyzosteria humbertiana* Saussure, *Mem. Soc. Geneva*, 17 : 131.

1969. *Blattella humbertiana* : Princis, *Orthopt. Catalog.* part 13 : 842-843.

Material examined : North Tripura district : 1 M, Manu, 23.ii.1993, Coll. R.S. Barman.

Diagnostic features : **Male** : Size small. Head with vertex exposed. Anteroventral margin of front femur with long spine on basal half and followed by much shorter spine, tarsal claws symmetrical, arolia small. Supra-anal plate more or less triangular and extends beyond the subgenital plate with distal margin broadly convex. Subgenital plate symmetrical and apex slightly convex.

Colour : General colour brownish. Head yellow, frontal yellowish brown. Abdomen yellowish brown, each segment with a rectangular dark-brown spot on each side which are connected by narrow stripe of simialr colour.

Female : Subgenital plate with posterior margin broadly convex.

Measurements (in mm) :	Male	Female
Total body length	9.5-12	10.4-13.5
Pronotum length	0.3	0.3
Pronotum width	0.35	0.35

Distribution : Widely distributed species in the world.

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

Family PYCNOSCELIDAE

Subfamily PYCNOSCELINAE

Genus *Pycnoscelus* Linnaeus, 1758

9. *Pycnoscelus surinamensis* (Linnaeus)

(Map 1)

1758. *Blatta surinamensis* Linnaeus, *Syst. naturae*, (10th Ed.) 1 : 424.
1903. *Pycnoscelus surinamensis* : Rehn, *Trans. Am. ent. Soc.*, 29 : 131-136.
1964. *Pycnoscelus surinamensis* : Princis, *Orthopt. Catalog.*, part 6 : 264.
1990. *Pycnoscelus surinamensis* : Roth, *Mem. Mus. Victoria*, 50 (2) : 357-378.

Material examined : Tripura south district : 1 F, 2 N, Amarapur, 5.iii.1991, coll. G.K. Srivastava.

Diagnostic features : *Female* : Medium size. Head with vertex exposed, ocelli large, approximate to the eye, interocular space smaller than the distance between the antennal sockets. Pronotum laterally rounded, posterior margin a little convex. Tegmen and wings extending scarcely upto the apex of the abdomen, sometimes not reaching upto the apex of the abdomen. Subgenital plate large, symmetrical, apex rounded; cerci small.

Colour : Shiny, blackish brown with buff lateral margins on the translucent tegmen. Anterior and lateral edges of pronotum are also buff coloured.

<i>Measurements</i> (in mm) :	<i>Female</i>	<i>Nymph</i>
Total body length	16-20	1.0-1.6
Pronotum length	0.55-0.6	0.4-0.5
Pronotum width	0.65-0.7	—
Tegmen length	1.8-2	—

Distribution : It is cosmopolitan.

Remarks : This species is normally exists as female. Occasionally parthenogenetic males occur in cultures but they are non-functional, when mated to parthenogenetic females (Roth, 1967). In male eighth sternite is rounded posteriorly, the ninth completely hidden and bearing one style, only nymph of this species available in the present collection. It is new record from Tripura.

Suborder BLABEROIDEA

Family PANESTHIDAE

Subfamily PANESTHIINAE

Genus *Salganea* Stal, 1879

Size variable, ranging from 15.5 mm. to 50.0 mm. Pronotum with anterior margin a narrow U or V shaped excision. Tegmina and wings are fully developed or tegmina and wings mutilated leaving only the basal regions. 5th dorsal segment of abdomen without lateral projections. Anterolateral corners of abdominal tergites 6 and

7 often with round holes, some-times additional holes on the corners of tergite 3, tergite 4 or tergite 5. Hind margin of last sternite usually indented to male and rounded in female.

10. *Salganea raggei* Roth

(Map 1)

1979. *Salganea raggei* Roth, *Aust. J. Zool. Ser.*, **69** : 30-35.

Material examined : Tripura west district : 1 M, Teliamura, 9.v.1992, coll. S.K. Chakraborty.

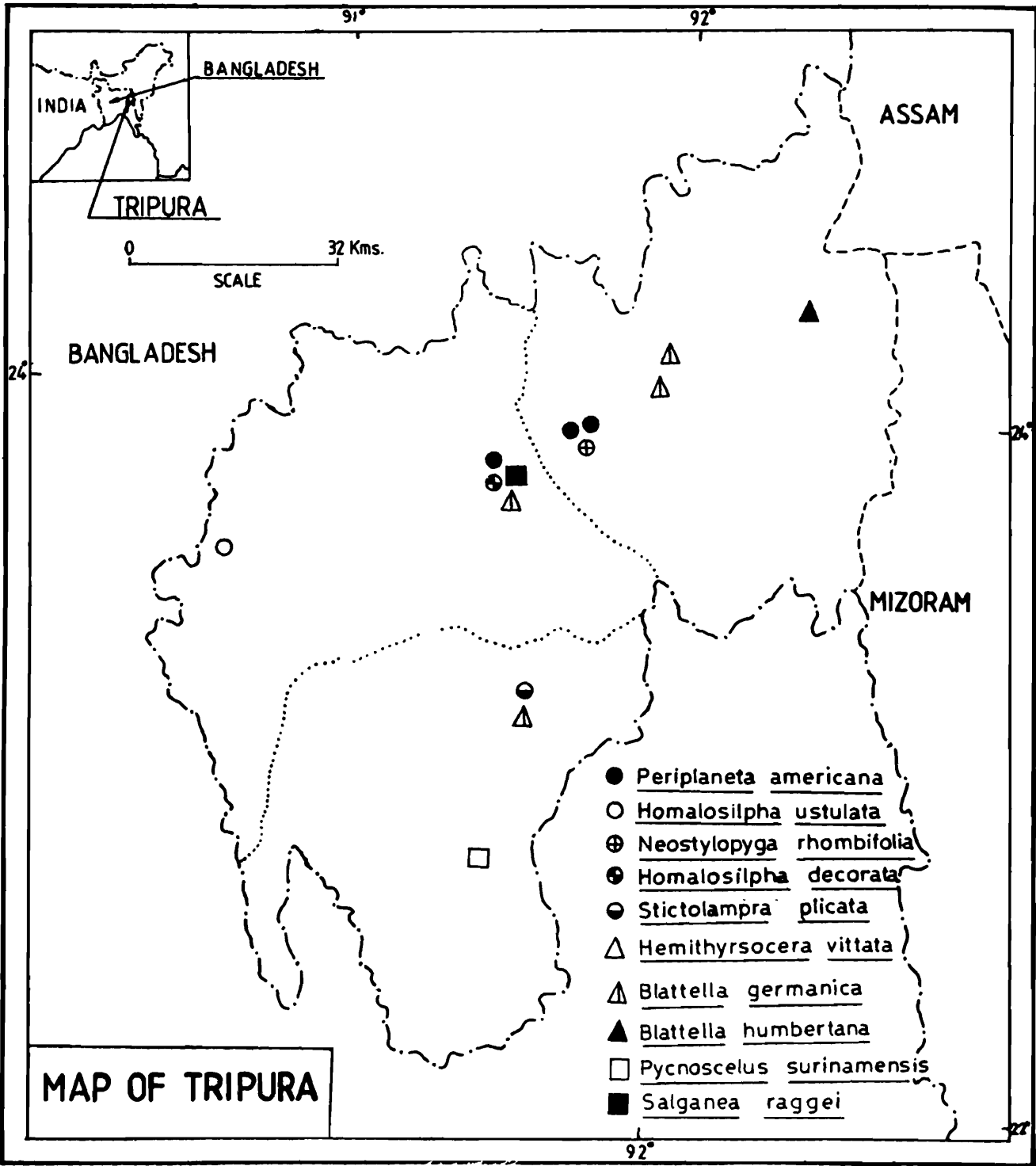
Diagnostic features : *Male* : Head punctulate, ocelli large, vertex not foveolate, exposed. Interocular space slightly smaller than the distance between antennal sockets. Pronotum hairless, anterior margin with a V-shaped emargination, a small reflexed tubercle behind the margin on each side of the mid line. Tegmina and wings extending well beyond the end of abdomen. Abdominal tergite 1-5 punctate, punctuation denser laterally, tergite 6 to 7th densely punctate over the entire surface, laterocaudal angle of abdominal segments 6th with a short bluntly oblique spine. Anteroventral margin of front femur with single spine. Supra-anal plate transverse, densely covers with small and large punctuation, hind margin with 8-16 mostly subequal teeth (some may be fused together, circus bulbous conical).

Colour : Head, pronotum, tegmina and abdominal tergite black. Legs and abdominal sternite reddish brown.

Female : Pronotum with anterior margin less excised, disc tubercle slightly prominent. Hind margin of supranal plate with 11-14 subequal teeth.

Nymph : Pronotum with anterior margin hardly indented, tubercle absent, anterior half hardly depressed.

<i>Measurements</i> (in mm) :	<i>Male</i>	<i>Female</i>
Total length of the body	29-48	30.5-49
Pronotum length	6.3-10	7-12
Pronotum width	10-16	11-16.5
Tegmen length	38-51	33-49.5



Map 1

Distribution : India (Tripura, Meghalaya, Nagaland, Sikkim and West Bengal); Bhutan, Burma, China, Hainan, Nepal, Taiwan, Thailand, North and South Vietnam.

Remarks : Only single specimen collected in the present study. This species is principally a main land species (Roth, 1979). It shows a little variation with *S. Biglumis*, except elongated tegmina and wings.

SUMMARY

The present paper deals with 10 species of Blattids distributed over 6 families and 8 genera collected from the districts of Tripura. All the species are recorded for the first time from the State. A key to the identification of Suborders,

families, subfamilies, genera and species of Blattariae has been provided as far as possible. The distribution maps are also provided for each species known from various districts of Tripura.

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INSECTA : ISOPTERA

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INTRODUCTION

Tripura is essentially a hilly state situated in the north east territories of India. It is bounded on the north and west by the plain districts of Bangladesh, on the south and east by hills of Assam and Bangladesh. The isolated hills and high lands are often made up of layer of sands and gravel greatly indurated with ferruginous cement clay.

Termite fauna of Tripura was completely unknown until 1975, when Sen-Sarma *et al.*, referred to the occurrence of 20 species from the State in their monograph on 'Wood destructing termites of India'. Out of these, two species of the genera *Neotermes* and *Nasutitermes* are not identified upto species level. As such a total of 19 species are known from the area with two species, namely *Glyptotermes tripurensis* and *Stylotermes beelsoni* were designated as new to science. However, in the latter period of the same year, Thakur (1975) described these two new species under his self authority. However, the most important taxonomic treatment of 25 species of termite was made by Sen-Sarma and Thakur (1979), of which 4 species, namely, *Neotermes paratensis*, *Microtermes labioangulatus*, *Angulitermes mishrai* and *Dicuspiditermes tripurensis* were described as new to science.

Two known species, *Neotermes mangiferae* Roonwal and Sen-Sarma and *Macrotermes khajuriae* Roonwal and Chhotani had been dropped unintentionally by Sen-Sarma and Thakur (1979) in their publication, the addition of which had

made the total number of termites from the area to 27 species.

Recently, a fairly good collection has been accumulated in the Isoptera Section made mostly through surveys by the sectional staff members led by P. H. Roy which had been further augmented by some small collection made by other survey parties from 1988-1994. The study of these collection has resulted to the recognition of 10 species (species in the list marked with asterisk) of which three species, namely, *Hospitalitermes ataramensis* Prasad and Sen-Sarma, *Odontotermes horni* (Wasmann) and *Odontotermes redemanni* (Wasmann) were real addition to the existing fauna.

Thus, to sum up the number of species occurring in the State stands to a total of 30 altogether.

The termite fauna of Tripura is fairly rich and shows strong affinities to the fauna of Burma and Brahmaputra Valley. Although mound building species of *Odontotermes* and *Macrotermes* are frequently found in the State, but the species are hardly seen to build mounds in the area. Instead *Odontotermes feae* hardly known as mound builder, has been collected from a single small mound (Sen-Sarma and Thakur, 1979).

SYSTEMATIC ACCOUNTS

General Morphology : Termites have three major castes, namely, imago, soldier and worker. The general morphology has been dealt recently by Roonwal and Chhotani (1989) in "Fauna of

India" including the characters of taxonomic importance. Identification of termite species is mostly based on these characteristic features of soldier caste. In addition, the measurements of the characters of the soldiers used for the preparation of keys are as follows : Length and width of head, length of mandibles (except in nasute forms) and distance of tooth (if present) from the tip of the mandible; length and width of pronotum and postmentum, number of antennal segments, etc. Since such characters are illustrated and described in numerous papers, these are not incorporated here just to avoid repetition.

Best method of collection of soil termites is done with the help of a shovel pushing it into the soil and put the material on a tray and ultimately picking them up with the help of a scissor. Wood-eating forms are collected by the forceps after cutting the wood with the help of a hand axe. All the collections are preserved in 70% alcohol kept in small vials. Collection of queen from the soil nest needs caution to trace the royal chamber wherein the queen lives.

List of Taxa : List of species so far recorded from Tripura (Author's name and year against each species in parenthesis indicates its first record from the State).

List of species recorded :

Family KALOTERMITIDAE

Genus *Neotermes* Holmgren

1. *Neotermes mangiferae* Roonwal and Sen-Sarma (Sen-Sarma *et al.*, 1975).

2. *N. paratensis* Sen-Sarma and Thakur (Sen-Sarma *et al.*, 1975).

Genus *Cryptotermes* Banks

3. *Cryptotermes bengalensis* Snyder (Sen-Sarma *et al.*, 1975).

Genus *Glyptotermes* Fröggatt

4. *Glyptotermes tripurensis* Thakur (Thakur, 1975).

Family STYLOTERMITIDAE

Genus *Stylotermes* Holmgren & Holmgren

5. *Stylotermes beelsoni* Thakur (Thakur, 1975).

Family RHINOTERMITIDAE

Genus *Coptotermes* Wasmann

6. *Coptotermes kishori* Roonwal & Chhotani (Sen-Sarma *et al.*, 1975).

7. *Coptotermes travians* (Haviland) (Sen-Sarma *et al.*, 1975).

Genus *Synhamitermes* Wasmann

8. *Synhamitermes quadriceps* Wasman (Sen-Sarma & Thakur, 1979).

Family TERMITIDAE

Subfamily TERMITINAE

Genus *Microcerotermes* Silvestri

9. *Microcerotermes annandalei* Silvestri (Sen-Sarma & Thakur, 1979).

10. *Microcerotermes crassus* Snyder (Sen-Sarma *et al.*, 1979).

11. *Microcerotermes labioangulatus* Sen-Sarma & Thakur (Sen-Sarma *et al.*, 1975).

Genus *Angulitermes* Sjostedt

12. *Angulitermes mishrai* Sen-Sarma & Thakur (*nom. nud.*) Sen-Sarma *et al.*, 1975).

Genus *Dicuspiditermes* Krishna (1968)

13. *Dicuspiditermes tripurensis* Sen-Sarma & Thakur (Sen-Sarma *et al.*, 1975).

Genus *Pericapritermes* Silvestri

14. *Pericapritermes durga* (Roonwal & Chhotani) (Sen-Sarma & Thakur, 1979).

Genus *Macrotermes* Holmgren

15. *Macrotermes serrulatus hopini* Roonwal & Sen-Sarma (Sen-Sarma & Thakur, 1979).

Genus *Odontotermes* Holmgren

- 16. *Odontotermes feae* (Wasmann) (Sen-Sarma *et al.*, 1975).
- 17. *Odontotermes giriensis* Roonwal & Chhotani (Sen-Sarma & Thakur 1979).
- 18. *Odontotermes kapuri* Roonwal & Chhotani (Sen-Sarma *et al.*, 1975).
- 19. *Odontotermes obesus* (Rambur) (Sen-Sarma & Thakur, 1979).

Genus *Hypotermes* Holmgren

- 20. *Hypotermes obscuriceps* (Wasmann) (Sen-Sarma *et al.*, 1975).
- 21. *Hypotermes xenotermitis* (Wasmann) (Sen-Sarma & Thakur, 1979).

Genus *Microtermes* Wasmann

- 22. *Microtermes obesi* Holmgren (Sen-Sarma *et al.*, 1975).
- 23. *Microtermes pakistanicus* Ahmed (Sen-Sarma & Thakur, 1979).

Genus *Nasutitermes* Bank

- 24. *Nasutitermes emersoni* Snyder (Sen-Sarma *et al.*, 1975).
- 25. *Nasutitermes jalpaiguriensis* Prasad & Sen-Sarma (Sen-Sarma *et al.*, 1975).

Family INDOTERMITIDAE

- 26. *Indotermes rongrensis* (Roonwal and Sen-Sarma).

List of species recorded for the first time

Family TERMITIDAE

Subfamily TERMITINAE

Genus *Odontotermes* Holmgren

- 1. *Odontotermes horni* (Wasmann)
- 2. *O. redemanni* (Wasmann)

Subfamily NASUTITERMITINAE

Genus *Hospitalitermes* Holmgren

- 3. *Hospitalitermes ataramensis* Prasad & Sen-Sarma

Key to the families of ISOPTERA (Soldier)

- 1. Tarsi with 3 segments 2
- Tarsi with 4 segments 3
- 2. Pronotum flat*Stylotermitidae*
- Pronotum strongly shaddle shaped*Indotermitidae*
- 3. Fontanelle absent*Kalotermitidae*
- Fontanelle present 4
- 4. Right mandible with a distinct subsidiary tooth at the base of anterior cutting edge of first marginal tooth; left mandible with three marginal teeth*Rhinotermitidae*
- Right mandible without subsidiary tooth; left mandible with marginal teeth, never with three*Termitidae*

Key to the genera of *Rhinotermitidae* (Soldier)

- 1. Head capsule short, phragmotic and truncated in front, almost black anteriorly; with comparatively shorter mandibles*Cryptotermes*
- Head capsule longish, not phragmotie, mandibles comparatively long 2
- 2. Left mandible with four or five marginal teeth; head capsule cylindrical, frons declivious, but not bilobed*Neotermes*
- Left mandible with two or three marginal teeth, head capusle thick, frons steep and bilobed*Glyptotermes*

Key to the genera of *Termitidae* (Soldier)

- 1. Head projected in front into a long nasus; mandibles degenerated and non functional... 2
- Head not projected in front into a nasus; mandibles well developed and functional 3
- 2. Posterior femora not so elongated; mandibles with or without spine*Nasutitermes*
- Posterior femora distinctly elongated; mandibles without any spine*Hospitalitermes*

3. Mandibles symmetrical, curved at tips 4
 — Mandibles asymmetrical, weakly to strongly twisted 10
4. Mandibles with inner margins serrate *Microcerotermes*
 — Mandibles with inner margins not serrate.....5
5. Mandibles strongly incurved apically, each with a prominent laterally directed triangular tooth*Synhamitermes*
 — Mandibles not strongly incurved apically, with or without teeth on the inner margin 6
6. Pronotum strongly saddle-shaped, anterior lobe longer than posterior lobe; antennal segments cylindrical much longer than broad*Speculitermes*
 — Pronotum weakly saddle-shaped, anterior lobe smaller than posterior lobe, antennal segment short, club-shaped.....7
7. Labrum with a hyaline tip; meso- and meta-nota prominently expanded laterally; mandibles without teeth*Macrotermes*
 — Labrum without a hyaline tip; meso- and meta-nota not expanded laterally; left mandible generally with a marginal tooth (except in species of *Microtermes*) 8
8. Mandibles short, thin and delicate; soldiers smaller than workers; smaller species *Microtermes*
 — Mandibles large and strong; soldiers generally larger than workers; larger species 9
9. Left mandible without a tooth but with 3-5 crenulations at basal half*Hypotermes*
 — Left mandible with tooth placed at different positions on its inner margin; without crenulations*Odontotermes*
10. Head capsule with a distinct frontal projection; mandibles elongate, feebly built, bow-shaped in side view*Angulitermes*

- Head capsule without a frontal projection; mandibles broad, strongly built, not bow-shaped in side view 11
11. Head capsule with antero-lateral corners extended into distinct tubercle-like projections in front and below antennal sockets*Dicuspiditermes*
 — Head capsule without tubercle like projections on its antero-lateral corners*Pericapritermes*

TAXONOMIC ACCOUNT OF SPECIES

Family KALOTERMITIDAE

Genus *Neotermes* Holmgren, 1911

1. Subgenus *Neotermes* (of *Calotermes*) Holmgren

1911. Holmgren, K. Sv. Vetensk. Akad. Handb., 46 (6) : 53-54.

2. Genus *Neotermes* Holmgren

1912. Silvestri, Ann. Mus. Civ. Stor. Nat. Geneva, (3) 5 (45) : 212.

1989. Roonwal and Chhotani, *Fauna of India (Isoptera)*, 1 : 191-194.

1. *Neotermes mangiferae* Roonwal and Sen-Sarma

1960. *Neotermes mangiferae* Roonwal & Sen-Sarma, *Contrib. Syst. Orient. Termites. (ICAR. Ent. Mongr. 1)* : 139-143, 208-211, S. Pw. Type locality : Eastern India.

1983. *Neotermes mangiferae*, Maiti, *Occ. Pap. Rec. zool. Surv. India* No. 42 : 22, 23.

1989. *Neotermes mangiferae*, Roonwal & Chhotani, *Fauna of India (Isoptera)*, 1 : 253-253.

Distribution : INDIA : Tripura : (Sen-Sarma and Thakur, 1975).

Elsewhere : None.

Remarks : The species was first reported from a dead log of a Mango tree in a timber depot at Calcutta and subsequently was reported from the dead branch of the same host at Paratia, Tripura.

2. *Neotermes paratensis* Sen-Sarma and Thakur

1975. *Neotermes paratensis* Sen-Sarma, Thakur, Mishra and Gupta, *Wood Destroying Termites of India (Final Tech. Rep. PL 480 Proj. A7-FS-58)* : 10 (*nom. nud.*)
1979. *Neotermes paratensis* Sen-Sarma and Thakur, *Indian Forest Rec. (N.S.)*, **13** (1) : 6-9, 1m, S. Pw. *Type-locality* : Paratia (Tripura, India).
1989. *Neotermes paratensis* Roonwal & Chhotani, *Fauna of India (Isoptera)*, **1** : 263-266.

Distribution : INDIA : Tripura : Paratia, known only from the type locality.

Remarks : The species is so far known only from its type locality in Tripura, attacking dead branch of a standing *Morus alba*.

Genus *Cryptotermes* Banks

1. Genus *Cryptotermes* Banks

1906. Banks, *Ent. News. Philadelphia*, **17** (9) : 336.
1989. Roonwal and Chhotani, *Fauna of India (Isoptera)*, **1** : 367-370.

3. *Cryptotermes bengalensis* Snyder

1934. *Cryptotermes bengalensis* Snyder, *Indian Forest Rec.*, **20** (11) : 4-6, 1m. S. *Type-locality* : Sundarbans, West Bengal.
1989. *Cryptotermes bengalensis* Roonwal and Chhotani, *Fauna of India, (Isoptera)*, **1** : 373-377.

Distribution : Indian subregion including the eastern India (Tripura : Agartala, Paratia, Belonia, Ambassa), Madhya Pradesh, Gujarat, Karnataka and Andaman and Nicobar Islands.

Remarks : The species was established by Snyder (1934) and was subsequently synonymised by Moszkowski (1955) with *C. havilandi*. However, Ahmed (1965) revived its status which has been followed here like many other authors.

Genus *Glyptotermes* Froggatt

1. Genus *Calotermes* Hagen (Part)

1858. Hagen, *Linn. Ent.*, **12** : 31-38.

2. Genus *Glyptotermes* Fröggatt

1896. Fröggatt, *Proc. Linn. Soc. N. S. W.*, **21** (4) : 518-543.
1989. Roonwal and Chhotani, *Fauna of India (Isoptera)* **1** : 280-283.

4. *Glyptotermes tripurensis* Thakur

1975. *Glyptotermes tripurensis*, Sen-Sarma, Thakur, Mishra and Gupta, *Wood Destroying Termites of India (Final Tech. Rep. PL 480 Proj. A 7-FS-58)* : 11-52 (*nom. nud.*)
1979. *Glyptotermes tripurensis*, Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, **13** (1) : 10-11, *Type locality* : Tiliamura, Tripura, India.
1989. *Glyptotermes tripurensis*, Roonwal & Chhotani, *Fauna of India (Isoptera)*, **1** : 320-322.

Distribution : INDIA : Tripura : Tiliamura (*Type-locality*)

Remarks : The species is so far only known from its type locality. It is reported to attack dead branch of a living tree of *Artocarpus chaplasha* at Tiliamura in Tripura.

Family STYLOTERMITIDAE

Genus *Stylotermes* Holmgren and Holmgren, 1917

1. Genus *Stylotermes* Holmgren and Holmgren

1917. Holmgren and Holmgren, *Mem. Dept. Agric. India (Ent.)* : **5** (3) : 141-144.
1989. Roonwal and Chhotani, *Fauna of India (Isoptera)*, **1** : 568-570.

5. *Stylotermes beelsoni* Thakur

1975. *Stylotermes beelsoni* Thakur, *J. Indian Acad. Wood Sci.*, **6** (2) : 94-98, S, W. *Type locality* : Tiliamura, Tripura, India.
1989. *Stylotermes beelsoni*, Roonwal & Chhotani, *Fauna of India (Isoptera)*, **1** : 575-577.

Distribution : INDIA : Tiliamura (Tripura, Eastern India).

Elsewhere : None.

Remarks : No information is available on its biology and distribution, since it is so far known from its type-locality only. However, it is reported from a *Ficus* sp. at Tiliamura in Tripura (Sen-Sarma, *et al.*, 1975).

Family RHINOTERMITIDAE
 Subfamily COPTOTERMITINAE
 Genus *Coptotermes* Wasmann,
 1896.

1. Subgenus *Coptotermes* (of genus *Termes* Linn.) Wasmann.

1896. Wasmann, *Ann. Mus. City Stor. Nat. Genova*, **16** (36) : 629.

2. Genus *Coptotermes* Wasmann

1898. Haviland, *J. Linn. Soc. Lond. (Zool.)*, **26** (169) : 390.

1989. Roonwal and Chhotani, *Fauna of India (Isoptera)*, **1** : 418–419.

Key to species of Coptotermes (Soldier)

1. Waist of postmentum lying in the middle of line connecting the level of maximum width and the hind margin; postmentum with minimum width larger (0.23–0.29 mm)
 *C. travians* (Haviland)

— Waist of postmentum lying below the middle of line connecting the level of maximum width and the hind margin; postmentum with minimum width smaller (0.18–0.20 m)
 *C. kishori* Roonwal & Chhotani

6. *Coptotermes kishori* Roonwal and Chhotani

1960. *Coptotermes kishori* Roonwal and Chhotani, *J. Zool. Soc. India*, **11** (2) : 127 (nom. nud.)

1962. *Coptotermes kishori* Roonwal and Chhotani, *Indian Species Termite Genus Coptotermes* (ICAR Ent. Monoqr. 2) : 9, 57–61, 77, 108–111, S. W. Type-locality : Berhampur, West Bengal, India.

1989. *Coptotermes kishori* Roonwal and Chhotani, *Fauna of India, (Isoptera)*, **1** : 457–461.

Distribution : INDIA : Tripura : Agartala, Ambasa, Belonia, Choraibari, Paratia; Kerala, Madhya Pradesh, Rajasthan and West Bengal.

Elsewhere : None.

Remarks : The species is very uncommon one and is sparsely found scattered all over the country.

7. *Coptotermes travians* Haviland

1898. *Coptotermes travians* Haviland, *J. Linn Soc. Lond. (Zool.)* **26** (164) : 391; PL 23 (figs. 19–22) Im. S. W.

1989. *Coptotermes travians*, Roonwal and Chhotani, *Fauna of India (Isoptera)*, **1** : 461–467.

Distribution : INDIA : Tripura : Belonia; Assam, Orissa, Andaman and Nicobar Islands,

Elsewhere : Burma, Bangladesh, Indonesia and Malaysia.

Remarks : The species is very widely distributed in the south east Asia including the eastern part of India. It is also an important species from economic point of view like its closest ally, *Coptotermes heimi*, a notorious species all over the country.

Family TERMITIDAE
 Subfamily APICOTERMITINAE
 Genus *Synhamitermes* Wasmann

1. Subgenus *Synhamitermes* Wasmann

1912. Holmgren, *K. Sv. Vetensk. Akad. Handl.*, **48** (4) : 91, 89.

2. Genus *Synhamitermes* Wasman

1949. Snyder, *Smith: misc. Coll.*, **112** : 129.

8. *Synhamitermes quadriceps* Wasmann

1902. *Synhamitermes quadriceps* Wasmann, *Zool. Jb. Syst.*, **17** (1) : 123–124.

Type-locality : Khandala, Maharashtra, India.

1979. *Synhamitermes quadriceps* Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, **13** (1) : 15.

Distribution : INDIA : Tripura : Ambasa; Assam, Maharashtra, Rajasthan.

Remarks : The species sparsely occurs in the soil nests from the eastern to western part of the country.

Subfamily TERMITINAE

1. Genus *Microcerotermes* Silvestri

1901. Silvestri, *Bull. Mus. Zool. Anat. Comp. Torino*, **16**, No. 389 : 3.

1966. Prasad, Thapa and Sen-Sarma, *Indian For. Bull (N. S.)* No. **248** : 2–5.

Key to species of *Microcerotermes* (Soldier)

1. Mandibles finely serrated and much shorter in relation to head-length (head-mandibular index 0.66-0.81).....*M. crassus* Snyder
- Mandibles coarsely serrated and slightly longer in relation to head-length (head-mandibular index (0.51-0.63).....2
2. Antero-lateral corners of labrum rounded, somewhat squarish.....*M. annandalei* Silvestri
- Antero-lateral corners of labrum greatly angulated, pentagonal in shape*M. labioangulatus* Sen-Sarma & Thakur

9. *Microcerotermes annandalei* Silvestri

1923. *Microtermes anandalee* Silvestri, *Rec. Indian Mus.*, **25** (2) : 225-228. S. W., Type-locality : Berkuda Island, Chilka Lake, Orissa.
1979. *Microcerotermes anandalei*, Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, **13** (1) : 15-16.

Distribution : INDIA : Tripura : Paratia; Bihar, Orissa.

Elsewhere : None.

Remarks : The species is mostly found in the soil nest in the eastern India particularly in less moist` areas.

10. *Microcerotermes crassus* Snyder

1934. *Microcerotermes crassus* T. E. Snyder, *Indian For. Rec. (N. S.) Ent.*, **20** (11) : 22-23. S. W. Type-locality : Meitkyina, Myanmar.
1966. *Microcerotermes crassus* Prasad, Thapa and Sen-Sarma, *Indian For. Bull. (N. S., Ent.)*, No. **246** : 35-39.
1979. *Microcerotermes crassus* Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.* **13** (1) : 16.

Distribution : INDIA : Tripura : Tiliamura.

Elsewhere : Myanmar.

Remarks : The species was first recorded from India by Sen-Sarma *et. al.* (1975) which was previously described from Myanmar.

11. *Microcerotermes labioangulatus* Sen-Sarma and Thakur

1975. *Microcerotermes labioangulatus* Sen-Sarma Thakur, Mishra and Gupta, *Wood destroying Termites of India (Final Tech. Rep. PL 480 Proj. A7-FS-58)* : 54 (*nom. nud.*).
1979. *Microcerotermes labioangulatus* Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.)*, **13** (1) : 16-18, Type-locality : Zoelchara, Ambasa, Tripura, India.

Distribution : INDIA : Tripura : Zoelchara, Paratia, Manu Range; Nagaland.

Elsewhere : None.

Remarks : The species is so far known only from its type-locality as mentioned above.

Genus *Angulitermes* Sjostedt

1924. *Angulitermes* Sjostedt, *Rev. Zool. Africaine*, **12** (2) : 257.
1949. *Angulitermes* Snyder, *Smith, Misc. Colls.*, **112** : 174.

12. *Angulitermes mishrai* Sen-Sarma and Thakur

1975. *Angulitermes mishrai* Sen-Sarma, Thakur, Mishra and Gupta, *Wood Destroying Termites of India (Final Tech. Rep. PL 480 Proj. A7-FS-58)* : 63 (*nom. nud.*).
1979. *Angulitermes mishrai* : Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.)*, **13** (1) : 18-20, S. W., Type-locality : Ambasa; Tiliamura, Tripura, India.

Distribution : INDIA : Tripura : Ambasa and Tiliamura.

Remarks : Uptil now, the species is known only from Tripura.

Genus *Dicuspiditermes* Krishna**Genus *Dicuspiditermes* Krishna**

1965. Krishna, *Amer Mus. Novit.*, No. 2210 : 16-18.
1984. Bose, *Rec. Zool. Survey India, Occ. Paper*, No. 49 : 144.

13. *Dicuspiditermes tripurensis* Sen-Sarma and Thakur

1875. *Dicuspiditermes tripurensis* Sen-Sarma, Thakur, Mishra and Gupta, *Wood Destroying Termites of India (Final Tech. Rep. PL 480 Proj. A7-FS-58)* : 63 (*nom. nud.*).

1979. *Dicuspiditermes tripurensis* Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, **13** (1) : 21-23. S. W., Type-locality : Tiliamura, Tripura, India.

Distribution : INDIA : Tripura : Tiliamura, Choraibari.

Genus *Pericapritermes* Silvestri

Genus *Pericapritermes* Silvestri

1914. Silvestri, *Boll. Lab. Zool. Gen. Agr.*, **9** : 134.

14. *Pericapritermes durga* (Roonwal and Chhotani)

1962. *Capritermes latignathus durga* Roonwal and Chhotani, *Proc. nat. Inst. Sci. India*, (B) **28** (4) : 325-329, S and W., Type-locality Cherrapunji, Meghalaya, India.
1968. *Pericapritermes latignathus durga* Krishna, *Bull. Am. Mus. nat. Hist.*, **138** (Art 5) : 294.
1979. *Pericapritermes latignathus durga* Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, **13** (1) : 23, 48 and 49.
1977. *Pericapritermes durga* Roonwal and Chhotani, *Ent. Basil.*, **2** : 64, 66, 68.

Material : i) Sev. S. and Sev. W. from Zoological Garden, Sepahijala Reserve Forest, West Tripura, Coll. P. H. Roy, 6. 11. 1991, ex. "under wood log" ii) 2 S. and Sev. W. from Zoological Garden, Sepahijala, Reserve Forest, West Tripura Coll. P. H. Roy, 6. 11. 1994, ex. "wooden strump"

Distribution : INDIA : Tripura : Sepahijala (present record), Ambasa (Zoeichara Range) and Belonia (Abhoya Forest) (Sen-Sarma and Thakur, 1979); Manipur, Meghalaya (Cherrapunji).

Remarks : The species is found only in the eastern India inhabiting mostly in the soil under log as found in Tripura.

Genus *Macrotermes* Holmgren

1. *Termes (Macrotermes)* Holmgren

1909. Holmgren, K. *Sev. Vet. Akad. Hondl.*, **44** (3) : 193 (No description).

2. *Macrotermes* Holmgren

1949. Snyder, *Smith. misc. Coll.* **112** : 208.
1997. Chhotani, *Fauna of India (Isoptera)*, **2** : 396-399.

15. *Macrotermes serrulatus hopini* Roonwal and Sen-Sarma

1956. *Macrotermes serrulatus hopini* Roonwal and Sen-Sarma, *Indian J. Agric. Sci.*, **26** (1) : 15-21. Type-locality : Hopin, Myanmar.
1979. *Macrotermes serrulatus hopini* Sen-Sarma and Thakur, *Indian For. Rec. (N. S.) Ent.*, **13** (1) : 23, 24 and 49.

Material : (i) 5 S. (Maj.) 1 S. (Min.) 12 W. from Amarpur, South Tripura, Coll. G. N. Saha. 12. 6. 1901. ex. "under bark" (ii) 3 Soldiers (Min.) Sev. Workers from Ushagram, Agartala, West Tripura, Coll. R. K. Kulin, 28. 12. 1991.

Distribution : INDIA : Tripura : Amarpur and Agartala (Ushagram) (Present record), Ambasa, Belonia and Paratia (Sen-Sarma and Thakur, 1997); Manipur.

Elsewhere : Myanmar (Hopin).

Remarks : The species was described from Myanmar and very recently reported from Tripura (Sen-Sarma and Thakur, 1979). It is collected from Tree-trunk under bark.

Genus *Odontotermes* Holmgren

1. *Termes (Odontotermes)* Holmgren

1911. Holmgren, K. *Sv. Vet. Akad. Handle.*, **46** : 11 (No description).

2. *Odontotermes* Holmgren.

1912. Holmgren K. *Sv. Vet. Akad. Handl.*, **48** : 35-40.
1981. Thakur, *Indian Forest Rec (N. S.) Ent.*, **14** (2) : 7-13.
1994. Maiti, Lahiri, Saha, Roy, State Fauna Series 6 : Fauna of Meghalaya,—Part 3 (In Press).

Key to species of *Odontotermes* (Soldier)

1. Distal segments of antennae not darker than the proximal segments, pale yellow to yellowish brown 2
- Distal segments of antennae distinctly darker than the proximal segments, dark rusty brown 3
2. Tooth on the left mandible placed near the middle (mandible-tooth index 0.50-0.54);

- head-capsule widest near the posterior third; sides weakly but distinctly convergent anteriorly *O. feae* (Wasmann)
- Tooth on the left mandible placed near the proximal end of middle one-third (mandible-tooth index 0.56–0.60); head-capsule widest in the middle, sides parallel indistinctly converging anteriorly
..... *O. horni* (Wasmann)
3. Tooth on the left mandible placed near the apices; mandibles rather feebly built; tooth index less than 0.28, head-mandibular index 0.59–0.79 4
- Tooth on the left mandible placed near the apical third; tooth index more than 0.28; head-mandibular index 0.59–0.66 5
4. Smaller species; head-capsule widest near the middle, head-mandibular index comparatively high (0.50–0.61, Mean 0.56)
..... *O. giriensis* Roonwal & Chhotani
- Larger species, head-capsule widest near the posterior third; head-mandibular index comparatively low (0.51–0.52)
..... *O. kapuri* Roonwal & Chhotani
5. Mandibles long; outer margin strongly bent near the basal third; labrum longish; head-mandibular index (0.69–0.79)
..... *O. redemanni* (Wasm.)
- 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)

16. *Odontotermes feae* (Wasmann)

1896. *Termes feae* Wasmann, *Ann. Mus. Stor. Nat. Genova* (2) 16 (36) : 625, S. W. Type-locality : Carin Cheba, Myanmar.
1913. *Odontotermes (Odontotermes) feae*, Holmgren, K. *Vetenak. Akad. Handl.*, 50 (2) : 129.
1914. *Odontotermes feae*, Silvestri, *Rec. Indian Mus.*, 8 (5) : 428.
1979. *Odontotermes feae*, Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, 13 (1) : 24, 25 and 49.

25-1/zsi/cal/2000

1994. *Odontotermes feae*, Maiti, Lahiri, Saha & Roy, *State Fauna Series 6 : Fauna of Meghalaya*, Part 3 (In Press).

Material : i) 6 S. and 1 W., Santin Bazar, S. Tripura, Coll. P. H. Roy, 12. 11. 91, ex. "Under Old plants" ii) 3 S. and 6 W. from Kunjaban, Agartala, West Tripura, Coll. P. H. Roy, 29. 10. 1991, ex. "Barbed fencing wooden pole", iii) 2 S. and 6 W. from Krishnapur forest, Tiliamura, West Tripura, Coll. P. H. Roy, 1. 11. 1991, ex. "Gallery on wooden log", (iv) one vial with 1 S. and 3 W. from Nepaltila, North Tripura, Coll. V. T. Darlong, 12. 6. 1988, v) 8 S. and 4 W. Tiliamura, W. Tripura, Coll. R. S. Burman, 27. 2. 1992.

Distribution : INDIA : Tripura : Agartala (Kunjabon), Tiliamura, (Krishnapur forest) Nepaltila and Santirbazar (present record); Agartala, Ambasa, Belonia, Paratia and Tiliamura (Sen-Sarma and Thakur, 1979); Assam, Bihar, Arunchal Pradesh, Meghalaya and Maharashtra.

Elsewhere : Bangladesh, Burma, Thailand and Vietnam.

Remarks : It is a very common species occurring in the South-Asian countries, including north-east India. In Tripura, it has been collected from mudplastering on fence post and other wooden poles.

17. *Odontotermes giriensis* Roonwal and Chhotani

1962. *Odontotermes giriensis* Roonwal and Chhotani, *Proc. Nat. Inst. Sci. India*. New Delhi (B) 28 (4) : 341–345, Type-locality : Rongrengiri, Garo Hills, Meghalaya, India.
1979. *Odontotermes giriensis* Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.* 13 (1) : 25, 26 and 50.
1981. *Odontotermes giriensis* Thakur, *Indian Forest Rec. (N. S.) Ent.* 15 (1) : 45.
1994. *Odontotermes giriensis*. Maiti, Lahiri, Saha, Roy, *State Fauna Series : Fauna of Meghalaya*, Part 3 (In Press).

Material : (i) 3 S. and 7 w. from Tiliamura, West Tripura. Coll. P. H. Roy, 2. 11. 1991, ex. "Gallery on Sal tree"

Distribution : INDIA : Tripura : Tiliamura (Sen-Sarma and Thakur, 1979). Arunachal Pradesh, Assam, Gujarat, Meghalaya, Orissa, Rajasthan and Uttar Pradesh.

Elsewhere : Bangladesh.

Remarks : It is purely an Indian species found scattered all over India. It is collected from gallary on a Sal tree in Tripura.

18. *Odontotermes horni* (Wasmann)

1902. *Termes horni* Wasmann, *Zool. Jahrb. (Syst.) Jena*, **17** (1) : III, S. Type-locality : Nalanda, Sri Lanka.
1912. *Odontotermes (Odontotermes) horni*, Holmgren, K. *Svenska. Vetensk. Akad. Handl.*, **48** : 36.
1949. *Odontotermes horni*, Snyder, *Smiths. Misc. Coll.*, **112** : 229.
1994. *Odontotermes horni* Maiti, Lahiri, Saha and Roy, *State Fauna Series 6 : Fauna of Meghalaya*, Part 3 (In Press).

Material : 1 S. and 5 W. from Jolai Bazar, South Tripura, Coll. V. T. Dariong. 12. 6. 1988. (ii) S. and W. from Navkal Bagan, Coll. R. S. Burman. 21. 2. 1992. (iii) 2 S. and 7 W. from Ghotaghat, South Tripura Coll. P. H. Roy, 7. 11. 1991, ex. "under a log" (iv) 4 S. and 8 W. from Ghotaghat, South Tripura Coll. P. H. Roy, 7. 11. 1991, ex. "under a log" (v) 2 S. and 3 W. from Sonamura, West Tripura, Coll. P. H. Roy, 8. 11. 1991. ex. "under Bamboo leaves" (iv) 2 S. and 10 W., Sepahijala Forest (near Rubber Garden), W. Tripura, Coll. P. H. Roy, 8. 11. 91, ex. under log and fallen leaves.

Distribution : INDIA : Tripura : Jolai Bazar, Navkal Bagan, Ghotaghat. Sepahijala and Sonamura, (all present record) Manipur and South India, Madhya Pradesh, West Bengal, Orissa.

Elsewhere : Sri Lanka, Vietnam and Cambodia.

Remarks : The identity of the species is always confused with that of *O. feae*, a very closely allied species to this. Both the species had been identified from the north-east India. Recently, Thakur (1981) doubted its occurrence to eastern India only where *O. feae* is commonly found. But it seems to be erroneous as per our present study.

19. *Odontotermes kapuri* Roonwal and Chhotani

1962. *Odontotermes kapuri* Roonwal and Chhotani, *Proc. nat. Inst. Sci. India*, (B) **28** (4) : 352-356, S. W. Type-locality : Cherrapunji, Meghalaya.
1981. *Odontotermes kapuri*, Maiti, Lahiri, Saha and Roy, *State Fauna Series 6 : Fauna of Meghalaya Part 3* :

Distribution : INDIA : Tripura : Ambasa, and Tiliamura; Meghalaya and West Bengal.

Elsewhere : Bhutan.

Remarks : The species less known in India, occurring in eastern India, including at the quite high altitude of Bhutan.

20. *Odontotermes obesus* (Rambur)

1842. *Termes obesus* Rambur, *Hist. nat. Ins. Neuroptera* : 304.
1949. *Odontotermes (Odontotermes) obesus*, Snyder, *Smiths. Misc. Coll.*, **112** : 285.
1994. *Odontotermes feae*, Maiti, Lahiri, Saha and Roy, *State Fauna Series 6 : Fauna of Meghalaya Part 3* :

Distribution : INDIA : Tripura : Ambasa, All over India.

Elsewhere : Bangladesh, Myanmar and Pakistan.

Remarks : It is one of the most common mound building species in India including its adjacent countries, like Bangladesh, Myanmar and Pakistan.

21. *Odontotermes redemanni* (Wasmann)

1893. *Termes redemanni* Wasmann, *Wien. Ent. Zeitg.*, **12** (7) : 239. 1m; S; W, Type-locality : Sri Lanka.
1913. *Odontotermes redemanni* Holmgren, K. *Svensk. Vetensk. Akad. Handl.*, **50** (2) : 110.
1994. *Odontotermes redemanni*, Maiti, Lahiri, Saha and Roy, *State Fauna Series 6 : Fauna of Meghalaya Part 3* (In Press).

Material : Sev. S. & W., Girania, 11. ix. 1992, Coll. B. N. Das and S. K. Saha.

Distribution : INDIA : Tripura : Girania; Bihar, Meghalaya, South India and West Bengal.

Elsewhere : Bangladesh and Sri Lanka.

Remarks : *Odontotermes redemanni* is a very variable and common mound building termite in India and reported for the first time from Tripura. It is very much closely allied to *Odontotermes obesus*, from which it cannot be easily isolated. It has got a minor pest status in the country.

Genus *Hypotermes* Holmgren

1. *Odontotermes* (*Xenotermes*) Holmgren

1912. Holmgren, K. *Sv. Vet. Akad. Handl.*, **48** : 36–39.

2. *Odontotermes* (*Hypotermes*)

1949. Snyder, *Smith. misc. Coll.*, **112** : 244.

3. *Hypotermes* Holmgren

1956. Roonwal and Sen-Sarma, *J. Agric. Sci.* **26** (1) : 21.

1984. Bose, *Rec. zool. Surv. India, Occ. Paper*, No. 49 : 200.

Key to species of *Hypotermes* (Soldier)

1. Side of head—capsule subparallel, gradually tapering anteriorly; mandibles about half the head—length to lateral base of mandibles ...
.....*H. obscuriceps* (Wasm.)
- Sides of head capsule convex, strongly converging in front; mandibles less than half the head—length to lateral base of mandibles ...
.....*H. xenotermitis* (Wasm.)

22. *Hypotermes obscuriceps* (Wasm.)

1902. *Termes obscuriceps* Wasmann, *Zool. Jahrb. Abt. Syst. Jena*, **17** (1) : 113.

1913. *Odontotermes* (*Hypotermes*) *obscuriceps*, Holmgren, K. *Vetensk. Akad. Handl.*, **50** (2) : 141.

1979. *Hypotermes obscuriceps*, Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, **13** (1) : 27, 28 and 51.

Material : i) 2 S. and 3 W. from Tiliamure, West Tripura, Coll. *P. H. Roy*, 2. 11. 91, ex. “gallery on tree”; ii) 2 S. and 4 W. from Sonamura, West Tripura, Coll. *P. H. Roy*, 7. 11. 91, ex. “gallery on stump of wood”; iii) Sev. S. and Sev. W. from Santir Bazar, Paratia Forest, South Tripura, Coll. *P. H. Roy*, 10. 11. 1991; iv) Sev. S. and Sev. W. from Sabroom, South Tripura, Coll. *M. Dutta*, 4. 11. 1991; v) 3 S. and 4 W. from Ghotaghat forest, South Tripura, Coll. *P. H.*

Roy, 6. 11. 1991, ex. “gallery on tree”, vi) 7 S. and sev. W. from Sepahijala, West Tripura, Coll. *P. H. Roy*, 8. 11. 1991, “under a long”, vii) 8 S. and Sev. W. from Sepahijala forest, West Tripura, Coll. *P. H. Roy*, 5. 11. 1991, ex. “gallery on tree”; viii) 4 S. and 7 W. from Ghotaghat forest, West Tripura, Coll. *P. H. Roy*, 8. 11. 1991, ex. “under a log”; ix) 3 S. and 5 W. from Sepahijala, West Tripura, Coll. *P. H. Roy*, 8. 11. 1991, ex. “under a bamboo”

Distribution : INDIA : Tripura : Ghotaghat forest, Sepahijala, Sonamura and Tiliamure (all present record); Ambasa, Belonia, Choraibari and Paratia; Meghalaya, Tamil Nadu and West Bengal.

Elsewhere : Sri Lanka and Vietnam (doubtful).

Remarks : The species is so far known from the eastern India as well as from Silauka and South Vietnam.

23. *Hypotermes xenotermitis* (Wasmann)

1896. *Termes xenotermitis* Wasmann, *Ann. Mus. Civ. Stor. Nat.*, (2) **16** (36) : 628,

1913. *Odontotermes* (*Hypotermes*) *xenotermitis*, Holmgren, K. *Vetensk. Akad. Handl.*, **50** (2) : 143.

1994. *Hypotermes xenotermitis*. Maiti, *et al.*, *State Fauna Series 6 : Fauna of Meghalaya. Part 3* (In Press).

Distribution : INDIA : Tripura : Belonia; Assam, Meghalaya, West Bengal.

Elsewhere : Myanmar, Thailand and Bangladesh.

Remarks : It is one of most common soil inhabiting termites in India and mostly found in the eastern India.

Genus *Microtermes* Wasmann

1. Genus *Microtermes* Wasmann

1902. Wasmann *Zool. Jahrb. Abt. Syst.*, **17** No. 1 : 115.

Key to species of *Microtermes* (Soldier)

1. Head capsule subcircular, sparsely hairy; mandibles very strongly hooked apically; labrum tongue-shaped, broadly rounded
.....*M. pakistanicus* Ahmed

- Head capsule oval, moderately pilose; mandibles weakly incurved apically; labrum lancet shaped, with triangular tip
.....**M. obesi** Holmgren

24. *Microtermes obesi* Holmgren

1913. *Microtermes obesi* Holmgren, K. Svenska Vetensk. Akad., **50** (2) : 150. 1m., Type-locality : Khandala, Maharashtra, India.
1913. *Microtermes anandi*, Holmgren, J. Bombay nat. Hist. Soc., **22** (1) : 114.
1979. *Microtermes obesi*, Sen-Sarma and Thakur, Indian Forest Rec. (N. S.) Ent., **13** (1) : 28, 29 and 52.
1994. *Microtermes obesi*, Maiti et al., State Fauna Series 4 : Fauna of Meghalaya (In Press).

Material : (i) Sev. S. and Sev. W. from **Kamal Sagar**, West Tripura, Coll. **S. K. Chakraborty** and **B. R. Mitra**, 7. 5. 1992. (ii) **one vial with** 4 S. and Sev. W. from **Kumar ghat forest Range**, North Tripura, Coll. **S. K. Chakraborty** and **B. R. Mitra**, 19. 5. 1992. (iii) Sev. S. and Sev. W. from **Ambassa**, North Tripura, Coll. **R. K. Kulkarni**, 25. 12. 1991. (iv). Sev. S. and Sev. W. from **Choraibari**, West Tripura coll. **S. K. Chakraborty** and **B. R. Mitra**, 27. 5. 1992, (v) 3 S. and 15 W. **Sepahijala Forest** (near Rubber Garden), W. Tripura, Coll. **P. H. Roy**, 8. 11. 91. ex. Under log and fallen leaves.

Distribution : INDIA : Ambassa, Choraibari, Kamal Sagar, Kumarghat and Sipahijala (all present record); Agartala, Ambassa, Belonia, Choraibari, Paratia and Tiliamura (Sen-Sarma and Thakur, 1979); Assam, Bihar, Meghalaya, Karnataka, Orissa, Maharashtra.

Elsewhere : Sri Lanka, Bangladesh, and Pakistan, Bhutan, Thailand, Vietnam, Kampuchia.

Remarks : The species is one of the subterranean termites occurring in different countries of the south-east Asia including India. It is a quite known pest of vegetable crop and occurs in close association with many other soil termites.

25. *Microtermes pakistanicus* Ahmad

1955. *Microtermes pakistanicus* Ahmad, Biologia. **1** (1) : 25–27, Type-locality : Chittagong Hills, Bangladesh.

1964. *Microtermes pakistanicus*. Chatterjee and Thakur, Indian Forest Rec. (N. S.) Ent., **13** (1) : 29, 30 and 53.

1979. *Microtermes pakistanicus*. Sen-Sarma and Thakur, Indian Forest Rec **10** (11) : 229–242.

Material : (i) 2 S. and Sev. W. from **Khowai village side**, West Tripura, Coll. **P. H. Roy**, 3. 11. 1991, ex. “under fallen bamboo leaves” (ii) 8 S. Sev. W. from **Ghota ghat forest area**, Sepahijala, West Tripura, Coll. **P. H. Roy**, 7. 11. 1991, ex. “Gallery in small log”; (iii) 2 S. and Sev. W. from **Rubber factory**, Sepahijala Reserve Forest, West Tripura, Coll. **P. H. Roy**, 8. 11. 1991, ex. “under a log”; (iv) Sev. S. and Sev. W. from **Zoological Garden**, Sepahijala Reserve Forest, West Tripura, Coll. **P. H. Roy**, 16. 11. 92, ex. 16. 11. 1991 (v) 3 S. and Sev. W. from **Sepahijala Reserve Forest**, West Tripura, Coll. **P. H. Roy**, 5. 11. 1991, ex. “gallery on tree” (vi) 3 S. and Sev. W., **Santir Bazar**, South Tripura, Coll. **P. H. Roy**, 12. 11. 1991, ex. “under a log” (vii) Sev. S. and W. **Agartala**, Tripura, Coll. **P. H. Roy**, 10. 11. 1991, ex. “Barbed wire fencing wooden pole”

Distribution : INDIA : Tripura : Agartala, Khowai village, Sepahijala and Santir Bazar (all present record); Ambassa, Belonia, Choraibari, Paratia and Tiliamura (Sen-Sarma and Thakur, 1979); Assam and Meghalaya.

Elsewhere : Bangladesh, Indonesia, Myanmar, Singapore and Thailand.

Subfamily NASUTITERMITINAE

Genus *Nasutitermes*

1. Genus *Nasutitermes* Dudley

1890. Dudley, Trans. N. Y. Acad. Sci., **9** : 158.

1994. Maiti et al. State Fauna Series 6 : Fauna of Meghalaya, Part 3 (In Press).

Key to species of *Nasutitermes* (Soldier)

1. Head-capsule brown to castaneous brown. posterior margin invaginated in the middle..
.....**N. emersoni** Snyder
— Head-capsule pale brown, posterior margin not invaginated in the middle

..... **N. jalpaiguriensis**
Prasad & Sen-Sarma

26. *Nasutitermes emersoni* Snyder

1934. *Nasutitermes (Nasutitermes) emersoni* Snyder, *Indian For. Rec.*, **20** (11) : 11-12, S., Type-locality : Sundarbans, Bangladesh.

1979. *Nasutitermes emersoni* Sen-Sarma and Thakur, *Indian Forest Rec. (N. S.) Ent.*, **13** (1) : 30-31.

Distribution : INDIA : Tripura : Choraibari

Elsewhere : Bangladesh.

27. *Nasutitermes jalpaiguriensis* Prasad and Sen-Sarma

1959. *Nasutitermes jalpaiguriensis* Prasad and Sen-Sarma, *Indian Counc. Agric. Res. Monogr.*, No. 1029 : 39-43, S. and W., Type-locality : Jalpaiguri, West Bengal.

1983. *Nasutitermes jalpaiguriensis* Maiti, *Rec. Zoo. Surv. India, Occ. Paper No. 42* : 124-126.

Distribution : INDIA : Tripura : Tiliamura : Arunachal Pradesh, West Bengal.

Elsewhere : Bangladesh.

Remarks : The species is widely distributed in the moist deciduous Forest tracts in the foot hills of Darjiling.

28. *Hospitalitermes ataramensis* Prasad and Sen-Sarma

1960. *Hospitalitermes ataramensis*, Prasad and Sen-Sarma, *Rev. Termite Genus Hospitalitermes. Indian Region (ICAR Monogr. 10. 29)* : 4, 5-10, W. S., Type-locality Ataram, Pokabo Reserve, Myanmar).

1977. *Hospitalitermes ataramensis*. Chhotani, *Occ. Pap. Rec. Zool. Surv. India*. No. 9 : 36.

Material : Several S. and W. from Nalkata, Tripura, Coll. V. T. Darlong, 14. 6. 1988.

Distribution : INDIA : Tripura, Nalkata (present record).

Elsewhere : Cambodia, Myanmar, Thailand and Vietnam.

Family **INDOTERMITIDAE**

Genus ***Indotermes* Roonwal and Sen-Sarma**

1. Genus *Indotermes* Roonwal and Sen-Sarma

1958. Roonwal and Sen-Sarma, *Trans. Bose Res. Inst.*, **22** : 81-82.

1989. Roonwal and Chhotani, *Fauna of India (Isoptera)*, **1** : 602-603.

29. *Indotermes rongrensis* (Roonwal and Chhotani)

1962. *Speculitermes cyclops rongrensis* Roonwal and Chhotani, *Proc. natul. Inst. Sci. India*, (B) **28** (4) : 314, W. Type-locality : Rongrengiri, Meghalaya, India.

1989. *Indotermes rongrensis* Roonwal and Chhotani, *Fauna of India (Isoptera)* **1** : 609.

1994. *Indotermes rongrensis* Maiti, *et al.*, *Fauna of Meghalaya : Series 6 Part 3* (In Press).

Distribution : INDIA : Tripura, Belonia, Choraibari, Tiliamura; Meghalaya.

Elsewhere : None.

Remarks : The species restricts itself in the eastern India, occurring mostly in the soil. In a single occassion in Tripura, it has been collected from the outer pocket of a termite mound.

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INSECTA : PSOCOPTERA

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INTRODUCTION

Psocopteran insects are commonly known as booklice and have much of economic importance. They are minute in size, subglobular in shape, whitish to brownish in colour, and damage our valuable books, manuscripts, dry preserved specimens of insects and plants. These, sometimes, disseminate plant diseases by feeding pathogenic fungi. They are generally found among old books, journals, leaf-litter, straws, in foliage and under bark.

Perusal of literature reveals that these insects are represented in India by over 85 species (Enderlein, 1903; Menon, 1938, 1942; Pearman, 1942; Datta, 1963, 1965, 1966, 1969; Thronton & Wong, 1966; Ray, 1979 and Badonnel, 1981) and from the world by over 2,500 species, whereas the representation in Tripura is only by 5 species till date.

A detailed account of the species, material of which were collected from the districts of Tripura or deposited in Zoological Survey of India. Account, is furnished, with synonymy, key, diagnostic characters, illustrations and distribution and also with a distribution-map of the species, collected from Tripura.

MATERIAL AND METHOD

These small insects (psocids) can be collected from old books (domestic) and in the field from foliage, bushes and straws, specially from semi-

dry and dry leaves by beating them with a stick and by placing a white enamel tray beneath.

The collected insects can then be put inside the glass tubes filled with alcohol by a fine brush, soaked in alcohol, for preservation. The preserved specimens can then be observed under microscope as such or stained or in dissected forms for study and drawing. The sclerotised parts can be dissected from musculature by KOH solution and then by dehydration in alcoholic strength.

The measurements of the specimens studied, were all in mm. (in alcohol).

MORPHOLOGY AND TERMINOLOGY

General Morphology

The psocids generally have a subglobular body, two pairs of thin, membranous wings (The bigger forewings normally in the pterostigma and smaller hindwings). The wings possess veins in most of the cases, a few may be apterous (where hind femora of the leg is swollen). Head is small with long, filiform antennae; legs are mostly medium-sized, in few these may be longer than body-length; Throat is proportionate to the body and abdomen is generally sub-globular, in few cases it may be oblong also. The genital armature lodged at the last abdominal segment (VII to IX), is well-sclerotised, both in male and in female, and is furnished with gonapophyses, hypandrium, subgenital plate, epiproct and paraproct.

TERMS AND EXPLANATION USED IN KEY AND TEXT

<i>Name of term</i>	<i>Explanation</i>
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.
Paraproct	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.

SYSTEMATIC ACCOUNT

*Systematic list of the species of psocoptera
known from Tripura*

Family PSYLLIPSOCIDAE

1. *Granthakita cuttackae* Behura & Dash

Family LIPOSCELIDAE

2. *Liposcelis transvaalensis* (Enderlein)

3. *Liposcelis bengalensis* Badonnel

Family CAECILIIDAE

4. *Dypsocus fucosus* Tharnton & Wong.

Family ECTOPSOCIDAE

5. *Ectopsocus bengalensis* Datta

Key to the families

1. Winged forms 2
—Non-winged forms; hind ferora of leg swollen*Liposcelidae*
2. Tarsal joint 3-segmented*Psyllipsocidae*
—Tarsal joint 2-segmented 3
3. Forewing : veins with one row of setae
.....*Caeciliidae*
—Forewing : veins with more than one row of setae*Ectopsocidae*

Family PSYLLIPSOCIDAE

Genus *Granthakita* Behura & Dash

1968. *Granthakita* Behura & Dash, *Park. Utkal Univ. J. (Sci.)*, 5 (2) : 47-51.

1. *Granthakita cuttackae* Behura & Dash

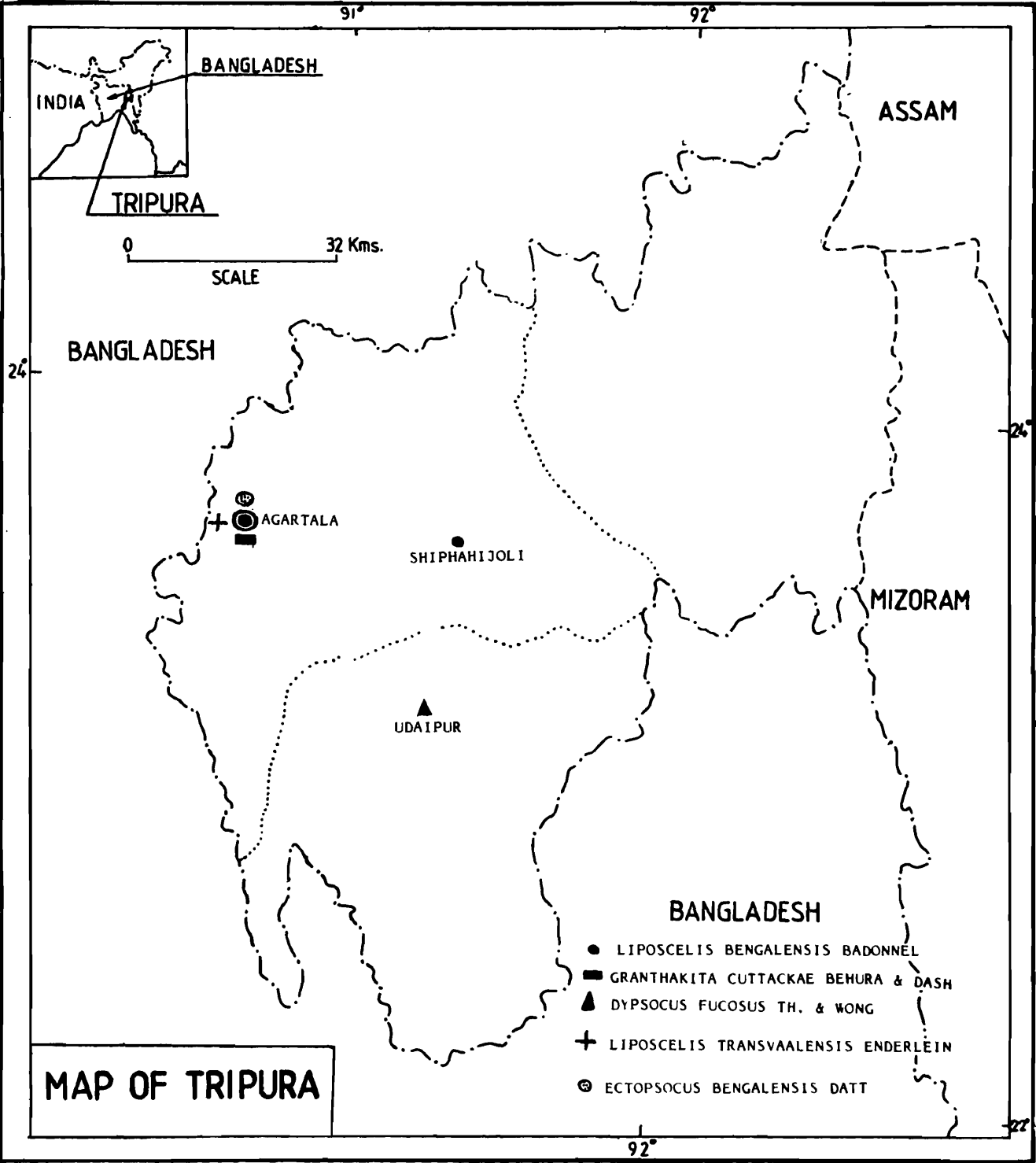
1968. *Granthakita cuttackae* Behura & Dash, *Prak. Utkal Univ. J. (Sci.)*, 5(2) : 47-51.

Material : 1 ex., Agartala, 22. 5. 1996 and 1 ex., Agartala, 31. 5. 1996, coll. T. R. Mitra.

Diagnosis : The veins of the wings are variable.

Distribution : India : Tripura (Agartala), West Bengal (Calcutta) and Orissa (Cuttack).

Remarks : This species is very common in human habitations. It is recorded for the first time from Tripura.



Map 1 : Distribution map of Psocoptera in Tripura.

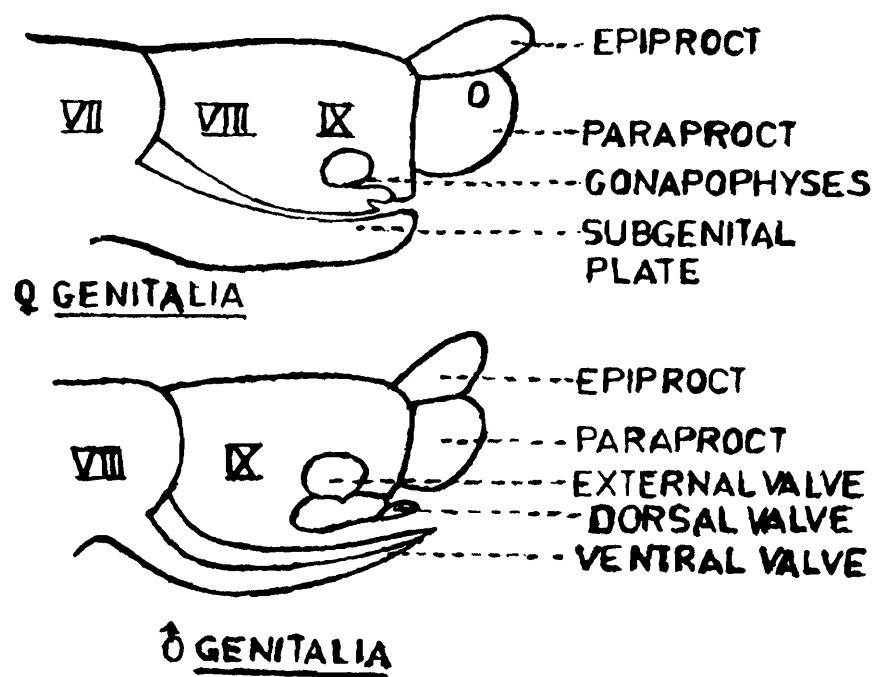
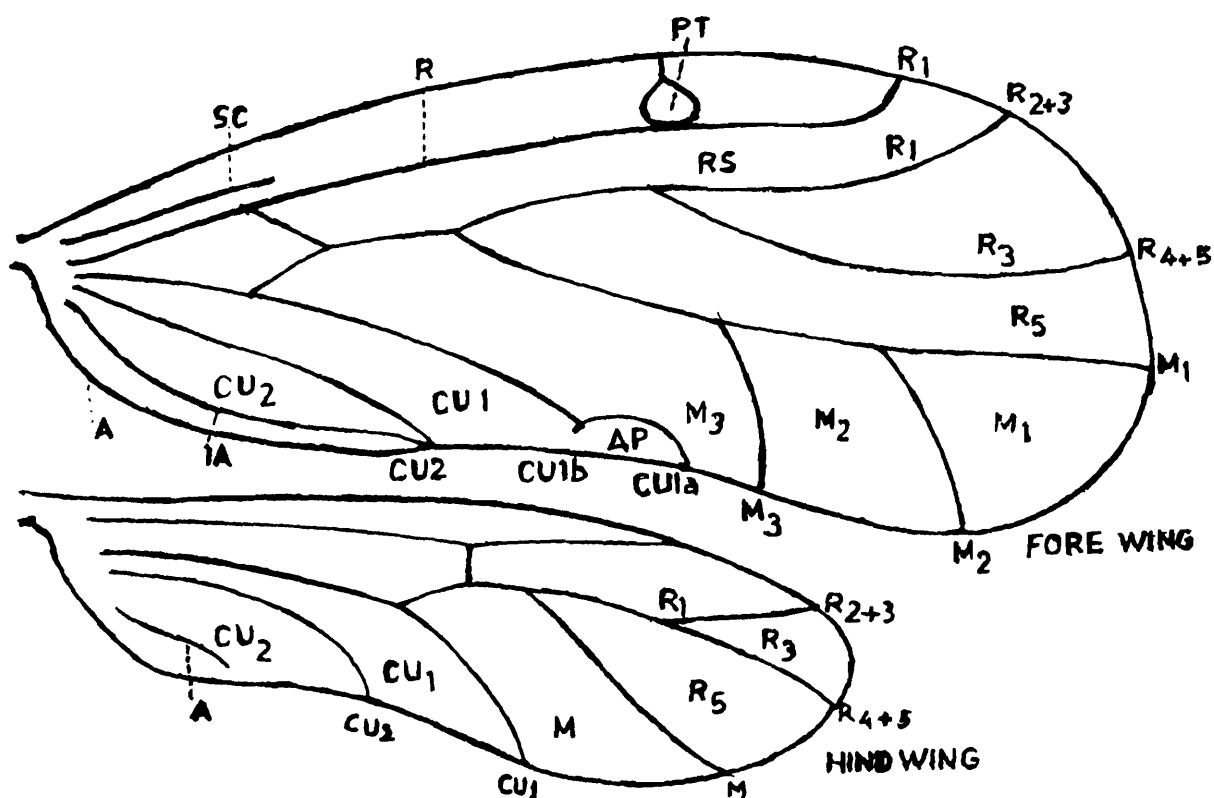


Fig. 1 : Forewing and its venations ; Fig. 2 : Hindwing and its venations.
Fig. 3 & 4 : Generalized representation of male and female genitalia respectively.

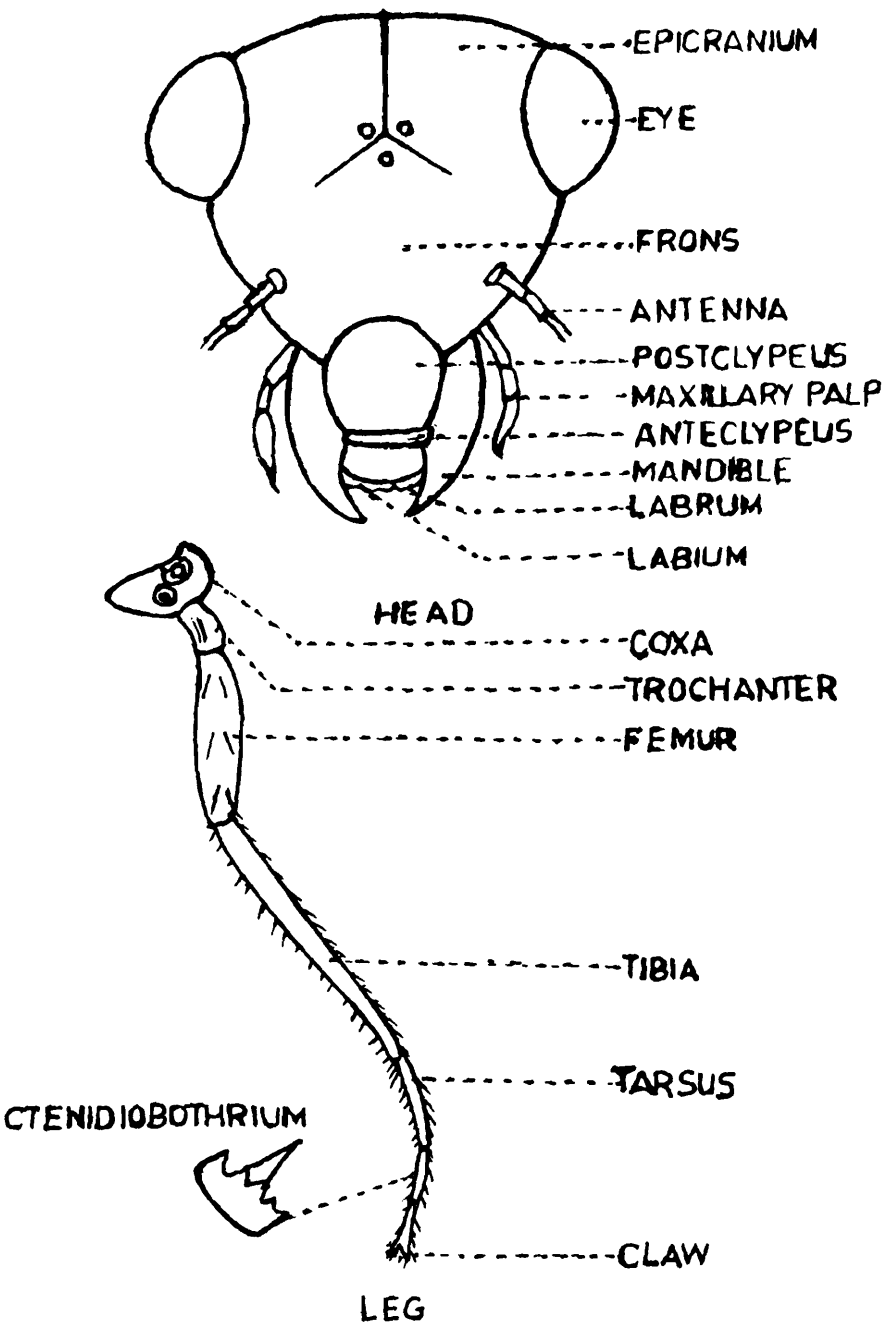


Fig. 5 : Head (Frontal view) ; Fig. 6 : Leg ; Fig. 7 : Ctenidibothria.

Family LIPOSCELIDAE

Genus *Liposcelis* Motschulsky1776. *Termes* Muller, *Zool. Danicae prod.*, p. 184.1967. *Liposcelis* Motschulsky, *smithers, Austr. Zool.* **14** (1) : 24.*Key to the species of Liposcelis Motschulsky*

1. No of sternal setae varies from 5-10.....
*L. transvalensis* End.
 —No. of sternal setae varies from 17-19
*L. bengalensis* Bad.

2. *Liposcelis transvaalensis* Enderlein1909. *Troctes transvaalensis* Enderlein, *Stettin ent. Ztg.*, **70** : 27.1967. *Liposcelis transvaalensis* (Enderlein), *Smithers, Austr. Zool.*, **14** (1) : 28.*Material* : 3 exs., Agartala, 25.5.1996, coll. T. R. Mitra.*Diagnosis* : The number of sternal setae varies between 9-10.*Distribution* : India : Tripura (Agartala), West Bengal (Calcutta), Maharashtra (Bombay) and South Africa (Transvaal).*Remarks* : This particular apterous psocid species damage our books. It is recorded for the first time from Tripura.3. *Liposcelis bengalensis* Badonnel1981. *Liposcelis bengalensis* Badonnel, *Rev. Suisse Zool.*, **88** (2) : 384-386.*Material* : 1 ex., Shiphaijoli, 26.v.1996, coll. T.R. Mitra.*Distribution* : India : Tripura (Shiphaijoli), West Bengal (Darjeeling).*Remarks* : It is recorded for the first time from Tripura.

Family CAECILIIDAE

Genus *Dypsocus* Hagen1866. *Dypsocus* Hagen, *Verh. Zool.-bot. Ges. Wien.*, **16** : 207.1969. *Dypsocus* Hagen, *Smithers, Austr. Zool.*, **14** (1) : 36.4. *Dypsocus fucosus* Th. & Wong1966. *Dypsocus fucosus* Thornton & Wong, *Tr. R. ent. Soc. Lond.*, **118** (1) : 10-13.*Material* : 1 ex., Udaipur, 29.5.1996, coll. T. R. Mitra.*Distribution* : India : Tripura (Udaipur), West Bengal (Darjeeling).*Remarks* : It is recorded for the first time from Tripura.

Family ECTOPSOCIDAE

Genus *Ectopsocus* Mcl.1899. *Ectopsocus* Mclachlan, *Ent. month Mag.*, **35** : 277.1967. *Ectopsocus* Mclachlan, *Smithers, Austr. Zool.*, **14** (1) : 64.5. *Ectopsocus bengalensis* Datta1965. *Ectopsocus bengalensis* Datta, *J. Beng. nat. Hist. Soc.*, **34** (1) : 58-60.1979. *Ectopsocus bengalensis* Datta, *Rec. zool. Surv. India*, **75** : 356.*Material* : 1 ex., Agartala, 30.v.1996, coll. T. R. Mitra.*Diagnosis* : Apical region of subgenital plate with 8 setae in ♂ and in ♂ penis frame with a pair of sagital plate anteriorly.*Distribution* : India : Tripura (Agartala), West Bengal (North 24-Parganas and Calcutta).*Remarks* : It is recorded for the first time from Tripura.

SUMMARY

The paper deals with 5 species of Psocoptera belonging to 4 genera and 4 families recorded for the first time from Tripura. All the species documented are furnished with synonymy, keys and distribution.

ACKNOWLEDGEMENTS

The author acknowledge his greatful thanks to Dr. J.R.B. Alfred, Director, Zoological Survey of India, Calcutta for facilities, sincere thanks are

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INSECTA : HEMIPTERA : CERCOPOIDEA, CICADELLOIDEA, CICADOIDEA AND FULGOROIDEA

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INTRODUCTION

The Hemiptera are the most important exopterygote insects with piercing and sucking type of mouth parts. The group is divided into two suborders viz., (i) Homoptera containing 8 superfamilies which include Aphids, Mealy bugs, Cicadas, Psyllids, White flies, Leaf hoppers, Tree hoppers etc. and (ii) Heteroptera consisting of 14 superfamilies which include stink and Shield bugs, Assassin bugs, Lace bugs etc. and 14 other families of aquatic and semiaquatic bugs.

The information available on homopteran fauna of Tripura is very meagre. The earlier reference on Homoptera from the state includes Ganguli and Ghosh, 1964 ; Gangopadhyay, 1980 ; Ganguli and Agarwala, 1985, Varshney, 1985 ; Agarwala and Varshney, 1988 ; Bhattacharya and Agarwala, 1991 ; Agarwala and Bhattacharya, 1992.

The present study is the first consolidated account of some superfamilies of the homopteran fauna (excluding Aphids) of Tripura. The account deals with 41 species belonging to 35 genera under five families viz., Cercopidae, Cicadellidae, Cicadidae, Fulgoridae and Membracidae. The Family Aphididae has been dealt separately. All the species constitute new records from the state of Tripura and very likely many more species of the order Hemiptera may be found if specialised surveys of different groups are undertaken.

The material dealt with here was collected by different survey parties of Zoological Survey of India. For each species the original reference and

subsequent reference(s) are given. Keys to families, subfamilies, genera and species for easy identification of various taxa, diagnosis of genera and species, distributional records within the state and elsewhere are also given. For limitation of space only selected references are provided.

The classification is basically followed after Distant (1902, 1910) and Metcalf (1963). All the material examined, are in the National Zoological Collections at the Zoological Survey of India, Calcutta.

SYSTEMATIC ACCOUNT

Key to the Suborders of HEMIPTERA of Tripura

Forewings usually of equal consistency
.....HOMOPTERA

Forewings usually thickened basally and membranous apically HETEROPTERA

Key to the families of suborder HOMOPTERA

1(2) Pronotum prolonged backward into a process MEMBRACIDAE

2(1) Pronotum normal 3

3(4) Abdomen usually with a pair of siphunculi arising from 5th or 6th tergite ; tarsi mostly two-segmented APHIDIDAE

(Dealt separately,
not included here)

4(3) Abdomen without such organ 5

- 5(6) Stridulatory apparatus present
.....CICADIDAE
- 6(5) Stridulatory apparatus absent 7
- 7(8) Last abdominal segment terminating in a
filament, anal area of wing distinctly
reticulated FULGORIDAE
- 8(7) Last abdominal segment normal ; wing not
as above 9
- 9(10) Hind tibiae with two rows of spines ; ocelli
situated between the eyes
.....CICADELLIDAE
- 10(9) Hind tibiae with a number of rows of
spines ; ocelli situated on vertex
.....CERCOPIIDAE

Suborder HOMOPTERA

Superfamily CERCOPOIDEA

Family I. APHROPHORIDAE

Genus 1. *Clovia* Stål

1. *Clovia conifera* (Walker)

2. *Clovia puncta* (Walker)

Genus 2. *Poophilus* Stål

3. *Poophilus costalis* (Walker)

Genus 3. *Ptyelus* St. Farg. & Serville

4. *Ptyelus nebulosus* (Fabricius)

Family II. CERCOPIIDAE

Genus 4. *Abidama* Distant

5. *Abidama producta* (Walker)

Genus 5. *Callitettix* Stål

6. *Callitettix varicolor* Breddin

Genus 6. *Leptataspis* Schmidt

7. *Leptataspis fulviceps* (Dallas)

Superfamily CICADELLOIDEA

Family III. CICADELLIDAE

Subfamily 1. CICADELLINAE

Genus 7. *Bothrogonia* Melichar

8. *Bothrogonia ferruginea* (Fabr.)

Genus 8. *Cicadella* Melichar

9. *Cicadella spectra* (Distant)

Genus 9. *Cofana* Melichar

10. *Cofana mimica* (Distant)

Genus 10. *Kolla* Distant

11. *Kolla opponens* Walker

Subfamily 2. GYPONINAE

Genus 11. *Neodartus* Melichar

12. *Neodartus acocephaloides* Distant

Subfamily 3. HECALINAE

Genus 12. *Parabolocratus* Fieber

13. *Parabolocratus albomaculatus* (Distant)

Subfamily 4. DELTOCEPHALINAE

Genus 13. *Exitianus* Ball

14. *Exitianus atkinsoni* (Distant)

15. *Exitianus indicus* (Distant)

16. *Exitianus nanus* (Distant)

Genus 14. *Goniagnathus* Fieber

17. *Goniagnathus punctifer* Walker

Genus 15. *Nephotettix* Matsumura

18. *Nephotettix nigropicta* Stål

19. *Nephotettix virescens* Fabricius

Genus 16. *Paramesus* Fieber

20. *Paramesus lineaticollis* Distant

Genus 17. *Recilia* Edwards

21. *Recilia dorsalis* (de Mots.)

Genus 18. *Thomsoniella* Signoret

22. *Thomsoniella porrecta* Walker

Subfamily 5. TYPHLOCYBINAE

Genus 19. *Empoasca* Walsh

23. *Empoasca subrufa* Motschulsky

Genus 20. *Zygina* Fieber

24. *Zygina maculifrons* Motschulsky

- Family IV. MEMBRACIDAE
 Subfamily 1. CENTROTINAE
 Tribe LEPTOCENTRINI
 Genus 21. *Centrotypus* Stål
 25. *Centrotypus flexuosus* (Fabricius)
 Genus 22. *Leptocentrus* Stål
 26. *Leptocentrus leucaspis* (Walker)
 27. *Leptocentrus substitutus* (Walker)
 Genus 23. *Nilautama* Distant
 28. *Nilautama typica* Distant
 Genus 24. *Otinotus* Buckton
 29. *Otinotus oneratus* (Walker)
 Tribe GARGARINI
 Genus 25. *Gargara* Amy. & Serv.
 30. *Gargara mixta* (Buckton)
 Superfamily CICADOIDEA
 Family V. CICADIDAE
 Subfamily 7. CICADINAE
 Genus 26. *Pomponia* Stål
 31. *Pomponia solitaria* Distant
 Genus 27. *Hapsa* Distant
 32. *Hapsa nicomache* (Walker)
 Genus 28. *Purana* Distant
 33. *Purana pryleri* Distant
 34. *Purana tigrina* Walker
 Genus 29. *Scieroptera* Stål
 35. *Scieroptera splendidula* Fabricius
 Superfamily FULGOROIDEA
 Family VI. ARAEOPIDAE
 Genus 30. *Liburnia* Stål
 36. *Liburnia pusana* (Distant)
 Genus 31. *Nilaparvata* Distant
 37. *Nilaparvata lugens* (Kirkaldy)
 Family VII. CIXIIDAE
 Genus 32. *Oliarus* Stål
 38. *Oliarus caudatus* Walker

- Family VIII. ISSIDAE
 Genus 33. *Vishnuloka* Distant
 39. *Vishnuloka prominula* Distant
 Subfamily 1. ACHILINAE
 Genus 34. *Kinnara* Distant
 40. *Kinnara ceylonica* Melich.
 Subfamily 2. DICTYOPHORINAE
 Genus 35. *Dictyophora* Germar
 41. *Dictyophora nigrimacula* Walker

Superfamily CERCOPOIDAEA

This group of insects is usually known as frog-hoppers or Cuckoospits. These are economically important insects.

The group is represented by about 2368 species belonging to 326 genera in the world (Animal Resources of India, State of the Art, Zoological Survey of India, 1991). In India, about 190 species in 37 genera are known. [Atkinson 1885; Distant 1908; Lallemand 1949; Metcalf 1960; Datta, B. and Ghosh, L. K., 1976 and Biswas, Ghosh, L. K. and Basu, R. C. (1994)].

Key to the families of the Superfamily CERCOPOIDEA

- 1(2) Anterior margin of pronotum rounded or angulate; eyes moderately transverse, scutellum flat, triangular
APHROPHORIDAE
 2(1) Anterior margin of pronotum straight; eyes equally as long as broad
CERCOPIDAE

Family I. APHROPHORIDAE

Key to the genera of the family APHROPHORIDAE

- 1(2) Face more or less convexly produced 3
 2(1) Face more or less flattened, not convexly produced CLOVIA

- 3(4) Clypeus slightly passing the apices of the anterior coxae POOPHILUS
- 4(3) Clypeus reaching but not extending beyond the apices of the anterior coxae PTYELUS

Genus 1. *Clovia* Stal

1866. *Clovia* Stal, *Hem. Afr.*, 4 : 75.

Type species : *Clovia bigoti* Sign.

Head anteriorly or subangularly rounded and as broad as pronotum.

Key to the species of the genus *Clovia*

- 1(2) Tegmina with a small black spot at posterior angle of inner margin; head a little shorter than the medial length of pronotum; lateral margin of sternum continuously greyish ..
.....*puncta*
- 2(1) Tegmina without such black spot at its inner margin but with a large median and longer apical, costal, hyaline or subhyaline spot; head almost as long as centre of pronotum & subtriangularly rounded between the eyes; lateral margin of sternum castaneous with longitudinal ochraceous fascia*conifera*

1. *Clovia conifera* (Walker)

1857. *Ptyelus conifer* Walker, *List Hom.*, 3 : 711.
1908. *Clovia conifer* : Distant, *Fauna Brit. India*, 4 : 93.
1994. *Clovia conifer* : Biswas, Ghosh & Basu, *State Fauna Series 3, Fauna of West Bengal, Part 5* : 17.

Material examined : 1 ex., Amarpur, South Tripura, 12. vi. 1990, coll. *G. N. Saha and party*; 1 ex., Teliamura, West Tripura, 21. vi. 1988, coll. *J. K. Jonathan and party*.

Diagnostic characters : Tegmina about two and a half times as long as broad, face castaneous with ochraceous margins, legs ochraceous with dark castaneous annulations, vertex and pronotum in some specimens with dark longitudinal lines, in others these are obsolete.

Length : 8 mm.

Distribution : Tripura (West Tripura, South Tripura), Assam, Sikkim, Tamil Nadu; Bangladesh; Burma; Java; Malay Peninsula; Philippines.

2. *Clovia puncta* (Walker)

1851. *Ptyelus puncta* Walker, *Hist. Hem.*, 3 : 718.
1908. *Clovia puncta* : Distant, *Fauna Brit. India*, 4 : 94.
1994. *Clovia puncta* : Biswas, Ghosh & Basu, *State Fauna Series 3 : Fauna of West Bengal, Part 5* : 18.

Material examined : 2 exs., Khorla, West Tripura, 9. xi. 1991, coll. *B. N. Das and party*; 1 ex., Bishramganj, West Tripura, 8. xi. 1991, coll. *B. N. Das and party*; 1 ex., Shipahijola, South Tripura, 11. v. 1992, coll. *B. N. Das and party*.

Diagnostic characters : Head a little shorter than the medial length of pronotum, sternum with a piceous spot behind each anterior coxa; anterior margin of face with a black spot on each side, tegmina with a small black spot at posterior angle of inner margin.

Length : 6 mm.

Distribution : Tripura (West Tripura, South Tripura), Bihar, Gujarat, Maharashtra, Sikkim, West Bengal.

Genus 2. *Poophilus* Stål

1866. *Poophilus* Stål, *Hem. Afr.*, 4 : 72.

Type species : *Poophilus actnosus* Stål

Head subangularly rounded, a little narrower than the pronotum, anterior margin acute; apex of the clypeus slightly passing the apices of the anterior coxae; ocelli equally separated from each other than from eyes. Pronotum with anterior margin broadly rounded, tegmina apically narrowed, costal margin rounded; wings broader than tegmina.

3. *Poophilus costalis* (Walker)

1851. *Ptyelus costalis* Walker, *List of specimens of Homopterous Ins. in the coll. of the Brit. Mus.*, 3 : 707.

1885. *Poophilus costalis* : Atkinson, *Asiatic soc. Bengal Jour.*, **54** : 144.

1994. *Poophilus costalis* : Biswas, Ghosh & Basu, *State Fauna Series 3, Fauna of West Bengal, Part 5* : 14.

Material examined : 1 ex., Baramura, West Tripura, 6. i. 1989, coll. *R. S. Burman and party*; 1 ex., Khwai, West Tripura, 9. xi. 1991, coll. *B. N. Das and party*.

Diagnostic characters : Body tawry or tawry brown, vertex of head with five very small black spots; face, disk of the sternum, anterior and intermediate legs fuscous or piceous; tegmina with apical and costal margin pale.

Length : 9-10 mm.

Distribution : Tripura (West Tripura), Assam, Bihar, Gujarat, Karnataka, Maharashtra, Uttar Pradesh, West Bengal; Africa; Bangladesh; China; Japan; Malay Peninsula; Philippine islands; Sima.

Genus 3. *Ptyelus* St. Farg. and Serv.

1825. *Ptyelus* St. Farg. and Serv., *Enc. Meth.*, **10** : 608.

Type species : *Ptyelus spumarius* Linn.

Head convexly rounded anteriorly and vertex much broader than long, face convexly produced, transversely striate, clypeus not passing the apices of anterior coxae, pronotum large, convex at anterior margin, subangularly sinuate before scutellum, tegmina coriaceous, about three times as long as broad, and four times larger than wings.

4. *Ptyelus nebulosus* (Fabricius)

1794. *Cercopis nebulosa* Fabricius, *Entomologia systematica emendata et. acuta*, **4** : 50.

1851. *Ptyelus nebulosus* Walker, *List of the specimens of Homopterous insects in the collection of Brit. Mus.* : 705.

1994. *Ptyelus nebulosus* : Biswas Ghosh & Basu, *State Fauna Series 3, Fauna of West Bengal, Part 5* : 16.

Material examined : 1 ex., Bishramganj, West Tripura, 8. xi. 1991, coll. *B. N. Das and party*.

Diagnostic characters : Head with two small black spots at anterior margin, tegmina about two

and a half times as long as broad with an oblique anterior fascia, a spot varied with fuscus at the commissure and an oblique transverse spot beyond the middle of the costal margin yellowish grey, vertex slightly shorter than the pronotum.

Length : 9 to 10 mm.

Distribution : Tripura (West Tripura), Karnataka, Tamil Nadu, Madhya Pradesh, Maharashtra, Uttar Pradesh, West Bengal; Java; Sri Lanka.

Family II. CERCOPIDAE

Key to the genera of the family CERCOPIDAE

- 1(2) Anterior legs elongate; anterior femora extending the lateral margins of the body; head not elongately produced in front of eyes; Face somewhat prominent, less than twice as long as broad, tegmina narrow, elongate, oblong, moderately amplified towards apices *Callitettix*
- 2(1) Anterior legs of moderate length, the anterior femora only slightly passing the lateral margins of the body and only slightly or not longer than the intermediate femora, pronotum with the posterior lateral margins not sinuate, its greatest breadth about two thirds of its length *Leptataspis*

Genus 4. *Abidama* Distant

1908. *Abidama* Distant, *Fauna Brit. India*, **4** : 114.

Type species : *Abidama producta* Walker

Head in male longly and acutely produced in front of eyes but in female vertex is transversely impressed, longitudinally ridged between the impression and base; rostrum short, not passing intermediate coxae, face compressed centrally, longitudinally ridged, angulate anteriorly.

5. *Abidama producta* (Walker)

1851. *Sphenorhina producta* Walker, *List of the specimens of Hemipterous insects in the collection of Brit. Mus.*, **3** : 896.

1908. *Abidama producta* : Distant, *Fauna Brit. India*, 4 : 114.
 1976. *Abidama producta* : Datta and Ghosh, *Eos. Revista Espinola De Entomologia Tomol. ano.*, : 54.
 1994. *Abidama sprooducta* : Biswas, Ghosh & Basu, State Fauna Series 3 : Fauna of West Bengal, Part 5 : 6.

Material examined : 1 ex., Teliamura, West Tripura, 20. v. 1972, coll. J. K. Jonathan and party; 2 exs., Anandabazar, North Tripura, 26. v. 1992, coll. S. K. Chakraborty and party.

Diagnostic characters : Head, pronotum, scutellum, apex of tegmina, body beneath black, legs and metasternum sanguineous, apex of scutellum and tegmina rufo-testaceous, wings dull hyaline, with dark veins, face almost longitudinally obliquely striate.

Length : Including tegmina M and F, 7 to 9 mm.

Distribution : Tripura (West Tripura, North Tripura), Assam, Bihar, Meghalaya, Uttar Pradesh; Burma; Nepal.

Genus 5. *Callitettix* Stål

1865. *Callitettix* Stal, *Ofv. Vet-A. K. Fish.*, : 152.

Type species : *Callitettix bracondides* Walker

Head with vertex about as broad as long, transversely depressed before apex, ocelli nearer to each other than to eyes. Pronotum elongate much longer than head, scutellum a little longer than broad; tegmina amplified towards apices, elongate, oblong. Posterior tibiae with one spine.

6. *Callitettix varsicolor* (Fabricius)

1794. *Cicada varsicolor* Fabr., *Ent. Syst.*, 4 : 50.
 1908. *Callitettix varsicolor* : Distant, *Fauna Brit. India*, 4 : 113.
 1994. *Callitettix varsicolor* : Biswas, Ghosh & Basu, State Fauna Series 3 : Fauna of West Bengal, Part 5 : 5.

Material examined : 1 ex., Kailasahar, North Tripura, 28. v. 1978, coll. J. K. Jonathan.

Diagnostic characters : Body shining black, tegmina with a white spot before the middle of

the clavus and a subtransverse white spot between the middle of upper claval margin and the costal margin, two sanguineous spots beyond the middle of the tegmen, the external large and transverse, the internal small and apex of clavus.

Length : Excluding tegmina 9 mm, including tegmina 20 to 22 mm.

Distribution : Tripura (North Tripura), Assam, Kashmir, Sikkim, Maharashtra, Uttar Pradesh.

Genus 6. *Leptataspis* Schmidt

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

Type species : *Leptataspis siamensis* Schmidt.

Anterior margin of the pronotum foliaceous, without any protruberances.

7. *Leptataspis fulviceps* (Dallas)

1850. *Cercopis fulviceps* Dallas, *Tr. E. S.*, : 10.
 1994. *Leptataspis fulviceps* : Biswas, Ghosh & Basu, State Fauna Series : Fauna of West Bengal, Part 5 : 13.

Material examined : 2 exs., Kumarghat, North Tripura, 18. v. 1992, coll. S. K. Chakraborty and party.

Diagnostic characters : Pronotum luteous with three transverse foveation before anterior margin, one central, the others behind it on each side; tegmina black, with a short sanguineous basal streak to clavus, head transversely impressed in front of eyes, lateral margins of prosternum luteous, abdomen above body beneath bluish black.

Length : Excluding tegmina 14 to 16; including tegmina 38 to 44 mm.

Distribution : Tripura (North Tripura), Assam, Meghalaya, Nagaland, Sikkim, West Bengal; Bhutan; Burma; Hong Kong; Malay Peninsula; Siam.

Superfamily CICADELLOIDEA

Family III. CICADELLIDAE

The Cicadellids are of much economic importance. They damage the rice plant by

sucking the sap from the vascular tissues and transmitting virus diseases besides reducing the vitality, vigour as fruit bearing capacity as well as forming malformations. Altogether, about 115 species have been reported to transmit 86 plant pathogens (Ishihara 1969).

Literature reveals that about 680 species of Cicadellids are known from India as against about 15,000 species from the world (Hamilton 1984). The improtant contributions are by Atkinson 1885; Distant (1908, 1916, 1918); (Pruthi 1930-1940), Ghauri (1963, 1967, 1974); Singh 1969; Bindra 1973, Bindra *et al.* 1970; Sohi 1972; Ramakrishna and Menon (1971-1974), Rao (1967, 1969, 1974); Malhotra and Sharma (1974, 1977), Datta 1971-'88; Datta and Dhar 1984; Sohi and Dworkoska 1983;

Key to subfamilies

- 1(2) Veins of tegmina inconspicuous before the apical cross veins TYPHLOCYBINAE
- 2(1) Veins of tegmina cospicuous throughout 3
- 3(4) Face tumid, ocelli on vertex lateral margin of pronotum rounded with keel CICADELLINAE
- 4(3) Face not tumid, ocelli may or may not be on vertex 5
- 5(6) Face flat, concave in profile depressed, squat-shaped; hind tibial spines normal, large and desely packed, ocelli nearer to anterior margin of crowns PENTHIMINAE
- 6(5) Face convex in profile, neither depressed nor squat-shaped 7
- 7(8) Distinctly not dorsoventrally flattened; pronotum with lateral margin usually not carinate; margin of gena not incised or strongly sinuate DELTOCEPHALINAE
- 8(7) Distinctly dorsoventrally flattened; pronotum with lateral margins carinate; vertex, pronotum and scutellum without

any longitudinally median impressed black line HECALINAE

Key to genera of Cicadellinae

- 1(4) Lateral margin of vertex in a line with inner margin of eyes 2
- 2(3) Scutellum with an arcuate transverse impression before apical area **Bothrogonia**
- 3(2) Scutellum somewhat small, not as above **Cicadella**
- 4(1) Lateral margins of vertex in a line with outer margin of eyes 5
- 5(6) Pronotum dark brown anteriorly, medially with dark triangular patch; face reddish brown, anterior margin including clypeus with a black Y-shaped band **Kolla**
- 6(5) Pronotum greenish with fine transverse impression; face not as above, centrally with white streak **Cofana**

Genus 7. **Bothrogonia** Melichar

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

Body large elongate, slender; head wider than pronotum, subtriangularly produced or rounded; face elongate, without either carina or foveola, moderately globose, lateral areas striate transversely; scutellum with an arcuate, transverse impression before apical area; tegmina longer than abdomen with five apical cells; posterior tibiae spinulose.

Type species : *Bothrogonia ferruginea* Fabricius

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

8. **Bothrogonia ferruginea** (Fabricius)

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

1988. *Bothrogonia ferruginea* (Fabricius) : Datta, *Rec. zool. Surv. India. Occ. Paper No.* 90 : 4.

Bothrogonia ferruginea (Fabricius) : M. Ghosh & L. K. Ghosh *State fauna Series, Fauna of Meghalaya*. Z. S. I. : 1-60. (In press)

Material examined : 11 exs., Tripura : 2 exs., North Tripura, Dulubari; W. Tripura, 16. 5. 92, coll. *B. Mitra and party*; 7 exs., Manu, 29. i. 1994, coll. *M. S. Shishodia*.

Diagnosis : Body robust, brownish yellow in colour; vertex with two black spots, one at apex and other between ocelli; face with transverse black spot before clypeus; pronotum with three black spots, one at anterior margin and other two at base, scutellum with a black spot at central region, tegmina blackish red, a black spot at base and at apex, its apical cell blackish; legs pale yellow in colour, apices of femora, tibiae and tarsi black, wings black, abdomen blackish.

Length : 14 mm (Male), 15 mm (Female).

Distribution : India; Tripura (West and North Tripura), Assam, Maharashtra, Meghalaya, Tamil-Nadu, Uttar Pradesh, West Bengal, Elsewhere : Borneo, Burma, Ceylon, Coorg, Dutch West Indies, Japan, Java, Liangs, Korea, Malay Peninsula, Malacca, Nepal, Philippines, Perak, Palhang, Singapore, Sumatra.

Remarks : It is reported injurious to apple in Hida Provine (Nawa 1916 : 325), Silkworm mulberry (Yokoyama 1925 : 192), Citrus plants in Japan (Miyshi 1926 : 338). It is suspected in spreading spike disease of Sandal forest (Dover 1934 : 36), reported on cotton from Formosa (Shiraki 1937 : 43).

Genus 8. *Cicadella* Latreille

1817. *Cicadella* Latreille, *Contenant Crustaces Arachinides Insectes* 3 : 406.

Anterior margin of head rounded, no carina or angle at transition from crown to face, ocelli in line with anterior eye angles, lateral clypeal sutures extending up to crown, clypeus convex, muscle impression distinct, clypellus with short pubescence; pronotal disk transversely rugulose; forewing with 3 closed anteapical cells and with 4 apical cells, textures coriaceous, rugulose; hind leg with femoral setae.

Type species : *Cicadella viridis* van Duzee

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

9. *Cicadella spectra* (Distant)

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

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

1910. *Cicadella spectra* (Distant), Datta *Rec. zool. Surv. India*, Occ. paper No. 90 : 26.

1993. *Cicadella spectra* (Distant) : M. Ghosh and L. K. Ghosh, *Fauna of Meghalaya, State Fauna Series* (In press).

Material examined : 27 exs. Tripura : Ambasa (N. Tripura), 16-19. xi. 74, coll. *M. S. Shishodia*; 4 exs., Teliamura, W. Tripura, 11. xi. 1974, coll. *M. S. Shishodia*; 2 exs., Ramnagar, (W. Tripura), 30. x. 1974, *M. S. Shishodia*; 2 exs., Sepaizola (North Tripura), 17. xii. 1988, coll. *R. C. Basu*; 2 exs., Bisalgarh, (West Tripura); 16. 1. 89, coll. *R. C. Basu*; 1 ex., Kurti, (N. Tripura), 13. xii. 1988, coll. *R. C. Basu*; 1 ex., Khowai, (W. Tripura), 4. iii. 1991, coll. *G. K. Srivastava*.

Diagnosis : Body white with yellow tint, vertex with four black spots, two black spots at central; one at base and one at apex, and the other two on the lateral margins near basal angles of face; the veins of the tegmina pale fuscous; legs brownish yellow, lateral margin of the face darker, a central line and the transverse striae pale brownish.

Length : 9 mm (F)

Distribution : India : Tripura (North Tripura & West Tripura), Bihar, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Elsewhere : Australia, Bangladesh, Nepal, Sri Lanka.

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

Genus 9. *Cofana* Melichar

1726. *Cofana* Melichar, *Ann. Mus. Nat. Hist.*, 23 : 345.

Head strongly produced, anterior margin narrow to broadly rounded; ocelli each closer to

anterior angle of eye; lateral clypeal suture extending on to crown; impression of cibarial muscles distinct.

Type species : *Tettigonia eburnea* Walker

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

10. *Cofana mimica* (Distant)

1908. *Kolla mimica* Distant, *Fauna Brit. India*, 4 : 225.
1988. *Cofana mimica* (Distant) : Datta, *Rec. zool. Surv. India, Occ. Paper No. 90* : 12.
1993. *Cofana mimica* (Distant) : M. Ghosh & L. K. Ghosh, *State Fauna Series, Fauna of Meghalaya* : 64 (In press).

Material examined : 1 ex., Ambasa (N. Tripura), 15. 5. 92, coll. B. Mitra; 1 ex., Teliamora, (W. Tripura), 13. 11. 1974, coll. M. S. Shishodia.

Diagnosis : Vertex with two black spots, one at apex and other between ocelli; face with a transverse black spot before the clypeus; three black spots on the pronotum, one at anterior margin and other two at base; scutellum with a centrally black spots; tegmina blackish red in colour, tegmina with a black spot at base and at the apex; wings black, apices of femora, tibiae and tarsi black; abdomen blackish.

Length :

Distribution : India : Tripura (North and West Tripura), Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal; Elsewhere : Borneo, Burma, Coorg, Dutch East Indies, Japan, Java, Korea, Liangs, Malay Peninsula, Malacca, Nepal, Pahang, Perak, Philippines, Singapore, Sri Lanka, Sumatra.

Remarks : This species is abundant with viruliferous cicadellids namely *Nephotettix virescens*, *N. nigropicta*, *I. dorsalis* and fulgorid species as *Nilaparvata lugens*. These species along with *Cofana* (K.) *mimica* are frequent on paddy crop during winter season.

Genus 10. *Kolla* Distant

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

Vertex subconical, narrowed anteriorly; lateral margin in line with outer margin of each eyes

which differs from *Tettigella* China & Fennah; vertex depressed near inner margin of each eyes, face distinctly striate, medially smooth and flattened, lateral area of face transversely striate; hind wings with submarginal vein continuous from hamulus around apex.

Type species : *Kolla insignis* Distant

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

11. *Kolla opponens* (Walker)

1851. *Tettigonia opponens* Walker, *List. Hom. Brit. Mus.*, 3 : 757.
1988. *Kolla opponens* (Walker) : Datta, *Rec. zool. Surv. India Occ. Paper 90* : 12.

Kolla opponens (Walker) : M. Ghosh and L. K. Ghosh, *State fauna of Meghalaya* (in press).

Material examined : 2 exs., Tripura : Sonamura, South Tripura, 6. x. 91, coll. B. N. Das and party.

Diagnosis : Body reddish, vertex with two anterior black spots and at base a transverse black spot, ocelli equidistant from each eye; basal margin and anterior margin of pronotum centrally connected, anterior margin black, a black spot at each basal angle of scutellum with a transverse furrow, face and clypeus black; a longitudinal fascia on claval and costal margin of the tegmina; a black fascia on beneath the abdomen; sternum spotted.

Length : 9 mm (Female).

Distribution : India : Tripura (S. Tripura), Assam, Uttar Pradesh, West Bengal, Elsewhere : Burma and Netherlands.

Subfamily GYPONINAE

Genus 11. *Neodartus* Melichar

1903. *Neodartus* Melichar, *Hom. Faun. Ceylon* : 162.

Vertex long, its length about 2/3 of the breadth between eyes, obtusely broadly angulate anteriorly, its lateral and apical margins slightly reflexed; ocelli on disk much more remote from each other than from eyes; pronotum longer than

vertex, lateral margins obliquely straight; posterior lateral margins strongly transversely oblique, anterior margin moderately convex, posterior margin slightly concave; scutellum broad, the basal area obliquely depressed; tegmina short, broad, widened posteriorly, clavus very broad, posterior tibiae strongly spinose.

Type species : *Neodartus acocephaloides*
Melichar

1903. *Neodartus acocephaloides* Melichar, *Hom. Fauna Ceylon* : 163.

12. *Neodartus acocephaloides* Melichar

1903. *Neodartus acocephaloides* Melichar, *Hom. Fauna Ceylon* : 163.

1947. *Neodartus acocephaloides* Evan, *Trans. Ent. Soc. London*, **98** : 105-271.

Material examined : 1 ex., Tripura; Simna, W. Tripura, 6. vi. 1990, coll. G. N. Saha.

Diagnosis : Vertex black, apical margin prominently reflexus; pronotum black, finely transversely rugulose; scutellum black, finely transversely striate and a transverse impression at apical area; tegmina with fine hairs, black in colour, thickly dark brown spotted, sometimes at middle an irregular transverse series of five greyish white spots, femora black, tibiae much paler and black spotted posterior tibiae strongly spinulose; abdomen black.

Length : 4 mm. (Female)

Distribution : India : Tripura (W. Tripura), West Bengal, Madras, Punjab. Elsewhere : Coorg, Luzon, Philippines.

Subfamily HECALINAE

Genus 12. *Parabolocratus* Fieber

1866. *Parabolocratus* Fieber, *zool. bot. Gesell. Wien. Verhandl.*, **16** : 502.

Body black or stramineous in color, head sometimes with a fuscous line submarginally, anteriorly subfoliaceous; clypeus swollen; genal margin notched below eyes, pronotal surface slightly rugulose, laterally carinate, diverging

distad; tegmina broad, appendix small, outer anteapical cell shorter than central anteapical cell, base acuminate, apex truncate, inner anteapical cell open basally, apical cell short.

Type species : *Parabolocratus sulcatus*
(Fieber)

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

13. *Parabolocratus albomaculatus* (Distant)

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

1988. *Parabolocratus albomaculatus* (Distant) : Datta, *Rec. zool. Surv. India Occ. Paper No.* **90** : 82.

Parabolocratus albomaculatus (Distant) : M. Ghosh & L. K. Ghosh, *State Fauna of Meghalaya*, Z. S. I. (in press).

Material examined : 1 ex., Tripura : Belenia, South Tripura, 16. v. 1976, coll. J. K. Jonathan.

Diagnosis : Body robust greenish colour, lateral and apical margin of the vertex strongly reflexed; pronotum finely transverse straight, scutellum with angulated line before apical area of tegmina brownish with white spots, wings hyaline; abdomen black.

Length : 4.5 mm (Female)

Distribution : India : Tripura (South Tripura), West Bengal; Elsewhere : Sri Lanka.

Subfamily DELTOCEPHALINAE

Genus 13. *Exitianus* Ball

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

Body robust, at the side rounded, head with eyes wider than pronotum, vertex rounded anteriorly; ocelli large, in front clypeus wide, pronotum short, transverse, its sides not or only faintly margined; elytra subcoriaceous, not overlapping at the apex; tegmina hyaline, appendix large, expanded, anteapical cell closed, two in number, abdomen with the apical area fully developed.

Type species : *Exitianus obscurinervis* (Stål)

1859. *Jaisus (Thamnotettix) obscurinervis* Stål, *Sevenska Vet. Akad. zool.*, **4** : 293.

Key to species of Exitianus

- 1(2) Scutellum with a large spot; on each basal angles two linear discal spots; pygofer posterior third with 4 macrosetae at apex, almost of same size and shape ***nanus***
- 2(1) Scutellum without such spots; pygofer with 2 macrosetae at apex 3
- 3(4) Abdomen fuscus; aedeagal shaft massive, subapically sulcate, a pair of sharp lateral processes arising mesad ***atkinsoni***
- 4(3) Abdomen dark brown; aedeagal shaft not as above and without any lateral process ***indicus***

14. *Exitianus atkinsoni* (Distant)

1908. *Athysanus atkinsoni* Distant, *Fauna Brit. India*, 4 : 348.
1938. *Exitianus atkinsoni* Oman, *Kans. Univ. Sci. Bull.*, 24 : 345.
1988. *Exitianus atkinsoni* (Distant) : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 132.

Material examined : 2 exs., Tripura; Jagindanagar, N. Tripura, 18. xii. 1988, coll. R. C. Basu.

Diagnosis : Vertex brownish yellow, rounded, with a black fascia across eyes and at base a central dark longitudinal line, on apical margin of each side with a black spot; ocelli large, disc convex, face granulate; the area of face widening from base of clypeus; face with brown striation on each side, clypeus with dark brown band; pronotum brownish yellow, posterior discal area greyish with a bow-like linear transverse black spots before anterior margin; pronotum indistinctly transverse, wrinkled; scutellum brownish yellow, with a large subtriangular black spot near each basal angle, and two small oblique black linear spots on the disk at central area; tegmina subhyaline, vein pale brown; Legs brownish yellow, femora with longitudinal series small brownish spots, abdomen blackish red.

Length : 5 mm (Female).

Distribution : India : Tripura (N. Tripura), Bihar, Jammu and Kashmir, West Bengal. Elsewhere : Nepal.

15. *Exitianus indicus* (Distant)

1908. *Athysanus indicus* Distant, *Fauna Brit. India*, 4 : 344.
1938. *Exitianus indicus* : Oman, *Kans. Univ. Sci. Bull.*, 24 : 383.
1989. *Exitianus indicus* (Distant) : Ghosh, L. K., Biswas, Chakraborty and Sen, *Hemiptera : Insecta, State Fauna Series, Orissa*, Z. S. I., 1 pl. 2 : 195.
- Exitianus indicus* (Distant) : Ghosh, M. & Ghosh, L. K., *State Fauna Series of Meghalaya*, Z. S. I. (in press).

Material examined : 2 exs. Tripura, Baramura; North Tripura, 4. xii. 1988, coll. R. C. Basu.

Diagnosis : Vertex subangularly rounded anteriorly, brownish yellow in colour, a transverse black fascia between the eyes; between the black fascia a distinct central longitudinal line at base; ocelli large; face centrally flattened and indistinctly finely granulated, with transverse brown striae on each lateral area. Pronotum brownish yellow, on disk dark greyish, a bow-like impressed line near anterior margin and on which more or distinct brownish dots; scutellum granulated, at basal area transverse impressed; tegmina greyish subhyaline; its vein brownish; legs brownish yellow; femora with longitudinal brownish streaks; abdomen fuscous.

Length : 5 mm (Female).

Distribution : India : Tripura (North Tripura), Assam, Bihar, Jammu, Meghalaya, Nepal.

16. *Exitianus nanus* (Distant)

1908. *Athysanus nanus* Distant, *Fauna Brit. India*, 4 : 345.
1938. *Exitianus nanus* Oman, *Kan. Univ. Sci. Bull.*, 24 : 383.
1988. *Exitianus nanus* : Datta, *Rec. zool. Surv. India*, Occ. Paper No. 90 : 69.

Exitianus nanus : M. Ghosh and L. K. Ghosh, *State Fauna Series of Meghalaya*, Z. S. I. (in press).

Material examined : 2 exs. Tripura, Baramura, North Tripura, 4. xii. 1988, coll. R. C. Basu.

Diagnosis : Vertex short, broad, in front rounded, vertex pale brownish vertex with a slender bow-like brownish red line between eyes; vertex with a line between the transverse line at

base castaneous brown; pronotum dull grayish, with two small pitchy black spots on the anterior margin behind the eyes, finely punctate scutellum brownish yellow, a rounded black spot on each side of the basal margin; legs pale brown, with a pitchy black spots on intermediate coxae; tegmina hyaline, its vein brown; abdomen pale brown.

Length : 5 mm (Female).

Distribution : India, Tripura (North Tripura), Bihar, Himachal Pradesh, Maharashtra, Meghalaya, Tamil Nadu; Elsewhere : Iraq.

Genus 14. *Goniagnathus* Fieber

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

Type species : *Jassus brevis* Herrich-sch.

1835. *Jassus brevis* Herrich-Sch., *Nomenclator Entomologicus*, I (i-iv) : 71.

Body short, robust, compressed, broad, vertex 3-4 times broader as middle length, anterior margin rounded; ocelli on inner side of the frontal suture; face about twice as broad as at clypeus, punctate with transverse stripes, clypeus rectangular; pronotum thrice as long as vertex; strongly obliquely striped and wrinkled, anterior margin smooth; tegmina broad with thick veins, two oblique veins connecting inner sector with inner fork of outer sector; posterior tibiae densely spined.

17. *Goniagnathus punctifer* (Walk.)

1858. *Bythoscopus punctifer* Walker, *Insecta Saunderseana*, p. 108.

1988. *Goniagnathus punctifer* (Walker) : Datta, *Rec. zool. Surv. India. occ. Paper No. 90* : 139.

Goniagnathus punctifer (Walker) : M. Ghosh & L. K. Ghosh, *State Fauna Series of Meghalaya*, Z. S. I. (in press).

Material examined : 1 ex., Tripura, West Tripura, Bisalgarh, 16. i. 1989, coll. R. S. Burman.

Diagnosis : Body robust, castaneous brown, head and vertex brownish yellow with obscure

dark spots, face with transverse brownly striations interrupted by longitude stripes; pronotum brownish yellow and very finely transversely striate; scutellum brownish yellow; tegmina pale brownish yellow, its costal margin and veins finely brown spotted; wings pale smoky brown in colour with a greyish-white streak; legs castaneous brown, annulated with piceous; abdomen above black and beneath pale brownish.

Length : 6 mm. (Female).

Distribution : India : Tripura (West Tripura), Assam, Bihar, Maharashtra, Meghalaya; Uttar Pradesh, West Bengal. Elsewhere : Burma, Malagasy, Maldive, Sri Lanka.

Genus 15. *Nephotettix* Matsumura

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

Type species : *Selenocephalus cinctipes* Uhler

1896. *Selenocephalus cinctipes* Uhler, *Proc. U. S. Nat. Hist. Mus.*, 19 : 292.

Body narrow compressed, color opaque green with black marking, vertex short, in front broadly rounded, union of vertex to front rounded and a transverse furrow near front angle running from one eye to other eye; frontal margin rather uncurved, the disk of vertex arched; ocelli at union of vertex to front not close to eyes and on the inside of the suture of the face and cheeks; face as long as or shorter than the width of cheek angle, flat, ocelli twice as broad as at the clypeus; pronotum longer than the medial length of vertex, on posterior margin very flatly curved, at the sides strongly rounded; tegmina at apices broadly rounded off, with only one discal cell; three middle cells; wings at apices narrowly rounded.

18. *Nephotettix nigropictus* (Stål)

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

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

1989. *Nephotettix nigropicta* (Stal) : Ghosh, L. K. Biswas, Chakraborty and Sen. *Fauna of Orissa (Insecta : Hemiptera)* : *State Fauna Series*, Z. S. I. No. 1 : 195.

Nephotettix nigropicta (Stal) : M. Ghosh & L. K. Ghosh, *State Fauna Series, Fauna of Meghalaya*, Z. S. I. (in press).

Material examined : 4 exs., Ambassa; North Tripura, 16-19. xi. 1974, coll. *M. S. Shishodia*; 2 exs., Sabrim, South Tripura, 10. xi. 91, coll. *B. N. Das*; 1 ex., Teliamura, North Tripura, 9. xii. 88, coll. *R. C. Basu*; 2 exs., Baramora, North Tripura, 4. xii. 88, coll. *R. C. Basu*; 1 ex., Jirania, North Tripura, 15. xii. 86, coll. *R. C. Basu*.

Diagnosis : Body greenish yellow in colour, smooth, and shining; a black line at the anterior margin of the vertex; vertex little longer in middle, head as broad as pronotum, face black; anterior margin of pronotum black, anterior margin of scutellum black and two black small spots on each side; tegmina green in colour, margin of clavus, a spot before middle extending to claval suture black, there acutely produced hindward, apical third of tegmina black; greater part of femora, tibiae and tarsi black; spinules black spotted at base of the posterior tibiae; abdomen black.

Length : 4.5 mm (Female), 4 mm (Male).

Distribution : India : Tripura (North and South Tripura), Bihar, Meghalaya, Orissa, Punjab, West Bengal. Elsewhere : East Africa, Philippines, Sri Lanka.

19. *Nephotettix virescens* (Fabricius)

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

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

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

Nephotettix virescens (Fabricius) : M. Ghosh & L. K. Ghosh, *State Fauna Series, Fauna of Meghalaya*, Z. S. I. (in press).

Material examined : 8 exs., Teliamura; North Tripura; 3. xii. 1988; coll. *R. C. Basu*; 3 exs., Sepoyjola; West Tripura, 17. xii. 1988, coll. *R. C. Basu*; 2 exs., Ambassa, North Tripura, 17. xi. 1974, coll. *M. S. Shishodia*; 1 ex., Jirani, North Tripura, 16. xii. 1986, coll. *R. C. Basu*; 1 ex.,

Bishramgange, West Tripura, 8. xi. 1991, coll. *B. N. Das*.

Diagnosis : Body yellowish green in colour, shining, smooth; head as broad as pronotum; a fine black line to anterior margin of vertex; face greenish yellow; in male face with lateral transverse dark black lines, in female face without darker black lines; tegmina in male with a discal black spot before middle in female without discal black spot; apical two-fifth black; lateral sternal black; abdomen black.

Length : 4 mm (Male), 4.5 mm (Female).

Distribution : India : Tripura (North and West Tripura), Bihar, Meghalaya, Orissa, West Bengal. Elsewhere : Ethiopian region, Indonesia, Japan, Korea, Malaysia, Micronesia, Palestine, Philippines, Singapore, Sumbawa, Taiwan, Thailand.

Genus 16. *Paramesus* Fieb.

1866. *Paramesus* Fieb., *Verh. Z-b. ges. Wien*, xvi : 506.

Type species : *Cicada nervosa* Fallen

1826. *Cicada nervosa* Fallen, *Hemiptera seveciae*, 2 : 45.

Diagnosis : Margin of vertex linear, the ridged of above and below margin with short fine transverse wrinkles parallel to margin, the margin of vertex somewhat raised, the whole face very finely greened, clypeus somewhat long, gradually widened to apex, almost sword-shaped, not extending to end of clypeus, chick and middle of the sides very obtusely angulated, almost round, pronotum in front very flatly curved; face to vertex on ridge nearly sub-right angularly obtuse to the clypeus suddenly narrowed; ocelli on the ridges of vertex near the eyes; vein of tegmina distinct, the brown brodering of the veins strongly pronounced; no marginal appendage.

20. *Paramesus lineaticollis* Distant

1908. *Paramesus lineaticollis* Distant, *Fauna Brit. India*, 4 : 294.

1967. *Paramesus lineaticollis* Melcalf, *General catalogue of Homoptera*, Part 10 : 2066.

Material examined : 1 ex., Tripura, Belonia, South Tripura, 16. v. 1978, coll. J. K. Jonathan.

Diagnosis : Body brownish yellow, vertex short, transverse and rounded anterior transverse with a black bow-like fasciae between the eyes; a short medial darkline present behind the transverse fascia extending to the base, pronotum with five longitudinal narrow fascia, the central fascia is most narrow and dark in colour, on each side fascia more pale and broad brown colour; face with transverse brown striations, in middle a longitudinal pale interruption, a pale elongate spot outwardly of clypeus on each side; tegmina pale brownish yellow, its veins very prominent, with brown prominent discal spots near the base and one or two small and linear dark spot; tibiae with piceous spotted and longly spinulose; abdomen beneath with longitudinal series of small red spots.

Length : 5.5 mm (Female).

Distribution : India : Tripura (S. Tripura), Bihar, Uttar Pradesh. Elsewhere : Basilan, Formosa, Java, Luzon, Philippines.

Genus 17. *Recilia* Edwards

1922. *Recilia* Edwards, *Ent. mon. mag.*, **58** : 206.

Type species : *Deltocephalus dorsalis*
Motschulsky

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

Vertex pointed or obtusely angularly produced, face symmetrically hexagonal; pronotum broader than long; tegmina longer or slightly shorter than the abdomen, rounded off behind, with distinct veins usually bordered with brown to black; in the clavus a distinct transverse vein running from the outer claval vein to the claval suture.

21. *Recilia dorsalis* (de Motschulsky)

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

1989. *Recilia dorsalis* (de Motschulsky) : Datta, *Rec. zool. Surv. India, Occ. Paper No. 90* : 169.

1994. *Recilia dorsalis* (De Motschulsky) : M. Ghosh & L. K. Ghosh, *State Fauna Series of Meghalaya*, Z. S. I. (in press).

Material examined : 2 exs. Tripura, Jirania, North Tripura, 16. xii. 1988, coll. R. C. Basu.

Diagnosis : Vertex brownish yellow, with two obscure spots at transverse depression and two small spots at base; a small longitudinal line at base; pronotum greyish in colour, with some obscure dark longitudinal shading; scutellum with dark spot near each basal angle, tegmina greyish in colour, tegmina with an irregular broad oblique brownish fascia from near base to apex, its margin deeply notched, and enclosed a central pale spot on claval sutures, from apex of clavus, there is an oblique series of brownish spots, a linear dark spot at middle of costal margin and brownish streaks between the veins on claval area; some dark spots on the coxae, some dark spots beneath abdomen.

Length : 3.5 mm (Female)

Distribution : India : Tripura (North Tripura), Meghalaya, Tamil Nadu, West Bengal. Elsewhere : Burma, Far East Asian countries, Sri Lanka.

Genus 18. *Thomsoniella* Signoret

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

Type species : *Thomsoniella kirschbaumi*
Signoret

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

Diagnosis : Body depressed; head extended anteriorly, vertex at anterior margin foliaceous, sulcatus length wise; vertex depressed, frons also depressed, frontal suture reaching to border of anterior part of head; lora occupying space between gena and frontal sutures; clypeus almost parallel, rounded at tip; pronotum broader than head including eyes; tegmina transparent hyaline with a narrow marginal rim; legs moderate, posterior tibiae spinose.

22. *Thomsoniella porrecta* Walker

1858. *Accocephalus porrectus* Walker, *List. Hom. Suppl.* : 262.
1903. *Thomsoniella porrectus* Melichar, *Hom. Faun. Ceylon* : 175.
1988. *Thomsoniella porrecta* Walker : Datta *Rec. zool. Surv. India* Occ. paper **90** : 188.
- Thomsoniella porrecta* Walker : M. Ghosh & L. K. Ghosh *State Fauna Series, Fauna of Meghalaya*, Z. S. I. (in press).

Material examined : 2 exs., Tripura; Ambassa, North Tripura, 28.5.1978, coll. J. K. Jonathan.

Diagnosis : Body greenish yellow in colour; vertex considerable shorter than breadth between eyes; its anterior margin usually blackish and distinctly reflexed, ocelli in groove very closed to eyes; vertex with four orange-red obscure longitudinal fasciae; pronotum greenish yellow with six orange-red obscure longitudinal fasciae and scutellum with three orange-red longitudinal fasciae; tegmina pale greenish yellow, apex of clavus area with two small black spots and another on the middle of first apical area.

Length : 5 mm (Female).

Distribution : India; Tripura (North Tripura), Bihar, Maghalaya, Orissa, Punjab, Elsewhere : Burma, Formosa, Maldives, Philippines, Queensland.

Subfamily TYPHLOCYBINAЕ**Genus 19. *Empoasca* Walsh**

1862. *Empoasca* Walsh, *Prairie Farmer*, (n.s.) **10** : 149.

Type species : *Empoasca viridescens* Walsh

1862. *Empoasca viridescens* Walsh, *Prairie Farmer*, **10** : 149.

Green in color, sometimes with markings of various colours, head as wide as pronotum, anterior margin of head rounded; ocelli may be present or absent; vertex sometimes pointed, otherwise rounded; pronotum broader distad; tegmina with obscure venation, ante apical cells open basally, hind wings with submarginal veins extending around apex of wing.

23. *Empoasca subrufa* Motschulsky

1868. *Thamnotettix subrufa* de Motschulsky, *Soc. Nat. Moscou Bul.* **36** : 100.
1903. *Typhlocyba subrufa* Melichar, *Homopteren Fauna Von Ceylon* : 218.
1910. *Zygina subrufa* Matsumura, *Ztschr. f. wiss. Insektenbiol.* **104**.
1916. *Empoasca subrufa* Matsumura, *Applied Entomology* : 394.
1968. *Empoasca subrufa* Melcali, *General Catalogue of Homoptera* : **vi** : 357.

Material examined : India : Tripura, Ambassa, N. Tripura, 25.v.1978, coll. J. K. Jonathan.

Diagnosis : Body elongate; shining reddish in colour; vertex subconvex, anteriorly truncate, ocelli distinct, eyes black, prominent; pronotum transverse, slightly carinate on median portion, anteriorly arcuate and posteriorly truncate and angles rounded; scutellum reddish in colour, tegmina palely white in colour, apex infuscate, veins white, wing hyaline; legs pale whitish; abdomen black.

Length : 3 mm.

Distribution : India : (North Tripura).

Genus 20. *Zygina* Fieber

1866. *Zygina* Fieber, *Zool. bot. Ges Wien*, **16** : 509.

Type species : *Typhlocyba nivea* Mulsant & Rey

1855. *Typhlocyba nivea* Mulsant & Rey, *Ann. Linn. Soc. Lond.* **2(2)** : 246.

Varied colour markings, body broad and robust to narrow and delicate insects; hindwing with submarginal veins confluent with cell apically, posterior branch of R_1 with M vein, Cu_2 confluent with submarginal vein at basal half of wing; tegmina with inner apical cell having base oblique to angulate.

24. *Zygina maculifrons* (de Mots)

1863. *Typhlocyba maculifrons* de Mots, *Soc. Nat. Moscou Bull.* **36** : 103.
1910. *Zygina maculifrons* Matsumura, *Ztschr. f. Wiss. Insektenbiol.* **6** : 104.

1968. *Zygina maculifrons* Metcalf, *General Catalogue of Homoptera* : 1394.

Material examined : 1 ex. Tripura, Ambassa, N. Tripura, 25.v.1979, coll. J. K. Jonathan.

Diagnosis : Body yellow in colour, anterior margin of head rounded, at apex large black spots; vertex not produced; face yellow in colour, long, with indistinct transverse brownish stripes; apex of clypeus black; pronotum longer than vertex, rounded in front, on the above of pronotum yellow with greyish colouring on the disk; scutellum long and triangular, a transverse depressed line on its middle, tegmina yellowish green in colour, with delicate vein; membrane slightly clouded with smoky brown; wing hyaline. legs yellow in colour; abdomen black.

Length : 2.5 mm (Female).

Distribution : India : Tripura (North Tripura), West Bengal. *Elsewhere* : China, Formosa, Japan, Java, Kwangtung, Honshu, Malay Peninsula, Singapore Island.

Family IV. MEMBRACIDAE

Membracids, usually known as Tree hoppers, are economically important group. They are characterised by the pronotum prolonged backward into a hood or process of variable length and structure. They suck the plant sap with the help of their piercing and sucking type of mouth parts.

The group represents about 2300 species in the world. A little over 200 species are so far known from India through the works of Buckton 1903; Paiva 1919; Funkhouser 1927; Dover 1932; Goding 1934; Evans 1948; Menon and Das 1958; MetCalf and Wada 1965; Ananthasubramanian and Ananthakrishnan 1975; Dutta *et al.*, 1978; Ghosh *et al.*, 1980 (in press); Biswas, Basu and Ghosh (1994).

Key to the tribes of the Subfamily CENTROTINAE

- 1(2) Lateral processes absent, or practically obsolete GARGARINI.

- 2(1) Lateral processes present
.....LEPTOCENTRINI.

Tribe LEPTOCENTRINI

Key to genera

- 1(2) Posterior pronotal process remote from scutellum.....3
2(1) Posterior pronotal process robust, more or less impinging on scutellum and inner tegminal margin 5
3(4) Posterior pronotal process curved at base, then bending downwards its apex touching or about touching the posterior angle of inner tegminal margin sometime passing tegmina.....*Leptocentrus*
4(3) Posterior pronotal process straight, not curved at base, not directed downward, its apex remote from tegmina and scarcely reaching posterior angle of inner tegminal margin*Nilautama*
5(6) Pronotum more or less gibbous before base of posterior process; pronotal lateral process divergent from line of anterior margin of pronotum*Centrotypus*
6(5) Posterior pronotal process slender, scarcely or slightly elevated above scutellum but as a rule not elevated from scutellum.....
.....*Otinotus*

Genus 21. *Centrotypus* Stal

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

Type species : *Centrotypus amplicornis* Stal

Posterior pronotal process never well separated from scutellum, gradually narrowed and covering the whole or almost the whole of scutellum, face without basal lobes on each side.

25. *Centrotypus flexuosus* (Fabricius)

1794. *Membracis flexuosus* Fabricius, *Ent. Syst.*, 4 : 12.

1908. *Centrotypus flexuosus* : Distant, *Fauna Brit. India*, 4 : 33.

Material examined : 1 ex., Bismarganj, W. Tripura 8. v. 1991, coll. B. Mitra and party.

Diagnostic characters : Pronotum dark, indigo-blue, lateral pronotal processes broad, laminate, apically obliquely truncate, posteriorly carinate, apically upwardly recurved, posterior process robust impinging on tegmina being pale ochraceous, apically castaneous, the base of costal and radial areas bluish black.

Length : 10 mm; width lateral pronotal process 8-8½ mm.

Distribution : Tripura (West Tripura), Assam, Meghalaya, Sikkim; Elsewhere : Bangladesh, Mayanmar, Malacca.

Genus 22. *Leptocentrus* Stal

1866. *Leptocentrus* Stal, *Hem. Afr.*, 4 : 87 & 90.

Type species : *Leptocentrus bos* Sign.

Pronotum with slender posterior process, tricarinate, well separated from scutellum and abdomen. Sometimes but seldom, posteriorly touching the interior margin of the tegmina; frons of pronotum more or less obliquely prominent towards face, scutellum transverse, nearly as long as broad.

Key to the species of the genus *Leptocentrus*

- 1(2) Lateral transverse process slender, centrally carinate above and somewhat strongly recurved, posterior process recurved from near base and touching the apex of the inner margin of tegmina.....*leucaspis*
- 2(1) Lateral transverse process less recurved, not much slender; posterior process less arched at base and more obliquely straight*substitutus*

26. *Leptocentrus leucaspis* (Walker)

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

1908. *Leptocentrus leucaspis* : Distant, *Fauna Brit. India*, 4 : 30.

1994. *Leptocentrus leucaspis* : Biswas, Ghosh & Basu, *State Fauna Series 3 : Fauna of West Bengal*, Part 5 : 75.

Material examined : 1 ex., Charaibari, North Tripura, 25. v. 1992, coll. B. Mitra and party.

Diagnostic characters : Pronotum black, lateral transverse process slender, centrally carinate above and strongly recurved, posterior transverse process tricarinate, recurved near base, touching the apex of the inner margin of tegmina; tegmina shining ochraceous, by piceous abdomen ventrally black.

Length : 7-8 mm; width lateral pronotal process 4½ to 7 mm.

Distribution : Tripura (North Tripura), Orissa, West Bengal. Elsewhere : Sri Lanka, Philippines.

27. *Leptocentrus substitutus* (Walker)

1857. *Centrotus substitutus* Walker, *List. Hom.*, 2 : 605.

1908. *Leptocentrus substitutus* : Distant, *Fauna Brit. India*, 4 : 29.

1994. *Leptocentrus substitutus* : Biswas, Ghosh & Basu, *State Fauna Series 3 : Fauna of West Bengal*, Part 5 : 75.

Material examined : 1 ex., Shanti bazar, S. Tripura, 23. ii. 1991, coll. G. K. Srivastava.

Diagnostic characters : Posterior pronotal process more obliquely straight, lateral transverse processes less recurved. Head, pronotum black, body beneath black, femora piceous.

Length : 6-6½ mm; width lateral pronotal process 4½ to 5 mm.

Distribution : Tripura (South Tripura), Maharashtra, West Bengal. Elsewhere : Sri Lanka.

Genus 23. *Nilautama* Distant

1908. *Nilantama* Distant, *Fauna Brit. India* 4 : 32.

Type species : *Nilantama typica* Distant

Pronotum elevated at base, the lateral processes broad, robust, a little directed upward, slightly apically recurved, posterior process short, slender, elevated obliquely upward, apex acute and almost extending to the point of the posterior angle of the inner margin of the tegmina.

28. *Nilautama typica* Distant

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

Material examined : 1 ex., Choraibari, N. Tripura, 27. v. 1992, coll. B. Mitra and party.

Diagnostic characters : Pronotum black, lateral transverse processes, broad, carinate behind middle, apex roundly truncate and a little recurved, obliquely upwardly divergent, remote from scutellum, tegmina bronzy ochraceous cosal area broadly black; scutellum and lateral margins of sternum cretaceously sericeous.

Length : 7 mm, width lateral pronotal process $4\frac{1}{2}$ mm.

Distribution : Tripura (North Tripura). All over India.

Genus 24. *Otinotus* Buckton

1903. *Otinotus* Buckton, *Monogr. Membrac.*; 232.

Type species : *Otinotus ammon* Buckton

Pronotum with transverse lateral angle produced and either directed horizontally or forwardly, posterior process slender, sinuate, scarcely or only a little separated from scutellum which is about as broad as long and its apex emarginate, central carination of posterior process continued through pronotum.

29. *Otinotus oneratus* (Walker)

1858. *Clutrotus oneratus* Walker, *Ins. Saund. Hom.* : 78.

1908. *Otinotus oneratus* Walker, *Fauna Brit. India*, 4 : 40.

1994. *Otinotus oneratus* : Biswas, Ghosh & Basu, *State Fauna Series 3 : Fauna of West Bengal, Part 5* : 77.

Material examined : 2 exs., Belonia, S. Tripura, 12. xi. 1991, coll. B. N. Das and party.

Diagnostic characters : Pronotum castaneous, posterior process long, slender, rarely separated from pronotum, impinging on tegmina, its apex passing the posterior angle of the inner margin of tegmina, tegmina pale semihyaline, punctate on the basal opaque area, lateral pronotal processes somewhat slender, obliquely upturned, apically a little curved.

Length : 6-7 mm. Width lateral pronotal process $3-3\frac{1}{2}$ mm.

Distribution : Tripura (South Tripura), Bihar, Maharashtra, Tamil Nadu, West Bengal; Elsewhere : Sri Lanka.

Tribe GARGARINI

Genus 25. *Gargara* Amy. & Serv.

1843. *Gargara* Amy. & Serv., *Hem.*, : 537.

Type species : *Gargara genistoe* Fabr.

Lateral angles of the pronotum unarmed and spinules to the posterior trochanters absent.

30. *Gargara mixta* (Buckton)

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

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

1994. *Gargara mixta* : Biswas, Ghosh & Basu, *State Fauna Series 3 : Fauna of West Bengal, Part 5* : 84.

Material examined : 1 ex., Belonia, S. Tripura, 25. xi. 1991, coll. G. K. Srivastava.

Diagnostic characters : Pronotum, brownish ochraceous, lateral angles angularly prominent, posterior process robust, gradually narrowing to apex, impinging on scutellum and tegmina and about reaching the posterior angle of the inner margin of tegmina; tegmina greyish opaque, base and costal area ochraceous.

Length : 5 mm; width pronotal angle 3 mm.

Distribution : India : Tripura (South Tripura), Maharashtra, West Bengal. Elsewhere : Sri Lanka.

Family V CICADIDAE

Subfamily CICADINAE

The Cicadids are forest insects. The Cicada's "song" (Buzzing sound) usually heard in the forest, is of a sexual nature. The song is stopped when the insect is alarmed. About 1162 species belonging to 131 genera are so far known from the world (Metcalf 1963). Of these, about 206 species are known to occur in oriental region. The Indian record of the group is of 145 species (Distant 1889, 1890, 1891, 1892, Kato 1932, Mathur 1953, Paiva 1917). The species dealt

with in this paper are new records from the State of Tripura.

Genus 26. *Pomponia* Stal

1866. *Pomponia* Stal, *Hem. Afr.* iv : 6.

Body variable, either long or very short and convex. Head including eyes about equal in width to anterior margin of mesonotum, ocelli much further apart from eyes than from each other, face convex. Pronotum with lateral margin moderately amplified and sinuated, posterior angle dilated, a little shorter than mesonotum; abdomen in male longer than space between apex of head and base of cruciform elevation, Tympana covered; opercula short and transverse; tegmina and wings hyaline, basal cell of tegmina longer than broad, more or less maculate; apical area eight, anterior femora distinctly spined.

31. *Pomponia solitaria* Distant

1888. *Pomponia solitaria* Distant, *A. M. N. H.* (6) : 295.

1932. *Pomponia solitaria* Kato, *Monograph of Cicadidae* : 162.

1963. *Pomponia solitaria* Metcalf, *General Catalogue of Homp. VIII* (Part I) : 852.

Material examined : 2 exs., Tripura : Sephaijola; West Tripura, 30. vi. 1995, coll. A. K. Hazra.

Diagnosis : Body brownish yellow, two linear black spots at the apex on the head and two small black spots at base of front, two transverse black spots present at lateral area of vertex; two black lines united at base on central area of pronotum and also with two black lines at lateral area of pronotum; a central longitudinal line on mesonotum, on each side of mesonotum a short oblique line; two black small spots in front of cruciform elevation; tegmina hyaline, the first and costal membrane brownish, the venation brownish yellow; wings hyaline; legs pale brownish, abdomen palely pilose.

Length : 27 mm.

Distribution : India : Tripura (West Tripura); Andaman Islands, Narkondam Islands.

Genus 27. *Hapsha* Distant

Body robust; head including eyes about as broad as mesonotum, considerably shorter than breadth between eyes, lateral margin obliquely sinuate from eyes to apex; pronotum distinctly shorter than mesonotum, subacutely toothed before middle of lateral margin; abdomen short, not longer than space between head and base of cruciform elevation; tympana covered, tympana flaps about as long as broad; opercula in male broad, their inner margins contiguous, nearly equally broad throughout, their apices convex, their outer margins very obsoletely sinuate; tegmina and wings hyaline.

Type species : *Hapsha nicomache* (Walker)

32. *Hapsha nicomache* (Walker)

1850. *Dundubia nicomache* Walker, *List. Hom.*, 1 : 64.

1953. *Hapsha nicomache* Walker, *Ind. Forst. Leaflet* (Ent.) 121(3) : 138-187.

1963. *Hapsha nicomache* Metcalf, *General Catalogue of Homp. VIII* (1) : 573.

Hapsha nicomache : M. Ghosh, G. C. Sen and L. K. Ghosh, *State Fauna Series, Fauna of Meghalaya*, Z. S. I. (in press).

Material examined : 1 ex., Tripura : Khumarghat Forest, N. Tripura, 19. viii. 1992, coll. B. Mitra.

Diagnosis : Body robust, brownish yellow, a lateral black striae on the head, lateral margin of vertex with two transverse black spots; pronotum with two black central longitudinal lines united posteriorly; pronotum with a transverse black spot; mesonotum with three central discal black lines united posteriorly; a small black spot on each side of mesonotum; a broad lateral fascia containing a small brownish yellow spot; tegmina hyaline, its venation dark brown, costal membrane brownish yellow postcostal area and transverse vein smoky in colour; abdomen black, lateral spots, margin brownish.

Length : 26 mm (Female).

Distribution : India : Tripura (N. Tripura), Assam, Meghalaya, Nagaland, Sikkim, Uttar Pradesh.

Genus 28. *Purana* Distant1905. *Purana* Distant, A. M. N. H. (7) xv : 60.

Head including eyes as wide as base of mesonotum and as long as space between eyes, face prominent and convex, its base almost at right angles to the lateral angles of the vertex; pronotum narrowed anteriorly, its lateral margin angulated or toothed; mesonotum much longer than pronotum; abdomen moderately conical above, gradually attenuated posteriorly, in male considerably longer than the space between the apex of head and base of cruciform elevation, tubercles on the second and third ventral segments large and prominent; opercula small; tympanal covering in male broader at base than long; tegmina and wings hyaline.

Type species : *Purana tigrina* WalkerKey to the species of *Purana*

Posterior and lateral margin of pronotum brownish yellow; mesonotum with two obscure obconical spots on anterior margin, its edges blackish; body brownish in colour
.....*pryeri*

Posterior, lateral margin of pronotum, its two central longitudinal lines and the outer incisures black; mesonotum without spots as above; body greenish yellow in colour
.....*tigrina*

33. *Purana pryeri* Distant1868. *Dundubia nebulilinea* Walker, *The Naturalist in Vancouver Island and British Columbia*, 2 : 84.1963. *Purana pryeri* Metcalf, *General Catalogue of Homoptera*, viii (1) : 468.

Purana pryeri G. Sen. M. Ghosh and L. K. Ghosh, *State Fauna Series, Fauna of Meghalaya* (in press).

Material examined : 5 exs., Tripura : Sepaijola, West Tripura, 2. v. 1995, coll. A. K. Hazra.

Diagnostic character : Body robust, brownish, frontal margin of head, ocelli area and its posterior margin blackish; pronotum with a central longitudinal sulcation, its posterior and lateral

margin brownish yellow; mesonotum with two obscure obconical spots on anterior margin; tegmina and wings hyaline with pale brownish tinge, its venation, costal membrane brownish, with a small dark spot at base, and submarginal series of small blackish red colour spots near apices; legs brownish yellow, abdomen brownish yellow, its tubercles dark brown.

Length : 28 mm (Male); 29 mm (Female).

Distribution : India : Tripura (West Tripura), Meghalaya. Elsewhere : Borneo.

34. *Purana tigrina* Walker1850. *Dundubia tigrina* Walker, *List of Homopteran insects*, Brit. Mus., 1 : 69.1963. *Purana tigrina* Metcalf, *General Catalogue of Homoptera*, viii (1) : 468.

Material examined : 1 ex., Tripura : Chorilan, North Tripura, 28. iv. 1995, coll. A. K. Hazra.

Diagnostic character : Body robust, greenish yellow in colour, head also greenish yellow; ocelli area and frontal margin black, a black spot on each lateral area of vertex; anterior margin of pronotum, two central longitudinal lines and the outer incisures black; a longitudinal fascia on mesonotum and also on each side a short curved fascia and two small black spots in front of cruciform elevation; a transverse spot between face and a small spot at apex, rostrum black; tegmina hyaline, venation brownish yellow, fuscous towards apical area; legs greenish yellow; abdomen beneath pale brownish yellow and apex black.

Length : 26 mm.

Distribution : India : Tripura (North Tripura); Andhra Pradesh. Elsewhere : Malay Peninsula.

Genus 29. *Scieroptera* Stål1866. *Scieroptera* Stål, *Hem. Afr.* iv. : 4.

Body robust. Head including eyes a little broader than base of mesonotum; front subconically flat, produced, shorter than vertex, the lateral margin both discontinuous, pronotum

longer than head, its lateral margin slightly convexly oblique, the posterior lateral angles distinctly produced; mesonotum (including cruciform elevation) not longer than pronotum; abdomen longer than space between apex of head and base of cruciform elevation; tympana entirely exposed, tympanal covering altogether absent, opercula in small and transverse anterior femora strongly spined beneath, face not longitudinally sulcate; tegmina more or less opaque, apical area eight, basal cell longer than broad; wings hyaline, apical area six.

Type species : *Scieroptera splendidula*
Fabricius

35. *Scieroptera splendidula* Fabricius

1963. *Scieroptera splendidula* Metcalf, *General Catalogue*, viii (1) : 51.

1975. *Tettigonia splendidula* Fabricius, *Sys. Ent.* : 681.

Scieroptera splendidula : G. Sen, M. Ghosh and L. K. Ghosh, *State Fauna of Meghalaya*, Z. S. I. (in press).

Material examined : 1 ex., Tripura : Teliamura, West Tripura, 9. v. 1992, coll. *M. Sil*.

Diagnosis characters : Body black in colour, front of head purplish in colour, vertex brownish yellow, pronotum also brownish yellow with central fascia mesonotum brownish yellow; cruciform elevation brownish, its central area black; tegmina dark brown and wings hyaline, costal membrane of tegmina brownish yellow; legs brownish, femora reddish brown and tibiae and tarsi black; abdomen frequently with a central, dorsal longitudinal black macular fascia.

Length : 15 mm (Female).

Distribution : India : Tripura (West Tripura), Assam, Bihar, Meghalaya, Sikkim, Uttar Pradesh, West Bengal. Elsewhere : Burma, China, Indochina, Java, Philippines, Sumatra, Tenasserim.

Superfamily FULGOROIDEA

Family VI ARAEOPIDAE

Fulgorids or "Lantern flies" are abundant in tropical regions as well as in temperate zones.

The group represents about 6521 species in the world (Animal Resources of India, Z. S. I. 1991). In India nearly 480 species are known through the contributions by Distant (1908, 1916); Paiva (1919); Menon and Prasad (1972); Chopra (1976); Dutta and Pramanick (1977); Dutta and Ghosh (1979).

Key to genera

Mesonotum faintly tricarinate, antennae inserted beneath the eyes; pronotum centrally, laterally and anteriorly carinate; posterior tibiae with a long spine at middle*Nilaparvata*

Mesonotum distinctly tricarinate; antennae inserted near lower margins of eyes; pronotum tricarinate; posterior tibiae with a short spine at middle*Liburnia*

Genus 30 *Liburnia* Stal

1866. *Liburnia* Stal, *Hem. Afr.*, iv. : 179.

Head distinctly narrower than pronotum; vertex a little longer than broad, slightly widened at base; face long and narrow, laterally and medially strongly carinate, antennae inserted near lower margins of eyes, clypeus slightly broader than face, laterally and medially carinate; pronotum as long as vertex, tricarinate, femora unspined but with a long robust spur at apex; tegmina not longly passing apex of abdomen.

Type species : *Liburnia (Embolophora) monoceros* Stal

1866. *Liburnia (Embolophora) monoceros* Stal, *Hemp. Africana*, 4 : 179.

36. *Liburnia pusana* (Distant)

1912. *Sogata pusana* Distant, *Ann. Mag. Nat. Hist.*, 9(8) : 191.

1943. *Liburnia pusana* Metcalf, *General Catalogue of Homp.* : 368.

Material examined : 4 exs., Tripura; Sobrum, South Tripura, 10, xi. 1991, coll. *B. N. Das*; 2 exs., Belonia, South Tripura, 16. v. 1978, coll. *J. K. Jonathan*.

Diagnosis : Vertex brownish yellow; face black, its carinations brownish; clypeus brownish yellow; pronotum brownish yellow, lateral area of pronotum pitchy black in colour, mesonotum brownish yellow, its lateral area pitchy black in colour; tegmina hyaline, pale brownish in colour, a transverse linear discal spot at middle. Wings hyaline, its vein dark brown; legs brownish yellow, posterior tibiae with a short spine at middle and a long apical spur; abdomen black, with a minute brownish yellow spot at base and lateral margin.

Length : 3 mm (Female).

Distribution : India : Tripura (South and East Tripura), South India, West Bengal.

Genus 31. *Nilaparvata* Distant

1906. *Nilaparvata* Distant, *Fauna Brit. India*, 3 : 473.

Head narrower than pronotum; vertex longer than broad, lateral margins strongly carinate, its anterior angle prominent, two oblique discal carination at middle and lateral margin, the basal margin ridged; face elongate, longer than broad, centrally and laterally prominently carinate, the central one furcate at base, apical margin strongly ridged; clypeus strongly medially carinate, antennae inserted beneath the eyes, pronotum about as long as vertex, centrally, laterally and anteriorly carinate, mesonotum faintly tricarinate; tegmina less than three times as long as broad, the apical margin rounded; wings at base broader than tegmina; posterior tibiae with a spine at middle, another at apex and with a long robust apical spur.

Type species : *Nilaparvata greeni* Distant

1906. *Nilaparvata greeni* Distant, *Fauna Brit. India*, 3 : 473.

37. *Nilaparvata* ((*Anderida*)) *lugens* Stal

1854. *Delphax lugens* Stal, *Ofv. Svenska. Vet. Akad. Forh.*, 11 : 246.

1906. *Nilaparvata lugens* Stal; *Fauna Brit. India*, 3 : 486.

1943. *Nilaparvata lugens* Stal; *General Catalogue of Homp.* : 296.

Material examined : 1 ex., Tripura : Belonia, South Tripura, 16. v. 1978, coll. J. K. Jonathan,

Diagnosis : Body brownish yellow; head castaneous brown; vertex brownish yellow, with anterior interspaces between central and lateral carination black; face brownish yellow, its carination pale yellowish, its margins pitchy black; clypeus castaneous, its carination pale yellowish; pronotum pale brownish yellow; mesonotum also with carinations faint pale brownish yellow; tegmina subhyaline with yellowish tint, veins smoky brown; an elongate black spot at apex of clavus; wings hyaline with an opaline lustre, the veins pale brownish.

Length : 2.5 mm (Female).

Distribution : India : Tripura (South Tripura). Elsewhere : China, Dutch East Indies, Fiji, Guam, Java, Malay Peninsula, Sri Lanka, Sumatra.

Family II. CIXIIDAE

Genus 32. *Oliarus* Stal

1862. *Oliarus* Stal, *Berliner Ent. Zeit.*, 6 : 306.

Head more less narrower than thorax, angularly emarginate at the base, vertex concave; face and clypeus together oblong oval-shaped, with distinct median longitudinal ridge running through them; the lateral margin rounded, face with an apical ocellus; margin of clypeus ridged; eyes sinuated beneath; antenna short; pronotum very short; deeply angularly sinuate, mesonotum with five longitudinal ridges; tegmina rounded at apices, legs moderately long, posterior tibiae armed with two or three spines.

Type species : *Oliarus walkeri* Stal

38. *Oliarus caudatus* Walker

1858. *Cixius caudatus* Walker, *Insecta Saunder*, : 43.

1906. *Oliarus caudatus* Distant, *Fauna Brit. India* 3 : 258.

1936. *Oliarus caudatus* Metcalf, *General Catalogue of the Hemiptera*, 2 : 54.

Oliarus caudatus Walker : M. Ghosh and L. K. Ghosh, *Fauna of Meghalaya, State Fauna Series*, Z. S. I. (in press).

Material examined : 3 exs., Tripura : Ambassa, North Tripura, 25. v. 1978. coll. J. K. Jonathan.

Diagnosis : Body pale castaneous brown, head with ridges brownish yellow, frontal area of face and central ridge pitchy-black, pronotum with carination also brownish yellow; mesonotum brownish yellow, mesonotum with five longitudinal carinate lines, those on each side of the central one slightly covering and not reaching anterior margin; tegmina hyaline, its venation brownish, stigma brownish at base, at apical area transverse veins smoky brown, with three very small brownish spots at apical margin, the longitudinal veins brownish. Wings hyaline, its venation pale smoky brown, legs brownish yellow, posterior tibiae with three distinct spines at middle; abdomen brownish yellow.

Length : 6 mm (Female)

Distribution : India, Tripura (North Tripura) Meghalaya, Sikkim.

Family VIII. ISSIDAE

Key to subfamilies

- 1(2) Claval vein not reaching apex, united with commissural margin near apex; tegmina sometimes abbreviated, or connate with clavus and corium; when so, the lateral margins of the clypeus are carinate.....
.....DICTYOPHORINAE
- 2(1) Claval vein continued to the apex itself, or united with the claval suture near apex; tegmina sometimes abbreviated, or connate with clavus and corium; when so, the lateral margins of the clypeus are not carinate ...
.....ACHILINAE

Genus 33. *Vishnuloka* Distant

1906. *Vishnuloka* Distant, *Fauna British India*, 3 : 345.

Head as wide as pronotum; vertex long moderately projecting, lateral margin roundly prominent, somewhat longly and triangularly produced in front and with a median carination, the lateral margin distinctly ridged; face convex, smooth without carination, much narrower at

anterior part, tegmina at apex with longitudinal vein forked, the lower longitudinal vein forked near middle, its bifurcation meeting on margin and apparently forming an elongate cellular area.

Type species : *Vishnuloka prominula* Distant

1906. *Vishnuloka prominula* Distant, *Fauna Brit. India*, 3 : 345.

39. *Vishnuloka prominula* Distant

1906. *Vishnuloka prominula* Distant, *Fauna Brit. India*, 3 : 345.

1954. *Vishnuloka prominula* Metcalf, *General Catalogue of Hemiptera* : 485.

Material examined : 1 ex., Tripura : Belonia, South Tripura, 16. v. 1978, coll. J. K. Jonathan.

Diagnosis : Body pale brownish yellow, head longly porrected and tapering to a long point, its lateral margin broadly prominently and finely transversely wrinkled; face moderately convexly rounded, very finely transverse striations; pronotum granulose, mesonotum chocolate brown, tegmina with a slightly oblique longitudinal piceous fascia, which commences near middle of costal margin and terminates at apex, strongly depressed inward, basal half of costal margin pitchy black and costal membrane brownish yellow, abdomen smoky grey brown; legs pale brownish yellow, posterior tibiae with spines.

Length : 10 mm (Female)

Distribution : India : Tripura (South Tripura), Sikkim.

Subfamily 1. ACHILINAE

Genus 34. *Kinnara* Distant

1906. *Kinnara* Distant, *Entomologist*, 38 : 8.

Head short, much narrower than pronotum, the anterior margins of face slightly projecting beyond eyes, the lateral angulations to vertex is concave with its lateral carinate, eyes with their posterior margins concavely emarginate; face narrowest between eyes, anteriorly emarginate, amplified towards middle, and then a little

narrowed to clypeus, centrally non carinate; clypeus about as long as face, centrally and laterally carinate; pronotum narrow; mesonotum moderately convex and very obsoletely tricarinate; legs of moderate length, posterior tibiae not spined; tegmina somewhat narrow, their apical margin rounded, a small distinct indentation on costal margin beyond middle, a series of transverse veins before apical area and two transverse discal veins just beyond middle, apical areas about ten in number; wings a little wider than tegmina.

Type species : *Pleroma ceylonica* Melichar

1903. *Pleroma ceylonica* Melichar, *Homopteran Fauna von Ceylon*, 42 : 26.

40. *Kinnara ceylonica* Melichar

1903. *Pleroma ceylonica* Melichar, *Homopteran Fauna von Ceylon*, 42 : 26.

1906. *Kinnara ceylonica* Distant, *Fauna Brit. India*, : 289.

1945. *Kinnara ceylonica* (Melichar), *General catalogue of Homop.* : 243.

Material examined : 3 exs., Tripura, Bishramgange, South Tripura, 8. xi. 1991, coll. B. N. Das; 1 ex., Ambassa, North Tripura, 28. 5. 1978, coll. J. K. Jonathan.

Diagnosis : Head short, yellowish, narrow; face slightly projecting; vertex concave with margin carinate; eyes black, face narrowest between eyes, emarginate at anterior margin, pronotum narrow, yellowish; mesonotum pale red in colour, convex and tricarinate; tegmina pale yellow, more or less greyish on apical half; a small chalky white spot at costal indentation, wings smoky brown with very obscure pale dark brown spots in apical areas to the tegmina; legs yellowish; abdomen black.

Length : 3.5 mm. (Female)

Subfamily 2. DICTYOPHORINAE

Genus 35. *Dictyophora* Germar

1833. *Dictyophora* Germar, *Silb. Rev. Ent.*, 1 : 175.

Body oblong or oval, somewhat depressed; head variable in size and form, usually porrectly longly produced, the cephalic process straight or recurved, vertex and face frequently carinate; clypeus centrally longitudinally carinate; second joint of antennae small, subglobose; rostrum long; pronotum frequently broadly emarginate at base slightly anteriorly sinuate behind the eyes; longitudinally carinate, the carination varying from one to three; mesonotum frequently tricarinate; tegmina extending beyond the apex of the abdomen, clavus without transverse vein; wings with a few apical transverse veins; legs moderately long and slender, femora shorter than tibiae, posterior tibiae armed with 4-6 spines.

Type species : *Dictyophora europaea* Linn.

1767. *Fulgora europaea* Linne, *Systema Naturae. Editio Duodecima* 1(2) : 704.

41. *Dictyophora nigrimacula* Walker

1857. *Dictyophora nigrimacula* Walker, *List of Homopterans Insects.*, 2 : 318.

1946. *Dictyophora nigrimacula* Metcalf, *General Catalogue of Homoptera* : 171.

Material examined : 1 ex., Tripura : Ambassa, North Tripura, 25. v. 1978, coll. J. K. Jonathan.

Diagnosis : Head bright brownish yellow, its longitudinal ridges green in colour, its lateral and apex area pitchy black, with green longitudinal carina at beneath; pronotum brownish yellow, its margin and central three carinae green in colour, mesonotum brownish yellow and a transverse pitchy black spot near each lateral angles of anterior margin, three longitudinal carinae and a small spot on each lateral margin; tegmina transparent, its venation dark brown and its apical area and stigma dark brown; wings transparent, veins dark brown; legs brownish yellow, longitudinal lines of legs black; posterior tibiae with five spines; abdomen brownish yellow, with much black quadrangular distinct spots.

Length : 8 mm (Female).

Distribution : India : Tripura (North Tripura), North India.

Chart showing the distribution of homopteran species from Tripura (Serial No. of the species is according to the Text)

Name of the species	W. Tripura	N. Tripura	S. Tripura
Superfamily CERCPOIDEA			
Family APHROPHORIDAE			
1. <i>Clovvia conifera</i> (Walker)	+	-	+
2. <i>Colvia puncta</i> (Walker)	+	-	+
3. <i>Poophilus costalis</i> (Walker)	+	-	-
4. <i>Ptyelus nebulosus</i> (Fabricius)	+	-	-
Family CERCOPIDAE			
5. <i>Abidama producta</i> (Walker)	+	+	-
6. <i>Callitettix varicolor</i> (Fabricius)	-	+	-
7. <i>Leptataspis fulviceps</i> (Dallas)	-	+	-
Superfamily CICADELLOIDEA			
Family CICADELLIDAE			
8. <i>Bothrogonia ferruginea</i> (Fabricius)	+	-	-
9. <i>Cicadella spectra</i> (Distant)	+	+	-
10. <i>Cofana mimica</i> (Distant)	+	+	-
11. <i>Kolla opponens</i> Walker	-	-	+
12. <i>Neodartus acocephaloides</i> Distant	+	-	-
13. <i>Parabolocratus albomaculatus</i> (Dist.)	-	-	+
14. <i>Exitianus atkinsoni</i> (Distant)	-	+	-
15. <i>E. indicus</i> Distant	-	+	-
16. <i>E. nanus</i> (Distant)	-	+	-
17. <i>Goniagnathus punctifer</i> Walker	+	-	-
18. <i>Nephotettix nigropicta</i> Stal			
19. <i>Nephotettix virescens</i> (Fabricius)	+	+	+
20. <i>Paramesus lineaticollis</i> Distant	-	-	+
21. <i>Recilia dorsalis</i> (De Mots)	-	+	-
22. <i>Thomsoniella porrecta</i> Walker	-	+	-
23. <i>Empoasca subrufa</i> Mots.	-	+	-
24. <i>Zygina maculifrons</i> Mots.	-	+	-
Family MEMBRACIDAE			
25. <i>Centrotypus flexuosus</i> (Fabricius)	+	-	-
26. <i>Leptocentrus leucaspis</i> (Walker)	-	+	-
27. <i>Leptocentrus substitutus</i> (Walker)	-	-	+
28. <i>Nilartama typica</i> Distant	-	+	-
29. <i>Otinotus oneratus</i> (Walker)	-	-	+
30. <i>Gargara mixta</i> (Buckton)	-	-	+

Name of the species	W. Tripura	N. Tripura	S. Tripura
Superfamily CICADOIDEA			
Family CICADIDAE			
31. <i>Pomponia solitaria</i> Distant	+	-	-
32. <i>Hapsa nicomache</i> (Walker)	-	+	-
33. <i>Purana pryleri</i> Distant	+	-	-
34. <i>Purana tigrina</i> Walker	-	+	-
35. <i>Scieroptera splendidula</i> Fabricius	+	-	-
Family FULGORIDAE			
36. <i>Liburnia pusana</i> (Distant)	-	-	+
37. <i>Nilaparvata lugens</i> (Kirkaldy)	-	-	+
38. <i>Oliarus caudatus</i> Walker	-	+	-
39. <i>Vishnuloka prominula</i> Distant	-	-	+
40. <i>Kinnara ceylonica</i> Melich.	-	+	+
41. <i>Dictyophara nigrimacula</i> Walker	-	+	-

SUMMARY

The paper incorporates the account of 41 species belonging to 35 genera distributed over 9 subfamilies under 8 families of Homoptera. All the species constitute the new record from the State of Tripura. Key to various taxa, general diagnosis of genera and species, geographical distribution both in India and abroad and references to the original literature have been provided. Notes on economic importance of the species, wherever possible, is given. Also, a chart showing the districtwise distribution of all the species belonging to 8 families of Homoptera is appended.

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INSECTA : HEMIPTERA : APHIDIDAE

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INTRODUCTION

Aphids are soft-bodied homopteran insects and constitute one of the most economically important groups of insects. Besides causing direct injury to the plants, many are important carriers of viral diseases of cultivated and wild plants. The aphids enjoy more or less cosmopolitan distribution and are found in abundance in places having temperate climate.

Out of estimated world fauna of 4,702 species of aphids (G. Remaudiere and M. Remaudiere, 1997), little over 780 species belonging to 211 genera are known from Indian region (Ghosh, A. K. 1989) while the representation from the Oriental fauna is 1050 species under 253 genera (Agarwala and Ghosh, A. K. 1985).

Aphid fauna of Tripura, is poorly known in the form of stray publications. So far, only 54 species belonging to 27 genera in 5 subfamilies are known from the state through the works of Ganguli and Ghosh 1965, Gangopadhyay 1980 (Ph. D. thesis), Ganguli and Agarwala 1985, Bhattacharya and Agarwala 1991, Agarwala and Bhattacharya 1992.

The present paper is an attempt to provide a comprehensive account of the above species/subspecies from the state of Tripura. It deals with a brief note on earlier investigations, keys to subfamilies, tribes, subtribes, genera, species/subspecies, literature references, biological notes wherever possible and geographical distribution of each species both within the state, India and also elsewhere. Measurements (in mm) of all the species and taxonomic remarks wherever possible are also given. Genera and species-wise break up under each subfamily has been shown in Table 1. The taxonomic keys, however, presented here are

essentially for identification of Aphididae of Tripura and it may not work for aphids not represented in this region. Keys are based chiefly on Apteræ.

A brief analysis of Aphid fauna of Tripura has been incorporated under Discussion.

Maps and charts of districtwise distribution of the species and subspecies are provided.

For taxonomic concept, Eastop and Hille Ris Lambers (1976), Ghosh, A. K. (1980, '82, '84, '88), Ghosh, A. K. and Quednau (1990) and Ghosh, A. K. and Agarwala (1993) have been followed.

Most of the material of aphids were examined from the collections of Dr. B. K. Agarwala, Life Science Department, Tripura University.

MORPHOLOGY AND TERMINOLOGY

Body of an aphid is normally of three regions viz. head, thorax and abdomen but fusion may take place between head and prothorax or may be various types of fusion of abdominal segments. The head (Text-Fig. 1) bears a flat or convex frons, with or without lateral frontal tubercles which when present may be smooth, rugose, spinulose, parallel and converging. Eyes are normally of large and compound but in apteræ of some group of aphids eyes may be represented by triommataidia. Paired lateral and dorsal tubercles may be present on head, thoracic and abdominal segments and ocular tubercles present on eyes of alatae. Antennae usually consist of two short basal segments and a flagellum of 1-4 segments; the penultimate segment bears a primary rhinarium at the distal end and in the last antennal segment consist of 'base' and slender apical part, called 'processus terminalis' (Text-fig. 1);

secondary rhinarium may vary in shape, size and number and may be variably present on segment III, IV and sometimes on base of segment VI in alatae, and on antennal segment III of apterae in some Aphididae. Rostrum consists of 5 segments, last segment being usually small and fused with 4th segment, combined structure is known as 'Ultimate rostral segment' which bears variable number of accessory hairs besides a tuft of 6 primary hairs at apex. Thorax is composed of pro-, meso- and meta-thorax, the first may fuse with the head, the others may variably fuse among themselves and abdomen. Mesothorax in apterae possesses mid-thoracic furca. Legs consists of usually 5 joints, sometimes coxae and trochanters may be fused. Tarsi (Fig. 1) are usually 2-segmented and the small first tarsal joint bears 2-7 ventral hairs, in some groups dorsal hairs may also be present. Second tarsal joint usually bears dorso and lateroapical hairs and a pair of terminal claws; empodial hairs present between the claws (Fig. 1). Forewing (Fig. 2) possesses stigma, a straight or curved radial sector, simple, once or twice forked media besides anal and cubital veins; hind wings (Fig. 2) usually smaller than fore wing, bears 2 oblique veins which may be reduced to 1 or may even be absent. Abdomen consists of 9 segments, each of the segments 1-7 usually bears a pair of spiracle. Lateral abdominal tubercles usually present on 1st and 7th tergite, those on 2nd-6th may be variably present; abdominal segment 5 or 6 (Fig. 3) usually bears a pair of siphunculi, of various shapes and characters. However, in some Aphididae, siphunculi are absent. Subanal plate situated ventral to cauda, modification of terminal abdominal segment. Cauda may be of various shapes and bears a few to many hairs.

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

MATERIAL AND METHODS

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

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

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

ii) A sheet of strong paper on a thin board is put under the host plant which is shaken gently, the aphids will then fall upon the substratum. Then the insects are collected and preserved in a suitable fluid. A part of an infested plant sample is also collected into tubes and the aphids are transferred into 96% alcohol.

iii) Another technique is to collect the aphids alive in a rather wide glass tube with a portion of the host plant. In this method, it is often possible to get more material in better condition because nymphs can be reared to adulthood and more alatae can be obtained than by picking directly.

iv) More sophisticated method may be adopted by using tubes of standard width that can be fitted to an exhaustor, and thereby the aphids are sucked in from the threshing board. This acts very quickly and the aphids are not damaged by handling. But the sample should not be large. In fact, the procedure is followed by every European worker.

v) However, the best method of collecting aphids in the field is to collect them alive along with their respective host plants. The portion of each infested plant along with the aphids is then placed in an expanded plastic bag or in tubes or in tins plugged with cotton. The advantage lies here in the fact that it may be possible to have winged specimens that come out within a day or

two from the original sample containing both the immature forms and wingless adults. As a result, desirable number of apterous and winged adults along with different stages of nymphs may be collected for study.

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

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

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

Light Trap : This method of aphid collection is not so effective as in aforesaid methods.

Preservation : The best way of preserving aphids is to put them in the fluid consisting of 2 vols. of 95% alcohol and 1 vol. of 75% lactic acid. Lactophenol also plays an important role in preservation. In this process the live aphids are placed directly into vials containing the clearing fluid made of saturated solution of lactic acid with clear phenol crystals. In this solution, the aphids are generally cleared within a few hours of day. In lactophenol the aphid material may be kept for up to 3 years without ill effects.

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

Name of the host plant and location on host:

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

Date of Collection :

Collector :

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

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

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

Mounting : The aphids preserved in alcohol are to be cleaned for mounting and permanent storage on slides. For this purpose aphids are washed in alcohol and boiled in a water bath for 5-7 minutes; after carefully decanting off the alcohol, 10% KOH is added to the tube and

specimens are boiled for 3-5 minutes for clearing. After removing the KOH the specimens are boiled in Chloral phenol solution (saturated) for about 10 minutes. After clearing, the specimens may be mounted in Berlese medium which is composed of Chloral hydrate 20 gm., Gum accacia (powdered) 12 gm., Glycerine 12 C.C. and distilled water 40 C.C. Eastop and van Emden (1972) may be consulted as to collection, preservation and mounting techniques.

CLASSIFIED LIST OF APHIDIDAE OF TRIPURA

Subfamily I. APHIDINAE

Tribe APHIDINI

Subtribe APHIDINA

Genus 1. *Aphis* Linnaeus, 1758

1. *Aphis citricola* van der Goot
2. *Aphis craccivora* Koch
3. *Aphis fabae* Scopoli
4. *Aphis glycines* (Matsumura)
5. *Aphis gossypii* (Glover)
6. *Aphis kurosawai* Takahashi
7. *Aphis longisetosa* (Basu)
8. *Aphis nasturtii* (Kaltenbach)
9. *Aphis nerii* Boyer de Fonscolombe
10. *Aphis punicae* (Passerini)

Genus 2. *Toxoptera* Koch

11. *Toxoptera aurantii* (Boyer de Fonscolombe)
12. *Toxoptera citricidus* (Kirkaldy)
13. *Toxoptera odinae* (van der Goot)

Subtribe RHOPALOSIPHINA

Genus 3. *Hysteroneura* Davis, 1919

14. *Hysteroneura setariae* (Thomas)

Genus 4. *Melanaphis* van der Goot, 1917

15. *Melanaphis bambusae* (Fullaway)
16. *Melanaphis sacchari* (Zehntner)

Genus 5. *Rhopalosiphum* Koch, 1854

17. *Rhopalosiphum maidis* (Fitch)
18. *Rhopalosiphum nymphaeae* (Linnaeus)
19. *Rhopalosiphum padi* (Linnaeus)
20. *Rhopalosiphum rufiabdominalis* (Sasaki)

Genus 6. *Schizaphis* Bröner, 1931

21. *Schizaphis graminum* (Rondani)
22. *Schizaphis rotundiventris* (Signoret)

Tribe MACROSIPHINI

Genus 7. *Acyrtosiphon* Mordvilko, 1914

23. *Acyrtosiphon pisum* (Harris)

Genus 8. *Aulacorthum* Mordvilko, 1914

24. *Aulacorthum rhamni* (Ghosh *et al.*)

Genus 9. *Brachycaudus* van der Goot, 1913

25. *Brachycaudus helichrysi* Kaltenbach

Genus 10. *Hyadaphis* Kirkaldy, 1904

26. *Hyadaphis coriandri* (Das)

Genus 11. *Lipaphis* Mordvilko, 1928

27. *Lipaphis erysimi* (Kaltenbach)

Genus 12. *Macrosiphoniella* del Guercio, 1911

28. *Macrosiphoniella sanborni* (Gillette)

Genus 13. *Macrosiphum* Passerini, 1860

29. *Macrosiphum indicum* (Basu)
30. *M. (Sitobion) miscanthi* (Takahashi)
31. *M. (S.) rosaeiformis* (Das)

Genus 14. *Myzus* Passerini, 1860

32. *Myzus ornatus* Laing
33. *Myzus persicae* (Sulzer)

Genus 15. *Pentalonia* Coquerel, 1859

34. *Pentalonia nigronervosa* Coquerel

Genus 16. *Semiaphis* van der Goot, 1913

35. *Semiaphis heraclei* (Takahashi)

Subfamily II. DREPANOSIPHINAE

Genus 17. *Tinocallis* Matsumura, 1919

36. *Tinocallis kahawaluokalani* (Kirkaldy)
37. *T. magnoliae* Ghosh and Raychaudhuri

Subfamily III. GREENIDEINAE

Genus 18. *Cervaphis* van der Goot, 1917

38. *Cervaphis quercus* (Takahashi)
39. *C. schouteniae* van der Goot

Genus 19. *Greenidea* Schouteden, 1905

40. *Greenidea* (*Trichosiphum*) *formosana heeri* (Raychaudhuri *et al.*)
41. *Greenidea* (*Greenidea*) *longicornis* Ghosh *et al.*

Genus 20. *Greenideoida* van der Goot, 1917

42. *Greenideoida* (*Paragreenideoida*) *bhalukpongensis* Ghosh *et al.*
43. *G. (P.) ceyloniae* van der Goot
44. *G. (Paratrachosiphum) luteum* (Basu)

Genus 21. *Schoutedenia* Rubsaamen, 1905

45. *Schoutedenia emblica* (Patel and Kulkarni)
46. *S. ralumensis* (Rubsaamen)

Subfamily IV. HORMAPHIDINAE

Genus 22. *Astegopteryx* Karsh, 1890

47. *Astegopteryx minuta* (v. d. Goot)

Genus 23. *Ceratovacuna* Zehntner, 1897

48. *Ceratovacuna lanigera* (Zehntner)
49. *C. silvestrii* (Takahashi)

Genus 24. *Nipponaphis* Pergande, 1906

50. *Nipponaphis* (*Pseudonipponaphis*) *himalayensis* (Ghosh and Raychaudhuri)

Genus 25. *Pseudoregma* Doncaster, 1966

51. *Pseudoregma alexandri* (Takahashi)
52. *P. bucktoni* Ghosh, Pal and Raychaudhuri

Genus 26. *Pseudoastegopteryx* Ghosh, Pal and Raychaudhuri

53. *Pseudoastegopteryx himalayensis* (Ghosh *et al.*)

Subfamily V. PEMPHIGINAE

Genus 27. *Tetraneura* Hartig, 1841

54. *Tetraneura nigriabdominalis* (Sasaki)

LIST OF ABBREVIATIONS USED

Aptera (e)	: Apterous viviparous female (s)
Alata (e)	: Alate viviparous female (s)
a. s.	: Antennal segment
b. d.	: Basal diameter of antennal segment III
F. T. C.	: First tarsal chaetotaxy
h. t. 2.	: Second joint of hind tarsus
p. t.	: Processus terminalis
T. U.	: Tripura University
u. r. s.	: Ultimate rostral segment
Y P. T.	: Yellow Pan Trap

APHIDS OF ECONOMIC IMPORTANCE IN TRIPURA

The following are the main aphid species which infest the plants of economic importance :-

Name of the species	Name of plants infested	Plant Family
<i>Aphis craccivora</i> Koch	<i>Dilichos lablab</i> Linn. (Bean)	Leguminosae
	<i>Vigna catjang</i> Endl. (Cowpea)	—do—
<i>Aphis gossypii</i> Glover	<i>Cucumis sativa</i> Linn. (Cucumber)	Cucurbitaceae

Name of the species	Name of plants infested	Plant Family
	<i>Cucurbita pepo</i> Linn. (Pumpkin)	Cucurbitaceae
	<i>Hibiscus esculentus</i> Linn. (Lady's finger)	Malvaceae
	<i>Lagenaria vulgaris</i> Ser. (Gourd)	Cucurbitaceae
	<i>Luffa cylindrica</i> M. Roem. (Sponge gourd)	—do—
	<i>Solanum melongena</i> Linn. (Brinjal)	Solanaceae
	<i>Solanum tuberosum</i> Linn. (Potato)	—do—
<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica campestris</i> Linn. (Mustard)	Cruciferae
	<i>B. napus</i> Linn. (Rape)	—do—
	<i>B. oleracea</i> Linn. (Cabbage)	—do—
	<i>B. oleracea</i> var <i>botrytis</i> (Cauliflower)	—do—
	<i>Raphanus sativus</i> Linn. (Radish)	—do—
<i>Myzus persicae</i> (Sulzer)	<i>Solanum melongena</i> Linn. (Brinjal)	Solanaceae
	<i>S. tuberosum</i> Linn. (Potato)	—do—
<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> Linn. (Maize)	Gramineae

Of the above named aphid species infesting different species of plants of economic importance, *Lipaphis erysimi* (Kaltenbach) is responsible for maximum damage to its host plants particularly in their productive phase of growth, and thereby hampers in the yield of seeds. On the other hand, *Aphis gossypii* Glover and *Myzus persicae* (Sulzer) infesting potato cause more damage as vectors of viral diseases than as direct pests. Though both *Myzus persicae* and *Lipaphis erysimi* are often found together on the same plant and in the same colony, the former forms a negligible proportion and hence, *Lipaphis erysimi* (Kalt.) plays the vital role in decimating the yield of mustard.

SYSTEMATIC ACCOUNT

Subfamily I. APHIDINAE

Key to the tribes of APHIDINAE

- 1(2) Spiracles of abdominal segments 1 and 2 placed close together; antennal tubercles often well developed.....MACROSIPHINI
- 2(1) Spiracles of abdominal segments 1 and 2 placed far apart; antennal tubercles usually not well developed APHIDINI

Tribe APHIDINI

Key to Subtribes

- 1(2) Lateral tubercles on abdominal segments 1 and 7 posterodorsal to the spiracles of these segments; frons with a 'rhopalosiphine' type of small projection just inner to the antennal sockets RHOPALOSIPHINA
- 2(1) Lateral tubercles on abdominal segments 1 and 7 posteroventral to the spiracles of those segments; frons normal and without any projection as above APHIDINA

Subtribe APHIDINA

Key to the genera

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

Genus 1. *Aphis* Linnaeus

1758. *Aphis* Linnaeus, *Syst. Nat.* (10th ed.), 1 : 451.

Type species : *Aphis sambuci* Linnaeus, 1758

Key to the species of the genus *Aphis* Linn.

Apterae :

- 1(2) Ultimate rostral segment stiletto-shaped; Cauda bearing 6-8 hairs*kurosawai*
- 2(1) Ultimate rostral segment not stiletto-shaped 3

- 3(4) First tarsal chaetotaxy 3, 3, 3; siphunculi longer than cauda bearing 10-14 hairs ...
.....*nerii*
- 4(3) First tarsal chaetotaxy 3, 3, 2 5
- 5(6) 8th abdominal tergite with 3-8 hairs; cauda bearing 10-14 hairs*fabae*
- 6(5) 8th abdominal tergite with only 2 hairs.
.....7
- 7(8) Abdominal dorsum usually completely sclerotic*craccivora*
- 8(7) Abdominal dorsum pale and smooth 9
- 9(10) Hairs on posterior abdominal tergites longer, never less than 3 times as long as b. d. III*longisetosa*
- 10(9) Hairs on posterior abdominal tergites shorter, never more than 2.40 x b. d. III
.....11
- 11(12) Siphunculi pale, smooth, dusky near apices; cauda pale to blackish and with 6-10 hairs*punicae*
- 12(11) Siphunculi dark, imbricated 13
- 13(14) Longest hair on hind femora as long as or longer than its maximum width; cauda bears 8-10 hairs, tergite 7 with 4 hairs..
.....*citricola*
- 14(13) Longest hair on hind femora appreciably shorter than its maximum width 15
- 15(16) Second tarsal segment with only primary hairs; cauda usually with 5 hairs
.....*nasturtii*
- 16(15) Second tarsal segment with both primary and secondary hairs 17
- 17(18) Cauda dark brown to blackish and bearing 5-6 hairs; colour much variable
.....*gossypii*
- 18(17) Cauda normally pale to dusky but never black; colour in life yellowish
.....*glycines*

1. *Aphis citricola* van der Goot

1914. *Aphis citricola* van der Goot, *Rec. Indian Mus.*, 13 : 175-183.

1992. *Aphis citricola* van der Goot : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 1.

Material examined : 1 alata, on *Calotropis juncea*, 1. i. 1982, coll. B. K. Agarwala.

Measurements (in mm) of the alata : Length of body 1.65; width of body 0.80, antenna 1.00; a. s. iii. 0.24, iv. 0.17, v. 0.16, vi (0.09 + 0.20); u. r. s. 0.10; h.t.2 0.09; siphunculus 0.20; cauda 0.16.

Distribution : India : Tripura (throughout), all over; Africa, Australia, China, Nepal, New Zealand, North America, Pakistan, Sri Lanka, Taiwan, Thailand and Vietnam.

Remarks : The species shows affinity with *A. pomi* but differs in having less number of caudal hairs 7-14 as against more hairs 13-20 in alatae. Ghosh, A. K. Ghosh, M. R. and Raychaudhuri, D. N. (1972) described the apterous oviparous female for the first time from India.

2. *Aphis craccivora* Koch

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

1992. *Aphis craccivora* Koch; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, Newsletter 2(3 & 4) : 2.

Material examined : Apteræ and alatae

Host plants : Cereals and Pulses.

Measurements (in mm) : Length of body 2.00; width 1.25; antenna 1.20; a. s. iii. 0.35; iv. 0.20; v. 0.21, vi. (0.11 + 0.30); u. r. s. 0.10; h.t.2 0.10; siphunculus 0.20; cauda 0.18.

Biological Notes : In life dark blackish to brownish green, abdominal dorsum shiny black. It infests all the aerial parts of the host plants heavily. Ants attend the aphids. Sometimes, Lady-bird beetles predate on these aphids.

Distribution : India : Tripura (all over); virtually cosmopolitan.

3. *Aphis fabae* Scopoli

1763. *Aphis fabae* Scopoli. *Entomologia Cornialica*, 136.

1990. *Aphis fabae* Scopoli : Ghosh, L. K. *Mem. zool. Surv. India* 17(3) : 29.

Material examined : 3 apteræ and 3 nymphs.

Host plant : *Rosa variegata*.

Measurements (in mm) : Length of body 1.85; width 0.99; antenna 0.90; a. s. iii 0.25; iv 0.15; v 0.14; vi (0.10 + 0.28); u. r. s. 0.22; ht₂ 0.18; siphunculus 0.48; cauda 0.40.

Biological Notes : Yellowish green aphids infest the under surface of leaves. The species is attended by ants.

Distribution : India : Tripura (West), all over; Africa, Europe, Middle East.

Remarks : Raychaudhuri, D. N. (ed.) (1980) described *sexuale* from Northwest India.

4. *Aphis glycines* Matsumura

1917. *Aphis glycines* Matsumura, J. Coll. Agric. Hokkaido imp. Univ., 7 : 387.

1990. *Aphis glycines* Matsumura; Ghosh, L. K., Mem. zool. Surv. India, 17(3) : 34.

1992. *Aphis glycines* Matsumura; Agarwala and Bhattacharya, Soc. Nat. Sci., 2(3 & 4) : 2.

Material examined : Apterae

Host plant : Leguminosae

Measurements (in mm) of one specimen : Length of body 1.30; width 0.70; antenna 1.05; a. s. iii 0.20, iv 0.15, v 0.17, vi (0.11 + 0.24); u. r. s. 0.10; ht₂ 0.05; siphunculus 0.20; cauda 0.19.

Biological notes : Greenish aphids infest the ventral surface of apical leaves and flowers. The species is attended by ants. Coccinellids and syrphids are found to predate on this aphid.

Distribution : India : Tripura (West, South and North), Manipur, West Bengal; China, Japan, Korea, Malaysia, Manchuria, Nepal, Philippines, Taiwan and Thailand.

Remarks : Agarwala and Bhattacharya (1992) recorded the species for the first time from Tripura.

5. *Aphis gossypii* Glover

1877. *Aphis gossypii* Glover, Rep. Comm. agric. Oper. Dep., 36.

1992. *Aphis gossypii* Glover; Agarwala and Bhattacharya Soc. Nat. Sci. 2(3 & 4) : 2.

Material examined : Many apterae and alatae.

Host plant : Plants belonging to many natural orders.

Measurements (in mm.) of one specimen : Length of body 1.38, width 0.75; antenna 1.07; a. s. iii 0.26, iv 0.18, v 0.17, vi (0.10 + 0.26); u. r. s. 0.12; ht₂ 0.11; siphunculus 0.29; cauda 0.15.

Biological notes : Pale brown to brownish yellow aphids infest all the aerial parts of the host plants. Attendant ants are seen in the colony of aphids. Beetles of Coccinellidae feed on these insects.

Distribution : India : Tripura (all over); Cosmopolitan.

Remarks : This is the commonest and highly polyphagous aphid infesting about 459 plant species belonging to 76 families in India.

6. *Aphis kurosawai* Takahashi

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

1992. *Aphis kurosawai* Takahashi, Agarwala and Bhattacharya, Soc. Nat. Sci., 2(3 & 4) : 2.

Material examined : Apterae

Host plant : Undet. Compositae

Measurements (in mm.) of an aptera : Length of body 1.50; width 0.82; antenna 0.75; a. s. iii 0.19, iv 0.14, v 0.14, vi (0.07 + 0.17); u. r. s. 0.12; ht₂ 0.03; siphunculus 0.17; cauda 0.14.

Biological notes : Deep yellow to greenish yellow aphids infest the aerial parts of the host plants. Ants usually attend the aphid colony.

Distribution : India : Tripura (West, North), Assam, Himachal Pradesh, J. & K. State, Manipur, Nagaland, Sikkim, Uttar Pradesh, West Bengal; Bhutan, China, Japan, Nepal, Taiwan and Thailand.

Remarks : The species is characterised by stiletto-shaped ultimate rostral segment. It leads anholocyclic life cycle throughout the year in the Indian ecosystem. Agarwala and Bhattacharya (1992) recorded the species for the first time from Tripura.

7. *Aphis longisetosa* Basu

1969. *Aphis ruborum longisetosus* Basu, *Oriental Ins.* 3 : 356.
1990. *Aphis longisetosa* Basu; Ghosh, L. K. *Mem. zool. Surv. India*, 17(3).
1992. *Aphis ruborum longisetosus* Basu; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae.

Host plant : *Rubus* sp.

Measurements (in mm.) of an aptera : Length of body : 1.70; width 1.00; antenna 0.90; a. s. iii 0.17, iv 0.10, v 0.11; vi (0.10 + 0.25); u. r. s. 0.12; ht₂ 0.09; siphunculus 0.15; cauda 0.16.

Biological notes : Colony infests lower surface of leaf of host plant without any visible injury to it. The aphids are usually yellow to brown yellowish in life.

Distribution : India : Tripura (West, South and North), Arunachal Pradesh, Himachal Pradesh, Meghalaya, Nagaland, Sikkim, Uttar Pradesh, West Bengal.

Remarks : Agarwala and Bhattacharya (1992) recorded the species for the first time from the State of Tripura. The species is characterised by its longer dorsal body hairs about 3 times as long as b. d. III.

8. *Aphis nasturtii* Kaltenbach

1843. *Aphis nasturtii* Kaltenbach, *Mon. Fam. Pfl.*, 76.
1990. *Aphis nasturtii* Kaltenbach : Ghosh, L. K. *Mem. zool. Surv. India*; 17(3) : 45.
1992. *Aphis nasturtii*; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Host plant : Many plant families.

Biological notes : Deep yellow to brown yellow aphids infest the aerial parts of the host plants. The ant *Tetramorium* sp. usually attends the aphid species.

Distribution : India : Tripura (widely distributed), all over; America, Europe, Great Britain, Middle East, Nepal, Pakistan, Taiwan; U. S. A.

Remarks : In India, the species infests about 74 species belonging to 64 genera in 37 plant families. Agarwala and Bhattacharya (1992) reported the species for the first time from the state of Tripura.

9. *Aphis nerii* Boyer de Fonscolombe

1841. *Aphis nerii* Boyer de Fonscolombe, *Ann. Soc. ent. Fr.*, 10 : 197.
1990. *Aphis nerii* Boyer de Fonscolombe; Ghosh, L. K. *Mem. zool. Surv. India*. 17(3) : 48.
1992. *Aphis nerii* B. d. F.; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Host Plant : Undet. Asclepiadaceae.

Biological notes : Bright yellow large aphids with distinct black siphunculi usually infest the under surface of young apical leaves.

Measurements (in mm.) of an aptera : Length of body 2.50; width 1.10; antenna 1.95; a. s. iii 0.44, iv 0.34; v 0.30; vi (0.14 + 0.56); u. r. s. 0.15 ht₂ 0.15; siphunculus 0.50; cauda 0.30.

Distribution : India : Tripura (West), all over; Africa, America, Australia, Bhutan, Burma, British Guinea, China, Europe, Fiji, Formosa, Japan, Java, Korea, Malaya, Middle East, Nepal, New Zealand, Siam, Solomon Is., Spain, Somaliland, Sri Lanka, Transval, U. S. A.

10. *Aphis punicae* (Passerini)

1863. *Aphis punicae* Passerini, *Archo Zool. Anat. Fisiol. (Modena)*, 2 : 32.
1990. *Aphis punicae* (Passerini); Ghosh, L. K. *Mem. zool. Surv. India*, 19(3) : 57.
1992. *Aphis punicae*; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Host plant : Unknown.

Measurements (in mm.) of an aptera : Length of body 1.50; width 0.85; antenna 0.84; a. s. iii 0.22, iv 0.17, v 0.14, vi (0.10 + 0.22); u. r. s. 0.20; ht₂ 0.18; siphunculus 0.60; cauda 0.32.

Biological notes : As a result of infestation by this aphid a sooty mould on the excretion develops. This covers twigs, leaves and fruits.

Distribution : India : Tripura (West), Himachal Pradesh, Manipur, Meghalaya, West Bengal; Africa, Europe, France, Italy Morocco, Pakistan, Spain, Switzerland, U. S. S. R.

Remarks : The species was recorded for the first time from Tripura by Agarwala and Bhattacharya (1992).

Genus 2. *Toxoptera* Koch

1856. *Toxoptera* Koch, *Die Pflanzen Aphiden*, 3 : 253.

Type species : *Toxoptera aurantiae* Koch, 1856

Aphis aurantii Boyer de Fonscolombe, 1841

Key to the species

- 1(2) Siphunculi 0.4-0.6 x Cauda; p. t. 2.5-3 x base of a. s. vi ***odinae***
- 2(1) Siphunculi 0.7-1.5 x Cauda; p. t. 3.5-5 x base of a. s. vi 3
- 3(4) Longest hair on a. s. iii shorter than b. d. iii; siphunculi sparsely imbricated; cauda with 8-15 hairs ***aurantii***
- 4(3) Longest hair on a. s. iii about 1.2-1.5 x b. d. iii; siphunculi heavily imbricated, black; cauda with 20-35 hairs ***citricidus***

11. *Toxoptera aurantii* (Boyer de Fonscolombe)

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

1976. *Toxoptera aurantii* (B. d. F.) : Mondal, Basu and Raychaudhuri, *Oriental Ins.*, 10(4) : 535-537.

1992. *Toxoptera aurantii* (B. d. F.) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2 (3 & 4) : 2.

Material examined : 1 aptera, 1 nymph on *Citrus*, Agartala.

Measurements (in mm.) of the aptera : Length of body 1.70; width 0.98, antenna 1.40; a. s. iii 0.35, iv 0.25, v 0.24; vi (0.10 + 0.36), u. r. s. 0.20; ht₂ 0.16; siphunculus 0.46; cauda 0.40.

Distribution : Widely distributed in Tripura and virtually cosmopolitan.

12. *Toxoptera citricidus* (Kirkaldy)

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

1976. *Toxoptera citricidus* (Kirkaldy) : Mondal, Basu and Raychaudhuri, D. N. *Oriental Ins.*, 10(4) : 538-540.

1992. *Toxoptera citricidus* (Kirkaldy) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2 (3 & 4) : 2.

Material examined : Nil.

Biological notes : Literature reveals that these dark brown aphids infest the under surface of young leaves, shoots and flower buds of the host plants.

Distribution : India : Tripura (all over); Cosmopolitan.

13. *Toxoptera odinae* (van der Goot)

1917. *Longiunguis odinae* van der Goot, *Contr. Fauna Indes neerl.*, 1(3) : 113.

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

1992. *Toxoptera odinae* (van der Goot); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm.) of an aptera : Length of body 1.75; width 1.00; antenna 1.12; a. s. iii 0.25, iv 0.17, v 0.16; vi (0.09 + 0.28); u. r. s. 0.21; ht₂ 0.16; siphunculus 0.17; cauda 0.35.

Distribution : India : Tripura (throughout), all over; China, Korea, Japan, Java, Malayasia, Nepal, Philippines, South America, Sri Lanka, Sumatra and Taiwan.

Subtribe RHOPALOSIPHINA

Key to the genera

- 1(2) Dorsum of abdomen with spinules arranged in polygons, each polygon enclosing a few spinules ***Rhopalosiphum***
- 2(1) Dorsum of abdomen without such spinules 3
- 3(4) Siphunculus short and thick; secondary rhinaria in alatae protuberant ***Melanaphis***
- 4(3) Siphunculus rather long; secondary rhinaria in alatae normal 5

5(6) Cauda pale, medially constricted, usually with 4 medial hairs; alatae with Media of fore wing twice-branched; hind wing with only 1 oblique vein *Hysteroneura*

6(5) Cauda not as above; alatae with Media of forewings once-branched; hind wing with 2 oblique veins *Schizaphis*

Genus 3. *Hysteroneura* Davis

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

Type species : *Siphonophora setaria* Thomas, 1878.

14. *Hysteroneura setariae* (Thomas)

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

1992. *Hysteroneura setariae* (Thomas); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, **2**(3 & 4) : 2.

Material examined : Apterae, Tripura : Agartala, on grass, 1.1.1982, coll. B. K. Agarwala.

Measurements : (Aptera) : Length of body 1.98, width 1.10; antenna 1.60; a. s. iii 0.40, iv 0.20, v 0.21, vi (0.10 + 0.55), u. r. s. 0.19; ht₂ 0.15; siphunculus 0.56, cauda 0.38.

Biological notes : Brownish-red aphids usually infest the ventral surface of leaves and inflorescence of the host plants without causing any noticeable injury. Ants attend the aphids.

Distribution : India : Tripura (West), all over; Africa; America; China; Eastern Is., Fiji, Hawaii, Japan, Java, Korea, Malayasia, Nepal, Philippines, Solomon Is., Taiwan, Thailand and Vietnam.

Genus 4. *Melanaphis* van der Goot

1917. *Melanaphis* van der Goot, *Contrib. Faune Ind. Neerl.*, **1**(3) : 60.

Type species : *Aphis bambusae* Fullaway, 1910.

Key to species of *Melanaphis*

1(2) Cauda with 5 hairs; Siphunculi longer than cauda and about 1.3 times as long as its basal diameter *bambusae*

2(1) Cauda with 12-14 hairs; siphunculi shorter than cauda, about twice as long as its basal diameter *sacchari*

15. *Melanaphis bambusae* (Fullaway)

1910. *Aphis bambusae* Fullaway, *Rep. Hawaii Agric. Exp. Stn.*, (1909) : 335.

1992. *Melanaphis bambusae* (Fullaway) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, **2**(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm.) of aptera : Length of body 1.15; width 0.64; antenna 1.05; a. s. iii 0.20, iv 0.15, v 0.20, vi (0.18 + 0.48); u. r. s. 0.12; ht₂ 0.12; siphunculus 0.25; cauda 0.20.

Biological notes : Greyish brown aphids usually colonise the undersurface of host plant. The species is attended by ants.

Distribution : India : Tripura (South), all over; Africa, Australia; China, Egypt, Hawaii is., Indonesia; Malayasia and Taiwan.

16. *Melanaphis sacchari* (Zehntner)

1897. *Aphis sacchari* Zehntner, *Arch. Suikerind Ned. Ind.*, **5** : 551.

1917. *Longiunguis sacchari* (Zehntner); van der Goot, *Contrib. Fauna Indes. Neerl.*, **1**(2) : 116.

1974. *Melanaphis sacchari* (Zehntner); Raychaudhuri and Banerjee, 1974, *Oriental Ins.*, **8**(3) : 379.

1992. *Melanaphis sacchari* (Zehntner); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, Agartala, **2**(3 & 4) : 2.

Material examined : Apterae and alatae

Host plant : *Saccharum officinarum*

Measurements (in mm) of an aptera : Length of body 1.68; width 1.00; antenna 1.10; a. s. iii 0.22, iv 0.18, v 0.17, vi (0.10 + 0.36); u. r. s. 0.08; ht₂ 0.09; siphunculus 0.11; cauda 0.14.

Biological notes : Greenish yellow insects infest growing shoots, lower portion of stem and both the surfaces of leaves of host plant. Ants attend the aphids.

Distribution : India : Tripura (South, West Belamia, Khowai Kamalpur subdivisions), all over India; virtually cosmopolitan.

Genus 5. *Rhopalosiphum* Koch1854. *Rhopalosiphum* Koch, *Die Pflanzen Aphiden*, 1 : 23.Type species : *Aphis nymphaeae* Linnaeus, 1961.Key to the species of *Rhopalosiphum*

Apterae :

- 1(2) 8th abdominal tergite with 4-8 hairs; antennae 5-segmented*rufiabdominalis*
- 2(1) 8th abdominal tergite with only 2 hairs; antennae usually 6-segmented 3
- 3(4) P. t. 1.4-1.8 x base of last antennal segment; u. r. s. 0.8-0.9 x ht₂*maidis*
- 4(3) P. t. 2.0 x base of last antennal segment; u. r. s. 1.0-1.13 x ht₂ 5
- 5(6) Siphunculi cylindrical; p. t. 4.5-5.0 x base of last antennal segment*padi*
- 6(5) Siphunculi distinctly clavate; p. t. 3.0 x base of last antennal segment*nymphaeae*

17. *Rhopalosiphum maidis* (Fitch)1856. *Aphis maidis* Fitch, *Trans. N. Y. agric. Soc.*, 15 : 531.1887. *Rhopalosiphum maidis* (Fitch) : Webster, *Reley Rept* : 148.1960. *Rhopalosiphum maidis* (Fitch) : Richards, *Canad. Ent.*, 92 : 19.1992. *Rhopalosiphum maidis* (Fitch) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 1.70; width 0.82; antenna 0.69; a. s. iii 0.14, iv 0.08, v 0.08, vi (0.07 + 0.18); u. r. s. 0.08; ht₂ 0.09; siphunculus 0.15; Cauda 0.09.

Biological notes : Yellow to green aphids infest the undersurface of leaves surrounding growing shoots. Ants attend the aphids. Coccinellid beetles predate on the insect.

Distribution : India : Tripura (West, North, South), all over India; Cosmopolitan.

Remarks : The species is a well known pest of a large number of graminaceous crops.

18. *Rhopalosiphum nymphaeae* (Linnaeus)1761. *Aphis nymphaeae* Linnaeus, *Fauna Succica*, 2 : 260.1960. *Rhopalosiphum nymphaeae* (Linnaeus); Richards, *Canad. Ent.*, 92 : 26.1992. *Rhopalosiphum numphaeae* (Linn.); Agarwala and Bhattacharya, *Sci. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 2.00; width 1.08; antenna 1.40; a. s. iii 0.21, iv 0.25, v 0.22; vi (0.12 + 0.43); u. r. s. 0.16; ht₂ 0.12; siphunculus 0.32; cauda 0.15.

Biological notes : Deep brown to blackish brown aphids infest both the upper and lower surface of leaves of host plant. Ants attend the aphids. Coccinellid beetles predate on the species.

Distribution : India : Tripura (West), all over the country; virtually cosmopolitan.

19. *Rhopalosiphum padi* (Linnaeus)1758. *Aphis padi* Linnaeus, *Syst. Nat.* (10 ed.) 1 : 451.1960. *Rhopalosiphum padi* (Linnaeus); Richards, *Canad. Ent.*, 92 : 29.1992. *Rhopalosiphum padi* (Linnaeus); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, Agartala, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 2.15.; width 1.25; antenna 1.38; a. s. iii 0.30; iv 0.22, v 0.16, vi (0.10 + 0.42); u. r. s. 0.11; ht₂ 0.10; siphunculus 0.25; cauda 0.15.

Biological notes : Blackish aphid usually infests upper and lower surface of leaves of host plant.

Distribution : India : Tripura (West and South), widely distributed in the country and virtually cosmopolitan.

20. *Rhopalosiphum rufiabdominalis* (Sasaki)1899. *Toxoptera rufiabdominalis* Sasaki, *Rep. Hokkaido natr. Agric. Exp. Stn.*, 17 : 202.1960. *Rhopalosiphum rufiabdominalis* (Sasaki) ; Richards, *Canad. Ent.*, 92 : 35.1992. *Rhopalosiphum rufiabdominalis* (Sasaki); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, Agartala, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm.) of an aptera: Length of body 2.10; width 1.10; antenna 1.40; a. s. iii 0.50; iv 0.10, v (0.10 + 0.55) u. r. s. 0.13; ht₂ 0.10; siphunculus 0.24; cauda 0.11.

Biological notes : Deep yellow to yellowish green insects infest the ventral surface of young and moderately old leaves of the host plant. Ants attend the aphids.

Distribution : India : Tripura (West, South), all over the country; Cosmopolitan.

Remarks : Young *et al.* (1971) reported the species from roots and underground stem in barley at Delhi. This was a first record of the species from the roots of Barley in India.

Genus 6. *Schizaphis* Börner

1931. *Schizaphis* Börner, *Ann. Schedlingsk.*, 7 : 10.

Type species : *Aphis graminum* Rondani, 1847.

21. *Schizaphis graminum* (Rondani)

1852. *Aphis graminum* Rondani, *Nouv. Ann. Sci. Nat. Bologna*, 6(3) : 10.

1980. *Schizaphis graminum* (Rondani); Raychaudhuri *et al.*, *In Aphids of N. E. India and Bhutan* : 72.

1992. *Schizaphis graminum* (Rondani); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Host plant : Unidentified Gramineae

Measurements (in mm) of an aptera : Length of body 1.60; width 1.0; antenna 0.90; a. s. iii 0.20, iv 0.11, v 0.15, vi (0.10 + 0.24); u. r. s. 0.06 ht₂ 0.08; siphunculus 0.25; cauda 0.16.

Biological notes : The aphid is greenish brown in colour. It infests the undersurface of leaf of host plant.

Distribution : India : Tripura (West), all over the country and virtually cosmopolitan.

22. *Schizaphis rotundiventris* (Signoret)

1860. *Schizaphis rotundiventris* Signoret, Eastop, *Aust. J. Zool.*, 14 : 498.

1971. *Schizaphis rotundiventris* (Signoret) : Chakrabarti, Ghosh and Raychaudhuri, *Sci. Cult.*, 37 : 248.

1992. *Schizaphis rotundiventris* (Signoret) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(III & IV) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 1.80; width of body 1.0; antenna 1.40; a. s. iii 0.30, iv 0.20, v 0.17, vi (0.08 + 0.55), u. r. s. 0.16; ht₂ 0.15; siphunculus 0.60; cauda 0.20.

Biological notes : Yellowish green aphids infest both the surfaces of leaves of the host plant.

Distribution : India : Tripura (West), Manipur, Meghalaya, Sikkim, South India, Uttar Pradesh, West Bengal; Africa, Australia, Egypt, Israel, Kenya, Nigeria, Pakistan, The Philippines, Rhodesia, Sri Lanka, Sudan.

Tribe MACROSIPHINI

Key to genera

1(2)	U. r. s. stiletto-shaped	<i>Macrosiphoniella</i>
2(1)	U. r. s. never stiletto-shaped	3
3(4)	Siphunculi reticulated with isodiametrical hexagonal cells	<i>Macrosiphum</i>
4(3)	Siphunculi never reticulated with isodiametrical hexagonal cells.....	5
5(6)	Siphunculi with spinular imbrications; dorsal abdominal hairs short with expanded apices; cauda with bulbous base	<i>Pentalonia</i>
6(5)	Siphunculi never with spinular imbrications; dorsal abdominal hairs not as above	7
7(8)	Head with spinulosity	9
8(7)	Head without spinulosity	11
9(10)	Median frontal prominence absent; lateral frontal tubercles rather strongly convergent.....	<i>Myzus</i>
10(9)	Median frontal prominence distinct; lateral frontal tubercles always divergent	<i>Aulacorthum</i>

- 11(12) Cauda subpentagonal, at most as long as basal width **Brachycaudus**
- 12(11) Cauda elongate, always longer than basal diameter 13
- 13(14) Siphunculi shorter than cauda; F. T. C. 3, 3, 2 **Semiaphis**
- 14(13) Siphunculi always longer than cauda 15
- 15(16) Lateral frontal tubercles on head well developed, diverging **Acyrtosiphon**
- 16(15) Lateral frontal tubercles weakly developed 17
- 17(18) Siphunculi with preapical circumcission and with distinct apical flange; midthoracic furca in apterae with separate arms **Hyadaphis**
- 18(17) Siphunculi without such circumcission; midthoracic furca in apterae sessile **Lipaphis**

Genus 7. **Acyrtosiphon** Mordvilko

1914. *Acyrtosiphon* Mordvilko, *Fauna Russie*, 1 : 85.

Type species : *Aphis pisi* Kaltenbach, 1843.

(= *Aphis pisum* Harris, 1776).

23. **Acyrtosiphon pisum** (Harris)

1776. *Aphis pisum* Harris, *Exposit. English Insects*, London, 66.
1958. *Acyrtosiphon pisum* (Harris); Basu, A. N. and Barnerjee, S. N. *Indian agric.*, 2 (2) : 89.

Material examined : Aptera

Measurements (in mm) of the aptera : Length of body 4.10; width of body 1.80; antenna 4.00; a. s. iii 1.02, iv 0.80, v 0.72, vi (0.25 + 1.00); u. r. s. 0.20; ht₂ 0.32; siphunculus 1.5; cauda 0.70.

Distribution : Tripura (all over); Cosmopolitan.

Genus 8. **Aulacorthum** Mordvilko

1914. *Aulacorthum* Mordvilko, *Fauna Russie*, 1 : 68.

Type species : *Aphis solani* Kaltenbach, 1843.

24. **Aulacorthum rhamni** Ghosh & Raychaudhuri

1970. *Aulacorthum rhamni* Ghosh and Raychaudhuri *Oriental. Ins.*, 4 : 379.
1980. *Aulacorthum rhamni* : Raychaudhuri, Ghosh and Basu, *In Taxonomy of the Aphids of North East India and Bhutan*, The Zoological Society Publ. : 105.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 2.82; width of body 1.12; antenna 3.30; a. s. iii 0.75, iv 0.65, v 0.55, vi (0.22 + 0.85); u. r. s. 0.27; ht₂ 0.21; Siphunculus 0.30; cauda 0.20.

Distribution : India : Tripura (West), Himachal Pradesh, Meghalaya, Sikkim, and West Bengal.

Genus 9. **Brachycaudus** van der Goot

1913. *Brachycaudus* van der Goot, *Tijdschr. Ent.*, 56 : 97.

Type species : *Aphis myosotidis* Koçh, 1854.

25. **Brachycaudus helichrysi** (Kaltenbach)

1843. *Aphis helichrysi* Kaltenbach, *Monogr. Pflanzen.* : 102.
1977. *Brachycaudus helichrysi* (Kalt.) : Raha, Singh, Raychaudhuri and Raychaudhuri, *Sci. Cult.*, 40(10) : 452.

Material examined : Apterae and alatae

Measurements (in mm) of an aptera : Length of body 1.20; width of body 0.80; antenna 0.62; a. s. iii 0.16, iv 0.12, v (0.08 + 0.18); u. r. s. 0.16; ht₂ 0.12; siphunculus 0.25; cauda 0.14.

Distribution : India : Tripura (all over), widely distributed; Cosmopolitan.

Genus 10. **Hyadaphis** Kirkaldy

1904. *Hyadaphis* Kirkaldy, *Entomologist*, 37 : 279.

Type species : *Aphis xylosite* Schrank, 1901
(= *Siphocoryne foeniculi* Pass., 1860).

26. **Hyadaphis coriandri** (Das)

1918. *Brevicoryne coriandri* Das, *Mem. Indian Mus.*, 6(4) : 180.
1980. *Hyadaphis coriandri* (Das) : Raychaudhuri, Ghosh and Basu, *In Taxonomy of the aphids of N. E. India and Bhutan* : 143.

1992. *Hyadaphis coriandri* : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 1.80, width of body 1.10; antenna 0.60; a. s. iii 0.25, iv 0.10, v (0.07 + 0.16); u. r. s. 0.17; ht₂ 0.20; siphunculus 0.15; cauda 0.33.

Distribution : India : Tripura (West), Bihar, Himachal Pradesh, Manipur, Meghalaya, Sikkim, South India, Uttar Pradesh; Egypt, Nigeria, Pakistan, South Africa.

Genus 11. *Lipaphis* Mordvilko

1928. *Lipaphis* Mordvilko, *Key to the identification of insects of European Russia* : 200.

Type species : *Aphis erysimi* Kaltenbach, 1843.

27. *Lipaphis erysimi* (Kaltenbach)

1843. *Aphis erysimi* Kaltenbach, *Mon. Fam. Pfl.* : 99.
1992. *Lipaphis erysimi* (Kalt.) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : 1 aptera, 1 alata and 3 nymphs, on *Brassica oleracea*, Agartala, coll. B. K. Agarwala.

Measurement (in mm) of an aptera : Length of body 1.52; width 0.97; antenna 0.93; a. s. iii 0.27, iv 0.10, v 0.11, vi (0.10 + 0.20); u. r. s. 0.09; ht₂ 0.10; siphunculus 0.18; cauda 0.15.

Biological notes : Greenish to greenish yellow aphids usually infest the aerial parts i.e., young leaves, growing shoots, flowers and fruits.

Distribution : India : Tripura (widely distributed), Cosmopolitan.

Remarks : The aphid shows a longitudinal row of impressed areas on each side of the mid abdominal dorsum. The species is one of the major pests of cruciferous crops not only in Tripura but also in other parts of India. It is, in fact, a menace to the cultivation of mustard.

Genus 12. *Macrosiphoniella* del Guercio

1911. *Macrosiphoniella* del Guercio, *Redia*, 7 : 331.

Type species : *Siphonophora atra* Ferrari, 1872.

28. *Macrosiphoniella sanborni* (Gillette)

1908. *Macrosiphum sanborni* Gillette, *Can. Ent.*, 40 : 65.
1992. *Macrosiphoniella sanborni* (Gillette) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 2.20; width of body 1.02; antenna 2.04; a. s. iii 0.40, iv 0.35, v 0.30, vi (0.15 + 0.55); u. r. s. 0.15; ht₂ 0.12; siphunculus 0.42; cauda 0.35.

Biological notes : Chocolate brown to dark brown insects infest both the surfaces of leaves, stem and flower bud. The species is attended by small black and brown ants.

Distribution : India : Tripura (widely distributed), virtually cosmopolitan.

Genus 13. *Macrosiphum* Passerini

1860. *Macrosiphum* Passerini, *Gli Afidi* : 27.

Type species : *Aphis rosae* Linnaeus 1758.

Key to species

- 1(2) P. t. about as long as a. s. iii; siphunculi about twice as long as cauda; cauda pale *rosaeiformis*
2(1) P. t. distinctly longer than a. s. iii; siphunculi not more than 1.5 x cauda 3
3(4) P. t. 1.3-1.7 x a. s. iii; u. r. s. as long as ht₂ *indicum*
4(3) P. t. about 1.3 x a. s. iii; u. r. s. about 0.7-0.8 x ht₂ *miscanthi*

29. *Macrosiphum (Sitobion) indicum* (Basu)

1964. *Sitobion indicum* Basu, *J. Linn. Soc., (Zool)*, 45 : 230.
1975. *Macrosiphum (Sitobion) indicum* (Basu) : David, *Oriental Ins.*, 9(4) : 409.
1992. *Macrosiphum indicum* (Basu) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 1.60; width of body 0.50; antenna 2.50; a. s. iii 0.45, iv 0.43, v 0.38, vi (0.10 + 0.70);

u. r. s. 0.15; ht₂ 0.15; siphunculus 0.72; cauda 0.68.

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

30. *Macrosiphum (Sitobion) miscanthi* (Takahashi)

1921. *Macrosiphum miscanthi* Takahashi, *Aphididae of Formosa*, 1 : 8.

1975. *Macrosiphum (Sitobion) miscanthi* (Takahashi); David, *Oriental Ins.*, 9(4) : 470.

1992. *Macrosiphum miscanthi* (Takahashi) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 3.0; width of body 1.25; antenna 3.50; a. s. iii 0.84, iv 0.65, v 0.55, vi (0.15 + 1.10); u. r. s. 0.11; ht₂ 0.14; siphunculus 0.75; cauda 0.50.

Biological notes : Brown to bright yellow aphids infest the leaves, both growing and basal portions of the shoots. The species exhibits colour variation.

Distribution : India : Tripura (West), Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh, West Bengal; Australia, China, Fiji, Hawaii, New Zealand and Taiwan.

31. *Macrosiphum (Sitobion) rosaeiformis* (Das)

1918. *Macrosiphum rosaeiformis* Das, *Mem. Indian Mus.*, 6(4) : 158.

1957. *Macrosiphum (Sitobion) rosaeiformis* (Das); David, *Indian J. Ent.*, 19(4) : 298.

1992. *Macrosiphum rosaeiformis* Das : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae and alatae

Measurements (in mm) of an aptera : Length of body 3.7; width of body 1.50; antenna 3.50; a. s. iii 0.90, iv 0.75, v 0.55; vi (0.14 + 0.78); u. r. s. 0.12; ht₂ 0.12; siphunculus 1.12; cauda 0.60.

Biological notes : Pink coloured aphids usually infest rose plant.

Distribution : India : Tripura (West), Assam, Himachal Pradesh, South India, Uttar Pradesh, West Bengal; Nepal, West Pakistan.

Genus 14. *Myzus* Passerini

1860. *Myzus* Passerini, *Gli Afidi* : 27.

Type species : *Aphis cerasi* Fabricius, 1775.

Key to species

- 1(2) Dorsum of abdomen in apterae pale but usually with segmentally arranged dark patches; dorsum of head spinulose only laterally; distance between 6th and 7th spiracles distinctly shorter than that between 5th and 6th; siphunculi weakly clavate *ornatus*
- 2(1) Dorsum of abdomen in apterae pale but without such segmentally arranged dark patches; dorsum of head spinulose uniformly; distance between 6th and 7th spiracles distinctly longer than that between 5th and 6th; siphunculi distinctly clavate *persicae*

32. *Myzus ornatus* Laing

1932. *Myzus ornatus* Laing, *Ent. mon. Mag.*, 68 : 52.

1953. *Myzus ornatus* Laing; Cottier, *Aphids of New Zealand* : 277.

1992. *Myzus ornatus* Laing; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements : (in mm.) of an aptera : Length of body 1.38; width of body 0.70; antenna 0.80; a. s. iii 0.20, iv 0.10, v 0.10, vi (0.8 + 0.20); u. r. s. 0.08; ht₂ 0.07; siphunculus 0.28; cauda 0.12.

Distribution : Cosmopolitan.

33. *Myzus persicae* (Sulzer)

1776. *Aphis persicae* Sulzer, *Abgekürzte Gesch. Insekten*, 105.

1953. *Myzus persicae* (Sulzer); Cottier, *Aphids of New Zealand* : 281.

1992. *Myzus persicae* (Sulzer); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae and Alatae

Measurements (in mm) of an aptera : Length of body 1.90; width of body 1.20; antenna 1.80; a. s. iii 0.45; iv 0.38, v 0.27, vi (0.12 + 0.45); u. r. s. 0.11; ht₂ 0.11; Siphunculus 0.50; Cauda 0.20.

Distribution : India : widely distributed; Cosmopolitan.

Genus 15. *Pentalonia* Coquerel

1859. *Pentalonia* Coquerel, *Ann. Ent. Soc. Fr.*, (3), 7 : 260.

Type species : *Pentalonia nigronervosa* Coquerel, 1859.

34. *Pentalonia nigronervosa* Coquerel

1859. *Pentalonia nigronervosa* Coquerel, *Ann. Soc. ent. Fr.*, 3 : 260.
1992. *Pentalonia nigronervosa* Coquerel; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 1.60; width of body 0.98; antenna 1.90; a. s. iii 0.35, iv 0.25, v 0.26, vi (0.10 + 0.70); u. r. s. 0.28; ht₂ 0.14; siphunculus 0.60; cauda 0.20.

Distribution : Cosmopolitan.

Genus 16. *Semiaphis* van der Goot, 1913

1913. *Semiaphis* van der Goot, *Tijdschr. Ent.*, 56 : 105.

Type species : *Anuraphis carotae* Koch, 1907.

35. *Semiaphis heraclei* (Takahashi)

1921. *Brachycolus heraclei* Takahashi, *Aphididae of Formosa*, 1 : 60.
1965. *Semiaphis heraclei* (Takahashi); Takahashi, *Insecta matsum.*, 23(1) : 53.
1992. *Semiaphis heraclei* (Takahashi); Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Aptera

Measurements (in mm.) of the aptera : Length of body 1.68; width of body 0.70; antenna 1.20; a. s. iii 0.40; iv 0.16, v 0.10, vi (0.09 + 0.35),

u. r. s. 0.09; ht₂ 0.10; siphunculus 0.06; cauda 0.14.

Distribution : India : Tripura (West), Assam, Manipur, Meghalaya; China, Indonesia, Hawaii, Is., Japan, Korea, and Taiwan.

Subfamily II. DREPANOSIPHINAE

Genus 17. *Tinocallis* Matsumura

1919. *Tinocallis* Matsumura, *Trans. Sapporo nat. Hist. Soc.*, 7 : 100.

Type species : *Tinocallis ulmiparvifoliae* Matsumura, 1919

Key to species

Spinal processes on 2nd abdominal tergite dark sclerotic, united at base on a dark spinopleural sclerotic band

.....**kahawaluokalani**

Spinal processes on 2nd abdominal tergite only occasionally united at base and not on a dark spinopleural sclerotic band

.....**magnoliae**

36. *Tinocallis kahawaluokalani* (Kirkaldy)

1907. *Myzocallis kahawaluokalani* Kirkaldy, *Proc. Hawaii Ent. Soc.*, 1 : 101.
1967. *Tinocallis kahawaluokalani* (Kirkaldy) : Richards, *Can. Ent.* 99(5) : 540.
1990. *Tinocallis kahawaluokalani* (Kirkaldy) : Ghosh A. K. and Quednau, *Fauna of India : Aphidoidea pt. 5. subfamily Drepanosiphinae* : 274.

Material examined : Nil.

Distribution : India : Tripura (West), Assam, Kerala, West Bengal; Formosa, Japan, Hawaii, North America.

Remarks : According to Ghosh and Quednau (1990) the species is widespread in the distribution range of its host plant *Lagerstroemia indica*. The species is characterised by its colour pattern of head, pronotum and wings (strongly pigmented).

37. *Tinocallis magnoliae* Ghosh & Raychaudhuri

1973. *Tinocallis magnoliae* Ghosh and Raychaudhuri, *Oriental Ins.* 6 : 379.

1992. *Tinocallis magnoliae* Ghosh and Raychaudhuri, Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2 : (III & IV) : 2.

Material examined : Alata

Host plant : *Magnolia* sp.

Measurements (in mm) of an alata : Length of body 1.65; width of body 0.62; antenna 1.00, a. s. iii 0.35, iv 0.20, v 0.18, vi (0.11 + 0.06); u. r. s. 0.06; ht₂ 0.07.

Biological notes : Brown-yellow aphids infest the ventral surface of leaves and young shoots of host plant. Attended by ants.

Distribution : India : Tripura (West) Meghalaya.

Remarks : The species was recorded by Agarwala and Bhattacharya (1992) for the first time from Tripura.

Subfamily III. GREENIDEINAE

Key to the tribes

- 1(2) Body of apterae with short to long process; siphunculi with a few hairs near apex *Cervaphidini*
- 2(1) Body of apterae without process; siphunculi with many hairs *Greenideini*

Tribe CERVAPHIDINI

Key to genera

Body with only one pair of process on tergite 7; siphunculi short and conical *Schoutedenia*

Many hair-bearing process at least along entire margin of body; siphunculi long, cylindrical and curved *Cervaphis*

Genus 18. *Cervaphis* van der Goot

1917. *Cervaphis* van der Goot, *Contr. Fauna Indes neerl.* 1(3) : 148.

Type species : *Cervaphis schouteniae* van der Goot, 1917

Key to species

Spinal hairs on dorsum of abdomen distinct;

flagellar hairs longer (0.06-0.10 mm. long); siphunculi long, about 0.37 x as long as body

..... *schouteniae*

Spinal hairs on abdominal dorsum fused; flagellar hairs short, about 0.03 mm long.....

..... *quercus*

38. *Cervaphis quercus* Takahashi

1918. *Cervaphis quercus* Takahashi, *Zool. Tokyo*; 30 : 458-461.

1993. *Cervaphis quercus*; Ghosh, A. K. and Agarwala, B. K., Fauna of India. Aphidoidea, pt. 6, Subfamily Greenideinae : 21.

Material examined : Apterae

Host plant : *Quercus* sp.

Measurements (in mm) of an aptera : Length of body 1.66; width of body 0.79; antenna 0.50; a. s. iii 0.25, iv (0.10 + 0.12), u. r. s. 0.22, ht₂ 0.40; siphunculus 0.30.

Biological notes : Pale to greenish yellow aphids infest the undersurface of young leaf, inflorescence and tender shoots. Ants attend the aphids.

Distribution : India : Tripura (West), Meghalaya, West Bengal; Nagaland; Japan, Korea, Taiwan and Thailand.

Remarks : This is the only oak-infesting species of the genus in India.

39. *Cervaphis schouteniae* Hille Ris Lambers

1917. *Cervaphis schouteniae* Goot, p. van der, *Contr. Fauna Ind. Neerl.*, 1 : 1.

1956. *Cervaphis schouteniae* Hille Ris Lambers, *Ent. Bericht.*, Amst. 16 : 130.

1985. *Cervaphis schouteniae*; Agarwala, B. K., Saha, S. and Ghosh, A. K., *Bull. zool. Surv. India*, 7 : 49

1993. *Cervaphis schouteniae*; Ghosh, A. K. and Agarwala, B. K., Fauna of India : Aphidoidea, pt. 6, Subfamily Greenideinae : 36.

Material examined : 4 apterae and 4 nymphs, from *Microcos paniculatus*, Agartala, 1982, coll. B. K. Agarwala; 5 apterae and 6 alatae from *Microcos paniculate*, v. 1982, coll. B. K. Agarwala.

Measurements (in mm) of an aptera : Length of body 1.55, width of body 0.84; antenna 0.47, a. s. iii 0.23, iv (0.09 + 0.10); u. r. s. 0.18; ht₂ 0.10; siphunculus 0.61.

Distribution : India : Tripura (West), Arunachal Pradesh, Meghalaya; Indonesia, Malaysia, the Philippines, Thailand and Vietnam.

40. *Greenidea (Trichosiphum) formosana heeri* Raychaudhuri, Ghosh, Banerjee and Ghosh

1973. *Greenidae (Trichosiphum) heeri* Raychaudhuri Ghosh, Banerjee and Ghosh, *Kontyu*, **41** : 66.

1992. *Greenidea heeri* Raychaudhuri *et al.*; Agarwala and Bhattacharya, *Soc. Nat. Hist.*, **2** : 2.

1993. *Greenidea (Trichosiphum) formosana heeri* Raychaudhuri *et al.*; Ghosh and Agarwala, *Fauna of India : Aphidoidea*, pt. 6, Subfamily Greenideinae : 221.

Material examined : 1 aptera and 3 nymphs, on *Psidium guajava*, Agartala, May, 1982, coll B. K. Agarwala.

Measurements (in mm) of an aptera : Length of body 2.10; width of body 0.90; antenna 1.82; a. s. iii 0.45; iv 0.25, v 0.27, vi (0.21 + 0.48); u. r. s. 0.25; ht₂ 0.13; siphunculus 2.10.

Biological notes : The brownish aphid chiefly infests tender shoots and undersurface of young leaves of the host plant. Ants attend the aphids. According to Ghosh, A. K. and Agarwala, B. K. (1993), the subspecies is commonly noticed in the autumn, early winter and summer in the hills and during winter in the plains of North-east India.

Distribution : India : Tripura (West), Manipur, Meghalaya, Nagaland, Sikkim, South India, Uttar Pradesh, West Bengal; Nepal.

41. *Greenidea (Greenidea) longicornis* Ghosh, Ghosh and Raychaudhuri

1970. *Greenidea longicornis* Ghosh, Ghosh and Raychaudhuri, *Oriental Ins.*, **4** : 380.

1992. *Greenidea longicornis*, Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

1993. *Greenidea (Greenidea) longicornis* (Ghosh, Ghosh and Raychaudhuri); Ghosh and Agarwala, *Fauna of India : Aphidoidea*, pt. 6, Greenideinae : 187.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 2.70; width of body 1.10; antenna 2.90; a. s. III 0.80, iv 0.48, v 0.50, vi (0.30 + 0.35); u. r. s. 0.24; ht₂ 0.14; siphunculus 1.80.

Distribution : India : Tripura (West), Meghalaya, Sikkim.

Genus 20. *Greenideoida* van der Goot

1917. *Greenideoida* van der Goot, *Contrib. Faune Indes Neerl.*, **1** : 140.

Type species : *Greenideoida elongata* van der Goot, 1917.

Key to the subgenera of *Greenideoida*

- 1(2) First tarsal segments with 5 ventral hairs; antennae 5-segmented *Pentatrichosiphum*
- 2(1) First tarsal segments with 7 ventral hairs; antennae 6-segmented *Paragreenideoida*

Key to the species of subgenus *Paragreenideoida*

- 1(2) Siphunculi about 0.55 mm long and 0.28 x as long as body *bhalukpongensis*
- 2(1) Siphunculi about 1.90 mm long and 0.68 x as long as body *ceyloniae*

42. *Greenideoida (Paragreenideoida) bhalukpongensis* Ghosh, Banerjee and Raychaudhuri

1971. *Greenideoida ceyloniae bhalukpongensis* Ghosh, A. K., Banerjee, H. and Raychaudhuri, D. N. *Oriental Ins.*, **5** : 105.

1993. *Greenideoida (Paragreenideoida) bhalukpongensis* Ghosh, A. K. and Agarwala, B. K. *The Fauna of India and the adjacent Countries* (Homoptera : Aphidoidea), Part 6, Subfamily : Greenideinae : 251.

Material examined : 1 aptera, from *Masua ferrea*, Agartala, 6. ii. 1983, coll. B. K. Agarwala.

Measurements (in mm) of an aptera : Length of body 1.64; width of body 0.74; antenna 1.12;

a. s. iii 0.38, iv 0.10, v 0.13, vi (0.11 + 0.28);
u. r. s. 0.13; ht₂ 0.10; siphunculus 0.56.

Biological notes : The species infests young sprouting, leaf buds and tender leaves and makes gregarious colony.

Distribution : India : Tripura (West), Arunachal Pradesh, Assam.

43. *Greenideoida (Paragreenideoida) ceyloniae* (Goot)

1905. *Greenidea artocarp* Schouteden, H. *Spolia Zeylan.*, 2 : 181 (Partim).
1917. *Greenideoida ceyloniae* van der Goot, P. *Contrib. Faune Indes, Neerl.*, 1 : 141.
1993. *Greenideoida (Paragreenideoida) ceyloniae* (Goot), Ghosh, A. K. and Agarwala, Fauna of India : Aphidoidea, pt. 6, subfamily Greenideinae : 255.

Material examined : 2 apterae, India : Tripura : Agartala from *Mesua ferrea*, 6. iii. 1983, coll. T.U.

Measurements (in mm) of an aptera : Length of body 2.84; width of body 1.09; antenna 2.45; a. s. iii 1.04, iv 0.25, v 0.27, vi (0.23 + 0.48); u. r. s. 0.14; ht₂ 0.10; siphunculus 1.92.

Distribution : India : Tripura (West), Assam, Meghalaya, South India; Malaysia, Philippines, Sri Lanka.

44. *Greenideoida (Pentatrichosiphum) luteum* (Basu)

1969. *Pentatrichosiphum luteum* Basu, *Oriental Ins.*, 3 : 183-186.
1992. *Greenideoida luteum*; Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.
1993. *Greenideoida (Pentatrichosiphum) luteum* (Basu, A. N.); Ghosh, A. K. and Agarwala, B. K., *Fauna of India : Aphidoidea*, pt. 6, Greenideinae : 263.

Material examined : Apterae

Host plant : *Litsea* sp.

Measurements (in mm) of an aptera : Length of body 2.70; width of body 1.12; antenna 1.26; a. s. iii 0.50, iv 0.17, v (0.14 + 0.25); u. r. s. 0.17; ht₂ 0.10; siphunculus 1.20.

Biological notes : The species infests the undersurface of the leaves of *Litsea* trees without

causing visible injury. No ant association has been recorded (Ghosh and Agarwala 1993).

Distribution : India : Tripura (West), Arunachal Pradesh, Meghalaya, Sikkim, West Bengal; Bhutan.

Genus 21. *Schoutedenia* Rubsaamen

1905. *Schoutedenia* Rubsaamen, *Marcellia*, 4 : 19.

Type species : *Schoutedenia ralumensis* Rubsaamen, 1905.

Key to the species of *Schoutedenia*

Processus terminalis at the most as long as u. r. s.***emblica***

Processus terminalis usually always longer than u. r. s.***ralumensis***

45. *Schoutedenia emblica* (Patel & Kulkarni)

1952. *Cerciaphis emblica* Patel and Kulkarni, *Curr. Sci.*, 21 : 350.
1990. *Schoutedenia emblica*; Remaudiere, *Bull. Soc. ent. Fr.*, 94 : 9.
1993. *Schoutedenia emblica*, Ghosh, A. K. and Agarwala, *Fauna of India : Aphidoidea*, pt. 6 Subfamily Greenideinae : 46.

Material examined : 1 alata, Y. P. T. Agartala, 2. iii. 1983, coll. K. Dasgupta.

Measurements (in mm) of an alata : Length of body 1.45; width of body 0.70; antenna 0.95; a. s. iii 0.38, iv 0.19, v (0.19 + 0.07), u. r. s. 0.10; ht₂ 0.12; siphunculus 0.04.

Distribution : India : Tripura (West), Andhra Pradesh, Maharashtra, Meghalaya, Tamil Nadu, West Bengal; Nepal.

46. *Schoutedenia ralumensis* Rubsaamen

1905. *Schoutedenia ralumensis*, Rubsaamen, *F. H., Marcellia*, 4 : 5-25.
1993. *Schoutedenia ralumensis*, A. K. Ghosh and Agarwala, B. K. *The Fauna of India and the adjacent Countries (Homoptera : Aphidoidea) Part : 6* Subfamily : Greenideinae : 52.

Material examined : Apterae, on *Darehoipara* sp. Tripura, 28. x. 1975, coll. K. Deb.

Measurements (in mm) of an aptera : Length of body 1.56; width of body 1.00; antenna 1.20; a. s. iii 0.40, iv 0.19, v (1.17 + 0.14); u. r. s. 0.09; ht₂ 0.11; siphunculus 0.07.

Distribution : India : Tripura (West), Meghalaya, Sikkim, West Bengal; Africa; Australia; Indonesia; Malaysia; Pakistan; Taiwan.

Subfamily IV. HORMAPHIDINAE

Key to the genera

- 1(2) Head in apterae without frontal horns; in apterae head, thorax and first antennal segment fused together *Nipponaphis*
- 2(1) Head in apterae with frontal horns 3
- 3(4) Body in apterae without waxpores or wax plates; frontal horns placed apart with rounded apices *Pseudoastegopteryx*
- 4(3) Body in apterae with wax pores 5
- 5(6) Dorsoapical hairs on ht₂ with swollen apices *Ceratovacuna*
- 6(5) One of the dorsoapical hairs on ht₂ with swollen apices and other short with blunt apex at least in alatae 7
- 7(8) Pronotum in apterae with two pleural grooves, separated by a median ridge; wax pores present only on antesiphuncular tergites along margins, postsiphuncular tergites with rounded wax gland cell groups *Pseudoregma*
- 8(7) Pronotum without deep pleural grooves, rather evenly rounded in apterae; waxpores present on all segments along the margin of abdomen in a row *Astegopteryx*

Genus 22. *Astegopteryx* Karsh

1890. *Astegopteryx* Karsh, *Ber. dt. bot. Geo.*, 8 : 57.

Type species : *Astegopteryx styracophila* Karsch, 1890.

47. *Astegopteryx minuta* (van der Goot)

1917. *Oregma minuta* van der Goot, *Contr. Faune Indes Neerl.*, 3 : 201.

1988. *Astegopteryx minuta* (van der Goot) : Ghosh, A. K., *Fauna of India (Homoptera : Aphidoidea)* pt. 4 Subfamily *Phloemyzinae*, *Anoeciinae* and *Hormaphidinae*, p. 274.

1992. *Astegopteryx minuta* (van der Goot) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 1.75; width of body 0.75; antenna 1.00; a. s. iii 0.20, iv (0.14 + 0.04); frontal horn 0.09; u. r. s. 0.11; ht₂ 0.14; diameter of siphuncular pore 0.10.

Distribution : India : Tripura (West), Arunachal Pradesh, Manipur, Meghalaya, Nagaland, North India, Sikkim, South India, West Bengal; Indonesia.

Genus 23. *Ceratovacuna* Zehntner, 1897

1897. *Ceratovacuna* Zehntner, *Archif. Java. Suikerindust.*, 5 : 553.

Type species : *Ceratovacuna lanigera* Zehntner

Key to the species of *Ceratovacuna* Zehntner

- 1(2) Wax gland cell groups present on abdomen marginally, pleurally and spinally *silvestris*
- 2(1) Waxgland cell groups present on abdomen only marginally *lanigera*

48. *Ceratovacuna lanigera* Zehntner

1897. *Ceratovacuna lanigera* Zehntner, *Meded. Proefstn Oost. Java*, (N. S.) 37 : 29.

1988. *Ceratovacuna lanigera* Zehntner : Ghosh, A. K. *The Fauna of India and the Adjacent countries (Homoptera : Aphidoidea)*, pt. 4, Subfamily *Phloemyzinae*, *Anoeciinae* and *Hormaphidinae* : 315.

Material examined : Nil.

Measurements (in mm) of an aptera (after Ghosh, A. K. 1988). Length of body 0.96; width of body 0.45; antenna 0.13; a. s. iii 0.06; iv (0.50 + 0.42); u. r. s. 7; ht₂ 0.10.

Distribution : India : Tripura (West), Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, South India, Uttar Pradesh, West Bengal; Formosa, Indonesia, Java, Philippines.

49. *Ceratovacuna silvestrii* (Takahashi)

1927. *Oregma silvestrii* Takahashi, *Boll. Lab. Zool. Gen. agr. R. Scuola Agric. Portici*, **20** : 148.
1988. *Ceratovacuna silvestrii* (Takahashi); Ghosh, A. K. *The Fauna of India and Adjacent Countries (Homoptera : Aphidoidea)*. pt. 4, Subfamily Phloemyzinae, Anoeciinae, and Hormaphidinae : 325.

Material examined : 3 apterae, on *Bambusa arundinacea*, Agartala, coll. B. K. Agarwala.

Measurements (in mm) of an aptera : Length of body 2.14; width of body 0.90; antenna 0.30; a. s. iii 0.12, iv (0.07 + 0.03); u. r. s. 0.14; ht₂ 0.20; diameter of siphuncular pore 0.08.

Distribution : India : Tripura (West), Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim, West Bengal; China.

Genus 24. *Nipponaphis* Pergande, 1906

1906. *Nipponaphis* Pergande, *Ent. News*, **17** : 205.

Type species : *Nipponaphis distychii* Pergande, 1906

50. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh and Raychaudhuri

1973. *Nipponaphis (Pseudonipponaphis) himalayensis* Ghosh and Raychaudhuri, *Kontyu*, **41** : 483.
1992. *Nipponaphis himalayensis* Ghosh and Raychaudhuri : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, (3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 1.05; width of body 0.82; antenna 0.15, a. s. iii 0.10, u. r. s. 0.08, ht₂ 0.05.

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

Genus 25. *Pseudoregma* Doncaster, 1996

1966. *Pseudoregma* Doncaster, *Entomologist*, **99** : 159.

Type species : *Pseudoregma bucktoni* Doncaster

Key to the species

- 1(2) Distinct wax gland cell groups absent;

Frontal horns short, bluntly conical.....
.....*bucktoni*

- 2(1) Distinct wax gland cell groups always present; Frontal horns long, stout, sharply pointed at apex, curved outward.....
.....*alexanderi*

51. *Pseudoregma alexanderi* (Takahashi)

1924. *Oregma alexanderi* Takahashi, *Aphididae of Formosa*, **3** : 81.
1992. *Pseudoregma alexanderi* (Takahashi) : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, **2**(3 & 4) : 2.

Material examined : Apterae

Measurements (in mm) of an aptera : Length of body 2.15; width of body 1.35; antenna 0.45; a. s. iii 0.20, iv (0.11 + 0.03) frontal horn 0.17; u. r. s. 0.17; u. r. s. 0.11, ht₂ 0.23.

Distribution : India : Tripura (West), Manipur, Meghalaya, Sikkim, Tripura, West Bengal; China, Indonesia and Taiwan.

52. *Pseudoregma bucktoni* Ghosh, Pal and Raychaudhuri

1976. *Pseudoregma bucktoni* Ghosh, Pal and Raychaudhuri, *Proc. zool. Soc., Calcutta*, **27** : 113.
1992. *Pseudoregma bucktoni* Ghosh et al. : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, **2**(3 & 4) : 2.

Material examined : Nil.

Measurements (in mm) of an aptera (after Ghosh, A. K. 1988) : Length of body 3.01; width of body 2.13; antenna 0.44; a. s. iii 0.19, iv 0.09, v (0.09 + 0.04), u. r. s. 0.12, ht₂ 0.23.

Distribution : India : Tripura (West), Karnataka, Manipur, Meghalaya, Sikkim, Tamil Nadu, West Bengal; Sri Lanka, Taiwan, Vietnam.

Genus 26. *Pseudoastegopteryx* Ghosh, Pal and Raychaudhuri

1974. *Pseudoastegopteryx* Ghosh, M. R., Pal, P. K. and Raychaudhuri, D. N., *Proc. zool. Soc., Calcutta*, **27** : 109.

Type species : *Pseudoastegopteryx himalayensis* Ghosh, Pal and Raychaudhuri

53. *Pseudoastegopteryx himalayensis* Ghosh et al.

1974. *Pseudoastegopteryx himalayensis* Ghosh, M. R., Pal, P. K. and Raychaudhuri, D. N. *Proc. zool. Soc. Calcutta*, 27 : 109.

1992. *Pseudoastegopteryx himalayensis* Ghosh et al. : Agarwala and Bhattacharya, *Soc. Nat. Sci.*, 2(3 & 4) : 2.

Material examined : Aptera

Measurements (in mm) of an aptera : Length of body 1.50; width of body 1.10; antenna 0.35; a. s. iii 0.15, iv (0.09 + 0.03), frontal horn 0.12; u. r. s. 0.11; ht₂ 0.13, diameter of siphuncular pore 0.10.

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

Subfamily V. PEMPHIGINAE

Genus 27. *Tetraneura* Hartig, 1841

1841. *Tetraneura* Hartig, *German's Z. Ent.*, 3 : 336.

Type species : *Aphis ulmi* Linnaeus, 1750.

54. *Tetraneura nigriabdominalis* (Sasaki)

1899. *Schizoneura nigriabdominalis* Sasaki, *Manual of insect pests of Crops in Japan*, 435.

1968-69. *Tetraneura* (*Tetraneurella*) *nigriabdominalis* Hille Ris Lambers, *Boll. Zool. Agr. Bachic, Ser. II*, 9 : 52.

1993. *Tetraneura* (*Tetraneurella*) *nigriabdominalis*, Ghosh, A. K., *Fauna of India : Aphidoidea, pt. 3, subfamily Pemphiginae* : 111.

Material examined : Alatae.

Measurements (in mm) of an alata : Length of body 2.10; width of body 1.15; antenna 0.68; a. s. iii 0.21; iv 0.07, v 0.20, vi (0.06); u. r. s. 0.11; ht₂ 0.15.

Distribution : India : Widely distributed including Tripura; virtually Cosmopolitan.

Remarks : In the hill region of Eastern India (Ca. 200-2700 mm.) these insects infest roots of Gramineae growing in dry sandy to wet clay soil, at depths of 0.88-1.020 cm throughout the year (Pal, P. K. 1975).

30-1/ZSI/Ca1/2000

Table-1. Number of aphid genera and species under different subfamilies of Aphididae from Tripura.

Aphid Subfamilies	Genera	Species/Subspecies
APHIDIDAE		
Aphidinae	16	35
Drepanosiphinae	1	2
Greenideinae	4	9
Hormaphidinae	5	7
Pemphiginae	1	1
Total :	27	54

The Chart showing Districtwise distribution of species/subspecies of Aphids known from Tripura.

Name of species/ subspecies	N. Tripura	S. Tripura	W. Tripura
Family	APHIDIDAE		
Subfamily	APHIDINAE		
Tribe	APHIDINI		
Genus	<i>Aphis</i> Linnaeus		
1. <i>Aphis citricola</i> (v. d. Goot)	+	+	+
2. <i>A. craccivora</i> Koch	+	+	+
3. <i>A. fabae</i> Scopoli	-	-	+
4. <i>A. glycines</i> (Mats.)	+	+	+
5. <i>A. gossypii</i> Glover	+	+	+
6. <i>A. kurosawai</i> Tak.	+	-	+
7. <i>A. longisetosa</i> (Basu)	+	+	+
8. <i>A. nasturtii</i> (Kalt.)	+	+	+
9. <i>A. nerii</i> (B. d. F.)	-	-	+
10. <i>A. punicae</i> (Pass).	-	-	+
Genus 2. <i>Toxoptera</i> Koch			
11. <i>Toxoptera aurantii</i> (B. d. F.)	+	+	+
12. <i>T. citricidus</i> (Kirk.)	+	+	+
13. <i>T. odinae</i> (v. d. G.)	-	+	+
Genus 3. <i>Hysteroneura</i> Davis			
14. <i>Hysteroneura setariae</i> (Thomas)	-	-	+
Genus 4. <i>Melanaphis</i> v. d. G.			
15. <i>Melanaphis bambusae</i> (Full.)	-	+	-
16. <i>M. sacchari</i> (Zehntner)	-	+	+
Genus 5. <i>Rhopalosiphum</i> Koch			
17. <i>Rhopalosiphum maidis</i> (Fitch)	+	+	+

Name of species/ subspecies	N. Tripura	S. Tripura	W. Tripura
18. <i>R. nymphaeae</i> (L.)	—	—	+
19. <i>R. padi</i> (L.)	—	+	+
20. <i>R. rufiabdominalis</i> (Sasaki)	—	+	+
Genus 5. <i>Schizaphis</i> Börner			
21. <i>Schizaphis graminum</i> (Rondani)	—	—	+
22. <i>S. rotundiventris</i> (Signoret)	—	—	+
Tribe MACROSIPHINI			
Genus 7. <i>Acyrtosiphon</i> Mordv.			
23. <i>Acyrtosiphon pisum</i> (Harris)	+	+	+
Genus 8. <i>Aulacorthum</i> Mordv.			
24. <i>Aulacorthum rhamni</i> (Ghosh <i>et al.</i>)	—	—	+
Genus 9. <i>Brachycaudus</i> v. d. G.			
25. <i>Brachycaudus helichrysi</i> (Kalt.)	+	+	+
Genus 10. <i>Hyadaphis</i> Kirk.			
26. <i>Hyadaphis coriandri</i> (Das)	—	—	+
Genus 11. <i>Lipaphis</i> Mordv.			
27. <i>Lipaphis erysimi</i> (Kalt.)	+	+	+
Genus 12. <i>Macrosiphoniella</i> del Guercio			
28. <i>Macrosiphoniella sanborni</i> (Gill.)	+	+	+
Genus 13. <i>Macrosiphum</i> Pass.			
29. <i>Macrosiphum (Sitobion) indicum</i> (Basu)	—	—	+
30. <i>M. (Sitobion) miscanthi</i> (Tak.)	—	—	+
31. <i>M. (S.) rosaeiformis</i> (Das)	—	—	+
Genus 14. <i>Myzus</i> Pass.			
32. <i>Myzus ornatus</i> Laing	+	+	+
33. <i>M. persicae</i> (Sulz.)	+	+	+
Genus 15. <i>Pentalonia</i> Coq.			
34. <i>Pentalonia nigronervosa</i> Coq.	+	+	+
Genus 16. <i>Semiaphis</i> v. d. G.			
35. <i>Semiaphis heraclei</i> (Tak.)	—	—	+
Subfamily DREPANOSIPHINAE			
Genus 17. <i>Tinocallis</i> Mats.			
36. <i>Tinocallis kahawaluokalani</i> (Kirk.)	—	—	+
37. <i>T. magnoliae</i> Ghosh & Raychaudhuri.	—	—	+

Name of species/ subspecies	N. Tripura	S. Tripura	W. Tripura
Subfamily GREENIDEINAE			
Genus 18. <i>Cervaphis</i> v. d. G.			
38. <i>Cervaphis quercus</i> (Tak.)	—	—	+
39. <i>C. schouteniae</i> v. d. G.	—	—	+
Genus 19. <i>Greenidea</i> Schout.			
40. <i>Greenidea (Trichosiphum) formosana heeri</i> (Raych. <i>et al.</i>)	—	—	+
41. <i>G. (G.) longicornis</i> Ghosh <i>et al.</i>	—	—	+
Genus 20. <i>Greenideoida</i> v. d. G.			
42. <i>Greenideoida (P.) bhalukpongensis</i> Ghosh <i>et al.</i>	—	—	+
43. <i>G. (P.) ceyloniae</i> v. d. G.	—	—	+
44. <i>G. (P.) luteum</i> (Basu)	—	—	+
Genus 21. <i>Schoutedenia</i> Rubsaamen			
45. <i>Schoutedenia emblica</i> (Patel & Kulk.)	—	—	+
46. <i>S. ralumensis</i> (Rubsaamen)	—	—	+
Subfamily HORMAPHIDINAE			
Genus 22. <i>Astegopteryx</i> Karsh			
47. <i>Astegopteryx minuta</i> (v. d. G.)	—	—	+
Genus 23. <i>Ceratovacuna</i> Zehnt.			
48. <i>Ceratovacuna lanigera</i> (Zehnt.)	—	—	+
49. <i>C. silvestrii</i> (Tak.)	—	—	+
Genus 24. <i>Nipponaphis</i> Pergande			
50. <i>Nipponaphis (Pseudonipponaphis) himalayensis</i> (Ghosh & Raych.)	—	—	+
Genus 25. <i>Pseudoregma</i> Doncaster			
51. <i>Pseudoregma alexandri</i> (Tak.)	—	—	+
52. <i>P. bucktoni</i> Ghosh <i>et al.</i>	—	—	+
Genus 26. <i>Pseudoastegopteryx</i> Ghosh <i>et al.</i>			
53. <i>Pseudoastegopteryx himalayensis</i> (Ghosh <i>et al.</i>)	—	—	+
Subfamily PEMPHIGINAE			
Genus 27. <i>Tetraneura</i> Hartig			
54. <i>Tetraneura nigriabdominalis</i> (Sasaki)	+	+	+

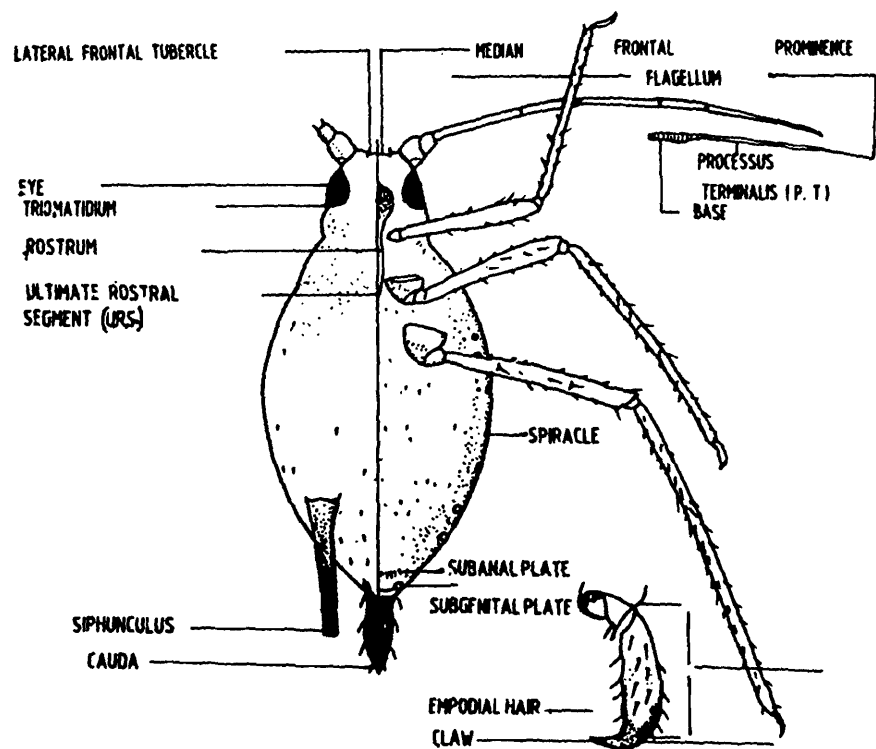
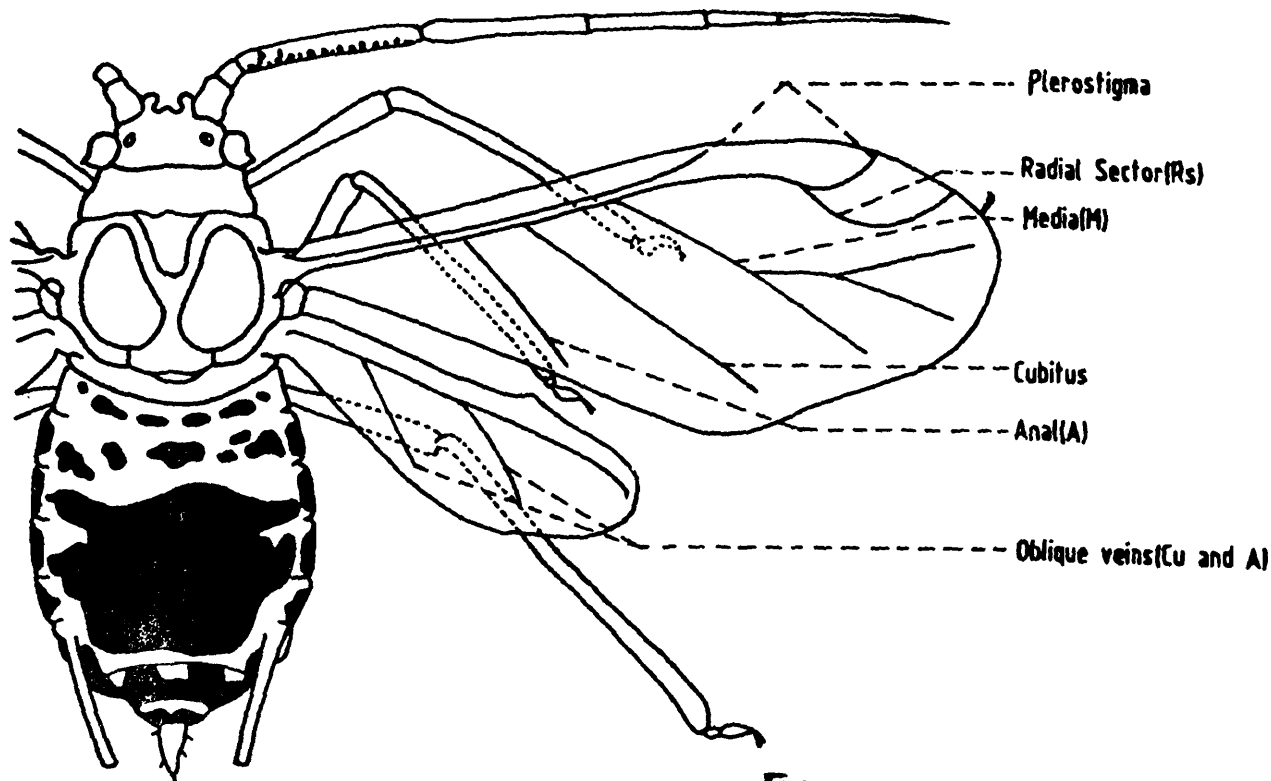


Fig. 1 : Typical Apterous Viviparous Female.



[After Raychaudhari.D.N.(ed) 1980]

Fig. 2 : Typical Alate Viviparous Female.

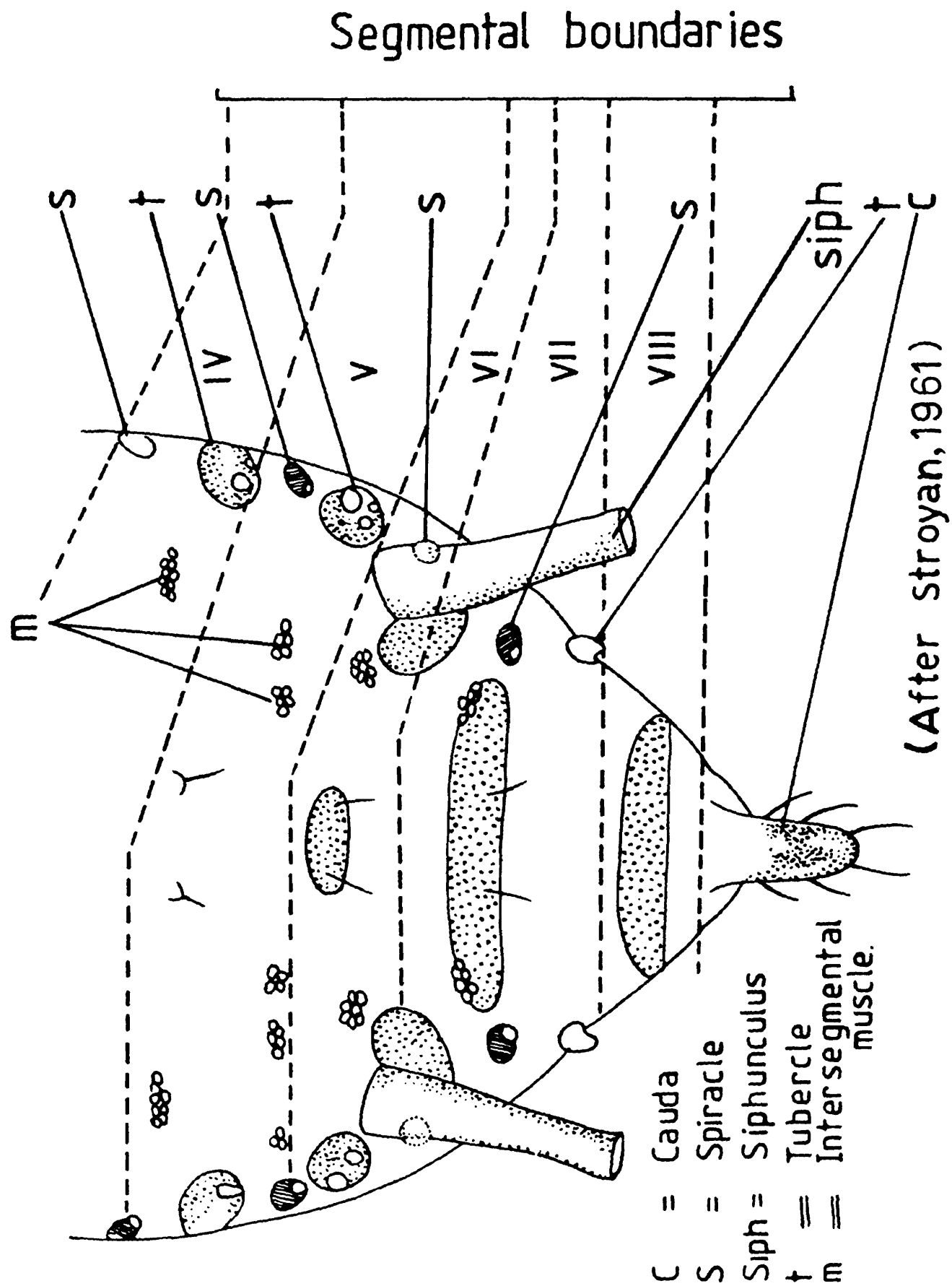
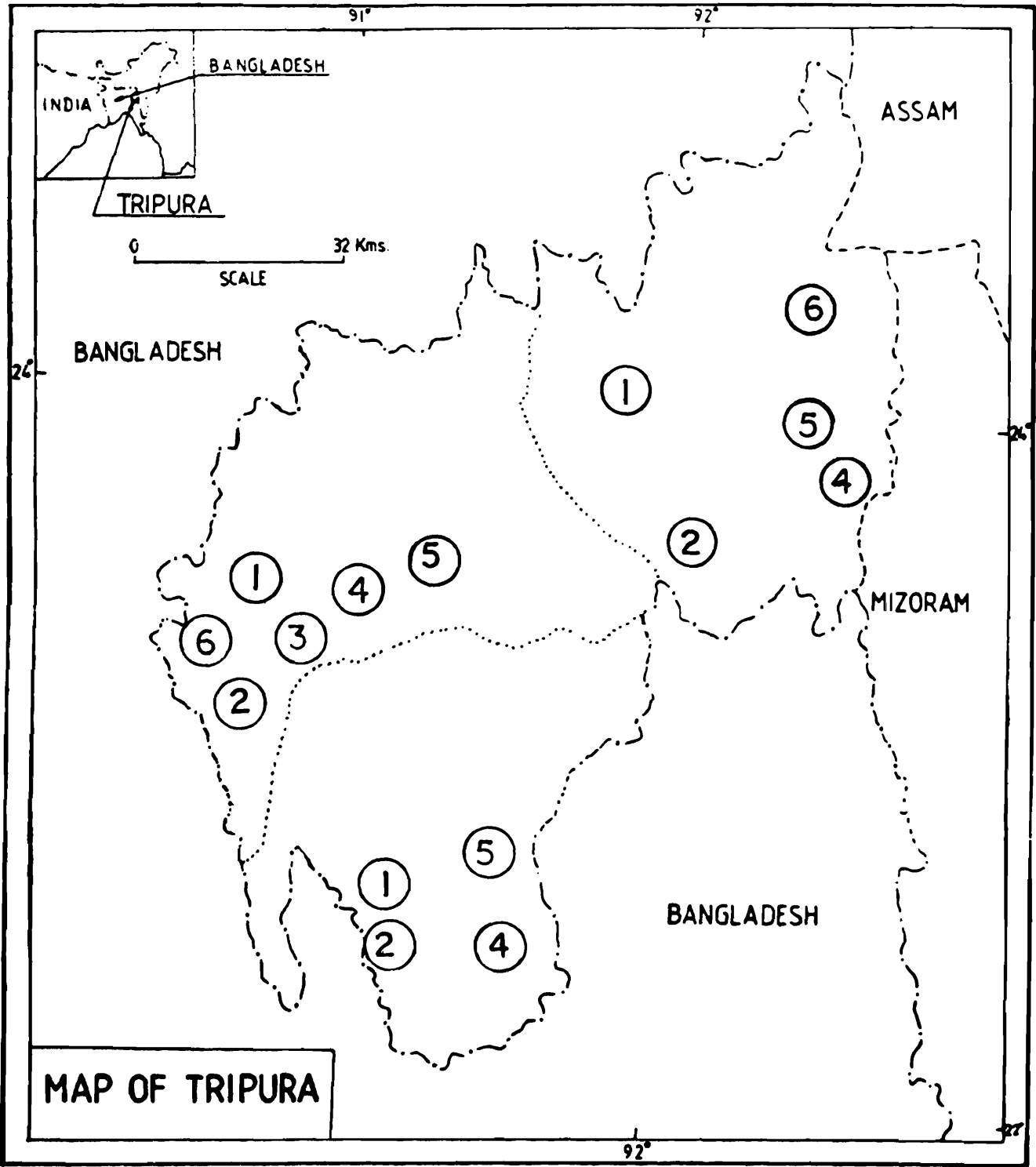


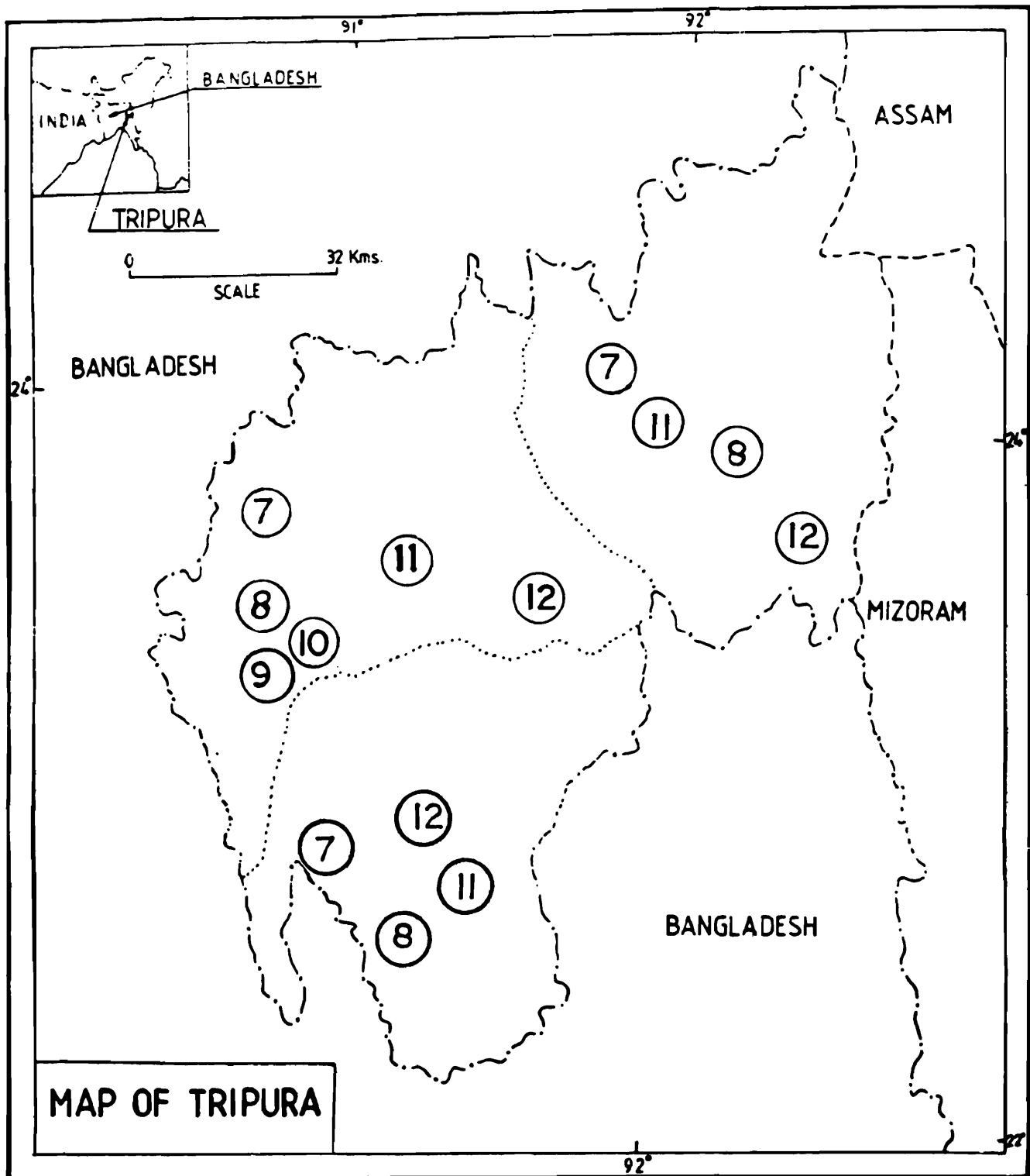
Fig. 3 : Posterior segments of abdomen of Apterous Viviparous Female.

Districtwise distribution of Aphids in Tripura : Hemiptera



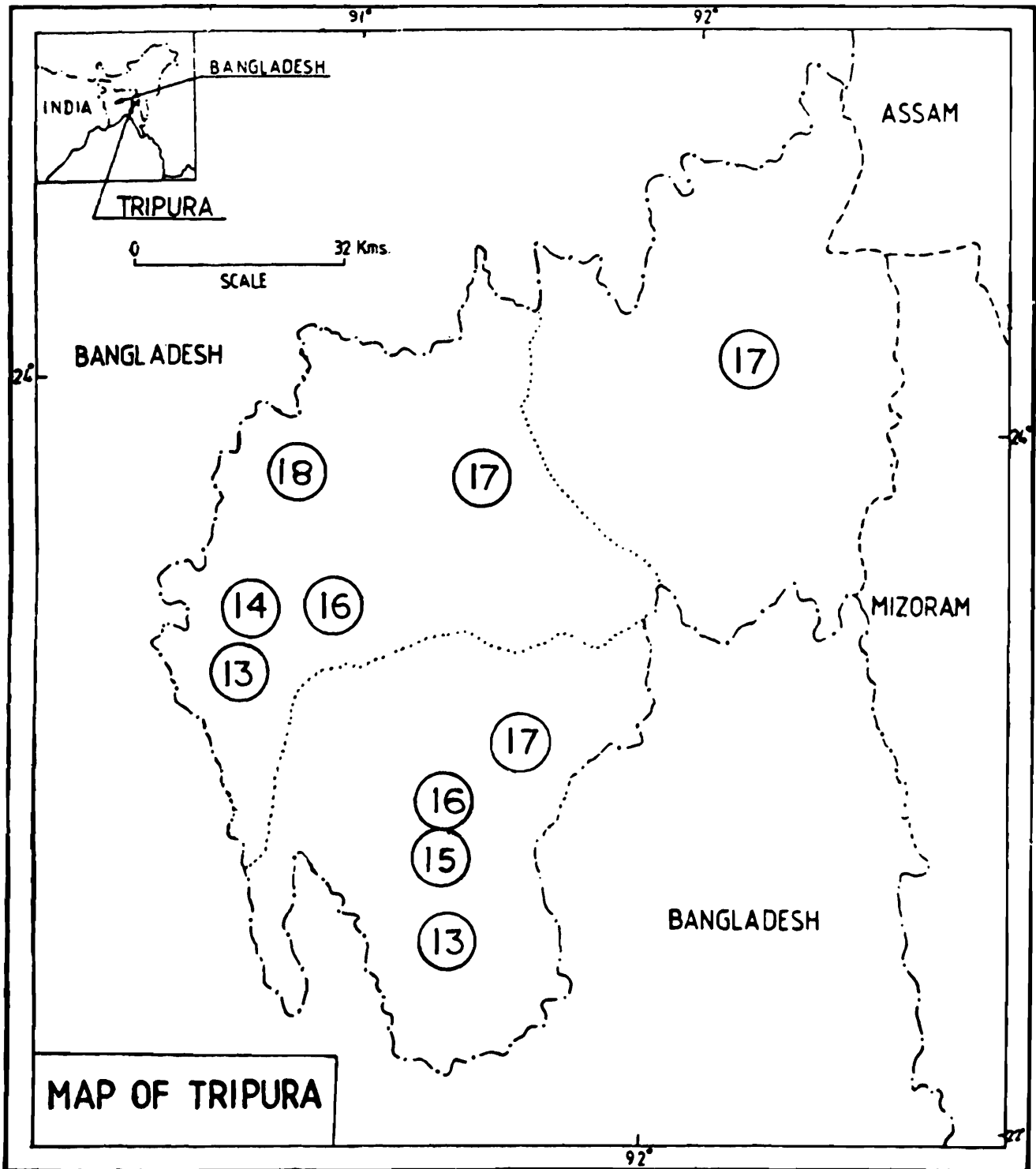
Map 1 : 1. *Aphis citricola* (v. d. Goot); 2. *A. craccivora* Koch; 3. *A. fabae* Scopoli; 4. *A. glycines* (Mats.); 5. *A. gossypii* Glover; 6. *A. kurosawai* Tak.

Districtwise distribution of Aphids in Tripura : Hemiptera



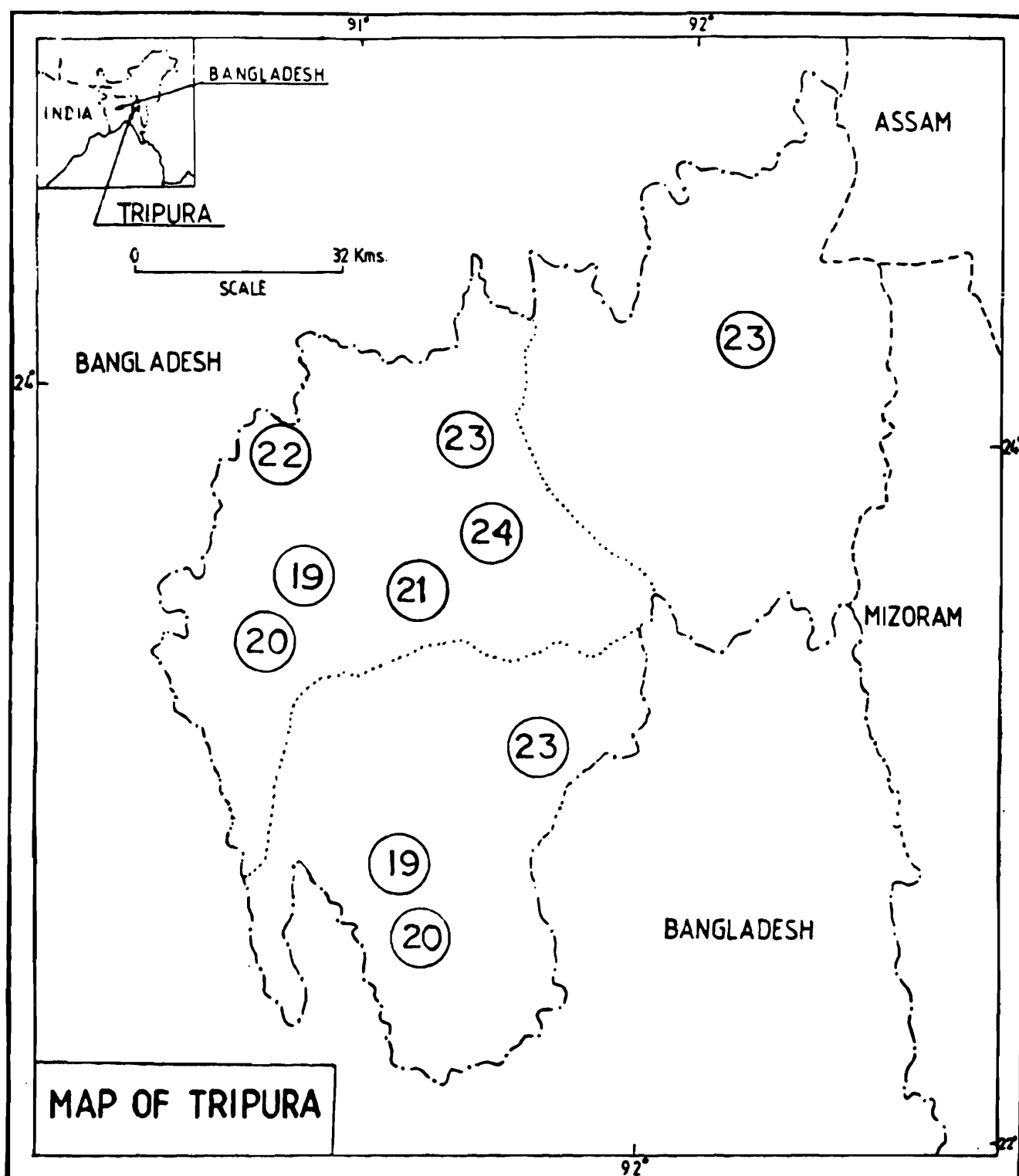
Map 2 : 7. *A. longisetosa* (Basu); 8. *A. nasturtii* (Kalt.); 9. *A. nerii* (B. d. F.); 10. *A. punicae* (Pass.); 11. *Toxoptera aurantii* (B. d. F.); 12. *T. citricidus* (Kirk.).

Districtwise distribution of Aphids in Tripura : Hemiptera



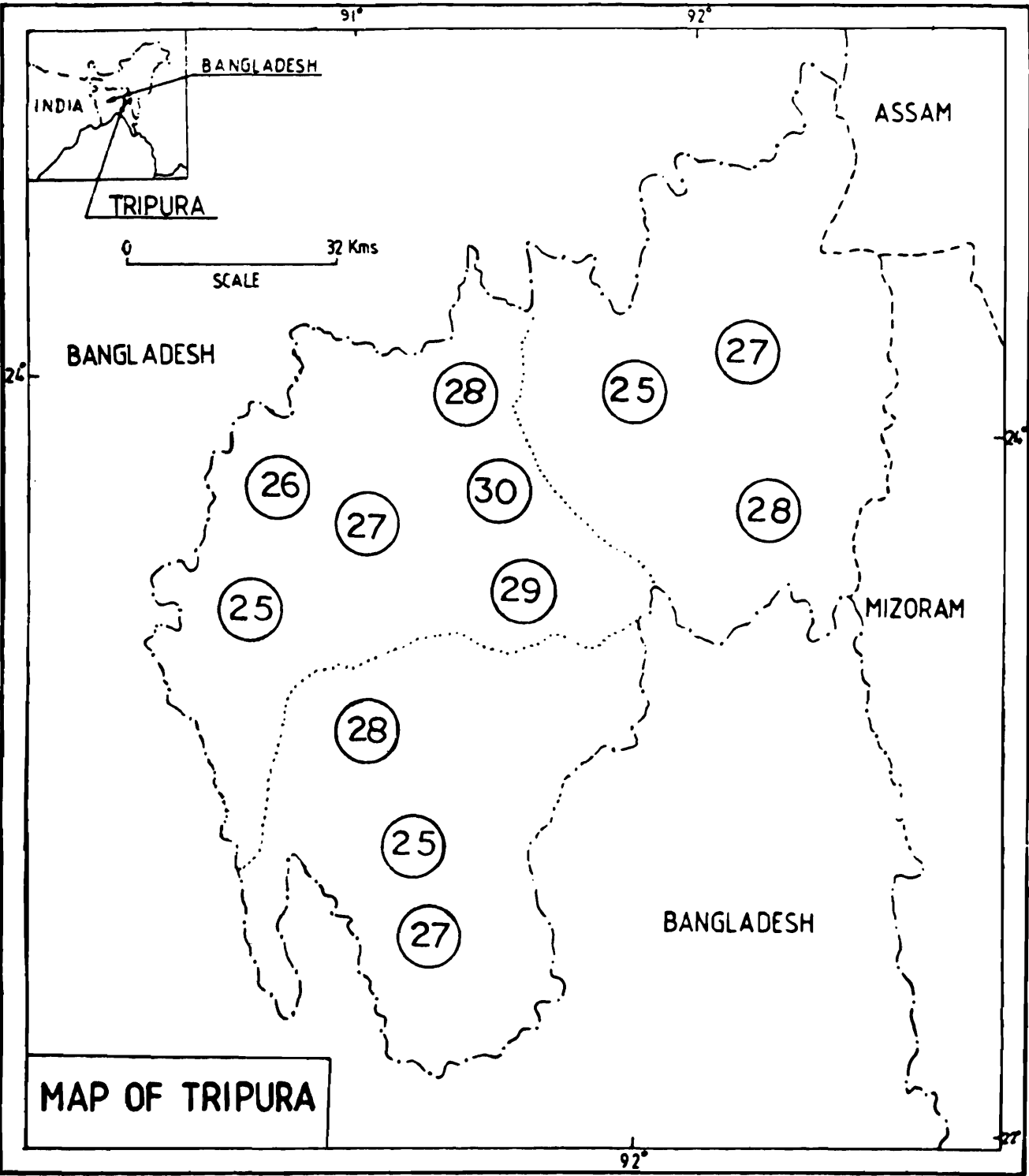
Map 3 : 13. *T. odinae* (v. d. G.); 14. *Hysteroneura setariae* (Thomas); 15. *Melanaphis bambusae* (Full.); 16. *M. sacchari* (Zehntner); 17. *Rhopalosiphum maidis* (Fitch); 18. *R. nymphaeae* (L.).

Districtwise distribution of Aphids in Tripura : Hemiptera



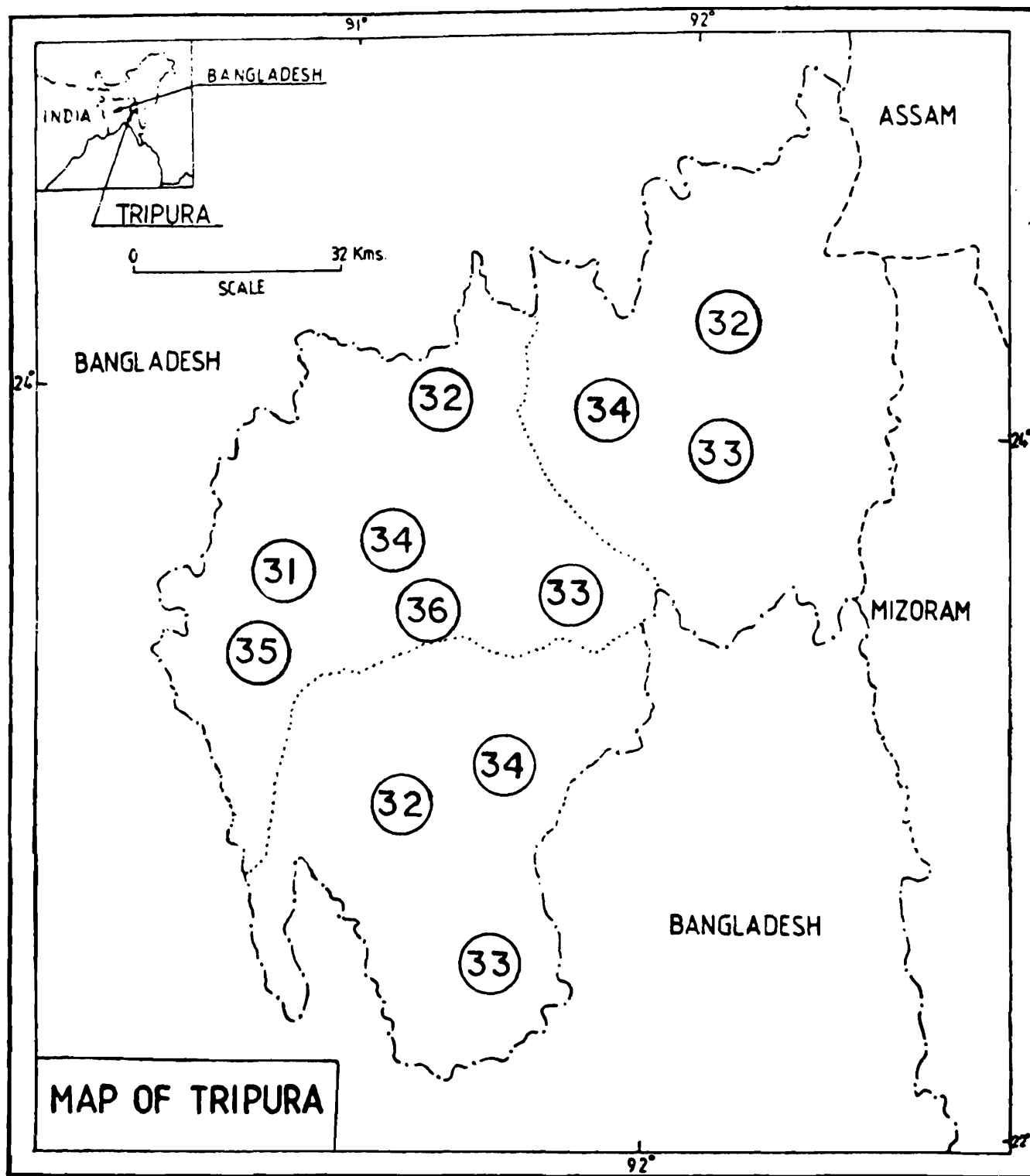
Map 4 : 19. *R. padi* (L.); 20. *R. rufiabdominalis* (Sasaki); 21. *Schizaphis graminum* (Rondani); 22. *S. rotundiventris* (Signoret); 23. *Acyrtosiphon pisum* (Harris); 24. *Aulacorthum rhamni* (Ghosh et al.).

Districtwise distribution of Aphids in Tripura : Hemiptera



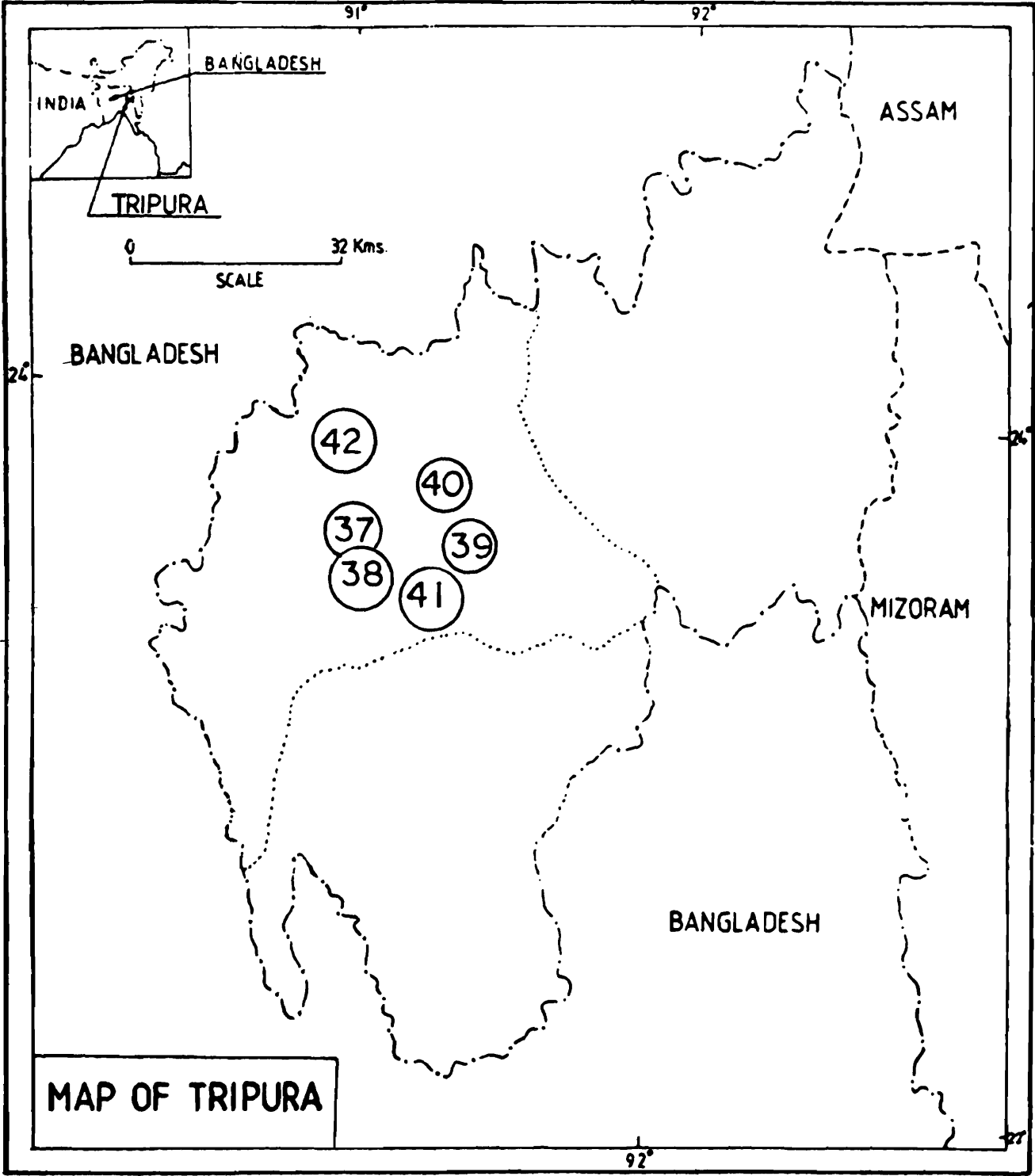
Map 5 : 25. *Brachycaudus helichrysi* (Kalt.); 26. *Hyadaphis coriandri* (Das); 27. *Lipaphis erysimi* (Kalt.); 28. *Macrosiphoniella sanborni* (Gill.); 29. *Macrosiphum (Sitobion) indicum* (Basu); 30. *M. (Sitobion) miscanthi* (Tak.).

Districtwise distribution of Aphids in Tripura : Hemiptera



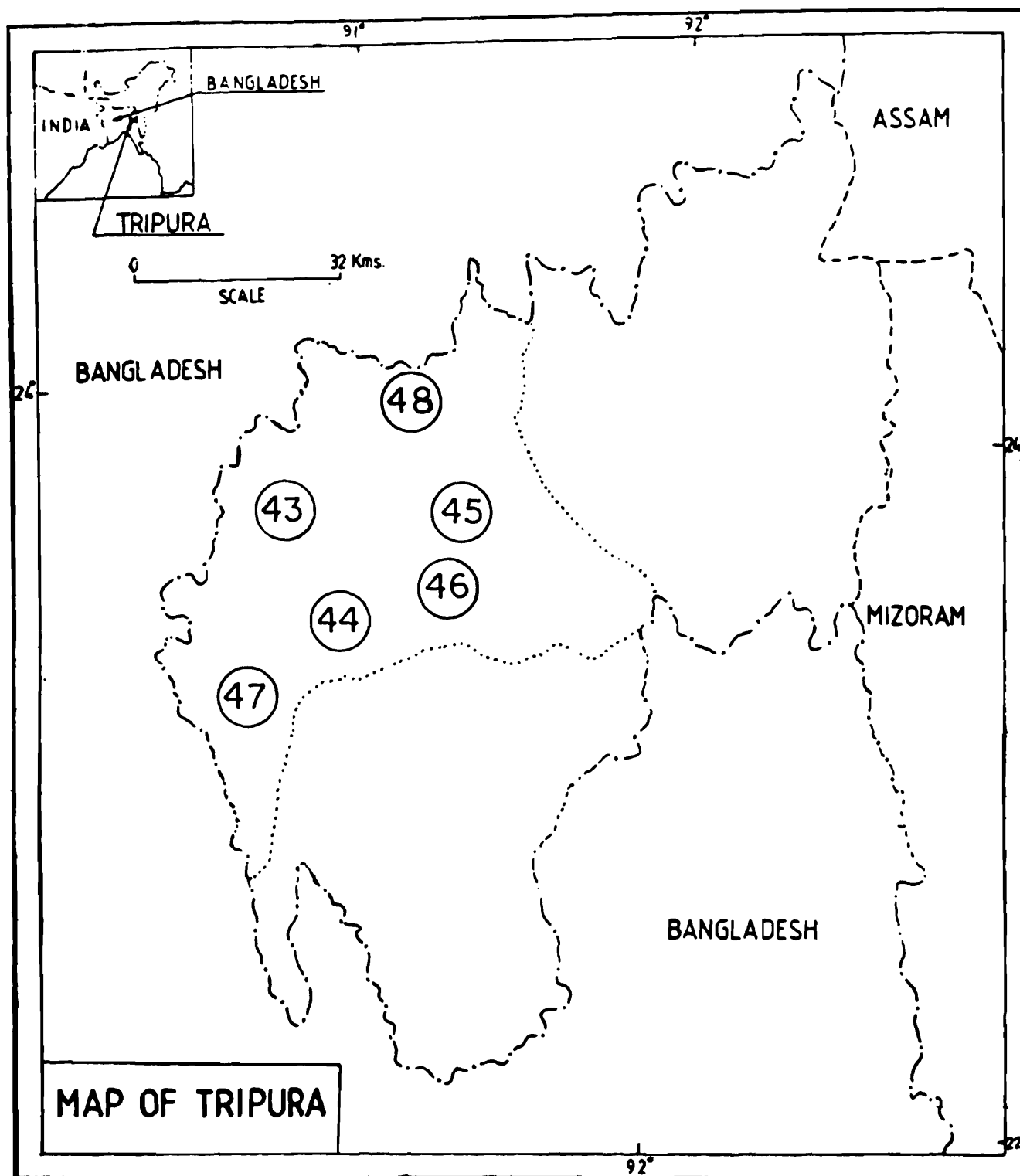
Map 6 : 31. *M. (S.) rosaeiformis* (Das); 32. *Myzus ornatus* Laing; 33. *M. persicae* (Sulz.); 34. *Pentalonia nigronervosa* Coq.; 35. *Semiaphis heraclei* (Tak.); 36. *Tinocallis kahawaluokalani* (Kirk.).

Districtwise distribution of Aphids in Tripura : Hemiptera



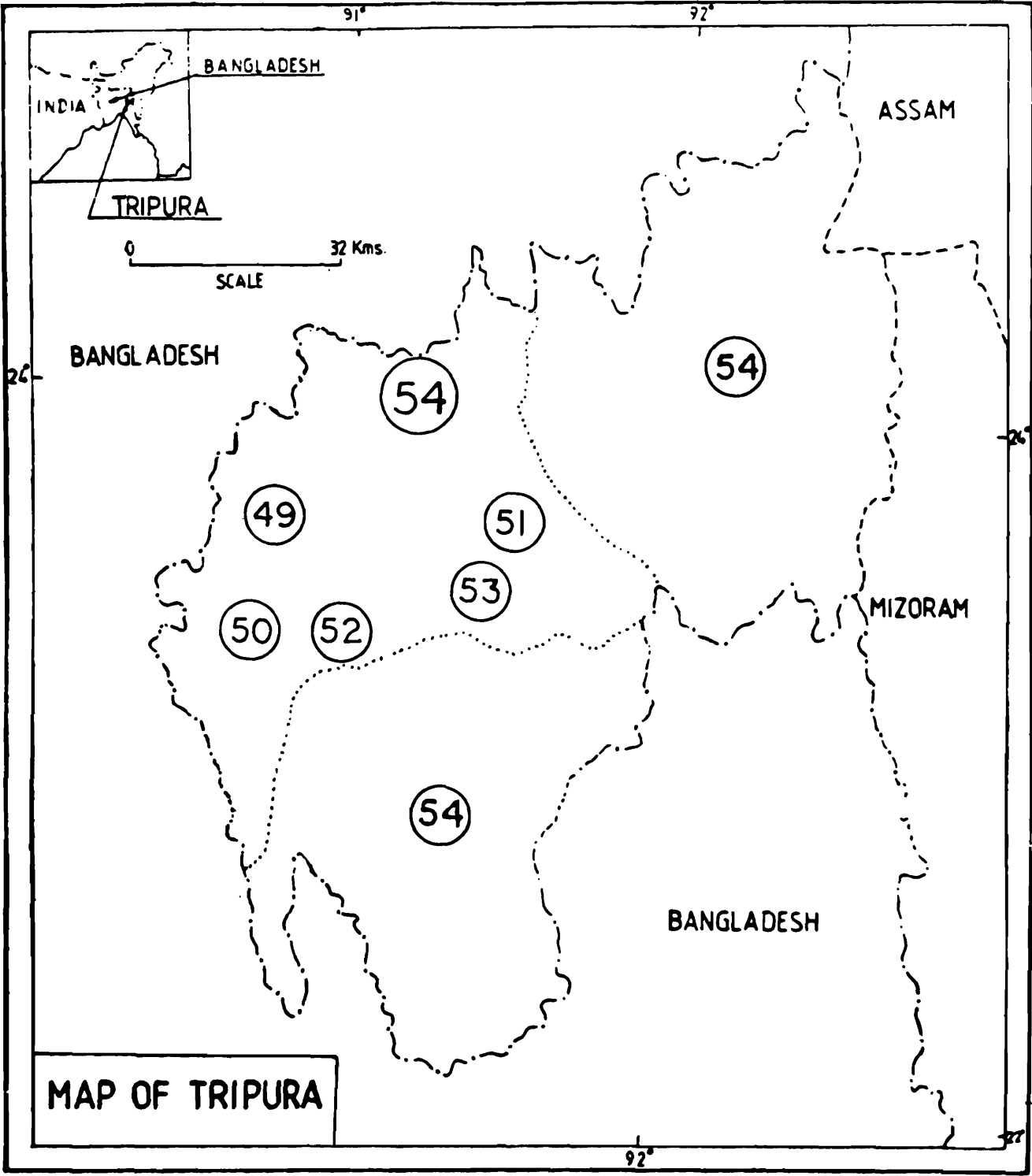
Map 7 : 37. *T. magnoliae* Ghosh & Raych.; 38. *Cervaphis quercus* (Tak.); 39. *C. schouteniae* v.d.G.; 40. *Greenidea* (*Trichosiphum*) *formosana heeri* (Raych. et al.); 41. *G. (G.) longicornis* Ghosh et al.; 42. *Greenideoida* (*P.*) *bhalukpongensis* Ghosh et al.

Districtwise distribution of Aphids in Tripura : Hemiptera



Map 8 : 43. *G. (P.) ceyloniae* v. d. Goot; 44. *G. (P.) luteum* (Basu); 45. *Schoutedenia emblica* (Patel & Kulk.); 46. *S. ralumensis* (Rubsamen); 47. *Astegopteryx minuta* (v. d. G.); 48. *Ceratovacuna lanigera* (Zehnt.).

Districtwise distribution of Aphids in Tripura : Hemiptera



Map 9 : 49. *Ceratovacuna silvestrii* (Tak.); 50. *Nipponaphis* (*Pseudonipponaphis*) *himalayensis* (Ghosh & Raych.), 51. *Pseudoregma alexandri* (Tak.); 52. *P. bucktoni* Ghosh et al.; 53. *Pseudoastegopteryx himalayensis* (Ghosh et al.), 54. *Tetraneura nigriabdominalis* (Sasaki).

SUMMARY

This work mainly concerns with the taxonomy of 54 species and subspecies of aphids belonging to 27 genera known from Tripura, one of the states of North-East India. Five subfamilies viz., Aphidinae, Drepanosiphinae, Greenideinae, Hormaphidinae, and Pemphiginae under the family Aphididae have been recognised for accommodating these genera.

A break up of the species and subspecies known so far from Tripura has been given in Table 1. The analysis of the taxa reveals that out of 5 subfamilies prevailing in Tripura, Greenideinae is predominant over other subfamilies except Aphidinae. Surprisingly, Anoeciinae and Lachninae are apparently absent in the state.

Various items like notes on economic importance, biology, methods of collection and preservation and measurements have been included not only in the interest of the future workers but also for the workers in the line. A classified list of the plant lice has been given to give the reader a first hand knowledge of the species found in the area before one goes into the details. Key to various taxa are also provided for easy recognition of the aphids. For each species of aphid, distribution has been given both in India and abroad.

Maps and charts of districtwise distribution of the species are provided.

This work is a first comprehensive account of aphids known so far from Tripura.

DISCUSSION

The fauna of India and the adjacent countries in Aphididae constitutes about 16% of the world fauna including a large number of rare and endemic species which constitute about 63% in N. E. India. On the contrary, the percentage of endemism in Tripura is apparently nil where only 54 species belonging to 27 genera under 5 subfamilies are so far known. As in other parts of Northeast India, the Greenideine fauna is predominant also in Tripura and ranks near only to Aphidinae. Incidentally, it may be mentioned here that India represents 63% of the world

Greenideine fauna of which 54% is known from India. Greenideine fauna of Tripura represents only 5.6% of Greenideinae of India. An analysis of the aphid fauna of Tripura also reveals that it constitutes only about 6.9% of the total species known from India, 5.3% of the species from the Oriental and only 1.3% of the species from the world aphid fauna. A perusal of literature also reveals that 160 genera (out of about 212 genera known so far from India) occur in N. E. India. Of these, only 27 genera are represented in the state.

An analysis of regionwise distribution of Indian aphids reveals that species diversity and abundance is more in hilly terrains which meet with the subtropical to warm temperate climate and represents the transition area between the realms of Oriental and Palaearctic regions. Both N. W. and N. E. India represent genera belonging to all the subfamilies but without the subfamilies Anoeciinae and Lachninae which have not so far been recorded from Tripura. The faunal diversity in Tripura is apparently meagre in comparison to the neighbouring states of N. E. India.

In view of the above fact, proper exploration of aphid fauna in the state of Tripura is very much needed. As such, through surveys (both extensive and intensive) round the year in various ecological niches may reveal many more interesting species to enrich the aphid fauna of Tripura.

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INSECTA : HEMIPTERA : COCCOIDEA

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INTRODUCTION

Coccids, which are popularly known as the scale insects or mealy bugs, are structurally quite different from other insects. They look like lifeless small protuberances or sometimes a white powdery covering on the leaves and tender shoots of the plants. Generally they neither fly nor walk. For an unknowing person, these insects appear harmless.

However, to biologists they are well known as voracious sap suckers who ultimately cause tremendous damage to the host plant. As these insects reproduce prolifically and frequently, the increasing numbers of these bugs create havoc on the plants. When they infest our economically important crops, fruit plants and garden bushes, they are termed as the pests of moderate to severe status.

Unfortunately, not much attention has been paid by zoologists to study these insects in our country. The collection, preservation and slide preparation (see Varshney, 1985) are time consuming exercise and the insects themselves provide considerably less characters to properly identify them upto genus and species. As such, the study of these insects is so far sporadic in our country.

From the North-eastern India we have an earlier account of coccids occurring on the tea plant (*Thea chinensis*, syn. *Cammelia sinensis*) by Das & Ganguli (1962). In the recent times, the present author has made a comprehensive

account of the coccids of Meghalaya (Varshney, 1998). No other detailed account on this group is available for this region.

For the State of Tripura, two short communications are available, namely the list by Ganguli & Ghosh (1964) reporting 25 species and the second list by Agarwala & Varshney (1988) reporting 22 species. The material of 2nd list was collected from Agartala and Sekarkoti only, while there is no mention of the places of collection for the first list. As such, the large part of Tripura remains unexplored for this group. The author could not survey this State and the present report is based on the above two lists. Data on host plants and distribution have been supplemented from the author's checklist for South Asia (Varshney, 1992, 1995).

Among noticeable observations, three comments may be made. Firstly, as shown by Agarwala & Varshney (1988), so far only two interesting species of the coccids have been encountered in Tripura, namely *Octaspidiotus tripurensis* and *Thysanofiorinia leei*, both belonging to Diaspididae. Secondly, there seems to be no mentioned record up till now of any lac insect species from Tripura, but efforts need to be made for thorough search, in view of the fact that 6 species belonging to two genera of Tachardiidae are already recorded from the North-eastern India (Varshney, 1977). Thirdly, only two species of Monophlebid—Margarodid mealy bugs (one with no species determination) are so far recorded from Tripura. This number is bound

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to be increased on further studies. In fact, if more surveys and collections are made then undoubtedly many more species of coccoids will be found occurring in Tripura.

Catalogues by Ali (1969-1974), Borchsenius (1966) and Ben-Dov (1993) and the atlases by Ferris (1937-1955) have been consulted for this study. Earlier works of Green (1908), MacGillivray (1921) and Ayyar (1930) have also been found useful.

In the present paper, no district-wise distribution of species could be shown, because Ganguly & Ghosh (1964) have not given collection localities and Agarwala & Varshney (1988) have reported all collections made in and around Agartala only.

A key to the families of Coccoidea in India is published earlier (Varshney, 1985) and illustrations of some coccid species have been given in earlier 'State Fauna' documents of Orissa (Varshney & Moharana, 1987), West Bengal (Varshney, 1994) and Meghalaya (Varshney, 1998), hence, these are not repeated here.

It is hoped that the present paper will pave the way for further studies on the coccids of Tripura.

SYSTEMATIC ACCOUNT

Class Insecta

Order Hemiptera

Superfamily Coccoidea

Family MONOPHLEBIDAE

Genus *Icerya* Signoret

1875. *Icerya* Signoret, *Ann. Soc. Ent. France*, (5) 4 : cclviii.

Type species : *Coccus sacchari* Guerin-Meneville.

1. *Icerya* sp.

1992. *Icerya* sp. : Varshney, *Rec. zool. surv. India, Occ. Paper*, 139 : 13.

Host plants : On sapota (*Manilkara achras*, syn. *Achras sapota*) in Tripura. Also on *Alangium*, *Nerium*, *Croton*, *Annona*, mango, rose, cashewnut etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Orissa etc.

2. *Icerya aegyptiaca* (Douglas). The Egyptian Mealybug.

1890. *Crossosoma aegyptiacum* Douglas, *Entomologist's mon. Mag.*, 26 : 79.

1896. *Icerya tangalla* Green, *Indian Mus. Notes*, 4 : 7.

1930. *Icerya aegyptiaca*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 70.

1970. *Icerya aegyptiaca*; Ali, *Indian Mus. Bull.*, 5 (1) : 81.

1992. *Icerya aegyptiaca*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 13.

Host plants : Polyphagous. On *Annona*, *Acacia*, *Artocarpus*, *Cajanus*, *Cassia*, *Croton*, *Ficus*, *Jatropha*, *Musa*, *Morus*, *Punica*, *Tectona*, *Tamarix* etc. On *Citrus* spp. and rose in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Bihar, W. Bengal, Orissa, Tamil Nadu, Kerala, Karnataka and Maharashtra in India and in Egypt, Pakistan, Sri Lanka, Bangladesh, Myanmar, China, Taiwan, Thailand, Philippines etc.

Family PSEUDOCOCCIDAE

Genus *Crisicoccus* Ferris

1950. *Crisicoccus* Ferris, *Atlas of the Scale insects of N. America*, 5 : 45.

Type species : *Dactylopius pini* Kuwana.

3. *Crisicoccus ? dischidae* (Takahashi)

1950. *Pseudococcus dischidae* Takahashi, *Indian J. Ent.*, 12 : 3.

1964. *Crisicoccus* sp. : Ganguli & Ghosh, *Indian J. Ent.*, 26 (3) : 358.

1970. *Crisicoccus dischidae*; Ali, *Indian Mus. Bull.*, 5 (2) : 82.

1992. *Crisicoccus ? dischidae*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 49.

Host plants : Groundnut in Tripura. Also on *Dischidia*.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Malay Peninsula.

Genus *Dysmicoccus* Ferris

1950. *Dysmicoccus* Ferris, *Atlas of the scale insects of N. America*, 5 : 22, 53.

Type species : *Dactylopius brevipes* Cockerell.

4. *Dysmicoccus* sp.

1992. *Dysmicoccus* sp. : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 49.

Host plants : On sugarcane (*Saccharum officinarum*) in Tripura. Also on *Cynodon dactylon*.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Pakistan.

5. *Dysmicoccus brevipes* (Cockerell)

1893. *Dactylopius brevipes* Cockerell, *Entomologist*, 26 : 267.
 1930. *Pseudococcus bromeliae* (Bouche); Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 60.
 1934. *Pseudococcus caninae* Green, *Stylops*, 3 : 162.
 1970. *Dysmicoccus brevipes*; Ali, *Indian Mus. Bull.*, 5 (2) : 105.
 1992. *Dysmicoccus brevipes*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 50.

Host plants : Pest on pineapple (*Ananas comosus*). Also on *Canna*, *Arachis*, *Vitis*, *Areca*, *Impatiens*, *Mangifera* etc. Occurs often on roots and rhizomes. On pineapple and arecanut in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in West Bengal, Orissa, Andhra Pradesh, Karnataka and Kerala in India and in Sri Lanka, Bangladesh, Thailand, Malay Peninsula, Taiwan and Philippines etc.

Genus *Planococcus* Ferris

1950. *Planococcus* Ferris, *Atlas of the Scale insects of North America*, 5 : 164.

Type species : *Dorthisia citri* Risso.

6. *Planococcus* sp.

1992. *Planococcus* sp. ; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 57.

Host plants : Polyphagous. In Tripura on *Cassia fistula* and cotton.

Distribution : India : Tripura (Ganguli & Ghosh, 1964; Agarwala & Varshney, 1988). Also other species in Karnataka, Kerala, Tamil Nadu, Orissa, Andhra Pradesh, West Bengal in India and Bangladesh, Myanmar, Sri Lanka, and Pakistan etc.

Remark : Ganguli & Ghosh (1964) mention a genus near Planococcids also occurring on groundnut in Tripura.

7. *Planococcus citri* (Risso)

1813. *Dorthisia citri* Risso, *Ann. Mus. d' Hist. Nat.*, 20 : 416.
 1964. *Planococcus citri* (Riso) [sic]; Ganguli & Ghosh, *Indian J. Ent.*, 26 (3) : 359.
 1992. *Planococcus citri*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 57.

Host plants : On sapota, pigeon pea and black pepper in Tripura. Elsewhere on *Citrus*, *Coffea*, *Theobroma*, *Cinchona*, *Annona*, *Artocarpus*, *Erythrina*, *Psidium*, *Ipomaea* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Karnataka, Kerala and Tamil Nadu in India and in Bangladesh, Sri Lanka, Pakistan etc.

Genus *Ferrisia* Fullaway

- 1923. *Ferrisia* Fullaway, *Proc. Hawaii. Ent. soc.*, 5 : 309, 311.

Type species : *Dactylopius virgatus* Cockerell.

8. *Ferrisia virgata* (Cockerell)

1893. *Dactylopius virgatus* Cockerell, *Entomologist*, 26 : 178.
 1964. *Ferrisiana virgata*; Ganguli & Ghosh, *Indian J. Ent.*, 26 (3) : 358.
 1992. *Ferrisia virgata*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 52.

Host plants : Highly polyphagous. On bean, cocoa, *Citrus* sp. and *Gliricidia* sp. in Tripura. Elsewhere on *Azadirachta*, *Abelmoschus*, *Ficus*, *Dodonaea*, *Dalbergia*, *Vitis*, *Ipomoea*, *Ziziphus* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in other parts of N.E. India,

W. Bengal, Bihar, U.P., M.P., Orissa, Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Goa, Maharashtra etc. in India and in Bangladesh, Maldives, Sri Lanka, Pakistan etc.

Genus *Paracoccus* Ezzat & McConnell

1956. *Paracoccus* Ezzat & McConnell, *Bull. Md. Agr. Expt. Stn.*, A-84 : 13, 17.

Type species : *Pseudococcus burnerae* Brain.

9. *Paracoccus* sp.

1992. *Paracoccus* : Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 55.

Host plants : On *Citrus* sp. in Tripura. Also on *Dalbergia* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Other species in U.P. and Andhra Pradesh in India.

Genus *Maconellicoccus* Ezzat

1958. *Maconellicoccus* Ezzat, *Soc. Ent. d' Egypte Bull.*, 42 : 380.

Type species : *Phenacoccus hirsutus* Green.

10. *Maconellicoccus hirsutus* (Green)

1908. *Phenacoccus hirsutus* Green, *Mem. Dept. Agr. India (Ent.)*, 2 (2) : 25.
1922. *Phenacoccus glomeratus* Green, *Coccidae of Ceylon*, Pt. 5 : 389.
1970. *Maconellicoccus hirsutus*; Williams, *Bull. ent. Res.*, 60 : 149.
1992. *Maconellicoccus hirsutus*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 55.

Host plants : On mesta in Tripura. Also on *Ficus*, *Tectona*, *Morus*, *Hibiscus*, *Annona*, *Vitis*, *Thespesia*, *Ziziphus*, *Cordia* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Delhi, Punjab, U.P., Bihar, W. Bengal, Orissa, Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, and Andaman Is. in India and in Bangladesh, Pakistan, Sri Lanka etc.

Genus *Nipaecoccus* Sulc

1945. *Nipaecoccus* Sulc, *Acta Soc. Sci. Nat. Morav.*, 17 (3) : 1.

Type species : *Dactylopius nipae* Maskell.

11. *Nipaecoccus viridis* (Newstead)

1894. *Dactylopius viridis* Newstead, *Indian Mus. Notes*, 3 (5) : 25.
1895. *Dactylopius vastator* Maskell, *Trans. Proc. New Zealand Inst.*, 27 (1894) : 65.
1919. *Pseudococcus nipae*; Fletcher, *Rept. Proc. 3rd Ent. Mtg. Pusa*, (1) : 289.
1992. *Nipaecoccus viridis*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 43.

Host plants : On cotton in Tripura. Also on *Artocarpus*, *Casuarina*, *Cucumis*, *Luffa*, *Psidium*, *Vitis*, *Ziziphus*, *Euphorbia*, *Thea*, *Dalbergia*, *Solanum* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, Goa, Maharashtra, Delhi, H.P., U.P., Bihar, W. Bengal, N.E. States and Orissa in India and in Bangladesh, Pakistan, Sri Lanka etc.

Genus *Coccidohystrix* Lindinger

1943. *Coccidohystrix* Lindinger, *Zischer. der Wien Ent. Gesell.*, 28 : 218.

Type species : *Echinococcus echinatus* Balachowsky.

12. *Coccidohystrix insolita* (Green)

1908. *Phenacoccus insolitus* Green, *Mem. Dept. Agr. India (Ent.)*, 2 (2) : 26.
1964. *Centrocooccus insolitus*; Ganguli & Ghosh, *Indian J. Ent.*, 26 (3) : 359.
1992. *Coccidohystrix insolita*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 40.

Host plants : On brinjal (*Solanum*) in Tripura. Also on *Cajanus*, *Abutilon*, *Datura*, *Hibiscus*, *Barleria*, *Adhatoda*, *Croton*, *Dalbergia*, *Morus* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Haryana, U.P., Bihar, West Bengal, Orissa, Andhra Pradesh, Goa,

Kerala, Gujarat, Tamil Nadu in India and in Bangladesh, Pakistan and Sri Lanka etc.

Genus *Brevennia* Goux

1940. *Brevennia* Goux, *Bull. Soc. d'Hist. Nat. d'Afrique du Nord*, **31** : 58.

Type species : *Ripersia* (*Brevennia*) *tetrapora* Goux.

13. *Brevennia rehi* (Lindinger)

1908. *Ripersia sacchari*; Green, *Mem. Dept. Agr. India* (Ent.), **2** (2) : 25.
 1917. *Ripersia sacchari oryzae* Fletcher, *Rept. Proc. 2nd Ent. Mtg. Pusa* : 177.
 1943. *Ripersia rehi* Lindinger, *Arb. Morph. Taxon. Ent.*, **10** : 152.
 1964. *Ripersia oryzae*; Ganguli & Ghosh, *Indian J. Ent.*, **26** (3) : 359.
 1992. *Brevennia rehi*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, **139** : 39.

Host plants : On paddy (*Oryza sativa*) in Tripura. Elsewhere on *Oryza*, *Sorghum*, *Panicum*, *Eriochloa*, *Andropogon*, *Cynodon* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Bihar, West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, M.P., Maharashtra, in India and in Myanmar, Bangladesh, Nepal, Pakistan etc.

Family ASTEROLECANIIDAE

Genus *Asterolecanium* Targ.

1868. *Asterolecanium* Targioni-Tozzetti, *Atti Soc. Ital. Sci. Nat.*, **11** : 41.

Type species : *Coccus aureus* Boisduval.

14. *Asterolecanium* sp.

1992. *Asterolecanium* sp. : Varshney, *Rec. zool. Surv. India, Occ. Paper*, **139** : 68.

Host plants : On bamboo in Tripura. Also on tea.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in West Bengal in India and in Sri Lanka.

Family CEROCOCCIDAE

Genus *Cerococcus* Comstock

1882. *Cerococcus* Comstock, *Rep. U. S. Dept. Agr., Commnr. Agr.* 1881-82 : 213.

Type species : *Cerococcus quercus* Comstock.

15. *Cerococcus indicus* (Maskell)

1897. *Eriococcus paradoxus* var. *indicus* Maskell, *Trans. Proc. New Zealand Inst.*, **29** (1896) : 318.
 1908. *Cerococcus hibisci* Green, *Mem. Dept. Agr. India, Ent. ser.*, **2** (2) : 19.
 1930. *Cerococcus hibisci*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, **197** (1929) : 53.
 1992. *Cerococcus indicus*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, **139** : 74.

Host plants : Polyphagous. On *Hibiscus*, *Gossypium*, *Tephrosia*, *Coffea*, *Solanum*, *Thespesia* etc. On maize and china rose in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964 as *C. hibisci*). Also in U.P., Bihar, West Bengal, Orissa, Andhra Pradesh, Karnataka and Maharashtra in India and in Pakistan, Sri Lanka, Bangladesh and Myanmar.

Remark : Ali (1970) has treated *hibisci* and *indicus* as separate species.

Family COCCIDAE

Genus *Ceroplastes* Gray

1828. *Ceroplastes* Gray, *Spicilegium Zoologica*, pt. **1** : 7.

Type species : *Coccus* (*Ceroplastes*) *chilensis* Gray.

16. *Ceroplastes* sp.

1992. *Ceroplastes* sp. : Varshney, *Rec. zool. Surv. India, Occ. paper*, **139** : 77.

Host plants : On *Anacardium* in Tripura. Also on *Psidium*, *Cocos*, *Prunus*, *Artocarpus*, *Ficus*, *Mangifera* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Delhi, Orissa etc. in India and in Bangladesh.

Genus *Coccus* Linn.1758. *Coccus* Linnaeus, *Systema Nat.*, ed. 10, 1 : 455.Type species : *Coccus hesperidum* Linnaeus17. *Coccus* spp.1992. *Coccus* spp.; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 82.

Host plants : Polyphagous. On *Melastoma melabethrium* in Tripura. Also on *Acacia*, *Mangifera*, *Psidium*, *Anacardium*, *Ficus*, *Dalbergia*, *Musa*, *Citrus*, *Nerium* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in U.P., Orissa, Andhra Pradesh in India and in Pakistan and Bangladesh.

18. *Coccus hesperidum* Linnaeus1758. *Coccus hesperidum* Linnaeus, *Systema Nat.*, ed. 10, 1 : 455.1908. *Lecanium hesperidum*; Green, *Mem. Dept. Agr. India, (Ent.)* 2 (2) : 30.1930. *Lecanium hesperidum*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 46.1974. *Coccus hesperidum*; Ali, *Indian Mus. Bull.*, 6 (2) (1971) : 24.1992. *Coccus hesperidum*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 84.

Host plants : Polyphagous. On cashewnut, mango, arecanut, and *Thea* sp. in Tripura. Also on *Areca*, *Amaranthus*, *Artocarpus*, *Capsicum*, *Camellia*, *Citrus*, *Croton*, *Dalbergia*, *Eugenia*, *Ficus*, *Ixora*, *Lonicera*, *Mangifera*, *Musa*, *Ziziphus* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964; Agarwala & Varshney, 1988). Also in J. & K., Bihar, West Bengal, Assam, Orissa, Andhra Pradesh, Kerala, Karnataka, Goa and Gujarat in India and in Pakistan, Sri Lanka, Bangladesh, Myanmar, Thailand, Malay Peninsula, Taiwan, etc.

19. *Coccus viridis* (Green)1886. *Lecanium viride* Green, *Observations on the Green Scale bug of coffee* : 1.1930. *Lecanium viridis*; Ayyar, *Bull. Dept. Agr., Res. Inst. Pusa*, 197 (1929) : 49.1974. *Coccus viridis*; Ali, *Indian Mus. Bull.*, 6 (2) (1971) : 28.1992. *Coccus viridis*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 87.

Host plants : On *Microcos paniculata* in Tripura. Also on *Coffea*, *Thea*, *Citrus*, *Plumiera*, *Cinchona*, *Manihot*, *Gardenia*, *Maesa*, *Antidesma*, *Loranthus* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Assam, Orissa, Tamil Nadu, Kerala and Karnataka in India and in Pakistan, Sri Lanka, Bangladesh, Myanmar, Thailand, Cambodia, Indonesia, Philippines and Taiwan.

Genus *Chloropulvinaria* Borchsenius1952. *Chloropulvinaria* Borchsenius, *Akad. Nauk SSSR Zool. Inst. Trudy*, 12 : 299.Type species : *Coccus flocciferus* Westwood.20. *Chloropulvinaria psidii* (Maskell)1893. *Pulvinaria psidii* Maskell, *Trans. Proc. New Zealand Inst.*, 25 (1892) : 223.1930. *Pulvinaria psidii*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 36.1974. *Chloropulvinaria psidii*; Ali, *Indian Mus. Bull.*, 6 (2) (1971) : 48.1992. *Chloropulvinaria psidii*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, 139 : 101.

Host plants : Polyphagous. On *Psidium*, *Ficus*, *Citrus*, *Achras*, *Mangifera*, *Coffea*, *Eugenia*, *Litchi*, *Mallotus*, *Morus*, *Cinchona* etc. On *Psidium*, *Melastoma*, *Gardenia* and *Anthocephalus* in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964; Agarwala & Varshney, 1988). Also in Bihar, West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Pondicherry, Kerala, Karnataka and Maharashtra in India and in Pakistan, Sri Lanka, Bangladesh, Thailand, Cambodia, Philippines and Taiwan.

Remark : Varshney (1992) has proposed *C. venkatramani* a closely related species, which is so far known from Tamil Nadu on *Amaranthus*.

Genus *Saissetia* Deplanche

1859. *Saissetia* Deplanche, *Bull. Soc. Linn. de Norwandie*, **4**, 203-207.

Type species : *Lecanium coffeae* Walker.

21. *Saissetia nigra* (Nietner)

1861. *Lecanium nigrum* Nietner, *Ceylon Times*, 1861 : 9.
 1902. *Saissetia nigrella* King, *Psyche*, **9** : 296.
 1985. *Saissetia nigra*; Varshney, *Oriental Ins.*, **19** : 27.
 1988. *Parasaissetia nigra*; Agarwala & Varshney, *Ann. Ent.*, **6** (1) : 55.

Host plants : On *Microcos paniculata* in Tripura. Also on many other plants viz. *Annona*, *Abelmoschus*, *Begonia*, *Hibiscus*, *Lawsonia*, *Morus*, *Thespesia*, *Ficus*, *Musa*, *Psidium*, *Canna*, *Cucumis*, *Cynodon* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Jammu & Kashmir, U.P., Bihar, West Bengal, Assam, Karnataka and Tamil Nadu in India and in Bangladesh, Myanmar, Pakistan, Sri Lanka etc.

Genus *Ceroplastodes* Cockerell

1893. *Ceroplastodes* Cockerell, *Entomologist*, **26** : 350

Type species : *Lecanopsis dugesii* Signoret.

22. *Ceroplastodes chiton* Green

1909. *Ceroplastodes chiton* Green, *Coccidae of Ceylon*, Pt. **4** : 287.
 1992. *Ceroplastodes chiton*; Varshney, *Rec. zool. Surv. India, Occ. Paper*, **139** : 107.

Host plants : On mandar in Tripura. Also on *Cassia*, *Cajanus*, *Solanum*, *Ficus*, *Thea*, *Ziziphus*, *Morus*, *Hibiscus* etc.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in H.P., U.P., West Bengal, North-eastern states and Andaman Is. in India and in Sri Lanka etc.

Family DIASPIDIDAE

Subfamily PARLATORIINAE

Genus *Parlatoria* Targ.

1868. *Parlatoria* Targioni-Tozzetti, *Atti Soc. Ital. Sci. Nat.*, **11** : 42.

Type species : *Aspidiotus proteus* Curtis.

23. *Parlatoria proteus* (Curtis)

1893. *Aspidiotus proteus* Curtis, *Gard. Chron.* : 676.
 1937. *Parlatoria proteus*; Ferris, *Atlas of the Scale insects of N. America*, **1** : 89.
 1969. *Parlatoria proteus*; Ali, *Indian Mus. Bull.*, **4** (1) : 79.
 1985. *Parlatoria proteus*; Varshney, *Oriental Ins.*, **19** : 31.

Host plants : Polyphagous. On *Thevetia peruviana* and *Thea* in Tripura. Also on *Bellatulum*, *Cymbidium*, *Pandanus*, *Polyalthia* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in West Bengal, Tamil Nadu and Karnataka in India and in Pakistan, England, Sri Lanka, Indonesia, Thailand and Philippine Is.

Subfamily ODONASPIDINAE

Genus *Odonaspis* Leonardi

1897. *Odonaspis* Leonardi, *Riv. di Patol. Veg.*, **5** : 284.

Type species : *Aspidiotus secretus* Cockerell.

24. *Odonaspis* sp.

1985. *Odonaspis* sp.; Varshney, *Oriental Ins.* **19** : 31.

Host plants : On bamboo in Tripura. Elsewhere on *Panicum*, *Andropogon* and other bamboo species.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Pakistan.

Subfamily ASPIDIOTINAE

Genus *Aonidiella* Berlese & Leonardi

1895. *Aonidiella* Berlese & Leonardi, in Berlese, *Riv. di Patol. Veg.*, **4** (1896) : 77, 83.

Type species : *Aspidiotus aurantii* Maskell.

25. *Aonidiella aurantii* (Maskell)

1879. *Aspidiotus aurantii* Maskell, *Trans. Proc. New Zealand Inst.*, **11** : 199.
 1930. *Aspidiotus aurantii*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, **197** (1929) : 25.

1938. *Aonidiella aurantii*; Ferris, *Atlas of the Scale insects of N. America*, 2 : 179.
1969. *Aonidiella aurantii*; Ali, *Indian Mus. Bull.*, 4 (2) : 33.
1985. *Aonidiella aurantii*; Varshney, *Oriental Ins.*, 19 : 32.

Host plants : Pest on *Citrus* spp. Also on *Agave*, *Annona*, *Aegle*, *Cannabis*, *Chrysanthemum*, *Eugenia*, *Psidium*, *Jasminum*, *Morus*, *Musa*, *Murraya*, *Nerium*, *Pyrus* etc. On *Citrus* spp. in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in H.P., Punjab, Delhi, Bihar, West Bengal, Assam, Orissa, Andhra Pradesh, Tamil Nadu, Kerala and Karnataka in India and in Nepal, Pakistan, Sri Lanka, Myanmar, China, Taiwan, Thailand, Cambodia, Philippines and Australia.

26. *Aonidiella orientalis* (Newstead)

1894. *Aspidiotus orientalis* Newstead, *Indian Mus. Notes*, 3 (5) : 26.
1930. *Aspidiotus orientalis*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 21.
1938. *Aonidiella orientalis*; Ferris, *Atlas of the Scale insects of N. America*, 2 : 180.
1970. *Aonidiella orientalis*; Ali, *Indian Mus. Bull.*, 5 (1) : 34.
1985. *Aonidiella orientalis*; Varshney, *Oriental Ins.*, 19 : 32.

Host plants : Polyphagous. On *Aegle*, *Areca*, *Acer*, *Albizia*, *Bauhinia*, *Butea*, *Cocos*, *Dalbergia*, *Diospyros*, *Eugenia*, *Ficus*, *Grewia*, *Hibiscus*, *Limonia*, *Melia*, *Musa*, *Mangifera*, *Morus*, *Phoenix*, *Psidium*, *Rosa*, *Solanum*, *Tamarindus*, *Thea*, *Ziziphus* etc. On *Gliricidia maculata*, *Cocos nucifera* and *Areca catechu* in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964; Agarwala & Varshney, 1988). Also in Punjab, Bihar, West Bengal, Orissa, M.P., Maharashtra, Karnataka, Kerala, Tamil Nadu and Andaman & Nicobar Is. in India and in Nepal, Pakistan, Sri Lanka, Myanmar and Philippines.

Genus *Aspidiotus* Bouche

1833. *Aspidiotus* Bouche, *Naturg. Sch. Nutz. Gard. Ins.* : 52.

Type species : *Aspidiotus nerii* Bouche.

27. *Aspidiotus* sp.

1985. *Aspidiotus* sp.; Varshney, *Oriental Ins.*, 19 : 32.

Host plant : On jack fruit in Tripura. Species of this genus highly polyphagous.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in other parts of India, Pakistan etc.

28. *Aspidiotus destructor* Signoret

1869. *Aspidiotus destructor* Signoret, *Ann. Soc. Ent. France*, (4) 9 : 120.
1896. *Aspidiotus lataniae* Signoret; Green, *Coccidae of Ceylon*, 1 : 49.
1899. *Aspidiotus transparens* Green, *J. Bombay nat. Hist. Soc.*, 13 : 69.
1930. *Aspidiotus destructor* and *A. lataniae*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 21-22.
1966. *Temnaspidiotus destructor*; Borchsenius, *Catalogue of Armoured Scale insects of the world* : 270.
1970. *Aspidiotus destructor*; Ali, *Indian Mus. Bull.*, 5 (1) : 37.
1985. *Aspidiotus destructor*; Varshney, *Oriental Ins.*, 19 : 32.

Host plants : Polyphagous. On *Artocarpus heterophyllus* in Tripura. Also on *Mangifera*, *Phoenix*, *Psidium*, *Carica*, *Ziziphus*, *Thea*, *Loranthus*, *Dalbergia*, *Cocos*, *Tamarindus*, *Annona* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in J. & K., Rajasthan, Maharashtra, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, West Bengal and Lakshadweep Is. in India and in Pakistan, Sri Lanka, Thailand, Indo-China and Philippine Is.

Genus *Chrysomphalus* Ashmead

1880. *Chrysomphalus* Ashmead, *Amer. Ent.*, 3 : 267.

Type species : *Chrysomphalus ficus* Ashmead (= *Coccus aonidum* Linn.)

29. *Chrysomphalus aonidum* (Linn.)

1758. *Coccus aonidum* Linnaeus, *Systema Nat.*, ed. 10, 1 : 455.

1880. *Chrysomphalus ficus* Ashmead, *Amer. Ent.*, **3** : 267.
 1930. *Aspidiotus ficus*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, **197** (1929) : 25.
 1966. *Chrysomphalus aonidum*; Borchsenius, *Catalogue of armoured Scale insects of the world* : 284.
 1970. *Chrysomphalus ficus*; Ali, *Indian Mus. Bull.*, **5** (1) : 40.
 1985. *Chrysomphalus aonidum*; Varshney, *Oriental Ins.*, **19** : 33.

Host plants : Pest on *Citrus* and *Phoenix*. Also occurs on *Bambusa*, *Ficus*, *Areca*, *Eugenia*, *Cocos*, *Mangifera*, *Psidium*, *Cassia*, *Musa*, *Ziziphus* etc. On arecanut in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964 as *C. ficus*). Also in Bihar, M.P., West Bengal, Assam, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Maharashtra and Gujarat in India and in Pakistan, Sri Lanka, Philippines, Taiwan etc.

30. *Chrysomphalus dictyospermi* (Morgan). Morgan's scale

1889. *Aspidiotus dictyospermi* Morgan, *Entomologist's mon. Mag.*, **25** : 352.
 1930. *Aspidiotus dictyospermi*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, **197** (1929) : 24.
 1938. *Chrysomphalus dictyospermi*; Ferris, *Atlas of the Scale insects of N. America*, **2** : 200.
 1970. *Chrysomphalus dictyospermi*; Ali, *Indian Mus. Bull.*, **5** (1) : 39.
 1985. *Chrysomphalus dictyospermi*; Varshney, *Oriental Ins.*, **19** : 33.

Host plants : Polyphagous. On *Thea* in Tripura. Also recorded on *Dendrobium*, *Mimusops*, *Cycas*, *Calophyllum*, *Ficus*, *Rosa*, *Mangifera*, *Cinnamomum* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Northern India, West Bengal, Assam, Andhra Pradesh, Tamil Nadu and Karnataka in India and in Sri Lanka, Thailand and Indonesia etc.

Genus *Hemiberlesia* Cockerell

1897. *Hemiberlesia* Cockerell in Leonardi, *Riv. di Patol. Veg.*, **5** : 375.

Type species : *Aspidiotus rapax* Comstock.

31. *Hemiberlesia lataniae* (Signoret). Latania scale

1869. *Aspidiotus lataniae* Signoret, *Ann. Soc. Ent. France*, (4) **9** : 124.
 1930. *Aspidiotus lataniae*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, **197** (1929) : 23.
 1938. *Hemiberlesia lataniae*; Ferris, *Atlas of the Scale insects of N. America*, **2** : 241.
 1966. *Hemiberlesia lataniae*; Borchsenius, *Catalogue of Armoured Scale insects of the world* : 306.
 1970. *Hemiberlesia lataniae*; Ali, *Indian Mus. Bull.*, **5** (1) : 46.
 1985. *Hemiberlesia lataniae*; Varshney, *Oriental Ins.*, **19** : 33.

Host plants : Highly polyphagous. On *Achras*, *Samanea*, *Cycas*, *Blumea*, *Vitis*, *Ficus*, palm, fig, pear, grape, cactus etc. On *Michelia champaka* and jackfruit in Tripura.

Distribution : India : Tripura (Ganguli & Ghosh, 1964; Agarwala & Varshney, 1988). Also in Tamil Nadu and Karnataka in India and in Sri Lanka, Thailand, Philippines, Taiwan and France. Almost cosmopolitan species.

Genus *Lindingaspis* MacGillivray

1921. *Lindingaspis* MacGillivray, *The Coccidae* : 388.

Type species : *Melanaspis samoana* Lindinger.

32. *Lindingaspis* sp.

1985. *Lindingaspis* : Varshney, *Oriental Ins.*, **19** : 33.

Host plant : *Thevetia peruviana* in Tripura.

Distribution : India : Tripura (Agarwala & Varshney 1988). Other species of *Lindingaspis* occur in various parts of India and in Pakistan, Sri Lanka etc.

Genus *Octaspidotus* MacGillivray

1921. *Octaspidotus* MacGillivray, *The Coccidae* : 387.

Type species : *Aspidiotus subrubescens* Maskell.

33. *Octaspidotus tripurensis* Takagi

1984. *Octaspidotus tripurensis* Takagi, *Ins. matsum.*, n.s. **28** : 9.

Host plants : Leaves of *Thevetia peruviana* in Tripura. Also on *Ficus religiosa*.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Thailand.

Remark : Discovered from Agartala, Tripura.

Genus *Pseudaonidia* Cockerell

1897. *Pseudaonidia* Cockerell, U. S. Dept. Agr., Div. Ent., Tech. Ser., 6 : 14.

Type species : *Aspidiotus duplex* Cockerell.

34. *Pseudaonidia* sp.

1985. *Pseudaonidia* : Varshney, *Oriental Ins.*, 19 : 34.

Host plant : On *Gliricidia maculata* in Tripura.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Other species of *Pseudaonidia* occur in N.E. India, Bihar, West Bengal and Southern India, as well as in Pakistan and Sri Lanka etc.

35. *Pseudaonidia trilobitiformis* (Green)

1896. *Aspidiotus trilobitiformis* Green, *Indian Mus. Notes*, 4 : 4.
1930. *Aspidiotus trilobitiformis*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 26.
1970. *Pseudaonidia trilobitiformis*; Ali, *Indian Mus. Bull.*, 5 (1) : 52.
1985. *Pseudaonidia trilobitiformis*; Varshney, *Oriental Ins.*, 19 : 34.

Host plants : On *Michelia champaka* in Tripura. Also on *Ixora*, *Mimusops*, *Mangifera*, *Dalbergia*, *Echitis*, *Diospyros*, *Gelonium*, *Jasminum*, *Psidium*, etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Bihar, West Bengal, Andhra Pradesh, Tamil Nadu and Kerala in India and in Pakistan, Sri Lanka, Philippines and Taiwan.

Genus *Temnaspidotus* MacGillivray

1921. *Temnaspidotus* MacGillivray, *The Coccidae* : 387.

Type species : *Aspidiotus excisus* Green.

36. *Temnaspidotus excisus* (Green)

1896. *Aspidiotus excisus* Green, *Coccidae of Ceylon*, 1 : 40, 53.
1921. *Temnaspidotus excisus*; MacGillivray, *The Coccidae* : 403.
1966. *Temnaspidotus excisus*; Borchsenius, *Catalogue of Armoured Scale insects of the world* : 271.
1970. *Temnaspidotus excisus*; Ali, *Indian Mus. Bull.*, 5 (1) : 56.
1985. *Aspidiotus excisus*; Varshney, *Oriental Ins.*, 19 : 32.

Host plants : Polyphagous. On *Clerodendron infortunatum* in Tripura. Also on *Cyanotis*, *Ipomoea*, *Jasminum*, *Tectona*, *Adhatoda*, *Ziziphus*, *Ficus*, *Dodonea* etc.

Distribution : India : Tripura (Agarwala & Varshney, 1988 as *Aspidiotus*). Also in Southern India, Pakistan, Sri Lanka, Taiwan etc.

Subfamily DIASPIDINAE

Genus *Fiorinia* Targ.

1868. *Fiorinia* Targioni-Tozzetti, *Atti Soc. Ital. Sci. Nat.*, 11 : 42.

Type species : *Fiorinia pellucida* Targ. (= *Diaspis fioriniae* Targ.).

37. *Fiorinia* sp.

1985. *Fiorinia* : Varshney, *Oriental Ins.*, 19 : 38.

Host plants : *Citrus* spp. in Tripura. Also on *Pinus* and *Nannorhops*.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in Pakistan etc.

Genus *Pinnaspis* Cockerell

1892. *Pinnaspis* Cockerell, *Inst. Jamaica J.*, 1 : 136.

Type species : *Mytilaspis pandani* Comstock (= *Aspidiotus buxi* Bouche).

38. *Pinnaspis aspidistrae* (Signoret)

1869. *Chionaspis aspidistrae* Signoret, *Ann. Soc. Ent. France*, (4) 9 : 443.
1930. *Pinnaspis aspidistrae*; Ayyar, *Bull. Dept. Agr. Res. Inst. Pusa*, 197 (1929) : 17.
1937. *Pinnaspis aspidistrae*; Ferris, *Atlas of Scale insects of N. America*, 1 : 97.

1969. [3. *Pinnaspis aspidistrae*] Heading missing; Ali, *Indian Mus. Bull.*, **4** (2) : 63.

1985. *Pinnaspis aspidistrae*; Varshney, *Oriental Ins.*, **19** : 38.

Host plants : Polyphagous. On *Aspidistra*, areca palm, *Artocarpus*, *Piper*, *Cocos*, *Citrus*, *Ficus*, *Acacia*, *Strobilanthes*, *Capparis*, *Mangifera*, *Cyanotis*, *Thespesia*, *Cassia* etc. On *Gliricidia maculata* in Tripura.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Madhya Pradesh, Maharashtra, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh in India and in Sri Lanka, France, Philippines Is. etc.

39. *Pinnaspis buxi* (Bouche). The Pandanus scale.

1851. *Aspidiotus buxi* Bouche, *Ent. Zeitg. Stettin*, **12** : 111.

1937. *Pinnaspis buxi*; Ferris, *Atlas of Scale insects of N. America*, **1** : 98.

1966. *Pinnaspis buxi*; Borchsenius, *Catalogue of Scale insects of the world* : 111.

1969. *Pinnaspis buxi*; Ali, *Indian Mus. Bull.*, **4** (2) : 63.

1985. *Pinnaspis buxi*; Varshney, *Oriental Ins.*, **19** : 38.

Host plants : *Pandanus*, *Buxus*, *Olea*, *Daphne*, *Artocarpus*, *Aleurites*, *Cassia*, *Ficus*, *Michelia*, *Punica*, *Nerium*, *Tamarindus* etc. On *Areca catechu* in Tripura.

Distribution : India : Tripura (Agarwala & Varshney, 1988) etc. Also in Pakistan, Sri Lanka, Philippines and in Europe.

40. *Pinnaspis strachani* (Cooley)

1899. *Hemichionaspis minor* Var. *strachani* Colley, *Spec. Bull. Mass. Agr. Expt. Stn.* : 54

1964. *Pinnaspis* [sic] *strachani* ; Ganguli & Ghosh, *Indian J. Ent.*, **26** (3) : 359.

1985. *Pinnaspis strachani* ; Varshney, *Oriental Ins.*, **19** : 39.

Host plants : On mesta in Tripura. Also on other plants elsewhere.

Distribution : India : Tripura (Ganguli & Ghosh, 1964). Also in other parts of India and in Nepal, Pakistan, Sri Lanka etc.

Genus *Thysanoflorinia* Balachowsky

1954. *Thysanoflorinia* Balachowsky, *Inst. Pasteur Mem. Sci.* : 168, 312.

Type species : *Fiorinia nephelii* Maskell.

41. *Thysanoflorinia leei* Williams

1971. *Thysanoflorinia leei* Williams, *Bull. ent. Res.*, **60** : 451.

1988. *Thysanoflorinia leei*; Agarwala & Varshney, *Ann. Ent.*, **6** (1) : 56.

Host plants : *Litsea chinensis* in Tripura. Also on *Nephelium*.

Distribution : India : Tripura (Agarwala & Varshney, 1988). Also in Hong Kong and Taiwan.

Remark : Takagi et al. (1989) have redescribed this species. Agarwala & Varshney (1988) have reported it first time from India.

SUMMARY

Coccoid species occurring in the State of Tripura, in North-Eastern India, are known from two earlier short communications of Ganguli & Ghosh (1964) and Agarwala & Varshney (1988). Altogether 41 species are reported in this paper (twelve identified upto genus only), belonging to 30 genera and 6 families. *Octaspidotus tripurensis* Takagi and *Thysanoflorinia leei* Williams are recorded in India from Tripura only, otherwise they are recorded from Thailand, Hong Kong and Taiwan.

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INSECTA : HEMIPTERA : REDUVIIDAE

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INTRODUCTION

The Reduviids are heteropteran insects, usually known as assassin bugs, are predaceous in habit. Some are pathogenic. The species *Triatoma rubrofasciata* Deg., is responsible for Kalazar in Madagascar and South Asia.

The group represents a little over 450 species belonging to 129 genera distributed over 14 subfamilies in India. (Distant 1904, 1910; Kemp 1924; China 1914; Samuel and Joseph 1953; Miller 1959a, b; 1980; Cook 1977; Ambrose and Livingstone 1986a, b; David Livingstone and Murugan 1987; David Livingstone and Ravichandran 1990; Ambrose and Vennison 1989; Biswas and Ghosh 1993).

Apparently nothing is known about the Reduviid fauna of Tripura, one of the eastern states in India.

The present paper is the first consolidated account of the Reduviid fauna of Tripura. It includes altogether 12 species in 11 genera under 5 subfamilies. All the species are new records from the state. General characters of the group, keys to various taxa, references, distribution in India and elsewhere under each species are given in the paper. Also, diagnostic characters in the case of species not included in the key, are provided.

The classification of the family has been mainly adopted after Distant (1904, 1910) and for some of the subfamilies Miller (1959) and Cook (1977) have been followed.

The work is based on the collections represented in Hemiptera Section, Zoological Survey of India, Calcutta.

General Diagnosis : Head narrow, longer than broad, jointed anteriorly; antennae filiform, apical segments often very fine, 4-5 segmented; eyes well developed; Ocelli when present placed behind the eyes; rostrum short, curved, stout, usually 3-segmented; pointed and with tip resting in a furrow between the fore coxae; prothorax prominent, smooth, ridged, spined or sharply angular; hemelytra with corium and clavus; membrane distinct with areoles; wings well developed, rudimentary or absent; legs hairy or spiny, fore legs somewhat raptorial tarsi 1-2 or 3-segmented with claws.

SYSTEMATIC ACCOUNT

Family REDUVIIDAE

I. Subfamily STENOPODINAE

1. Genus *Oncocephalus* Klug, 1830

1. *Oncocephalus annulipes* Stål

II. Subfamily SALYAVATINAE

2. Genus *Lisarda* Stål 1859

2. *Lisarda rhypara* Stål

3. Genus *Valentia* Stål 1865

3. *Valentia apetala* (Deveill)

4. Genus *Petalochirus* Pal. Beauv, 1805

4. *Petalochirus burmanus* Distant

III. Subfamily ACANTHASPIDINAE

5. Genus *Acanthaspis* Amy, & Serv., 1843

5. *Acanthaspis luteipes* Walker

IV. Subfamily ECTRICHODIINAE

6. Genus *Vilius* Stål, 18636. *Vilius melanopterus* Stål7. Genus *Haematorrhopus* Stål, 18747. *Haematorrhopus marginatus* Reuter

V. Subfamily HARPACTORINAE

Division 1. HARPACTORARIA

8. Genus *Sphedanolestes* Stål., 18668. *Sphedanolestes mendicus* (Stål)9. *Sphedanolestes trichorus* (Stål)

Division 2. CORANUSARIA

9. Genus *Coranus* Curtis, 183310. *Coranus fuscipennis* Reuter

Division 3. POLIDIDUSARIA

10. Genus *Polididus* Stål, 195811. *Polididus armatissimus* Stål11. Genus *Scipinia* Stål, 186112. *Scipinia horrida* (Stål)

Key to the Subfamilies

1. Hemelytra with a quadrangular areolet or cell at interior area of corium near base of membrane; first joint of rostrum rarely very short, generally elongate; space between eyes transverse HARPACTORINAE

— Hemelytra without a quadrangular areolet or cell at interior area of corium, near base of membrane 2

2. Hemelytra with a discoidal areolet or cell somewhat sexangular and touching base of membrane, or largely triangular STENOPODINAE

— Hemelytra without a discoidal areolet or cell 3

3. Scutellum with its apex broad and two or three spined ECTRICHODIINAE

— Scutellum with its apex triangular or subtriangular 4

4. Anterior tarsi two-jointed SALYAVATINAE

— Anterior tarsi three-jointed ACANTHASPIDINAE

I. Subfamily STENOPODINAE

1. Genus *Oncocephalus* Klug, 18301830. *Oncocephalus* Klug, *Symb. Phys.*, iicType species : *Oncocephalus notatus* Klug1. *Oncocephalus annulipes* Stål1855. *Oncocephalus annulipes* Stål, *Ofv. Vet. AK. Forb.*, : 44.1994. *Oncocephalus annulipes* : Biswas, Ghosh & Basu, State fauna series 3 : Fauna of West Bengal, part 5 : 377.

Material examined : 1 ex., Khasia mangal, Tripura, 22. x. 1977, Coll. N. Muraleedharan.

Diagnostic characters : Brownish ochraceous, pronotum with lateral margins armed medially with a small tubercle, three indistinct longitudinal fasciae on anterior area of pronotum, two annulations to first joint of antennae, large medial spot on post-ocular portion, first joint of antennae as long as anteocular portion of head, a central streak to clavus, a posterior oblong subclaval spot with a smaller outer spot, and a large subquadrate spot in inner areola to corium; a small basal and a large discal spot to membrane; three annulations to anterior tibiae.

Distribution : India : Tripura (North Tripura?), Himachal Pradesh, Maharashtra. *Elsewhere* : Burma, Sri Lanka.

II. Subfamily SALYAVATINAE

Key to the genera of the Subfamily SALYAVATINAE

1. Head produced porrectly between antenniferous tubercles; anterior tibiae simple *Lisarda*

— Head not produced porrectly between antenniferous tubercles 2

2. Anterior tibiae apically compressed and ampliased *Valentia*

— Anterior tibiae strongly dilated on each side
.....*Petalochirus*

2. Genus *Lisarda* Stål

1859. *Lisarda* Stål, *Ofv. Vet. AK. Forth.* : 192.

Type species : *Lisarda rhypara* Stål

2. *Lisarda rhypara* Stål

1874. *Lisarda rhypara* Stål, *En. Hem.* 4 : 83.

Material examined : 1 ex., N. E. Sakherbazar, North Tripura, 9. viii. 1979, coll. K. P. Singh & party.

Diagnostic characters : Pronotum, scutellum, sternum and head above fuscous, hemelytra, abdomen beneath and legs brownish ochraceous, apices of femora and base of the tibiae castaneous; antennae ochraceous, apex of the first joint fuscous; lateral pronotal angle short, acute, recurved; anterior prolongation of head porrect, scutellum with its apical spine slender, acute, obliquely suberect.

Distribution : India : Tripura (North Tripura).
Elsewhere : Bangladesh, Myanmar, Sri Lanka.

3. Genus *Valentia* Stål

1865. *Valentia*, Stål, *Hem. Afr.*, 3 : 144.

Type species : *Valentia apetala* de Vuill

3. *Valentia apetala* (de Vuill)

1864. *Petalcephala apetala* de Vuill, *Ann. Soc. Ent. Fr.* : 142.

1874. *Valentia apetala* : Stål, *En. Hem.* : 82.

Material examined : 1 ex., Champaknagar, West Tripura, 27. vi. 1990, coll. G. N. Saha and party; 1 ex., Mahadelotila, West Tripura, 22. vi. 1990, coll. G. N. Saha and party.

Diagnostic characters : Head, pronotum, scutellum, sternum, coxae fuscous; hemelytra, abdomen beneath and legs brownish testaceous; a small luteous rounded spot on inner margin of corium; convexium, basal area of femora, antennae with the first joint and apex ochraceous,

second joint fuscous, lateral pronotal spines a little upwardly directed; spines to convexium backwardly directed; apical spine to scutellum long, erect, anterior area of head and pronotum centrally finely sulcate.

Distribution : India : Tripura (West Tripura).
Elsewhere: Bangladesh, Java, Malay Peninsula, Siam.

4. Genus *Petalochirus* Pal. Beauv. 1805

1805. *Petalochirus* Pal. Beauv. *Ins.* : 13.

Type species : *P. variegatus* Pal. Beauv.

4. *Petalochirus burmanus* Distant

1903. *Petalochirus burmanus* Distant, *Ann. Soc. Ent. Belg.* : 55.

Material examined : 2 exs., Thakehara, South Tripura, 12. x. 1977, coll. N. Muraleedharan.

Diagnostic characters : Brownish ochraceous or pale fuscous; connexivum luteous with large black spots and each spot containing a very small luteous spot; hemelytra mottled with luteous, head conspicuously sulcated from between the eyes; antennae piceous, first joint with a pale central annulation; anterior tibiae broadly dilated outwardly, moderately dilated inwardly; posterior tibiae with a spine near apex.

Distribution : India : Tripura (South Tripura).
Elsewhere : Myanmar.

III. Subfamily ACANTHASPIDINAE

5. Genus *Acanthaspis* Amy. & Serv.

1843. *Acanthaspis* Amy. & Serv., *Hem* : 336

Type species : *Acanthaspis flavotaria* Aahn

5. *Acanthaspis luteipes* Walk.

1873. *Acanthaspis luteipes* Walker, *Cat. Het.*, 7 : 175.

Material examined : 1 ex., Champaknagar, West Tripura, 27. vi. 1990, coll. G. N. Saha and party.

Diagnostic characters : Dull purplish brown in colour; a large transverse spot almost crossing corium, spots to connexivum above and beneath, abdomen beneath, coxae, trochanters and legs pale ochraceous; head with a longitudinal incision between eyes, spots on each side of ocelli; pronotum with anterior lobe moderately sculptured and centrally sulcate, posterior lobe weakly rugulose, lateral angles subacutely prominent.

Distribution : Tripura (West Tripura); Karnataka; North India.

IV. Subfamily ECTRICHODIINAE

Key to the genera of the Subfamily ECTRICHODIINAE

1. Anterior femora strongly incrassated; antennae with six joints; abdomen not longitudinally impressed below or with the first four segments linearly medially impressed *Haematorrhopus*
- Anterior femora very slightly incrassated; antennae with four joints *Vilius*

6. Genus *Vilius* Stål

1863. *Vilius* Stål, *Ann. Soc. Ent. Fr.* : 45.

Type species : *Vilius melanopterus* Stal

6. *Vilius melanopterus* Stål

1863. *Vilius melanopterus* Stål, *Ann. Soc. Ent. Fr.* : 45.

1994. *Vilius melanopterus* : Biswas, Ghosh & Basu, State fauna series 3 : Fauna of West Bengal, Part 5 : 390.

Material examined : 1 ex., Sepahijola, West Tripura, 30. v. 1989, coll. R. Tilak and party.

Diagnostic characters : Reddish testaceous to coral red in colour, antennae, hemelytra, apices of the femora and bases of tibiae fuscous; eyes large, strongly exserted; three longitudinal impressions on the posterior lobe of pronotum, antennae ochraceously pilose in male, legs wholly fuscous in female.

Distribution : India : Tripura (West Tripura); Assam; Meghalaya.

Elsewhere: Bangladesh, Burma, Malay Peninsula.

7. Genus *Haematorrhopus* Stål, 1874

1874. *Haematorrhopus* Stål, *En. Hem.*, 4 : 49.

Type species : *Ectrichodia linnaei* Stal (by present designation)

7. *Haematorrhopus marginatus* (Reuter)

1881. *Physorhynchus marginatus* Reuter, *Act. Soc. Sc. Fenn.*, 12 : 301.

Material examined : 2 exs., Ambassa, North Tripura, 2. iii. 1991, coll. G. K. Srivastava; 1 ex., Jaikang vill., North Tripura, 25. v. 1992, coll. B. Mitra and party.

Diagnostic characters : Females apterous; dorsal surface of abdomen violaceous black and lateral margin of connexivum sanguineous, in female posterior lobe of pronotum is much longer than the anterior lobe; dorsal surface of the abdomen transversely and irregularly rugose.

Distribution : India : Tripura (North Tripura), Assam, Meghalaya, Bengal. **Elsewhere :** Burma.

V. Subfamily HARPACTORINAE

Key to the genera of the Subfamily HARPACTORINAE

1. Scutellum with a longitudinal carination which in some cases produced in a suberect process or spine; antennae with first joint not longer than head; lateral angles of pronotum unarmed *Coranusaria*
- Scutellum has no carination or spine 2
2. Femora granulate, generally nodulose, always spinous, body spinous *Polididusaria*
- Femora not granulate or spinous; body oblong or subelongate not spinous; head as long as or very little longer than pronotum; anteocular and postocular area almost subequal in length *Harpactoraria*

Division 1. HARPACTORARIA

8. Genus *Sphedanolestes* Stål

1866. *Sphedanolestes* Stål, *Ofv. Vet. AK. Forh.* : 284 & 288.

Type species : *Sphedanolestes impressicollis* Stål

Key to the species of the genus
SPHEDANOLESTES

- Pronotum black, anterior lobe and posterior margins sanguineous; head with a large spot behind eyes black *mendicus*
— Pronotum sanguineous; head with a small black lateral spot near eyes *trichorus*

8. *Sphedanolestes mendicus* (Stål)

1866. *Reduvius mendicus* Stål, *Ofv. Vet. AK. Forh.* : 286.
1902. *Sphedanolestes mendicus* : Distant, *Fauna Brit. India*, 8 : 341.
1994. *Sphedanolestes mendicus* : Biswas, Ghosh & Basu, State fauna series 3 : Fauna of West Bengal, Part 5 : 394.

Material examined : 1 ex., Amarapur, South Tripura, 5. iii. 1991, coll. G. K. Srivastava and party.

Diagnostic characters : A black species with anterior lobe and posterior & lateral margins of pronotum, apex and lateral margin of scutellum, connexivum, coxae & trochanters sanguineous; head about as long as pronotum, with a black large spot behind eyes.

Distribution : India : Tripura (South Tripura), Assam, Meghalaya. *Elsewhere* : Myanmar, Malay Peninsula.

9. *Sphedanolestes trichorus* (Stål)

1874. *Haemactus trichorus* Stål, *En. Hem.*, 4 : 34.
1902. *Sphedanolestes trichorus* Distant, *Fauna Brit. India*, 2 : 343.

Material examined : 1 ex., Maicheza, South Tripura, 27. ix. 1977, coll. N. Muraleedharan.

Diagnostic characters : A coral red species with antennae, rostrum, head, and legs black, the posterior tibiae moderately curved, base of the

head, femora and a small lateral spot to head near eyes coral red; membrane fuscous violaceous, posterior area palely hyaline.

Distribution : India : Tripura (South Tripura).

Elsewhere : Myanmar.

Division 2. CORANUSARIA

9. Genus *Coranus* Curtis

1833. *Coranus* Brit., *Ent.*, 10 : 453.

Type species : *Coranus subapterus* de Geer

10. *Coranus fuscipennis* Reuter

1881. *Coranus fuscipennis* Reuter, *Act. Soc. Sc. Fenn.*, 12 : 275.
1994. *Coranus fuscipennis* : Biswas, Ghosh & Basu, State fauna series 3 : Fauna of West Bengal, Part 5 : 400.

Material examined : 1 ex., Udaipur, South Tripura, 17. v. 1992, Coll B. C. Das and party.

Diagnostic characters : Black species, greyishly sericeous or pilose, scutellum with an erect conical spine; corium pale ochraceous, ferruginous on apical area, membrane and clavus brassy black, abdomen beneath black with sublateral pale testaceous markings on each side, connexivum pale testaceous with piceous transverse spots, femora nodulose black or indistinctly annulated with ferruginous; antennae piceous, first joint luteous and as long as head.

Remarks : The species is hitherto reported for the first time from India.

Distribution : India : Tripura (South Tripura).
Elsewhere : Sumatra.

Division 3. POLIDIDUSARIA

Key to the genera of the Division
POLIDIDUSARIA

1. First and second joint of rostrum subequal in length *Scipinia*

- First joint of rostrum longer than second; postocular area a little longer than anteocular; all the femora spined *Polididus*

10. Genus *Polididus* Stål1858. *Polididus* Stål *Ofv. Vet Ak. Forth.*, 448.Type species : *Polididus spinosissimus* Stål11. *Polididus armatissimus* Stål1859. *Polididus armatissimus* Stål, *Ofv. Vet. AK. Forh.* : 376.1994. *Polididus armatissimus* : Biswas, Ghosh & Basu, State fauna series 3 : Fauna of West Bengal, Part 5 : 402.

Material examined : 2 exs., Kailasahar, North Tripura, 28. v. 1978, coll. J. K. Jonathan and party; 2 exs., Sepahijola, West Tripura, 30. v. 1989, coll. R. M. Kamble and party.

Diagnostic characters : A pale brownish ochraceous species; head with a long spine behind the base of each antenna and with a number of smaller discal spines, pronotum spinous, the longest being two erect one on anterior lobe and the lateral spines to posterior lobe; anterior tibiae and femora strongly spinous, intermediate and posterior tibiae spinulose.

Distribution : India : Tripura (North Tripura, West Tripura); Maharashtra; West Bengal. *Elsewhere* : Myanmar, China, Japan, Philippines, Sri Lanka.

11. Genus *Scipinia* Stål1861. *Scipinia* Stål, *Stett. ent. Zeit.*, 22 : 137 & 138.Type species : *Scipinia horrida* Stål12. *Scipinia horrida* (Stål)1859. *Sinea horrida* Stål, *Freg. Eug. Resa, Ins.* : 262.1874. *Scipinia horrida* : Stål, *En. Hem.*, 4 : 15.1994. *Scipinia horrida* : Biswas, Ghosh & Basu, State fauna series 3 : Fauna of West Bengal, Part 5 : 402.

Material examined : 1 ex., Teliamura, West Tripura, 15. vii. 1989, coll. R. S. Barman and party.

Diagnostic characters : An ochraceous species with black spots to the upper surface of head and connexivum with the largest on 4th and 5th segments; head above with three long spines on each side and with a number of small spines

between or around them; anterior lobe of pronotum with four long and a number of smaller spines, posterior lobe of pronotum granulate, its lateral angle acute, upwardly directed.

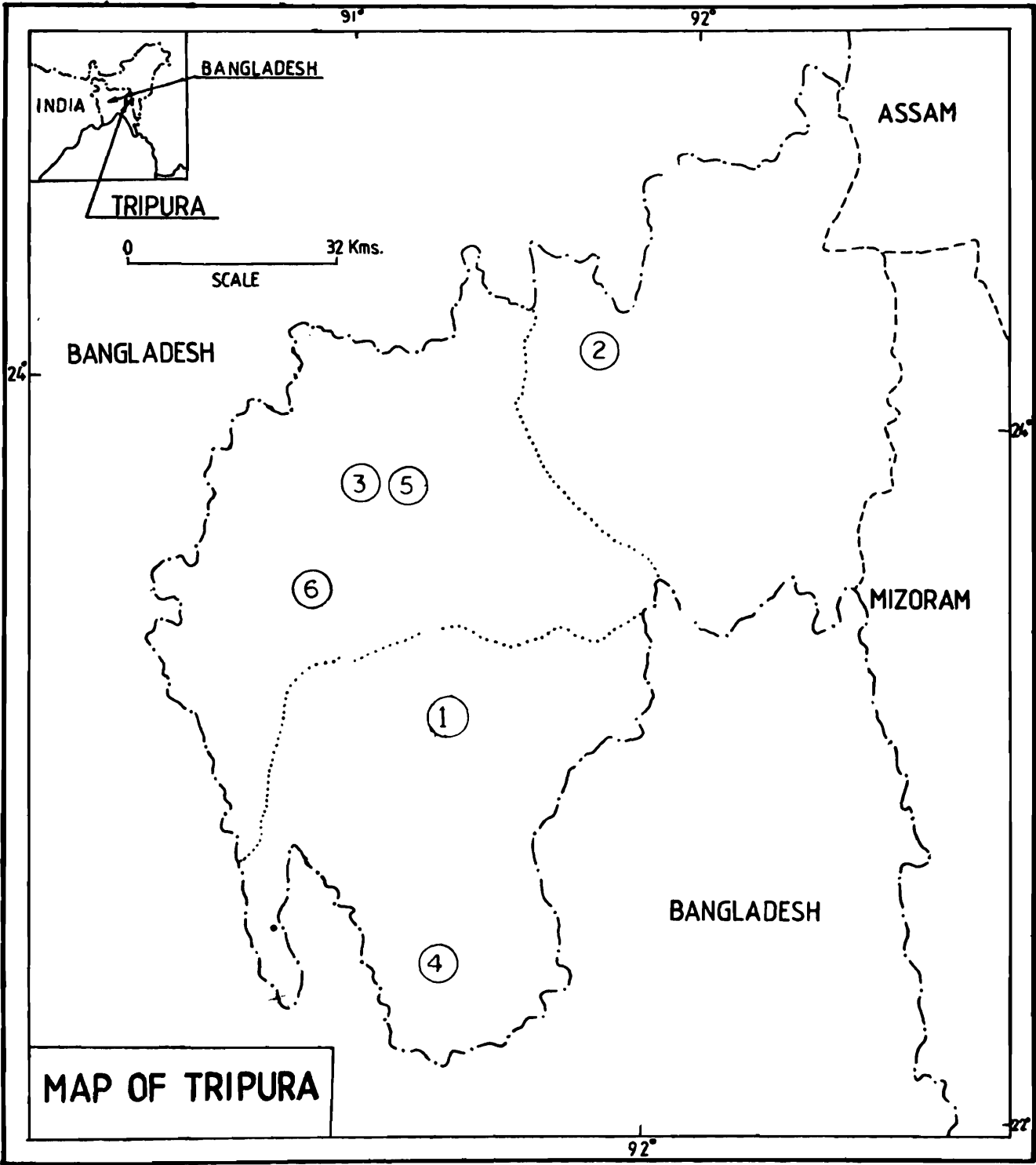
Distribution : India : Tripura (West Tripura); Sikkim. *Elsewhere* : Myanmar, Philippines, Sri Lanka.

Table 1. Distribution of Reduviid in different districts of Tripura.

Name of species/ subspecies	W. Tripura	N. Tripura	S. Tripura
1. <i>Oncocephalus annulipes</i> Stål	—	+	—
2. <i>Lisarda rhypara</i> Stål	—	+	—
3. <i>Valentia apetala</i> (de Veill)	+	—	+
4. <i>Petalochirus burmanus</i> Distant	—	—	+
5. <i>Acanthaspis luteipes</i> Walker	+	—	+
6. <i>Vilius melanopterus</i> Stål	+	—	—
7. <i>Haematorrhopus marginatus</i> Reuter	—	+	—
8. <i>Sphedanolestes mendicus</i> (Stål)	—	—	+
9. <i>Sphedanolestes trichorus</i> (Stål)	—	—	+
10. <i>Coranus fuscipennis</i> Reuter	—	—	+
11. <i>Polididus armatissimus</i> Stål	+	+	—
12. <i>Scipinia horrida</i> (Stål)	+	—	—

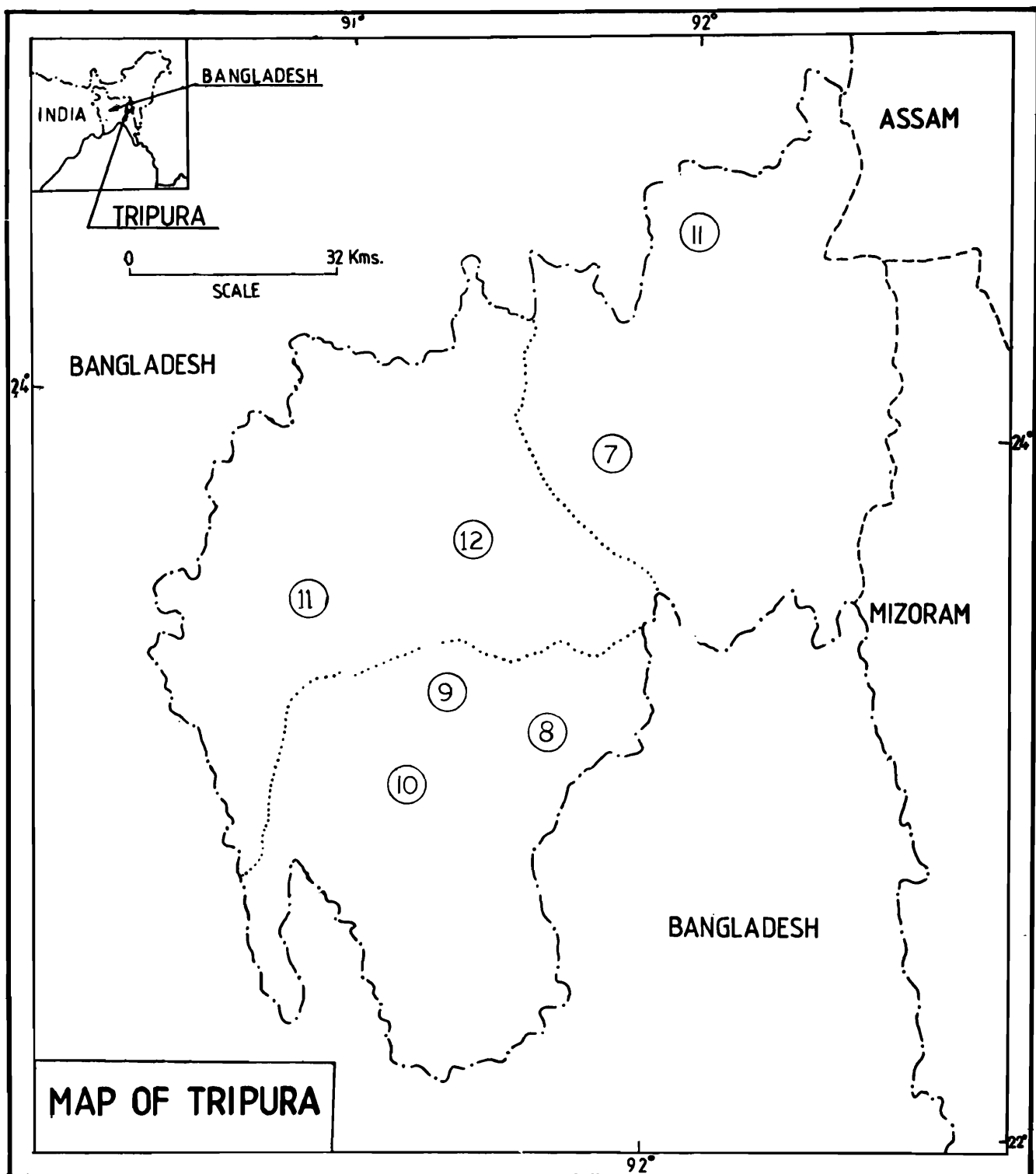
SUMMARY

The paper provides a comprehensive account of 12 species belonging to 11 genera under 5 subfamilies of the family Reduviidae from Tripura. All these species constitute new records from the State. Running keys to various taxa are incorporated for easy identification of the group. General diagnosis of the species (not included in



Map 1 : Showing Distribution of the Species of Reduviidae

1. *Oncocephalus annulipes* Stal; 2. *Lisarda rhypara* stal; 3. *Valentia apetala* (de Veill); 4. *Petalochirus burmanus* Distant; 5. *Acanthaspis luteipes* Walker; 6. *Vilius melanopterus* Stal.



Map 2 : Showing Distribution of the Species of Reduviidae

7. *Haematorrhopus marginatus* Reuter; 8. *Sphedanolestes mendicus* (Stal); 9. *Sphedanolestes trichorus* (Stal); 10. *Coranus fuscipennis* Reuter; 11. *Polididus armatissimus* Stall; 12. *Scipinia horrida* (Stal).

the key) is given. Besides, distributional record of each species from India and elsewhere is provided. The study is based on the existing collections as well as mopping survey material of survey parties in the recent years.

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INSECTA : HEMIPTERA : COREOIDEA

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INTRODUCTION

Coreoids are commonly phytophagous insects, abundantly occur in India in plains as well as in hills, and some of them are reported as economically important pests particularly on cereals, pulses, vegetables and fruits. They often produce obnoxious odour to avoid their predators.

Distant (1904, 1908, 1918) had contributed a comprehensive faunistic study as a pioneer worker on coreoids of Indian subcontinent in his *Fauna of British India Volumes*. Since then stray works have been done on Indian forms by some authors like Paiva (1919), Kumar (1965), Dolling (1978), Basu and Mitra (1977), O'Shea and Schaefer (1980). The coreoid bugs in India are represented by four families viz. Coreidae, Alydidae, Rhopalidae and Stenocephalidae. Chopra (1967) had produced a valuable contribution on the higher classification of the family Rhopalidae. Classification is based on Richards and Davies (1977).

The present study is based upon the collections of Coreoids from Tripura by different survey parties from Zoological Survey of India as well as the named collection present in the National Zoological Collection.

Nearly 190 species of coreid bugs have, so far, been recorded from India. The present study has recorded 18 species under 10 genera belonging to two families from the State of Tripura. All the species dealt in this paper, are being recorded for the first time from the State.

MATERIAL AND METHOD

Coreoids are found in agricultural fields, vegetable gardens and other herbs and shrubs since they are phytophagous in nature. They are well fliers like other hemipteran insects and are collected by sweeping the habitat with insect net or by hand picking with forceps, also by light traps during night time.

The collected specimens are killed in a killing Jar using liquid Benzene or Chloroform vapour and preserved dry with para-di-chloro-benzene and naphthalene. In the field the insects are kept in the insect envelopes and labelled properly by mentioning locality, altitude, date of collection and name of the collector with ecological notes. In the laboratory the specimens are set, pinned and mounted to display scientifically for easy handling and observation under binocular stereoscopic microscope during the process of identification and morphological studies. For detailed specific identification the genitalia are also dissected out properly and mounted on slides for further study.

SYSTEMATIC ACCOUNT

List of the Tripura coreoid species studied in this paper is given below. All the species are recorded for the first time from the State of Tripura.

Superfamily	COREOIDEA
Family	I. ALYDIDAE
Subfamily	LEPTOCORISINAE

Genus 1. *Leptocorisa* Latreille 1825

- 1.
- Leptocorisa acuta*
- (Thunberg)

Subfamily ALYDINAE

Genus 2. *Riptortus* Stål 1859

- 2.
- Riptortus linearis*
- (Fabricius)

- 3.
- Riptortus strenuus*
- Horvath

- 4.
- Riptortus pedestris*
- (Fabricius)

Family II. COREIDAE

Subfamily CORINAE

Tribe MICTINI

Genus 3. *Derepteryx* White 1839

- 5.
- Derepteryx hardwicki*
- White

Genus 4. *Mictis* Leach 1814

- 6.
- Mictis tenebrosa*
- (Fabricius)

- 7.
- Mictis gallina*
- Dallas

Genus 5. *Anoplocnemis* Stål 1873

- 8.
- Anoplocnemis phasiana*
- (Fabricius)

Tribe GONOCERINI

Genus 6. *Cletus* Stål 1859

- 9.
- Cletus punctiger*
- (Dallas)

- 10.
- Cletus bipunctatus*
- (Westwood)

- 11.
- Cletus punctulatus*
- (Westwood)

Genus 7. *Cletomorpha* Mayr 1866

- 12.
- Cletomorpha raja*
- Distant

Tribe HOMOCERINI

Genus 8. *Homocerus* Burmeister 1835

- 13.
- Homocerus biguttatus*
- Westwood

- 14.
- Homocerus striicornis*
- Scott

- 15.
- Homocerus walkeri*
- Kirby

- 16.
- Homocerus inornatus*
- Stål

Genus 9. *Physomerus* Burmeister 1835

- 17.
- Physomerus grossipes*
- (Fabricius)

Subfamily HYDARINAE

Genus 10. *Hydarella*

- 18.
- Hydarella orientalis*
- (Distant)

Superfamily COREOIDEA

Coreid bugs are commonly known as leaf-footed bugs. They are generally medium to large insects, head much narrower than pronotum with four segmented antennae inserted on the upper side of the head; ocelli present; rostrum four segmented; scent gland opening on thorax conspicuous. Most of the insects dull coloured and can produce pungent scent, in some genera they exhibit extra ordinary dialation of the antennae, many species have flattened and leaf like legs hence they are called leaf-footed bugs. Generally they are phytophagous insects, only a few species are known to be predaceous in nature.

The superfamily Coreoidea is represented in Tripura by two families, namely Coreidae and Alydidae.

Key to the families of superfamily
COREOIDEA in Tripura

1. Bucculae short, not extending to the insertion of antennae; pronotum posteriorly slightly longer than the head along the mid-longitudinal axis; scutellum not reaching the base of metanotum and generally narrower than the interocular space ALYDIDAE
- Bucculae long, extending to near insertion of antennae; pronotum posteriorly three time or more longer than head along the mid-longitudinal axis; scutellum reaching or surpassing the base of metanotum and generally broader than the interocular space COREIDAE

Family I. ALYDIDAE

In Tripura the family Alydidae is represented by two subfamilies.

Key to the subfamilies of the family
ALYDIDAE

1. Pronotum at widest point usually at least half as wide as and distinctly longer than head;

aedeagus always with a ventral pair of thecal appendages; ocelli minute to large, usually centrally placed and moderately separated from each other behind the compound eyes

.....subfamily LEPTOCORISINAE

Pronotum at widest point only slightly wider and longer than head; aedeagus usually without ventral pair of thecal appendages; ocelli usually large, generally centrally placed and narrowly separated from each other

.....subfamily ALYDINAE

Subfamily LEPTOCORISINAE

Genus 1. *Leptocorisa* Latreille 1825

1825. *Leptocorisa* Latreille, *Fam. Nat.* : 421.

1. *Leptocorisa acuta* (Thunberg)

1783. *Cimex acutus* Thunberg, *Nov. Ins. Sp.*, 2 : 34

1853. *Gerris vericornis* : Fabricius, *Syst. Rhyng.* : 260

1904. *Leptocorisa acuta* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 410.

1965. *Leptocorisa acuta* : Ahmad, *Bull. Brit. Mus. (nat. Hist.)* Suppl., 5 : 78.

1994. *Leptocorisa acuta* : Chakraborty *et. al.*, *Rec. zool. Surv. India, Occ. Paper*, 161 : 17.

Material examined : 3 exs., Udaipur, South Tripura Dist., 4.vii.1977, M. S. Sishodia coll.; 1 ex., Thakchera, Amarpur, North Tripura Dist. 12. xii. 1977, N. Muraleedharan coll.; 5 exs. Kailasahar, North Tripura Dist., 28.v.1978, J. K. Jonathan coll.; 1 ex., Ambassa, North Tripura Dist., 5.xii.1988, R. C. Basu coll.; 10 exs., Jogendranagar, North Tripura Dist., 18.xii.1988, R. C. Basu coll.; 3 exs., Teliamura, West Tripura Dist., 6.i.1989, R. S. Burman coll.; 10 exs., Sonamura, West Tripura Dist, 14. i. 1989, R. S. Burman coll.; 1 ex., Ambassa, North Tripura Dist., 13.v.1992, B. Mitra coll., 3 exs., Ambassa, North Tripura Dist., 15.v.1992, B. Mitra coll.; 2 exs., Agartala, West Tripura Dist., 28.v.1992, B.C. Das coll.

Diagnosis : Body length of adult insects may be 13-16 mm; body cylindrical, pale brown in

colour; head elongated; antennae uniformly pale, first and fourth joints longest and subequal in length while second and third shortest and subequal; rostrum short, hardly reaching apices of second coxae; a small distinct tubercle near each lateral pronotal angle; pronotum with a distinct mid-longitudinal carina.

Distribution : India : Tripura (South Tripura, North Tripura, West Tripura); Assam; Bihar; Karnataka; Kerala; Maharashtra; Meghalaya; Sikkim; Tamil Nadu; West Bengal. Elsewhere : Australia, Bhutan, Formosa, Hong Kong, Malaysia, New Guinea, Pakistan, Sri Lanka, Sumatra, Solomon, Islands, Thailand, Vietnam.

Subfamily ALYDINAE

Genus 2. *Riptortus* Stål 1859

1859. *Riptortus* Stål, *Ofv. Vet.-Akad. Jorth.*, : 460.

Key to the species of the genus Riptortus

1. Pronotal disk with no distinct rugocities; lateral pronotal spines not acute, and small *linearis*

Pronotal disk with scattered rugocities; lateral pronotal spines acute and long 2

2. Body cinemon brown; one single long lateral pronotal spine on each angle; posterior femur with thick row of ventro-lateral spines *strenuus*

Body dark brownish ochraceous; one moderately long and another small—two spines on lateral pronotal angle on each side; posterior femur with moderate spine row on ventro-lateral side *pedestris*

2. *Riptortus linearis* (Fabricius)

1775. *Lygaeus linearis* Fabricius, *Syst. Ent.* : 710.

1904. *Riptortus linearis* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 415.

Material examined : 4 exs., Bazarbari, South Tripura Dist., 6.x.1977, M. Muraleedharan coll.; 2 exs., Belonia, South Tripura Dist., 18.v.1978, J. K. Jonathan coll.; 2 exs., Udaipur, South Tripura

Dist., 4. vii. 1974. M. S. Shisodia coll.; 3 exs., Ambassa, North Tripura Dist., 25.v.1978, J. K. Jonathan coll.; 1 x., Mohar Chapa, West Tripura Dist., 20.v.1992, B.C. Das coll.; 2 exs. Ambassa, North Tripura Dist., 25.v.1992, B. C. Das coll.; 1 ex., Kamalnagar, West Tripura Dist., 7.iii.1992, B. Mitra coll.; 1 ex., Ambassa, North Tripura Dist., 14. v. 1991, S. Chakraborty coll.; 3 exs., Kumarghat, North Tripura Dist., 19. v. 1991, B. Mitra coll.

Diagnosis : Adult insect may reach upto 15 mm in length, linear in appearance. Other diagnostic characters as in the key.

Distribution : India : Tripura (Districts—South Tripura, North Tripura, West Tripura); Karnataka; Sikkim; West Bengal. Elsewhere : Burma, Malayan Archipelago, Sri Lanka.

3. *Riptortus strenuus* Horvath

1889. *Riptortus strenuus* Horvath, *Term. Fuzetek*, : 35.
 1904. *Riptortus strenuus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 415.
 1994. *Riptortus strenuus* : Chakraborty *et al.* *Rec. zool. Surv. India, Occ. Paper*, 161 : 19.

Material examined : 3 exs., Kailasahar, North Tripura Dist. 28. v. 1978, J. K. Jonathan coll.; 2 exs., Belonia, South Tripura Dist., 17.v.1978, J. K. Jonathan coll.; 2 exs., Bagma, West Tripura Dist., 5.xi.1991, B. N. Das coll.

Diagnosis : Adult insect may reach upto 16 mm in length, stout and wider in appearance in comparison to *R. linearis*. Other characters as in key.

Distribution : India : Tripura (Districts—South Tripura, North Tripura, West Tripura); Arunachal Pradesh; Uttar Pradesh.

4. *Riptortus pedestris* (Fabricius)

1775. *Gerris pedestris* Fabricius, *Syst. Ent.*, : 727.
 1788. *Cimex pedestris* : Gimel, *Syst. Nat.*, 4 : 219.
 1904. *Riptortus pedestris* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 414.
 1994. *Riptortus pedestris* : Chakraborty *et al.*, *Rec. zool. Surv. India, Occ. Paper*, 161 : 19.

Material examined : 2 exs., Teliamura, West Tripura Dist., 6.i.1989, R. S. Burman coll.; 2 exs., Ambassa, North Tripura Dist., 15. v. 1992, B. Mitra coll.

Diagnosis : Adult insect may be 15-18 mm in length. Other diagnostic characters as in key.

Distribution : India : Tripura (Districts—West Tripura, North Tripura); Karnataka; Maharashtra; Meghalaya. Elsewhere : Burma, Malay Peninsula.

Family II. COREIDAE

In Tripura the family Coreidae is represented by two subfamilies.

Key to the subfamilies of the family COREIDAE

1. Antennal first joint without clavate apices; tibiae sulcate above.....subfamily COREINAE
- Antennal first joint with clavate apices; tibiae non-sulcate above.....subfamily HYDARINAE

Subfamily COREINAE

Tribe MICTINI

Key to the genera of the tribe Mictini

1. Pronotum produced anteriorly remarkably beyond the tip of the head.....*Derepteryx*
 Pronotum not produced anteriorly beyond the tip of the head.....2
2. Abdomen beneath in male distinctly tuberculate; posterior tibiae dentate on inner margin in male.....*Mictis*
 Abdomen beneath in male very strongly gibbously tuberculate; posterior tibiae not dentate in either sex*Anoplocnemis*

Genus 3. *Derepteryx* White 1839

1839. *Derepteryx* White, *Charlesworth's Mag. nat. Hist.*, (2) 3 : 542.

5. *Derepteryx hardwicki* White

1839. *Derepteryx hardwicki* White, *Charlesworth's Mag. nat. Hist.*, (2) 3 : 542.

1904. *Derepteryx hardwicki* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 334.

Material examined : 2 exs., Kumarghat, North Tripura Dist., 19.v.1992, B. Mitra coll.

Diagnosis : Body length 26-28 mm, breadth between the pronotal angles 15-16 mm; pronotum above rugose, not tuberculate; lateral process of pronotum strongly spined on both inner and outer margins; posterior femora of male incrassate and armed with a single well developed spine on the ventral side on each; posterior tibiae of male dilated only on inner side.

Distribution : India : Tripura (District—North Tripura); Meghalaya. Elsewhere : Burma.

Genus 4. *Mictis* Leach 1814

1814. *Mictis* Leach, *Zool. Misc.*, 1 : 92.

Key to the species of the genus *Mictis*

1. Pronotum with lateral angles moderately prominent and subacutely rounded; fourth antennal segment longest and slightly longer than the first segment ***tenebrosa***

Pronotum with lateral angles moderately prominent and apices not rounded but subacute to pointed processes; fourth antennal segment longest and much longer than the first segment ***gallina***

6. *Mictis tenebrosa* (Fabricius)

1787. *Cimex tenebrosa* Fabricius, *Mant.*, 2 : 288.

1842. *Mictis fasciatus* : Westwood, in *Hope Cat.*, 2 : 11.

1904. *Mictis tenebrosa* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 344.

1919. *Mictis tenebrosa* : Paiva, *Rec. Indian Mus.*, 16 : 356.

Material examined : 1 ex.; Ambassa, North Tripura Dist., 14.v.1992, S.K. Chakraborty coll.

Diagnosis : Adult insects may be 23-26 mm in length, breadth between the pronotal angles 8-

9 mm; posterior femora in male strongly curved and incrassate but in female less curved and moderately thickened. Other characters as in key.

Distribution : India : Tripura (District—North Tripura); Assam; Meghalaya; Sikkim. Elsewhere : Burma, China, Malay Peninsula.

7. *Mictis gallina* Dallas

1952. *Mictis gallina* Dallas, *List. Hem.*, 2 : 403.

1904. *Mictis gallina* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 345.

1919. *Mictis gallina* : Paiva, *Rec. Indian Mus.*, 16 : 356.

Material examined : 2 ex., Charilum, West Tripura Dist., 28.v.1995, A. K. Hazra coll.; 2 exs., Udaipur, South Tripura Dist., 28.ix.1977, N. Muraleedharan coll.; 1 ex., Bijpur, West Tripura Dist., 27.v.1992, B. N. Das coll.

Diagnosis : Body length 25-26 mm, breadth between pronotal angles 9-10 mm, pronotal lateral margins finely serrated; posterior femora of male very much incrassate and distally thickened, in female apically incrassate but less prominent than in male. Other characters as in key.

Distribution : India : Tripura (Districts—South Tripura, West Tripura).

Genus 5. *Anoplocnemis* Stål 1873

1873. *Anoplocnemis* Stål, *En. Hem.*, 3 : 47.

8. *Anoplocnemis phasiana* (Fabricius)

1781. *Lygaeus phasiana* Fabricius, *Spec. Ins.*, 2 : 361.

1871. *Mictis ferrifera* : Walker, *Cat. Het.*, 4 : 24.

1904. *Anoplocnemis phasiana* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 346.

Material examined : 2 exs., Bazarbari, South Tripura Dist., 6.x.1977, N. Muraleedharan coll.

Diagnosis : Body length 22-28 mm, breadth between pronotal angles 7-10 mm; posterior femora of male distinctly curved at the base and incrassate, inwardly broadly dentate near apex and outer margin serrated.

Distribution : India : Tripura (District—South Tripura); Assam; Karnataka; Kerala; Maharashtra; Meghalaya; Nagaland; Tamil Nadu. Elsewhere : Burma, Malay Peninsula, Sri Lanka.

Tribe GONOCERINI

Key to the genera of the tribe Gonocerini

1. Lateral angles of pronotum acutely upwardly produced; abdominal segmental angles not exteriorly acutely produced *Cletus*

Lateral angles of pronotum horizontally produced; abdominal segmental angles exteriorly acutely produced *Cletomorpha*

Genus 6. *Cletus* Stål 1859

1859. *Cletus* Stål, *Freg. Resa. Ins. Hem.*, : 236.

Key to the species of the genus *Cletus*

1. Adult insect may reach upto 12 mm in length with lateral angles prominently acutely produced and apices with black spines, one on each *punctiger*

Adult insect may reach upto 10 mm in length; pronotum with lateral angles otherwise 2

2. Breadth between the pronotal angles 3.5-4 mm; pronotal angles shortly but acutely produced, apices ending with sharp pointed fuscous spines; femora without castaneous spots *bipunctatus*

Breadth between the pronotal angles 4.5-5 mm; pronotal angles widely and acutely produced, apices ending with short thick castaneous spines; all femora covered with numerous castaneous spots *punctulatus*

9. *Cletus punctiger* (Dallas)

1852. *Gonocerus punctiger* Dallas, *List. Hem.*, 2 : 494.

1871. *Homocerus minax* : Walker, *Cat. Het.*, 4 : 99.

1904. *Cletus punctiger* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 393.

1919. *Cletus punctiger* : Paiva, *Rec. Indian Mus.*, 16 : 359.

Material examined : 2 exs., Baramura, South Tripura Dist., 21.v.1978, J. K. Jonathan coll.; 1

ex., Belonia, South Tripura Dist., 18.v.1978, J. K. Jonathan coll.; 3 exs., Bairagi Bazar, Agartala, West Tripura Dist., 22.xii.1988, R. C. Basu and party coll.; 1 ex., Manu, North Tripura Dist., 8.xii.1988, R. C. Basu and party coll.; 1 ex., Teliamura, West Tripura Dist., 21.v.1992, B. C. Das and party coll.; 2 exs., Ambassa, North Tripura Dist., 12.v.1992, B. Mitra and party coll.; 1 ex., Amarpur, South Tripura Dist., 15.v.1992, B. C. Das and party coll.

Diagnosis : Body length 11-12 mm, breadth between the pronotal angles 5-5.5 mm; sternum coarsely punctate with a small black spot on the lateral area on each side. Other characters as in key.

Distribution : India : Tripura (Districts—South Tripura, North Tripura, West Tripura); Meghalaya; West Bengal. Elsewhere : Burma, China.

10. *Cletus bipunctatus* (Westwood)

1842. *Coreus bipunctatus* Westwood, in *Hope Cat.*, 2 : 23.

1904. *Cletus bipunctatus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 393.

1919. *Cletus bipunctatus* : Paiva, *Rec. Indian Mus.*, 16 : 359.

Material examined : 3 exs., Kumarghat, North Tripura Dist., 27.ix.1969, V. C. Agrawal coll.; 8 exs., Ambassa, North Tripura Dist., 13.v.1992, B. Mitra and party coll.; 1 ex., Dharmanagar, North Tripura Dist., 12.xii.1988, R. C. Basu and party coll.; 1 ex., Kumarghat, North Tripura Dist., 2.xii.1988, R. C. Basu and party coll.; 1 ex., Pulinpur, West Tripura Dist., 10.xi.1992, B. Mitra and party coll.; 3 exs., Teliamura, West Tripura Dist., 21.v.1992, B. C. Das and party coll.; 8 exs., Kamalnagar, West Tripura Dist., 7.v.1992, B. N. Das and party coll.; 2 exs., Agartala, West Tripura Dist., 28.v.1992, B. C. Das and party coll.; 2 exs., Manu, North Tripura Dist., 23.ii.1989, A. K. Sanyal and party coll.; 2 exs., Manu, North Tripura Dist., 8.xii.1988, R. C. Basu and party coll.; 1 ex., Agartala, West Tripura Dist., 3.x.1994, M. S. Shisodia and party coll.

Diagnosis : Body length scarcely 10 mm, breadth between pronotal angles 3.5-4 mm. Other characters as in key.

Distribution : India : Tripura (Districts—North Tripura, West Tripura); Karnataka; Maharashtra; Meghalaya; West Bengal. Elsewhere : Burma.

11. *Cletus punctulatus* (Westwood)

1842. *Coreus punctulatus* Westwood, in *Hope Cat.*, 2 : 23.

1904. *Cletus punctulatus* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 392.

1919. *Cletus punctulatus* : Paiva, *Rec. Indian Mus.*, 16 : 358.

Material examined : 3 exs., Sonamura, South Tripura Dist., 6.v.1995, A. K. Hazra and party coll.; 3 exs., Belonia, South Tripura Dist., 13.v.1992, B. C. Das and party coll.; 1 ex., Kailasahar, North Tripura Dist., 8.xii.1988, R. C. Basu and party coll.; 4 exs., Dharmanagar, North Tripura Dist., 11.xii.1988, R. C. Basu and party coll.; 3 exs., Moharchapa, West Tripura Dist., 20.v.1992, B.C. Das and party coll.; 2 exs., Ambassa, North Tripura Dist., 13.v.1992, B. Mitra and party coll.; 1 ex., Agartala, West Tripura Dist., 28.v.1992, B.C. Das and party coll.

Diagnosis : Body length scarcely 10 mm; breadth between pronotal angles 4.5-5 mm. Other characters as in key.

Distribution : India : Tripura (Districts—South Tripura, North Tripura, West Tripura); Assam; Meghalaya; Nagaland; Sikkim; West Bengal.

Genus 7. *Cletomorpha* Mayr 1866

1866. *Cletomorpha* Mayr, *Reise Nov. Hem.* : 118.

12. *Cletomorpha raja* Distant

1901. *Cletomorpha raja* Distant, *Ann. Mag. nat. Hist.*, (7) 7 : 423.

1904. *Cletomorpha raja* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 397.

1919. *Cletomorpha raja* : Paiva, *Rec. Indian Mus.*, 16 : 359.

1977. *Cletomorpha raja* : Basu and Mitra, *Newsl. zool. Surv. India* 3 (5) : 274.

1994. *Cletomorpha raja* : Chakraborty *et al.*, *Rec. zool. Surv. India, Occ. Paper*, 161 : 15.

Material examined : 3 exs., Ambassa, North Tripura Dist., 17.vii.1977, M. S. Shisodia and party coll.; 1 ex., Udaipur, South Tripura Dist., 17.v.1992, B. C. Das and party coll.

Diagnosis : Body length 9 mm, breadth between pronotal angles 4 mm, antennae dark brown in colour; antennal first and second joints subequal in length; pronotum with lateral angles acutely produced and distinctly recurved on each.

Distribution : India : Tripura (Districts—South Tripura, North Tripura); Assam; Meghalaya; Sikkim; West Bengal. Elsewhere : Burma.

Tribe HOMOECERINI

Key to the genera of the tribe Homoeocerini

1. Posterior femora and tibiae not modified; pronotal angles moderately prominent.....
.....**Homoeacerus**
- Posterior femora and tibiae modified remarkably, and strongly incrassate; pronotal angles not prominent**Physomerus**

Genus 8. *Homoeacerus* Burmeister 1835

1835. *Homoeacerus* Burmeister, *Handb.*, 2 (1) : 316.

Key to the species of the genus *Homoeacerus*

1. Pronotal angles moderately prominent to form small process on each; antennal 3rd segment a little longer than 4th; corium with a pale small obscure discal spot placed near to the inner angle**biguttatus**
- Pronotal angles conspicuously prominent and each terminating with an acute spine like structure; antennal 3rd segment otherwise; corium spot otherwise.....2
2. Antennal 3rd segment shortest and considerably shorter than 4th; corium with no

pale spot but a subcostal black line
*striicornis*

Antennal 4th segment shortest and longer than
 3rd; corium with pale spot but no subcostal
 black line 3

3. Antennal 1st segment slightly longer than 3rd;
 corium with two small transverse spots placed
 at the inner angle*walkeri*

Antennal 1st and 2nd segments subequal in
 length; corium with a large transverse pale
 spot which laterally touches both inner and
 outer margins*inornatus*

13. *Homoeocerus biguttatus* Westwood

1842. *Homoeocerus biguttatus* Westwood, in *Hope Cat.*,
 2 : 22.

1904. *Homoeocerus biguttatus* : Distant, *Fauna Brit. India*,
Rhynchota, 1 : 360.

Material examined : 1 ex., Ananda Bazar,
 North Tripura Dist., 26.v.1992, S. K. Chakraborty
 and party coll.; 1 ex., Siphaijola, West Tripura
 Dist., 5.xi.1991, B. N. Das and party coll.; 2 exs.,
 Selama, North Tripura Dist., 26.vi.1992, B. C.
 Das and party coll.

Diagnosis : Body length 21 mm, breadth
 between pronotal angles 6 mm. Other characters
 as in key.

Distribution : India : Tripura (Districts—
 North Tripura, West Tripura); Sikkim.

14. *Homoeocerus striicornis* Scott

1874. *Homoeocerus striicornis* Scott, *Ann. Mag. nat. Hist.*,
 (4) 14 : 362.

1904. *Homoeocerus striicornis* : Distant, *Fauna Brit. India*,
Rhynchota, 1 : 360.

1994. *Homoeocerus striicornis* : Chakraborty *et. al.*, *Rec.*
zool. Surv. India, Occ. Paper, 161 : 16.

Material examined : 2 exs., Bazarbari, South
 Tripura Dist. 7.x.1977, N. Muraleedharan coll.

Diagnosis : Body length 17-20 mm, breadth
 between pronotal angles 4.5-5.5 mm. Other
 characters as in key.

Distribution : India : Tripura (District—
 South Tripura); Assam; Meghalaya; Sikkim.
 Elsewhere : Japan, Sri Lanka.

15. *Homoeocerus walkeri* Kirby

1891. *Homoeocerus walkeri* Kirby, *J. Linn. Soc. Zool.*, 24 :
 91.

1904. *Homoeocerus walkeri* : Distant, *Fauna Brit. India*,
Rhynchota, 1 : 358.

Material examined : 2 exs., Belonia, South
 Tripura Dist., 18.v.1978, J.K. Jonathan and party
 coll.; 1 ex., Manu, North Tripura Dist., 26.xi.1994,
 M. S. Shishodia and party coll.

Diagnosis : Body length 18-19 mm, breadth
 between pronotal angles 5.5-6 mm. Other
 diagnostic characters as in key.

Distribution : India : Tripura (Districts—
 South Tripura, North Tripura); Assam;
 Meghalaya; Nagaland; Sikkim. Elsewhere :
 Burma, Sri Lanka.

16. *Homoeocerus inornatus* Stål

1873. *Homoeocerus inornatus* Stål, *En. Hem.*, 3 : 58.

1904. *Homoeocerus inornatus* : Distant, *Fauna Brit. India*,
Rhynchota, 1 : 355.

Material examined : 2 exs., Sonamura, West
 Tripura Dist., 14.i.1989, R. S. Burman and party
 coll.; 2 exs., Agartala, West Tripura Dist.,
 28.v.1992, B. C. Das and party coll.

Diagnosis : Body length 13-16 mm, breadth
 between pronotal angles 4-4.5 mm. Other
 characters as in key.

Distribution : India : Tripura (District—West
 Tripura); Meghalaya; Pondicherry; Sikkim,
 Elsewhere : Burma, China.

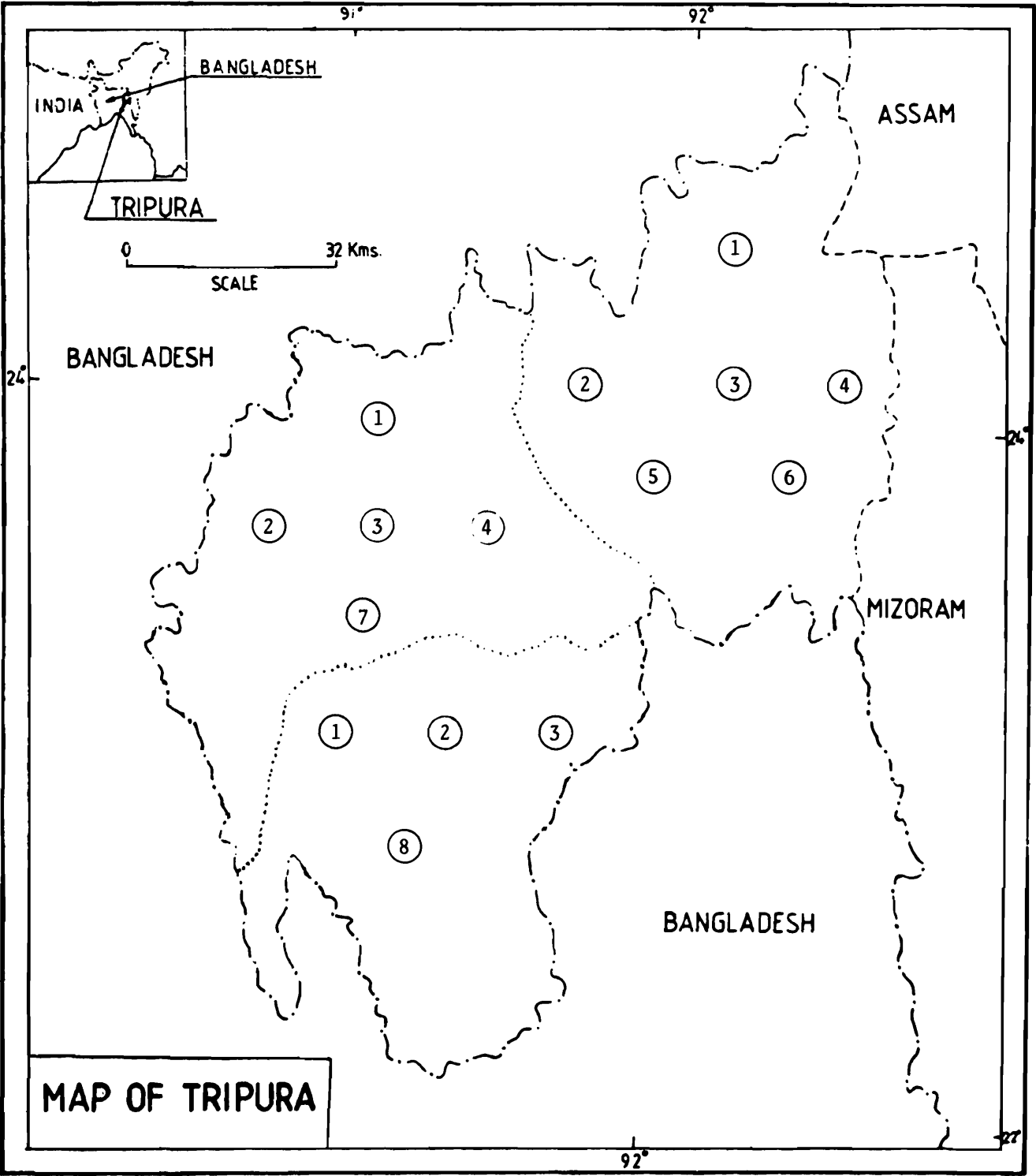
Genus 9. *Physomerus* Burmeister 1835

1835. *Physomerus* Burmeister, *Handb.*, 2 : 341.

17. *Physomerus grossipes* (Fabricius)

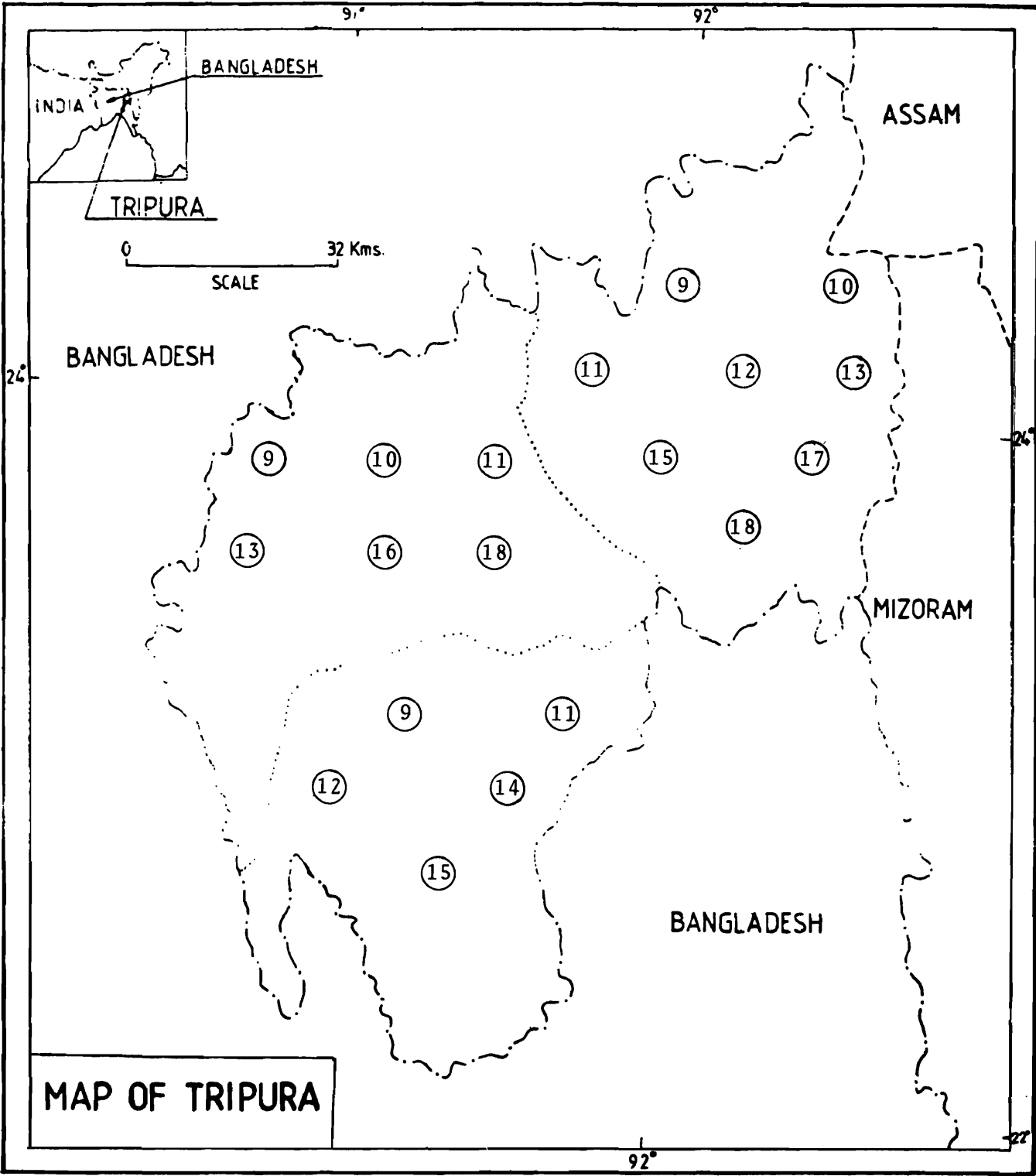
1794. *Lygaeus grossipes* Fabricius, *Ent. Syst.*, 4 : 135.

1871. *Physomerus dilineatus* : Walker, *Cat. Het.*, 4 : 59.



Map 1 : Distribution of Coreoid Bugs in Tripura

1. *Leptocorisa acuta* (Thunberg); 2. *Riptortus linearis* (Fabricius); 3. *Riptortus strenuus* Horvath; 4. *Riptortus pedestris* (Fabricius); 5. *Derepteryx hardwicki* White; 6. *Mictis tenebrosa* (Fabricius); 7. *Mictis gallina* Dallas; 8. *Anoplocnemis phasiana* (Fabricius).



Map 2 : Distribution of Coreoid Bugs in Tripura.

9. *Cletus punctiger* (Dallas); 10. *Cletus bipunctatus* (Westwood); 11. *Cletus punctulatus* (Westwood); 12. *Cletomorpha raja* Distant; 13. *Homoeckerus biguttatus* Westwood; 14. *Homoeckerus stricornis* Scott; 15. *Homoeckerus walkeri* Kirby; 16. *Homoeckerus inornatus* Stal; 17. *Physomerus grossipes* (Fabricius); 18. *Hydarella orientalis* (Distant).

1904. *Physomerus grossipes* : Distant, *Fauna Brit. India, Rhynchota*, 1 : 383.

Material examined : 1 ex., Unakuti, North Tripura Dist., 22.v.1992, B. Mitra and party coll.; 2 exs., Ambassa, North Tripura Dist., 13.v.1992, S. Chakraborty and party coll.; 2 exs. Nepal tilla, North Tripura Dist., 12.vi.1988, V.T. Darlong coll.

Diagnosis : Body length 20-24 mm, breadth between pronotal angles 5.5-6.5 mm; posterior tibiae strongly incrassate, finely longitudinally tuberculate on upper and outer areas and obtusely spinous beneath, each with a long spine at the middle of inner margin and finely serrated upto apex; rostrum reaching the intermediate coxae.

Distribution : India : Tripura (District—North Tripura) Assam; Andaman and Nicobar Islands; Maharashtra; Meghalaya; Sikkim; West Bengal. Elsewhere : Burma, Malay Archipelago, Sri Lanka.

Subfamily HYDARINAE

Genus 10. *Hydarella*

18. *Hydarella orientalis* (Distant)

1904. *Hydara orientalis* Distant, *Fauna Brit. India, Rhynchota*, 1 : 398.

1975. *Hydarella orientalis* : Ahmad and Shadab, *Pakistan J. Soc. Ins. Res.*, 18 (3-4) : 135.

Material examined : 1 ex., Kailasahar, North Tripura Dist., 29.v.1978, J. K. Jonathan and party coll.; 1 ex., Teliamura, West Tripura Dist., 21.v.1978, J. K. Jonathan and party coll.

Diagnosis : Body length 7 mm; thickly punctate, punctures very coarse on the corium, arranged in longitudinal series on clavus, very profound in a single longitudinal submarginal series to corium; pronotum with lateral angles spinous; abdomen more coarsely punctate laterally.

Distribution : India : Tripura (Districts—North Tripura, West Tripura); Meghalaya.

SUMMARY

The paper presents an account of 18 species under 10 genera distributed in two families, namely Coreidae and Alydidae under the Superfamily Coreoidea from the State of Tripura. As there was no previous faunistic-cum-taxonomic studies on Coreids from Tripura the present paper solicits all the species of Coreids are the new record from the State of Tripura. Diagnostic characters of each of the species studied alongwith the distribution in various districts of Tripura and other states of India as well as abroad have been included. Distribution of species has also been cited in the map of Tripura.

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INSECTA : HEMIPTERA : HETEROPTERA : PENTATOMOIDEA

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INTRODUCTION

The Pentatomids or "Shield bugs" are heteropteran insects which are terrestrial and phytophagous. Some are carnivorous in habit. These insects are mostly solitary in nature. However, a few species may be seen in clusters. They are generally pests of vegetable crops. A few families like Asopidae are chiefly predaceous on lepidopteran larvae. They can be recognised by a pungent odour emitted by them. They group is abundant in tropical regions and also spread over temperate zones. A perusal of literature reveals that a little over 550 species (against 5,000 spp. in the world) of Pentatomoidea are known from the Indian region. (Distant 1902, 1908, 1918; Datta *et al.* 1985, Chakraborty *et al.* 1993, 1994; Hedge 1995).

Our knowledge in the Pentatomid fauna of Tripura is poor. According to Distant (*op. cit.*) only two species (marked *) are apparently recorded from the state of Tripura. Pentatomid fauna of Tripura remained hitherto unexplored. However, Zoological Survey of India has undertaken a series of faunistic surveys in all the three districts of Tripura. During this project quite a large number of hemipterous specimens including Pentatomoidea have been brought by different survey parties.

The present work is an attempt to provide a comprehensive account the superfamily Pentatomoidea of Tripura.

The paper deals with 20 species in 15 genera belonging to 6 families. Of these, 18 species belonging to 14 genera are being reported for the first time from the state of Tripura.

The paper is based on the material collected during mopping surveys of Tripura. A classified list of species so far known from Tripura is appended. For each species is given the original reference and subsequent references, diagnostic characters, distributional records within the state and elsewhere, and also running keys for easy identification of various taxa are given.

The present study may be considered the first comprehensive systematic work from the state of Tripura since no previously published information on this group is known from the State.

The classification is basically followed after Distant (1903, 1908, 1918). The material is in the Zoological Survey of India, Calcutta.

CLASSIFIED LIST OF PENTATOMOIDEA OF TRIPURA

Order	HEMIPTERA
Sub Order	HETEROPTERA
Superfamily	PENTATOMOIDEA
Family I.	PENTATOMIDAE
Division I.	ANTESTIARIA
Genus 1.	<i>Plautia</i> Stål
1.	<i>Plautia fimbriata</i> (Fabricius)
Division II.	CARPOCORARIA
Genus 2.	<i>Dolycoris</i> Mulsant and Roy
2.	<i>Dolycoris indicus</i> Stål

- Division III. EURYDEMARIA 13 *Adrisa magna* (Uhler)
- Genus 3. *Agonoscelis* Spinola
3. *Agonoscelis nubila* (Fabricius)
- Genus 4. *Eurydema* Laporte
4. *Eurydema pulchrum* (West wood)
- Division IV EUSARCOCORIARIA
- Genus 5. *Eysarcoris* Hahn
5. *Eysarcoris guttiger* (Thunberg)
6. *Eysarcoris montivagus* (Distant).
7. *Eysarcoris ventralis* (Westwood)
- Division V. HALYARIA
- Genus 6. *Erthesina* Spinola
8. *Erthesina* sp.
- Devision VI. MENIDARIA
- Genus 7. *Menida* Motsch.
9. *Menida histrio* (Fabricius)
10. *Menida formosa* (Westwood)
- Division VII. NEZARIA
- Genus 8. *Nezara* Amyot & Serville
11. * *Nezara viridula* (Linnaeus)
- Family II. ASOPIDAE
- Genus 9. *Andrallus* Bergroth
12. *Andrallus spinidens* (Fabricius)
- Family III. CYDNIDAE
- Genus 10. *Adrisa* Amyot & Serville
- Family IV. DINIDORIDAE
- Genus 11. *Coridius* Illiger
14. *Coridius brunneus* (Thunberg)
- Genus 12. *Megymenum* Laporte
15. *Megymenum* sp.
- Family V. PLATASPIDAE
- Genus 13. *Brachyplatys* Boisd
16. *Brachyplatys subaeneus* (Westwood)
- Genus 14. *Coptosoma* Dallas
17. *Coptosoma cribrarium* (Fabricius)
18. *Coptosoma siamicum* Walker
- Family VI. SCUTELLERIDAE
- Genus 15. *Chrysocoris* Hahn
19. *Chrysocoris purpureus* (Fabricius)
20. **Chrysocoris stollii* (Wolff)

SYSTEMATIC ACCOUNT

Key to families of PENTATOMOIDEA

1. Head always clypeated; hemelytra longer than the body, folded in at the base of membrane PLATASPIDAE
– Head normal, hemelytra straight not folded in at the base of membrane 2
2. Hamus present; scutellum covering the whole of the hemelytra, excepting extreme base outer margin..... SCUTELLERIDAE
– Hamus absent..... 3
3. Scutellum large, nearly covering the whole of abdomen..... CYDNIDAE

- Scutellum extending to rarely beyond middle of abdomen; tarsi 3-segmented 4
- 4. Membrane very large DINIDORIDAE
- Membrane small 5
- 5. Basal segment of rostrum inserted at labrum ASOPIDAE
- Basal segment of rostrum not inserted at labrum PENTATOMIDAE

Family 1. PENTATOMIDAE

Key to Divisions :

- 1. Scutellum broad 2
- Scutellum triangular 3
- 2. Body obovate; scutellum always broad and short, lateral lobes of head never meet in front of central lobe *Eusarcocoriaria*
- 3. Abdomen armed at base 4
- Abdomen unarmed at base 5
- 4. Head normal and narrowed at apex *Nezaria*
- Head shorter and broader *Menidaria*
- 5. Lateral margins of pronotum perrate or dentate *Halyaria*
- Lateral margins of pronotum normal 6
- 6. Abdomen with a short basal furrow *Carpocoraria*
- 7. Body, obovate, head subtriangular *Antestiaria*
- Body elongate, head obvate *Eurydemaria*

Division 1. ANTESTIARIA

Genus 1. *Plautia* Stal, 1867

1867. *Plautia* Stal, *Ofv. SK. Forth.*, 514 Type-species : *Plautia fimbriata* (Fabricius)

1. *Plautia fimbriata* (Fabricius)

1987. *Cimex fimbriata* Fabricius, *Mant. Jos.*, II : 295.
 1904. *Plautia fimbriata* (Fabr.), Distant, *Fauna Brit. India Rhyn.*, I : 181.

1989. *Plautia fimbriata* (Fabr.) : Ghosh, L. K., Biswas, Chakraborty & Sen, *Fauna of Orissa : State Fauna Series No. 1* : 205.

1995. *Plautia fimbriata* (Fabricius), Hedge, V. *Rec. Zool. Surv. India Occ. Paper No. 166* : 28.

Material examined : 2 exs., North Tripura, Kaila Sahar, 30. V. 1978, *Coll. J. K. Jonathan*; 1 ex., North Tripura, Dharam nagar, 1. vi. 1978, *coll. J. K. Jonathan*; 1 ex., West Tripura, Agartala, 28. V. 91, *coll. B. C. Das party*.

Diagnostic characters : Bright pale olivaceous green; Corium purplish-red with greenish lateral margins; membrane fuliginous with two brown spots on base; abdomen above red.

Length : 10-11 mm.

Distribution : India : Tripura (Agartala, Dharam nagar, Kaila sahar) : Assam, Maharashtra, Meghalaya, Nagaland, Orissa, Sikkim, Tamil Nadu, West Bengal. *Elsewhere* : Burma, China, Japan, Malay Archipelago, Malay Peninsula, Sri Lanka.

Division II. CARPOCORARIA

Genus 2. *Dolycoris* Mulsant & Rey, 1866

1866. *Dolycoris* Mulsant & Rey, *Pun. France Pent.* : 238.
 Type-species : *Dolycoris baccarum* (Linnaeus).

2. *Dolycoris indicus* Stal

1876. *Dolycoris indicus* Stal, *Ent. Hem.* 5 : 76.
 1977. *Dolycoris indicus* Stal, Datta and Chakraborty, *Newsl. Zool. Surv. India*, 3 (4) : 212.

Dolycoris indicus Stal, Chakraborty, S. P. and Ghosh, L. K. *State Fauna Series, Fauna of Meghalaya* (in Press).

Material examined : 1 ex., South Tripura, Belonia, 18.iv.78; *Coll. J. K. Jonathan*; 2 exs., North Tripura, Dharam nagar 1. vi. 78, *Coll. J. K. Jonathan*.

Diagnostic characters : Brownish ochraceous, sparsely punctate; body beneath and legs luteous with small black spots near coxae; connexivum spotted with black at the incisures; membrane greyish.

Length : 9.5 mm.

Distribution : India : Tripura (Belonia, Dharam nagar), Maharashtra, Meghalaya, Nagaland, South India, West Bengal.

Division III. EURYDOMARIA

Key to genera

1. Body elongately ovate, remotely pilose
..... **Agonoscelis**
- Body not as above, not pilose 2
2. Body ovate, eyes sessile **Eurydema**

Genus 3. *Agonoscelis* Spinola, 1837

1837. *Agonoscelis* Spinola, *Ess.* : 327. *State Fauna Series*.

Type species : *Cimex nubila* Fabricius.

3. *Agonoscelis nubila* (Fabricius)

1775. *Cimex nubila* Fabricius, *Syst. Ent.* : 712.

1857. *Agonoscelis nubila*, Dallas, *List. Hem.* 1 : 179.

1986. *Agonoscelis nubila* Hegde, *East Ghats Ins.*, 1 : 27.

Agonoscelis nubila (Fabricius) : Chakraborty, S. P. and Ghosh, L. K. *State Fauna Series, Fauna of Meghalaya* (in press).

Material examined : 8 exs., North Tripura, Pacharthal, 20. v. 1992, *Coll. S. K. Chakraborty & party*; 2 exs., North Tripura, Panisagar, 12.xii.88, *Coll. R. C. Basu & party*; 2 exs., North Tripura, Dharam nagar, 1.vi. 1978. *Coll. J. K. Jonathan*; 5 exs., North Tripura, Unakali, *Coll. B. Mitra & party*; 3 exs., South Tripura, Belonia, 12.xi.91, *coll. B. N. Das & party*; 9 exs., South Tripura, Santi bazar, 11.vi. 1990, *Coll. G. N. Saha & party*.

Diagnostic characters : Body yellow-brown, covered with black punctures; an irregular central fascia to pronotum, apex of scutellum levigate; body beneath and legs luteous; membrane fuliginous with veins piceous.

Length : 10-11 mm.

Distribution : India : Tripura (Pacharthal, Panisagar, Dharam nagar, Belonia, Unakali, Santi bazar); Bihar, Jammu & Kashmir, Karnataka,

Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Tamil Nadu, West Bengal. *Elsewhere* : Burma, China, Japan, Malayan Archipelago, Malay Peninsula and Sri Lanka.

Genus 4. *Eurydema* Laporti, 1832

1832. *Eurydema* Laporti, *Ess. Hem.* 61.

Type species : *Eurydema oleraceum* (Linnaeus).

4. *Eurydema pulchrum* (Westwood)

1837. *Pentatoma pulchrum* Westwood, *Hope Cat.*, 1 : 34.

1904. *Eurydema pulchrum* (Westwood), Distant, *Fauna Brit. India, Rhyn.* 1 : 190-191.

Eurydema pulchrum (Westwood), Chakraborty and Ghosh, *State Fauna Series, Fauna of Meghalaya* (in press).

Material examined : 1 ex., North Tripura, Dharm nagar, 1. vi. 1978, *Coll. J. K. Jonathan*.

Distribution : India : Tripura (Dharam nagar) Assam, Meghalaya, Nagaland.

Elsewhere : Burma, China, Sumatra and Queensland.

Division IV. EUSARCOCORIARIA

Genus 5. *Eysarcoris* Hahn, 1834

1834. *Eysarcoris* Hahn. *Wanz.*, 11 : 66.

Type species : *Eysarcoris aepeus* (Scopoli).

Key to the species of *Eysarcoris*

1. Whole of abdominal ventral disc black 2
- Whole abdominal ventral disc not black but with a central angulate fascia being black; apical joint of antennae brownish yellow; lateral angles of pronotum acutely prominent **montivagus**
2. Anterior area of pronotum normal without any spot; apical joint of antennae shining black; lateral angles of pronotum obtusely prominent **guttiger**
- Anterior area of pronotum with two large brassy-black spots, pronotal angles simple ...
..... **ventralis**

5. *Eysarcoris guttiger* (Thunberg)

1783. *Cimex guttiger* Thunberg, *Nov. Ins. Sp.* 2: 32.

1857. *Eysarcoris guttiger* (Thunberg), Dallas, *List. Hem.*, 1: 288.

Eysarcoris guttiger (Thunb.): Chakraborty and Ghosh, *State Fauna Series, Fauna of Meghalaya* (in press).

Material examined : 1 ex., North Tripura, Kumarghat, 18.vi. 1992, *Coll. B. Mitra & party*; 1 ex., West Tripura, Mongiaban, 24. V. 1990, *Coll. G. N. Saha & party*.

Distribution : India : Tripura (Kumarghat, Mongiaban); Maharashtra Meghalaya, Nagaland, Orissa, Sikkim, South, India, West Bengal. **Elsewhere :** Sri Lanka.

6. *Eysarcoris montivagus* (Distant)

1904. *Eysarcoris montivagus* (Distant), *Fauna Brit. India Rhyn.* 1: 166.

1989. *Eysarcoris montivagus* (Distant), Ghosh, Biswas, Chakraborty and Sen, *Fauna of Orissa : State Fauna Series No. 1* : 204.

Material examined : 2 exs., North Tripura, Ambassa, 25.v. 1978, *Coll. J. K. Jonathan*; 2 exs., West Tripura, Teliamura, 20.v.78, *Coll. J. K. Jonathan*.

Distribution : India : Tripura (Ambassa, Teliamura); Assam, Meghalaya, Nagaland, Orissa, West Bengal.

7. *Eysarcoris ventralis* (Westwood)

1904. *Eysarcoris ventralis* (Westwood), Distant, *Faun. Brit. India Rhyn.*, 1: 167.

Eysarcoris ventralis (Westwood), Chakraborty and Ghosh, *State Fauna Series, Fauna of Meghalaya* (in press).

Material examined : 1 ex., West Tripura, Mongiaban, 24.v.90. *Coll. G. N. Saha & party*; 1 ex., South Tripura, Garjee, 13. v. 78, *Coll. J. K. Jonathan*; 1 ex., West Tripura, Agartala, 15. vii. 1984, *Coll. R. S. Barman & party*.

Distribution : India : Tripura (Agartala, Garjee, Mongiaban) Arunachal Pradesh, Bihar, Karnataka, Maharashtra, Meghalaya, West Bengal.

Elsewhere : Burma, Malay Peninsula.

Division V. HALYARIA**Genus 6. *Erthesina* Spinola, 1837**

1837. *Erthesina* Spinola, *Ess.* : 291.

Type species : *Erthesina fullo* (Thunberg)

8. *Erthesina* sp.

Material examined : 1 ex., West Tripura, Khowai, 4. iii. 1991, *Coll. G. K. Srivastava & party* : 1 ex., North Tripura, Kaila Sahar, 30.v.1978, *Coll. J. K. Jonathan*.

Division VI. MENIDARIA**Genus 7. *Menida* Motschulsky 1861**

1861. *Menida* Motsch. *Et. Ent.*, 10 : 23.

Type species : *Menida violacea* Motschulsky

Key to species

1. 4 longitudinal lines to head black; ventral spine reaching the intermediate coxae; apex of scutellum normal ***histrio***
- Head with 3 longitudinal ochraceous lines; ventral spine passing intermediate coxae; scutellum with a large anchor-shaped spot ...
..... ***formosa***

9. *Menida histrio* (Fabricius)

1787. *Cimex histrio* Fabricius, *Mant. Ins.*, 11 : 296.

1904. *Menida histrio* (Fabricius), Distant, *Fauna Brit. India Rhyn.*, 1 : 228.

1986. *Menida histrio* Hedge, *Rec. Zool. Surv. India Occ. Paper No. 168* : 32.

Material examined : 1 ex., North Tripura, Kaila sahar, 29.v.78, *coll. J. K. Jonathan*; 1 ex., North Tripura, Dharam nagar, 1.vi. 78. *coll. J. K. Jonathan*; 2 exs., North Tripura, Ambassa, 25. v. 78. *coll. J. K. Jonathan*; 1 ex., North, Tripura, Kumarghat, 17.vi.92, *coll. S. K. Chakraborty & party*; South Tripura, Belonia, 13.x.92 *Coll. B. C. Das & party*.

Distribution : India : Tripura (Ambassa, Belonia, Dharam nagar, Kaila sahar, Kumarghat); Maharashtra, Tamil Nadu West Bengal

Elsewhere : Burma, China Formosa, Sri Lanka.

10. *Menida formosa* (Westwood)

1837. *Pentatoma formosa* Westwood, *Hope Cat.*, 1 : 34.

1904. *Menida formosa* (Westwood) Distant, *Fauna Brit. India, Rhyn.*, 1 : 226-227.

Material examined : 1 ex., North Tripura, Teliamura, 20.v.1978, *Coll. J. K. Jonathan*.

Distribution : India : Tripura (Teliamura); Maharashtra; Sikkim.

Elsewhere : Burma, Malayan Archipelago, Malay Peninsula.

Division VII. NEZARIA

Genus 8. *Nezara* Amyot & Serville, 1843

1843.. *Nezara* Amyot & Serville, *Hem.* : 143.

Type species : *Nezara viridula* (Linnaeus)

11. *Nezara viridula* (Linnaeus)

1758. *Cimex viridula* Linnaeus, *Oyst I Nat. ed.* 10 : 444

1985. *Nezara Vyiridula* (Linn.), Datta, Ghosh & Dhar, *Rec. zool. Surv. India Occ. Paper No. V* : 14.

1986. *Nezara viridula*, Hedge, *East Ghat Ins.*, 1 : 28.

Material examined : 6 exs., North Tripura, Kaila sahar, 29.v.78 and 30. v. 78, *coll.* J. K. Jonathan; 2 exs., North Tripura, Dharamnagar, 1. vi. 78. *coll.* J. K. Jonathan; 1 ex., North Tripura, Dharamnagar 24.v.92, *coll.* S. K. Chakraborty & party : 1 ex., West Tripura, Teliamura, 21.v.92, *Coll. B. C. Das & party*; 1 ex., West Tripura, Simug, 6. vi. 90, *coll.* G. N. Saha & party.

Diagnostic characters : Above dark green or greenish ochraceous; antennae green with apices of 3rd, 4th and 5th segments purplish brown; extremity of segmental angles to abdomen black. In some variety head (excluding base) and anterior area and lateral margins of pronotum pale luteous. In others there are two spots at base of head, 3

spots on anterior area of pronotum, 3 basal and apical spots to scutellum and a discal spot on corium.

Length : 12-16 mm.

Distribution : It is widely distributed species and common to all regions in India.

Elsewhere : Distributed throughout the palaearctic, Nearctic and Ethiopian Regions and over a large portion of the Neotropical, Oriental and Australasian regions.

Family : ASOPIDAE

Genus 9. *Andrallus* Bergroth, 1906

1906. *Andrallus* Bergroth, *Ann. Soc. Ent. Belg.*, 49 : 370

Type species : *Andrallus spinidens* (Fabricius)

12. *Andrallus spinidens* (Fabricius)

1787. *Cimex spinidens* Fabricius, *Ment. Inst.*, 11 : 285.

1906. *Andrallus spinidens* Bergroth, *Ann. Soc. ent. Belg.*, 49 : 370.

1995. *Andrallus spinidens*, Hedge, *Rec. zool. Surv. India Occ. Paper No. 168* : 34

Material examined : 1 ex., North Tripura, Teliamura, 3.xii. 88, *coll.* R.C. Basu & party.

Diagnostic characters : Pale brownish ochraceous; head with a blackish punctate fascia on each side of central lobe; scutellum with the apex and a central apical line luteous, lateral margins of corium broadly luteous.

Length : 13-16 mm.

Distribution : India : Tripura (Teliamura); Assam, Bihar, Maharashtra, Meghalaya, Tamil Nadu. **Elsewhere** : Abissinia, Africa, Bangladesh, Fiji, Malay Archipelago, Mexico, Tahiti and Virtually widely distributed.

Family III. CYDNIDAE

Genus 10. *Adrisa* Amyot & Serville, 1843

1843. *Adrisa* Amyot & Serville, *Hem.* : 89.

Type species : *Adrisa nigra* Amyot & Serville

13. *Adrisa magna* (Uhler)

1860. *Acatalectus magna* Uhler, *Proc. Ac. N. S. Phil.* 222.

1904. *Adrisa magna* (Uhler), Distant, *Fauna Brit. India, Rhyn.* : 1 : 89.

Material examined : 1 ex., North Tripura, Kumarghat, 18.v.92. coll. S. K. Chakraborty & party.

Diagnostic characters : Shining black, head rounded in front; pronotum subquadrate with rounded anterior angles, anterior area impunctate; scutellum rugosely punctate with a more or less distinct central carinate line; membrane fuliginous.

Length : 13-19 mm.

Distribution : India : Tripura (Kumarghat); Nagaland. *Elsewhere* : Burma, Hong Kong.

Family IV. DINIDORIDAE

Key to genera

1. Lateral lobes of head a little longer than central lobe; abdominal margins normal; antennae 5-segmented ***Coridius***
 - Lateral lobes of head much longer than central lobe; abdominal margins lobately dentate; antennae 4-segmented ***Megymenum***

Genus 11. *Coridius* Illiger, 1807

1807. *Coridius* Illiger, *Faung. Etrusca* (2) 2 : 361.

Type species : *Cimex janus* Fabricius

14. *Coridius brunnaeus* (Thunberg)

1783. *Cimex brunneus* Thunberg, *Nov. Ins. Sp.*, 11 : 45.

1987. *Coridius brunneus*, Durai, *Oriental Ins.*, 21 : 195-196.

1987. *Coridius obscurus*, Durai, *Oriental Ins.*, 21 : 195-196.

Coridius brunneus, Chakraborty, S. P. and Ghosh, L. K. *State Fauna Series, Fauna of Meghalaya* (in press).

Material examined : 1 ex., North Tripura, Ambassa, 2.ii.91, coll. G. K. Srivastava & party;

1 ex., North Tripura, Ambassa, 25. v. 78, coll. J. K. Jonathan; 1 ex., South Tripura, Garjee, 13. v. 78, coll. J. K. Jonathan.

Diagnostic characters : Brownish ochraceous, body beneath and legs infuscated; apical antennal segment luteous; abdomen above red or black.

Length : 17-20 mm.

Distribution : India : Tripura (Ambassa, Garjee); Assam, Bihar, Maharashtra, Meghalaya, Nagaland, West Bengal. *Elsewhere* : Burma, Indonesia, Malaysia, Malay Archipelago.

Genus 12. *Megymenum* Laporte 1832

1832. *Megymenum* Laporte, *Ess. Hem.* : 52.

Type species : *Megymenum dentatum* Boisd.

15. *Megymenum* sp.

Material examined : 1 ex., North Tripura, Ambassa, 25.v.1978, coll. J. K. Jonathan.

Family V. PLATASPIDAE

Key to genera

1. Head is nearly as broad as anterior angles of pronotum; antennae remote from the eyes. pronotum normal ***Brachyplatys***
 - Head is distinctly narrower than anterior angles of pronotum, antennae inserted at the base; pronotum amplified ***Coptosoma***

Genus 13. *Brachyplatys* Boised, 1835

1835. *Brachyplatys* Boised, *Voy. Astr. Ent.*, 11 : 627.

Type species : *Brachyplatys vanikorensis* Boisd

16. *Brachyplatys subaeneus* (Westwood)

1837. *Plataspis subaeneus* Westwood, *Hope Cat. Hem.*, 1 : 17.

1904. *Brachyplatys subaeneus* (Westwood), Distant, *Fauna Brit. India, Rhyn.*, 1 : 11.

Material examined : 1 ex., West Tripura, Simug, 6. vi.90, coll. G.N. Saha & party.

Diagnostic Characters : Black shining; head and sternum beneath opaque black excepting central area of head ochraceous; legs, lateral margins of abdomen and very short and conical ray-like fasciae to the lateral margins of the abdomen beneath ochraceous; antennae piceous with their bases brownish-yellow.

Length : 6-7 mm.

Distribution : India : Tripura (Simug); Andaman Islands, Karnataka, Maharashtra, Sikkim, Sri Lanka, West Bengal. *Elsewhere :* Burma, Cambodia, China, Formosa, Malay Archipelago.

Genus 14. *Coptosoma* Dallas, 1851

1851. *Coptosoma dallas*, *List Hem.*, 1 : 61

Type species : *Coptosoma globosus* (Fabricius)

Key to the species of Coptosoma

1. Ochraceous or greenish yellow; basal callosity of scutellum normal; abdomen with long ray-like marginal spots; apiceous spot behind each eye ***cribrarium***
 –Shining black; a spot on basal callosity, and a spot near each basal angle of scutellum; abdominal margins and eye normal ***siamicum***

17. *Coptosoma cribrarium* (Fabricius)

1798. *Cimex cribrarium* Fabricius, *Ent. Syst. Suppl.* : 531.

1904. *Coptosoma cribrarium* (Fabricius), Distant, *Fauna Brit. India, Rhyn.*, 1 : 22-23.

1995. *Coptosoma cribrarium*; Hedge, *Rec. zool. Surv. India Occ. Paper No. 168* : 14.

Material examined : 3 exs., North Tripura, Dharamnagar, 1. vi. 78, coll. J. K. Jonathan.

Distribution : India : Tripura (Dharam nagar) Maharashtra, Nagaland, Punjab, Tamil Nadu, West Bengal. *Elsewhere :* Burma, China and Formosa.

18. *Coptosoma siamicum* Walker

1867. *Coptosoma siamicum* Walker, *Cat. Het.*, 1 : 89.

1904. *Coptosoma siamicum* Walker; Distant, *Fauna Brit. India, Rhyn.*, 1 : 30-31.

Material examined : 1 ex., North Tripura, Dharamnagar, 1.vi.78, coll. J. K. Jonathan.

Distribution : India : Tripura (Dharamnagar) Madhya Pradesh, West Bengal. *Elsewhere :* Burma, Malayan Archipelago, North Australia, Sri Lanka.

Family VI. SCUTELLERIDAE

Genus 16. *Chrysocoris* Hahn. 1834

1834. *Chrysocoris* Hahn. *Wanz. Ins.*, 11 : 38.

Type species : *Chrysocoris dilaticollis* (Guerin).

Key to species of Chrysocoris

1. Larger in size; length 15-17 mm. 5 spots on pronotum ***purpureus***
 – Smaller in size; length 13-14.5 mm. 8 spots on pronotum ***stollii***

19. *Chrysocoris purpureus* (Westwood)

1837. *Callidea purpureus* Westwood, *Hope cat.*, 1 : 15

1904. *Chrysocoris purpureus* (Westwood), Distant, *Fauna Brit. India, Rhyn.* 1 : 58.

1986. *Chrysocoris purpureus*, Hedge, *East Ghat Ins.* 1 : 24.

Material examined : 1 ex., West Tripura, Udaipur, 14. v. 78, coll. J. K. Jonathan; 1 ex., North Tripura, Puchahal, 2.xii.88, coll. R. C. Basu & party; 1 ex., North Tripura, Ambassa, 5.xii. 88, coll. R. C. Basu & party.

Distribution : India : Tripura, Ambassa, Puschahal, Udaipur; Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu.

20. *Chrysocoris stollii* (Wolff)

1801. *Cimex stollii* wolff, *IC.* 11 : 48.

1904. *Chrysocoris stollii*, Distant, *Fauna Brit. India, Rhyn.* 1 : 58.

Chrysocoris stollii, Chakraborty, S. P. and Ghosh, L. K. *State Fauna Series, Fauna of Meghalaya* (in press).

Material examined : 2 exs., West Tripura, Udaipur, 14.v.78, coll. J. K. Jonathan; 2 exs., North Tripura, Kaila sahar, 30.v.78, coll. J. K. Jonathan; 2 exs., West Tripura, Simug, 6. vi. 90,

coll. G. N. Saha & party; 3 exs., South Tripura, Santibazar, 2.vi.90, coll. G. N. Saha & party; 2 exs., North Tripura, Ambassa, 5. xii. 88. coll. R. C. Basu & party.

Distribution : India : Tripura (Ambassa, Kailasahar, Santi bazar Simug, Udaipur);

Remark : This species is found throughout the country.

SUMMARY

The paper incorporates the account of 20 species in 15 genera distributed over six families of Pentatomoidea. 18 species amongst a total of 20 species examined constitute the new records for the state of Tripura.

Besides, keys to taxa, general diagnosis of each species, geographical distribution of the species both in India and abroad, references to the original literature have also been provided.

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INSECTA : HEMIPTERA : WATER-BUGS

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INTRODUCTION

The present paper on the water-bugs of Tripura, is aimed to bring out a faunistic-cum-taxonomic study of the group concerned from the state. The work consists of a taxonomic treatment of nine families of water-bugs of the Order-Hemiptera, of which six families are aquatic, belonging to the Series-Hydrocorisae, namely Ochteridae, Corixidae, Nepidae, Belostomatidae, Pleidae and Notonectidae while other three families are surface dwelling semi-aquatic bugs belonging to the Series-Amphibicorisae, namely Mesoveliidae, Gerridae and Veliidae (Classification is based upon Richards and Davies, 1977).

The material studied is based upon the collections made by various survey parties of the Zoological Survey of India and other named and unnamed collections housed in the National Zoological Collection. The present study may be considered as the first comprehensive systematic work from the State of Tripura since no previously published account on water-bugs is known from the state. Distant (1902, 1906, 1910) had not recorded any species of water-bugs from Tripura in his Fauna of British India, Rhynchota volumes.

The present work precisely includes the keys for different taxa and diagnostic characters for each species. Distributional pattern of each species in the map of Tripura as well as their distribution in other states, and world are also appended.

Approximately 230 species of water-bugs have been recorded, so far, from India. The present paper has recorded 20 species under 15 genera of

water-bugs, belonging to nine families, from the State of Tripura. All the species are being recorded for the first time from the state. The studied materials are present in the National Zoological Collection, Calcutta.

MATERIAL AND METHOD

The water-bugs of the Order-Hemiptera, are mainly of two major categories according to the nature of habitat, aquatic and semiaquatic. The aquatic bugs live beneath the water and the Tripura samples comprise families (except Ochteridae which are shore dwelling) like Corixidae, Nepidae, Belostomatidae, Pleidae and Notonectidae. The semiaquatic bugs dwell on the surface of water and the studied samples are of three families, namely Mesoveliidae, Gerridae and Veliidae. The water-nets, made up of close meshed Nylon threads, have been used to collect the water-bugs from the water-pools and streams. The collected materials, in the field, are preserved in the 70% Ethyl alcohol or Rectified spirit. In the Laboratory, the specimens have been studied under the Stereoscopic Binocular Microscope. After setting and pinning in the Laboratory the studied materials are kept in dry Insect Cabinet with proper labels, where Naphthalene powder and Carbolic acid are used as preservative and antifungal chemicals respectively. A number of water-bug specimens are kept as wet collection in 70% Ethyl alcohol or Rectified Spirit with proper labels after changing the alcohol in the Laboratory.

SYSTEMATIC ACCOUNT

Following is the Systematic list of all the species contained in the present paper.

SERIES HYDROCORISAE

Family I. OCHTERIDAE

Genus 1. *Ochterus* Latreille 1807

1. *Ochterus marginatus* (Latreille)

Family II. CORIXIDAE

Genus 2. *Micronecta* Kirkaldy 1897

2. *Micronecta* (*Dichaetonecta*) *haliploides* Horvath

Family III. NEPIDAE

Genus 3. *Ranatra* Fabricius 1790

3. *Ranatra varipes* Stål

Genus 4. *Laccotrephes* Stål 1865

4. *Laccotrephes ruber* (Linnaeus)

5. *Laccotrephes griseus* (Guerin)

Family IV. BELOSTOMATIDAE

Genus 5. *Sphaerodema* Laporte 1832

6. *Sphaerodema rusticum* (Fabricius)

7. *Sphaerodema molestum* (Dufour)

Genus 6. *Lethocerus* Mayr 1853

8. *Lethocerus indicus* (Lepeletier and Serville)

Family V. PLEIDAE

Genus 7. *Plea* Leach 1817

9. *Plea liturata* (Fieber)

Family VI. NOTONECTIDAE

Genus 8. *Anisops* Spinola 1837

10. *Anisops batillifrons* Lundblad

11. *Anisops breddini* Kirkaldy

Genus 9. *Nychia* Stål 1859

12. *Nychia marshalli* (Scott)

SERIES AMPHIBICORISAE

Family VII. MESOVELIIDAE

Genus 10. *Mesovelgia* Mulsant and Rey, 1852

13. *Mesovelgia vittigera* Horvath

Family VIII. GERRIDAE

Subfamily RHAGADOTARSINAE

Genus 11. *Rhagadotarsus* Breddin 1905

14. *Rhagadotarsus kraepelini* Breddin

Subfamily EOTRECHINAE

Genus 12. *Onychotrechus* Kirkaldy 1903

15. *Onychotrechus sakuntala* (Kirkaldy)

Subfamily GERRINAE

Genus 13. *Limnogonus* Stål 1868

16. *Limnogonus nitidus* (Mayr)

17. *Limnogonus parvulus* (Stål)

Family IX. VELIIDAE

Subfamily RHAGOVELIINAE

Genus 14. *Rhagovelia* Mayr 1865

18. *Rhagovelia nigricans* (Burmeister)

Subfamily MICROVELIINAE

Genus 15. *Microvelia* Westwood 1834

19. *Microvelia diluta* Distant

20. *Microvelia albomaculata* Distant

Key to the families dealt in the paper

1. Antennae shorter than head, usually hidden in cavities beneath eyes and not visible from above (except Ochteridae). [Aquatic and shore bugs] Series-HYDROCORISAE 2
- Antennae longer than head, inserted in front of eyes and clearly visible from above [Semiaquatic bugs] Series-AMPHIBICORISAE 7
2. Ocelli present; middle and hind legs without fringe of swimming hairs; front legs similar to middle legs OCHTERIDAE

- Ocelli absent; middle and hind legs provided with more or less extensive fringe of long swimming hairs; front legs different than the middle legs 3
- 3. Rostrum very short and broad with no distinct segmentation; front tarsi spatulate and developed into comblike palae; base of head overlapping the anterior margin of pronotum CORIXIDAE
- Rostrum cylindrical or cone shaped with distinctly 3-4 segmented; front tarsi normal and not modified into palae; base of head inserted into pronotum 4
- 4. Abdomen with a pair of long, slender non-retractile posterior appendages; hind coxae short, free and rotatory NEPIDAE
- Abdomen without paired long, slender posterior appendages or may have a pair of retractile small appendages hind coxae broadly jointed to the thoracic pleura 5
- 5. Body elongated; head spherical; adult scarcely upto 17 mm in length; hind legs may either be fringed with long swimming hairs or not fringed with haris; abdomen with no posterior appendages 6
- Body dorso-ventrally flattened and elongately suboval in shape; head more or less triangular in shape; adults large, 13-82 mm in length (Indian forms); hind legs with long swimming hairs and paired claws; abdomen with a pair of short, flat, retractile posterior appendages BELOSTOMATIDAE
- 6. Adult minute, less than 3 mm in length; rostrum 3-segmented; hind legs normal and not fringed with haris; abdominal venter not narrowly keeled but rather elevated into variously formed carinae at the middle of each segment and not provided with long haris; pronotum and hemelytra coarsely punctured PLEIDAE
- Adult moderate in size, varies from 6-17 mm; rostrum 4-segmented; hind legs very long and fringed with long swimming haris; abdominal venter with median longitudinal narrow keel

provided with long hairs; pronotum and hemelytra not punctured
.....NOTONECTIDAE

- 7. Coxae not contiguous, sometimes widely separated from each other; scutellum covered, not visible in winged forms and absent in wingless forms; claws of atleast front tarsi inserted before apex 8
- Coxae contiguous or nearly so; scutellum double, not covered and visible from above in winged forms, absent in wingless forms; claws of all inserted at tips of tarsi MESOVELIIDAE
- 8. Rostrum 4-segmented; middle and hind legs elongated; hind femora very long greatly exceeding the apex of abdomen; adult with median metasternal scent gland opening GERRIDAE
- Rostrum 3-segmented; middle and hind legs not elongated; hind femora scarcely, if at all, surpassing the tip of abdomen; adult with lateral metathoracic scent gland opening VELIIDAE

SERIES HYDROCORISAE

Family I. OCHTERIDAE

Genus 1. *Ochterus* Latreille 1807

1807. *Ochterus* Latreille, *Ges. Crust. Ins.*, 3 : 142.

1. *Ochterus marginatus* (Latreille)

1804. *Acanthia marginatus* Latreille, *Hist. Ins.*, 12 : 242.

1807. *Ochterus marginatus* Latreille, *Ges. Crust. Ins.*, 3 : 143.

1906. *Pelogonus marginatus* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 14.

1992. *Ochterus marginatus* : Bal and Basu, *Proc. zool. Soc. Calcutta*, 45 (Suppl. A) : 325.

Material examined : 1 ex., Belonia, South Tripura Dist., 18.iv.1978, J.K. Jonathan and party coll.

Diagnosis : Adult insects may attain a length of 4-6 mm; body moderately depressed; antennae short and 4-segmented, inserted beneath the eyes; pronotum transverse and hexangular, lateral

margin laminately ampliate and moderately rounded; yellowish spots to the margins of the abdomen; hemelytra totally covering the abdomen.

Distribution : India : Tripura (District—South Tripura), Bihar, Orissa, Maharashtra, Meghalaya, Uttar Pradesh, West Bengal.

Elsewhere : Burma, Nepal, Sri Lanka.

Family II. CORIXIDAE

Genus 2. *Micronecta* Kirkaldy 1897

1897. *Micronecta* Kirkaldy, *Entomologist*, 30 : 260.

2. *Micronecta (Dichaetonecta) haliploides* Horvath

1904. *Micronecta haliploides* Horvath, *Ann. Hist. nat. Mus. Hung. Budapest*, 2 : 594.

1905. *Micronecta inflatula* : Breddin, *Soc. Ent. Zurich*, 20 : 57.

1910. *Micronecta merope* : Distant, *Fauna Brit. India, Rhynchota* 5 : 351.

1934. *Micronecta haliploides* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 104.

1940. *Micronecta (Dichaetonecta) haliploides* : Hutchinson, *Trans. Conn. Acad. Arts Sci.*, 33 : 377.

Material examined : 1 ex., Ambassa, North Tripura Dist., 5.xii.1988, R. C. Basu and party coll.

Diagnosis : Adult insects may attain a length of about 3 mm.; pronotum transverse and narrow, lateral margins very short, elytra pale with punctiform black spots and lateral margins moderately convexly rounded.

Distribution : India : Tripura (District—North Tripura); Meghalaya; West Bengal.

Elsewhere : Bangladesh, Java.

Family III. NEPIDAE

Key to the genera of the family NEPIDAE of Tripura

1. Body slender, subcylindrical; pronotum slender and much longer than broad; hind coxae very

close; anterior femora a little incrassate without any groove beneath; anterior femora provided with one or two pairs of sharp teeth; anterior coxae very long ***Ranatra***

— Body elongately suboval and flattened; pronotum about as long as or little shorter than broad; hind coxae widely separated; anterior femora incrassate and longitudinally grooved beneath to hold the tibiae; anterior femora not provided with sharp teeth but a round tubercle at the base on each; anterior coxae very short ***Laccotrephes***

Genus 3. *Ranatra* Fabricius, 1790

1790. *Ranatra* Fabricius, *Skr. nat. Selsk.*, 1 (1) : 227.

3. *Ranatra varipes* Stål

1861. *Ranatra varipes* Stål, *Ofvers. K. Vet. Akad. Forh.*, 18 : 203.

1910. *Ranatra varipes* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 316.

1947. *Ranatra varipes* : Hafiz and Pradhan, *Rec. Indian Mus.*, 45 : 366.

1974. *Ranatra varipes* : Fernando and Cheng, *Fdn. Mus. J.*, 19 : 32.

Material examined : 1 ex., Sepahijala Reserve Forest, West Tripura Dist., 14.ix.1992, B. N. Das, S. K. Saha and S. K. Ghosh coll.

Diagnosis : Adult insect may attain a length of about 19-20 mm and abdominal appendages reach upto 12 mm in length; pronotum provided with a distinct ridge at the posterior angle on each side, metasternal process posteriorly blunt and slightly rounded with no lateral concavity.

Distribution : India : Tripura (District—West Tripura); Bihar; Meghalaya; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Burma, Malay Peninsula, Nepal, Sri Lanka, Thailand.

Genus 4. *Laccotrephes* Stål 1865

1865. *Laccotrephes* Stål, *Hem. Afric.*, 3 : 186.

Key to the species of the genus *Laccotrephes*

1. Adults attain a length about 30-35 mm; abdomen above yellowish red in colour; prosternum provided with a small indistinct tubercle; abdominal appendages a little longer than the body***ruber*** (Linnaeus)

— Adults never attain a length more than 15-20 mm; abdomen above with light bluish tinge; prosternum provided with a strong acute spine like structure; abdominal appendages shorter than the body***griseus*** (Guerin)

4. *Laccotrephes ruber* (Linnaeus)

1764. *Nepa ruber* Linnaeus, *Mus. Lud. Ulr.* : 165.

1868. *Laccotrephes ruber* : Stal, *Hem. Fabr.*, 1 : 135.

1906. *Laccotrephes ruber* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 18.

1992. *Laccotrephes ruber* : Bal and Basu, *Proc. zool. Soc. Calcutta*, 45 (Suppl. A); 325.

Material examined : 1 ex., Debsai Choudhury para, North Tripura Dist., 16.vi.1988, V. J. Dallong and party coll.; 1 ex., Anand Bazar Gram, Dharampur, North Tripura Dist., 5.xii.1989, Y. P. Sinha and party coll.; 2 exs., Panisagar, Dharmanagar, North Tripura Dist., 7.xii.1989, Y. P. Sinha and party coll.; 4 exs., Ambassa, Kamalpur, North Tripura Dist., 8.xii.1989, Y. P. Sinha and party coll.; 7 exs., Manu, Kailashsahar, North Tripura Dist., Y. P. Sinha and party coll.; 6 exs., Kadamtala, Dharmanagar, North Tripura Dist., 15.xii.1989, Y. P. Sinha and party coll.; 18 exs., Tarakpur, 10 kms. North of Dharampur, North Tripura Dist., 15.xii.1989, Y. P. Sinha and party coll.; 8 exs., Bourakandi, Dharmanagar, North Tripura Dist., 17.xii.1989, Y. P. Sinha and party coll.; 12 exs., Churraibari, Dharmanagar, North Tripura Dist., 19.xii.1989, Y. P. Sinha and party coll.

Diagnosis : As in the key.

Distribution : India : Tripura (District—North Tripura); Himachal Pradesh; Jammu and Kashmir; Maharashtra; Meghalaya; Nagaland; Orissa; West Bengal.

Elsewhere : China, Formosa, Japan, Sri Lanka.

5. *Laccotrephes griseus* (Guerin)

1829. *Nepa griseus* Guerin, *Iconogr. Regne Anim. Ins.*, : 352.

1910. *Laccotrephes griseus* : Montandon, *Annali Mus. zool. Napoli*, 3 (10) : 3.

1934. *Laccotrephes griseus* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 20.

1947. *Laccotrephes griseus* : Hafiz and Pradhan, *Rec. Indian Mus.*, 45 : 364.

1992. *Laccotrephes griseus* : Bal and Basu, *Proc. zool. Soc. Calcutta*, 45 (Suppl. A) : 325.

Material examined : 1 ex., Kamalacherra River, Dullubari, North Tripura Dist., 15.iii.1992, T. Roy and party coll.

Diagnosis : As in the key.

Distribution : India : Tripura (District—North Tripura) Pondicherry; Tamil Nadu; Maghalaya; West Bengal.

Elsewhere : Burma, Malacca, Seychelles, Sri Lanka, Thailand.

Family IV. BELOSTOMATIDAE**Key to the genera of the family
BELOSTOMATIDAE of Tripura**

1: Body moderate in size, generally attain a length from 12 to 27 mm, and more or less ovate or sub-ovate; head in front of eyes subtriangularly produced; hemelytra with distinct membrane, often very small, contains areas moderately convexly ampliate; anterior tarsal claws two of equal length on each***Sphaerodema***

— Body larger in size, length may vary from 40 to 110 mm and narrowly elliptical; head in front of eyes not conically produced; hemelytra with distinct membrane provided with prominent longitudinal veins and not outwardly ampliate; anterior tarsal claw one on each ...
.....***Lethocerus***

Genus 5. *Sphaerodema* Laporte 1832

1832. *Sphaerodema* Laporte, *Ess. Hemipt.*, 2 : 18.

Key to the species of the genus *Sphaerodema*

1. Anterior tarsal claws very small; ventro-lateral stripe of fine hairs on the abdomen narrower...
***rusticum*** (Fabricius)

Anterior tarsal claws moderately well developed and longer; ventrolateral stripe of fine hairs on the abdomen broader
***molestum*** (Dufour)

6. *Sphaerodema rusticum* (Fabricius)

1803. *Nepa rustica* Fabricius, *Syst. Rhyncho.* : 106.
 1906. *Sphaerodema rusticum* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 36.
 1947. *Sphaerodema rusticum* : Hafiz and Pradhan, *Rec. Indian Mus.*, 45 : 374.
 1992. *Sphaerodema rusticum* : Bal and Basu, *Proc. zool. Soc. Calcutta*, 45 (Suppl. A) : 326.

Material examined : 3 exs., Aglapur, Dharmanagar, North Tripura Dist., 13.xii.1989, Y. P. Sinha and party coll.; 4 exs., Dhyana para, Dharmanagar, North Tripura Dist., 14.xii.1989, Y. P. Sinha and party coll.

Diagnosis : Body length of adult varies from 15-17 mm; a little narrower in width than that of *molestum*; lateral and basal margins of pronotum and embolium are always pale in colour. Other characters as in key.

Distribution : India : Tripura (District—North Tripura); Orissa; Maharashtra; West Bengal.

Elsewhere : Austria, Burma, China, Japan, Java, Malay Peninsula, Philippines, Sri Lanka, Sumatra, Thailand, New Guinea.

7. *Sphaerodema molestum* (Dufour)

1863. *Appasus molestum* Dufour, *Annu. Soc. ent. Fr.*, : 395.
 1906. *Sphaerodema molestum* : Distant, *Fauna Brit. India, Rhynchota*, 3 : 36.
 1947. *Sphaerodema molestum* : Hafiz and Pradhan, *Rec. India Mus.*, 45 : 347.
 1994. *Sphaerodema molestum* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal, Part-5* : 538.

Material examined : 1 ex., Aglapur, Dharmanagar, North Tripura Dist., 13.xii. 1989, Y. P. Sinha and party coll.; 1 ex., Kadamtala, Dharmanagar, North Tripura Dist., 15.xii.1989, Y. P. Sinha and party coll.

Diagnosis : Body length varying from 13.5-17.5 mm; a little broader in width than *rusticum*; posterior angles of pronotum a little more obtuse and less acute than those of *rusticum*. Other diagnostic characters as in key.

Distribution : India : Tripura (District—North Tripura); Jammu and Kashmir; Orissa; West Bengal.

Elsewhere : Malacca, Sumatra.

Genus 6. *Lethocerus* Mayr 1853

1853. *Lethocerus* Mayr, *Verh. zool. bot. Ver. Wien*, 2 : 17.

8. *Lethocerus indicus* (Lepeletier and Serville)

1825. *Belostoma indica* Lepeletier and Serville, *Encycl. Meth.* : 272.
 1909. *Lethocerus indicus* : Montandon, *Bull. Soc. Sci. Buc.*, 17 : 138.
 1956. *Lethocerus indicus* : Usinger, *Aquatic Insects of California* : 204.
 1992. *Lethocerus indicus* : Bal and Basu, *Proc. zool. Soc. Calcutta*, 45 (Suppl. A) : 326.

Material examined : 1 ex., Ambassa, North Tripura Dist., 1.i.1973, V. C. Agarwal and R. K. Kacker coll.; 1 ex., Churraibari, Dharmanagar, North Tripura Dist., 19.xii. 1989, Y. P. Sinha and party coll.

Diagnosis : This giant Indian water-bug may vary in length from 62-85mm; head between eyes with parallel sides; pronotum with a transverse faciae at the basal end and a fine mid-longitudinal carination; hemelytra with distinct membrane provided with longitudinal veins; posterior tibiae and tarsi amply compressed; intermediate and posterior leg provided with thick sets of swimming hairs on the ventral side.

Distribution : India : Tripura (District—North Tripura); Assam; Bihar; Kerala;

Maharashtra, Meghalaya; Mizoram; Orissa; Uttar Pradesh; West Bengal.

Elsewhere : Burma, China, Java, Malay Peninsula, Pakistan, Philippines, Sri Lanka, Sumatra.

Family V. PLEIDAE

Genus 7. *Plea* Leach 1817

1817. *Plea* Leach, *Trans. Linn. Soc. London*, 12(1) : 14.

9. *Plea liturata* (Fieber)

1844. *Plea liturata* Fieber, *Ent. Monogr. Leipzig*, (5) 3 : 296.

1910. *Plea metiadusa* : Distant, *Fauria Brit. India, Rhynchota*, 5 : 337.

1918. *Plea quinquenotata* : Paiva, *Rec. Indian Mus.*, 14 : 29.

1934. *Plea* (*Paraplea*) *liturata* : Lundblad, *Arch. Hydrobiol. Suppl.*, 12 : 129.

1974. *Plea liturata* : Fernando and Cheng, *Fdn. Mus. J.*, 19 : 40.

1992. *Plea liturata* : Bal and Basu, *Proc. zool. Soc. Calcutta*, 45 (Suppl. A) : 326.

Material examined : 1 ex., Ambassa, North Tripura Dist., 7.i.1973, V.C. Agarwal and party coll.

Diagnosis : Body length upto 2 mm and dull yellowish grey in colour; elytra coarsely but prominently punctate; pronotum with fine punctures spread all over; abdominal keel prominent and not compact, moderately prominent spine like process on 4th, 5th and 6th abdominal sternite.

Distribution : India : Tripura (District—North Tripura); West Bengal.

Elsewhere : Bali, Java, Sumatra, Malay Peninsula.

Family VI. NOTONECTIDAE

Key to the genera of the family NONONECTIDAE of Tripura

1. Hemelytra commissure with a definite hair-lined pit at the anterior end just behind the scutellum; pronotum more longer than wide

thus a bit longer in shape; ventral abdominal keel extending to the last abdominal segment; posterior margin of each eye with normal curvature; elytra with well defined clavus ...

.....*Anisops*

Hemelytra commissure without any hair-lined pit at the anterior end; pronotum more wider than long thus transverse in shape; ventral abdominal keel not extending upto the last abdominal segment; posterior margin of each eye E-shaped; elytra without clavus

.....*Nychia*

Genus 8. *Anisops* Spinola 1837

1837. *Anisops* Spinola, *Ess. Ins. Hemipt.* : 58

Key to the species of the genus Anisops (based on males)

1. Cephalic horn present, its frons excavate triangularly with rounded apex, bordered on each side by two carinae, the inner two carinae meet apically to form a median commissure; eyes not holoptic; stridulatory comb composed of 13 teeth, basal 6 teeth much longer than the apical 7 teeth

.....*batillifrons* Lundblad

Cephalic horn absent; eyes holoptic; stridulatory comb irregular in shape, composed of 7 irregular teeth where 4th and 5th teeth largest and flattened

.....*breddini* Kirkaldy

10. *Anisops batillifrons* Lundblad

1933. *Anisops batillifrons* Lundblad, *Ann. Mag. nat. Hist.*, (10) 12 : 463.

1951. *Anisops batillifrons* : Brooks, *Kans. Univ. Sci. Bull.*, 34 (8) : 420.

1994. *Anisops batillifrons* : Bal and Basu, *State Fauna Series* 3 : *Fauna of West Bengal*, Part-5 : 547.

Material examined : 2 exs. (M, F), Rudra Sagar, Melaghar, South Tripura Dist. 24.iii.1992, T. Roy and party coll.; 1 ex. (M), Kamalacherra River, Dulubari, North Tripura Dist., 15.iii.1992, T. Roy and party coll.

Diagnosis : Body length for males 5.6-6.4 mm, for females 5.4-6.3 mm; greatest body width

at about two-fifth of the body length; general body colour pale or pale yellowish or greyish. Other characteristics as in the key.

Distribution : India : Tripura (Districts—South Tripura, North Tripura); Assam; West Bengal.

Elsewhere : Burma, China, Formosa, Japan, Philippines.

11. *Anisops breddini* Kirkaldy

1901. *Anisops breddini* Kirkaldy, *Entomologist*, **34** : 5-6.
 1910. *Anisops breddini* : Distant, *Fauna Brit. India, Rhynochota*, **5** : 333.
 1951. *Anisops breddini* : Brooks, *Kans. Univ. Sci. Bull.*, **34** (8) : 439.
 1994. *Anisops breddini* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal* : Part-5 : 548

Material examined : 1 ex. (F), Garjee, West Tripura dist., 14.v.1978, *J. K. Jonathan* coll.; 3 exs. (FF), Ambassa, North Tripura Dist., 5.xii. 1988, *R.C. Basu and party* coll.; 5 exs. (4 FF, 1 M), Manu, Kailasahar, North Tripura Dist., 8.xii.1988, *R.C. Basu and party* coll.; 3 exs. (1F, 2 MM), Panisagar, Dharmanagar, North Tripura Dist., 12.xii. 1988, *R.C. Basu and party* coll.; 4 exs. (1F, 3 MM), Biltai, North Tripura Dist., 14.xii. 1988, *R.C. Basu and party* coll.; 5 exs. (2FF, 3MM), Jirania, Agartala, West Tripura Dist., 16.xii.1988, *R.C. Basu and party* coll.; 8 exs. (2FF, 2MM, 4 Nymphs), Sepahijala Reserve Forest, West Tripura Dist., 14. ix. 1992, *B. N. Das, S. K. Saha and S. K. Ghosh* coll.

Diagnosis : Body length for males 5.7-6.6 mm, for females 5.4-5.7 mm, greatest width at the middle of the body length; general body colour pearlaceous. Other characters as in the key.

Distribution : India : Tripura (District—West Tripura, North Tripura); Kerala; Orissa; West Bengal.

Elsewhere : Burma, Malay Peninsula, Sri Lanka.

Genus 9. *Nychia* Stål, 1859

1859. *Nychia* Stål, *Eugen. Resa. Zool. I.* : 268.

12. *Nychia marshalli* (Scott)

1872. *Antipalocoris marshalli* Scott, *Entomologist's mon. Mag.* **8** : 245.
 1900. *Nychia marshalli* : Kirkaldy, *Annu. Soc. ent. Bleg.*, : 435.
 1934. *Nychia marshalli* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 155.
 1994. *Nychia marshalli* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal*, Part-5 : 550.

Material examined : 5 exs. (3FF, 2 MM), Ambassa, North Tripura Dist., 5. xii. 1988, *R. C. Basu and party* coll.; 1 ex. (M), Manu, Kailasahar, North Tripura Dist., 8.xii.1988, *R. C. Basu and party* coll.; 1 ex. (F), Panisagar, North Tripura Dist., 12. xii. 1988, *R. C. Basu and party* coll.; 1 ex. (M), Biltai, Dharmanagar, North Tripura Dist., 14. xii. 1988, *R. C. Basu and party* coll.; 1 ex (F), Kamalacherra River, Dullubari, North Tripura Dist., 15.iii.1992, *T. Roy and party* coll.

Diagnosis : Males are little longer than females, attain a length of about 5.2 mm while females reach upto 4.8 mm approximately but females are a bit wider at the middle of the body than males which are more slender in appearance; head with vertex a little raised; eyes holoptic, postero-lateral margin of eye E-shaped; pronotum short and transverse with concave anterior angles; hemelytra without any clavus; posterior legs slender and longer than the body length; hemelytra fully cover the body in the females while in males last three abdominal segments remain uncovered.

Distribution : India : Tripura (District—North Tripura); West Bengal.

Elsewhere : Africa, Europe, Sri Lanka.

SERIES AMPHIBICORISAE

Family VII. MESOVELIIDAE

Genus 10. *Mesovelis* Mulsant and Rey 1852

1852. *Mesovelis* Mulsant and Rey, *Ann. Linn. Lyon.*, **1850-52** : 138.

13. *Mesovelis vittigera* Horvath

1895. *Mesovelis vittigera* Horvath, *Rev. Entomologie*, **14** : 160.

1901. *Mesoveliea orientalis* : Kirkaldy, *Entomologist*, **34** : 808.
 1903. *Mesoveliea mulsanti* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 137.
 1939. *Mesoveliea vittigera* : Hafiz and Ribeiro, *Rec. Indian Mus.*, **41** : 424.
 1989. *Mesoveliea vittigera* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper No. 118* : 35.
 1994. *Mesoveliea vittigera* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal, Part-5* : 513.

Material examined : 1 M (Macropterous), Manu, Kailasahar, North Tripura Dist., 8.xii.1988, R. C. Basu and party coll.; 1 M (Macropterous), Jirania, Agartala, West Tripura Dist., 16.xii.1988, R. C. Basu and party coll.; 1 F (Macropterous), Panisagar, North Tripura Dist., 12.xii.1988, R. C. Basu and party coll.; 1 M (Apterous), 1 F (Macropterous), Biltai, North Tripura Dist., 14. xii. 1988, R. C. Basu and party coll.

Diagnosis : Adults attain a length about 2.5-3.00 mm; body elongate with prominent head; eyes large almost touching the anterior margin of pronotum, macropterous adult with two ocelli; 4-segmented antennae, 2nd segment shortest while other three segments subequal in length; hemelytra may (macropterous forms) or may not (apterous forms) present; corium encloses 3 closed-cells; scutellum large; males are easier to identify by last abdominal ventral segment with a single median spine in a group and two sets of brush like hairs laterally.

Distribution : India : Tripura (Districts—North Tripura, West Tripura); Andaman Islands; Bihar; Karnataka; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Africa, Australia, Bangladesh, Burma, Egypt, Java, Philippines, Sri Lanka, Sumatra, Syria.

Family VIII. GERRIDAE

Key to the subfamilies of the family GERRIDAE of Tripura

1. Ventral lobes of head prominently produced; first abdominal sternum present
Subfamily-RHAGADOTARSINAE

— Ventral lobes of head not as above; first abdominal sternum absent 2

2. Pronotal lobe always reduced in wingless forms; pretarsal arolia (ventral arolia) present; lateral suture between meso- and metathorax distinct Subfamily-EOTRECHINAE

Pronotal lobe usually not reduced in wingless forms; if so, then pretarsal arolia absent; lateral suture between meso- and metathorax indistinct Subfamily-GERRINAE

Key to the genera and species of the family GERRIDAE

1. Eighth abdominal segment of both sexes produced to a long cylindrical process. Antennae with basal two segments stouter than the rest, 2nd segment shortest while 3rd and 4th segments subequal in length
*Rhagadotarsus kraepelini* Breddin

— Eighth abdominal segment of both sexes not produced to any cylindrical process. Antennae otherwise 2

2. First segments of middle and hind tarsi shorter than the second segments; claws long, nearly equal to the first tarsal segment. Antennae with first segment longest and curved, rest of the segments subequal in length; rostrum considerably surpassing the anterior coxae ...
*Onychotrechus sakuntala* (Kirkaldy)

First tarsal segment much shorter than the second tarsal segment on the front leg; antennae otherwise; rostrum otherwise
*Limnogonus* 3

3. Antennal 4th segment slightly smaller than the 1st segment; posterior tip of pronotum remarkably angular; anterior lobe of pronotum with a pair of linear, small yellowish patches; 7th abdominal segment of both sexes provided with fairly prominent connexival spines
*L. nitidus* (Mayr)

— Antennal 4th segment nearly half in length than the 1st segment; posterior tip of pronotum more or less convexly rounded; anterior lobe of pronotum with a single roundish yellow

patch; 7th abdominal segment not provided with connexival spines.....*L. parvulus* (Stal)

Subfamily RHAGADOTARSINAE

Genus 11. *Rhagadotarsus* Breddin 1905

1905. *Rhagadotarsus* Breddin, *Mt. Mus. Hamburg*, **22** : 136.

14. *Rhagadotarsus kraepelini* Breddin

1905. *Rhagadotarsus kraepelini* Breddin, *Mt. Mus. Hamburg*, **22** : 137.
 1910. *Nacebus dux* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 166.
 1934. *Rhagadotarsus kraepelini* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 412.
 1994. *Rhagadotarsus kraepelini* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal, Part-5* : 518.

Material examined : 12 exs., (11 FF, 1 M), Panisagar, Dharmanagar, North Tripura Dist., 12.xiii.1988, R. C. Basu and party coll.; 7 exs., (6 FF, 1 M), Biltai, Dharmanagar, North Tripura Dist., 14.xii.1988, R.C. Basu and party coll.

Diagnosis : Adult may attain a length of about 4 mm; body sub-elongate with 8th abdominal segment in both sexes produced to a long cylindrical process; eyes inwardly somewhat roundly truncated and not emerginate and not produced over the anterior margin of pronotum; pronotum very short, appearing only as a broad collar; middle legs much longer than the hind legs.

Distribution : India : Tripura (District—North Tripura); West Bengal.

Elsewhere : Burma, China, Formosa, Java, Malay, Philippines, Singapore, Sri Lanka.

Subfamily EOTRECHINAE

Genus 12. *Onychotrechus* Kirkaldy 1903

1903. *Onychotrechus* Kirkaldy, *Entomologist*, **36** : 44.

15. *Onychotrechus sakuntala* (Kirkaldy)

1901. *Gerris sakuntala* Krikaldy, *Entomologist*, **34** : 117.

1902. *Onychotrechus sakuntala* : Distant, *Fauna Brit. India, Rhynchota*, **2** : 183.

1929. *Onychotrechus sakuntala* : Esaki, *Ann. Mag. nat. Hist.*, (10) **4** : 418.

1982. *Onychotrechus sakuntala* : Andersen, *Semiaquatic bugs, Entomonograph*, **3** : 183.

Material examined : 1 ex. (F), Ambassa, North Tripura Dist., 5.xii.1988, R. C. Basu and party coll.

Diagnosis : Adult insect may be 5.5 mm in length; head with lateral yellowish margins in front of eyes and mid-longitudinal yellowish fascia; pronotum with yellowish anterior margin, lateral margins and three longitudinal discal fasciae; antennae with first segment longest and curved, remaining segments shorter and subequal in length; rostrum considerably surpassing the anterior coxae; middle femora slightly longer than posterior femora; tarsal claws long.

Distribution : India : Tripura (District-North Tripura); Meghalaya.

Elsewhere : Burma, Sri Lanka.

Subfamily GERRINAE

Genus 13. *Limnogonus* Stål 1868

1868. *Limnogonus* Stål, *K. svenska Vet.-Akad. Handl.*, **7** : 132.

16. *Limnogonus nitidus* (Mayr)

1865. *Hydrometra nitida* Mayr, *Verh. zool.-bot. Ges. Wien*, **15** : 443.
 1910. *Gerris nitida* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 142.
 1934. *Limnogonus nitidus* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 387.
 1979. *Limnogonus nitidus* : Polhemus, *Bull. Fish Res. Stn., Sri Lanka*, **29** : 90.
 1989. *Limnogonus (Limnogonus) nitidus* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **118** : 41.

Material examined : 1 ex. (M), Charilum, West Tripura Dist., 17.xi.1969, V. C. Agrawal and party coll.; 2 exs. (MM), Halkalia, South Tripura Dist., 5.xii.1969, V. C. Agrawal and

party coll.; 12 exs. (4 FF, 8 MM), Ambassa, North Tripura Dist., 5.xii.1988, R. C. Basu and party coll.; 2 exs. (FF), Panisagar, North Tripura Dist., 12.xii.1988, R. C. Basu and party coll. 1 ex. (F), Biltai, North Tripura Dist., 14.xii.1988, R. C. Basu and party coll.; 1 (F), Jirania, Agartala, West Tripura Dist., 16.xii.1988, R. C. Basu and party coll.

Diagnosis : Body length of adult insects from 6.0-8.0 mm; antennae with 2nd and 3rd segments shortest and nearly subequal in length. Other diagnostic characters as in the key.

Distribution : India : Tripura (Districts—South Tripura, North Tripura, West Tripura); Assam; Bihar; Kerala; Meghalaya; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Bangladesh, Borneo, Burma, Celebes, Java, Maldives Islands, Malaya, Nepal, Sri Lanka, Sumatra, Thailand, Vietnam.

17. *Limnogonus parvulus* (Stal)

1859. *Gerris parvula* Stal, *K. svenska Eug. zool.*, 4 : 265.
 1868. *Limnogonus parvulus* : Stal, *K. svenska Vet.-Akad. Handl.*, 7 : 133.
 1899. *Gerris tristan* : Kirkaldy, *Rev. d'Ent.*, 18 : 88.
 1902. *Gerris tristan* : Distant, *Fauna Brit. India, Rhynchota*, 2 : 179.
 1934. *Limnogonus parvulus* : Lundblad, *Arch. Hydrobiol. Suppl.* 12 : 384.
 1969. *Limnogonus parvulus* : Cheng and Fernando, *Oriental Ins.*, 3 (2) : 102.
 1994. *Limnogonus parvulus* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal, Part-5* : 526.

Material examined : 11 exs. (7 FF, 4 MM), Charilum, West Tripura Dist. 17.xi.1969, V. C. Agarwal and party coll.; 8 exs. (3 FF, 5 MM), Bishalgarh, West Tripura Dist., 20.xi.1969, V. C. Agrawal and party coll.; 1 ex. (F), Ambassa, North Tripura Dist., 5.xii.1988, R. C. Basu and party coll.; 1 ex. (M), Panisagar, North Tripura Dist., 12.xii.1988, R. C. Basu and party coll.; 1 ex. (F), Jirania, Agartala, West Tripura Dist., 16.xii.1988, R. C. Basu and party coll. 1 ex. (F), Udaipur, South Tripura Dist. 17.v.1992, B. C. Das and party coll.

Diagnosis : Body length of adult insects may be 6.0-6.5 mm; antennal 1st segment longest and as long as or little longer than the 2nd and 3rd segments together. In male the hind margin of pygopore is straight while in female the hind margin of the 7th abdominal segment is bisinuate ventrally. Other diagnostic characters as in the key.

Distribution : India : Tripura (Districts—South Tripura, North Tripura, West Tripura); Assam; Bihar; Kerala; Meghalaya; Orissa; Tamil Nadu; Uttar Pradesh; West Bengal.

Elsewhere : Bangladesh, Burma, China, Iran, Java, Malay Peninsula, Muscat, New Guinea, Oman, Pakistan, Philippines, Ryukyu Islands, Solomon Islands, Singapore, Sri Lanka, Taiwan, Thailand, Timor, Vietnam.

Family IX. VELIIDAE

Key to the subfamilies and genera of the family VELIIDAE of Tripura

1. Tarsal formula 3 : 3 : 3; last tarsal segment of the middle leg deeply clefted and provided with leaf-like claws and plumage structures arising from the base of the cleft
Subfamily RHAGOVELIINAE and genus *Rhagovelia*
- Tarsal formula 1 : 2 : 2; middle tarsal segment not clefted and more than twice as long as hind larsi
Subfamily MICROVELIINAE and genus *Microvelia*

Subfamily RHAGOVELIINAE

Genus 14. *Rhagovelia* Mayr 1865

1865. *Rhagovelia* Mayr, *Verh. zool.-bot. Wein*, 15 : 445.

18. *Rhagovelia nigricans* (Burmeister)

1835. *Velia nigricans* Burmeister, *Handb. Ent.*, 2 : 213.
 1903. *Rhagovelia maculata* : Distant, *Ann. Mus. nat. Hist.*, (7) 12 : 472.
 1910. *Rhagovelia nigricans* : Distant, *Fauna Brit. India, Rhynchota*, 5 : 137.

1919. *Rhagovelia nigricans* : Paiva, *Rec. Indian Mus.*, **16** : 362.
1950. *Rhagovelia nigricans* : Pradhan, *Rec. Indian Mus.*, **48** : 102.
1989. *Rhagovelia (Rhagovelia) nigricans* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **118** : 51.

Material examined : 12 exs. (Macropterons 2 FF, Apterons 6 FF, Apterons 4 MM), Panisagar, Dharmanagar, North Tripura Dist., 12.xii.1988, R.C. Basu and party coll.

Diagnosis : Body length of adult insects may be 3.0-4.0 mm; body colour piceous black; anterior margin of pronotum yellowish red with a narrow median interruption; antennae, legs and margins of pronotum longly pilose; antennae with 1st segment longest and outwardly curved, 2nd and 4th segments subequal and each slightly shorter than the 3rd segment; males with proximal part of middle legs rounded and armed with thorn like spines and small pegs.

Distribution : India : Tripura (District-North Tripura); Assam; Bihar; Himachal Pradesh; Kerala; Maharashtra; Meghalaya; Punjab; Tamil Nadu; Uttar Pradesh.

Elsewhere : Egypt, Jordan, Palestine, Seycheles; Sri Lanka, Syria, West and East Africa.

Subfamily MICROVELIINAE

Genus 15. *Microvelia* Westwood 1834

1834. *Microvelia* Westwood, *Ann. Soc. ent. France*, **3** : 647.

Key to the species of the genus *Microvelia*

1. Antennal 2nd segment distinctly shorter than the 3rd segment; hemelytra scarcely reaching the abdominal apex; pronotum with reddish-yellow anterior margin reaching the anterior angles*diluta* Distant
- Antennal 2nd and 3rd segments subequal in length, hemelytra reaching beyond the apex of abdomen; pronotum with reddish-yellow anterior margin, not reaching the anterior angle*albomaculata* Distant

19. *Microvelia diluta* Distant

1909. *Microvelia diluta* Distant, *Ann. Mag. nat. Hist.*, **3** (8) : 500.
1910. *Microvelia diluta* : Distant, *Fauna of Brit. India, Rhynchota*, **5** : 139.
1918. *Microvelia diluta* : Paiva, *Rec. Indian Mus.*, **14** : 21.
1934. *Microvelia diluta* : Lundblad, *Arch. Hydrobiol. Suppl.*, **12** : 307.
1989. *Microvelia diluta* : Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **118** : 52.
1994. *Microvelia diluta* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal, Part-5* : 515.

Material examined : 4 exs. (Macropterous 1 M, Apterous 3 FF), Ambassa, North Tripura Dist., 7.i.1973, V. C. Agrawal and party coll.; 14 exs. (Macropterous 5 MM, 2 FF, Apterous 4 MM, 3 FF), Manu, Kailasahar, North Tripura Dist., 8.xii.1988, R. C. Basu and party coll.; 4 exs. (Apterous 3 MM, 1 F), Panisagar, North Tripura Dist., 12.xii.1988, R. C. Basu and party coll.; 26 exs. (Macropterous 12 MM, 9 FF, Apterous 1 M, 4 FF), Biltai, Dharmanagar, North Tripura Dist., 14.xii.1988, R. C. Basu and party coll.

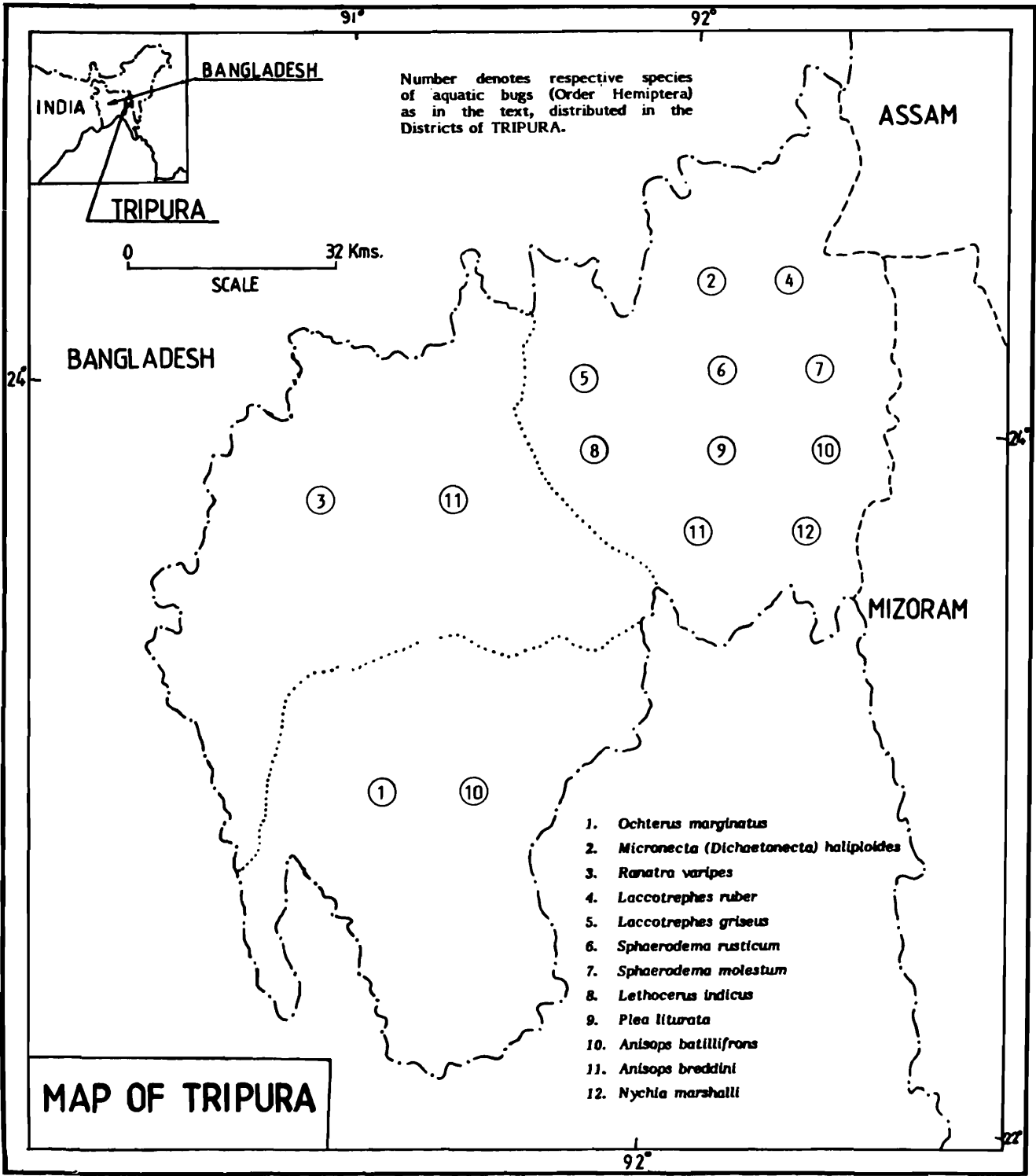
Diagnosis : Body length about 2.5 mm; lateral angles of pronotum sub-equally prominent, presence of tibial comb both in the anterior and middle tibiae in males. Other diagnostic characters as in the key.

Distribution : India : Tripura (District—North Tripura); Bihar; Tamil Nadu; West Bengal.

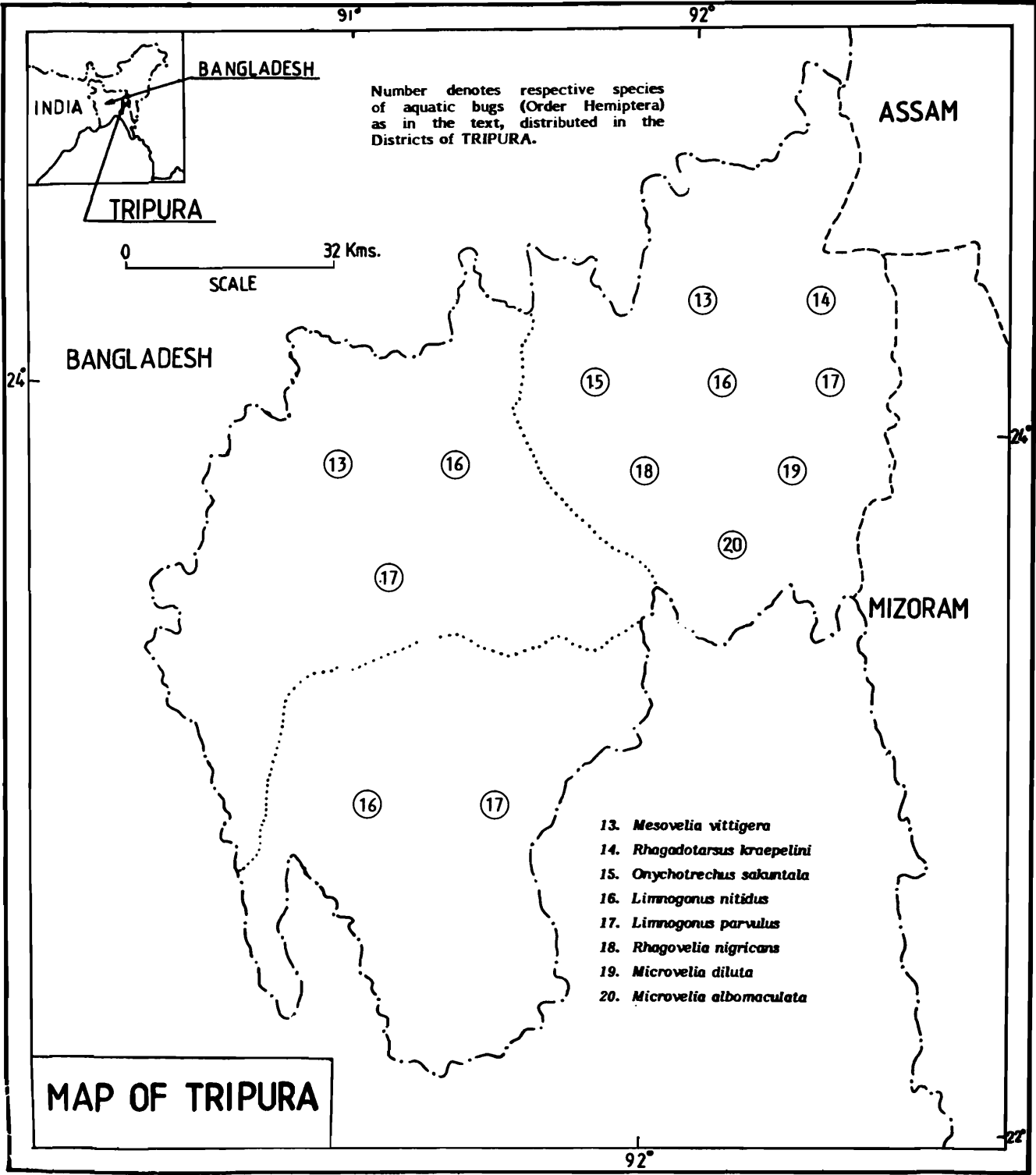
Elsewhere : Bangladesh, Burma, Singapore, Sri Lanka, Sumatra.

20. *Microvelia albomaculata* Distant

1909. *Microvelia albomaculata* Distant, *Ann. Mag. nat. Hist.*, **3** (8) : 499.
1910. *Microvelia albomaculata* : Distant, *Fauna Brit. India, Rhynchota*, **5** : 138.
1925. *Microvelia albomaculata* : Bueno, *Spolia Zeylanica*, **13** : 229.
1994. *Microvelia albomaculata* : Bal and Basu, *State Fauna Series 3 : Fauna of West Bengal, Part-5* : 515.



Map 1



Map 2

Material examined : 3 exs. (Macropterous 1 M, 2 FF), Ambassa, North Tripura Dist., 7.i.1973, V.C. Agrawal and party coll.

Diagnosis : Body length about 2.0 mm; a greyish marginal fascia on the inner side of each eye from tip to the base of head; lateral angles of pronotum sub-angularly prominent. Other diagnostic characters as in the key.

Distribution : India : Tripura (District—North Tripura), West Bengal.

Elsewhere : Bangladesh.

SUMMARY

The present paper is based upon the collections made by different survey parties of the Zoological Survey of India, and the unnamed collections housed in the National Zoological Collection, Calcutta. It deals with 20 species under 15 genera belonging to nine families of water-bugs from the State of Tripura. All the species are recorded for the first time from the State since no previously published faunistic account on water-bugs from

the State of Tripura is found. Necessary taxonomic keys for families, subfamilies, genera and species of water-bugs have been constructed in the present work. Besides, synonymic references, distributional pattern within the state, other states and elsewhere in the world for each species have been included in the paper.

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