

NEW RECORDS OF AQUATIC AND SEMI-AQUATIC HETEROPTERA (INSECTA: HEMIPTERA) FROM WEST BENGAL AND ODISHA

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INTRODUCTION

The aquatic and semi-aquatic Heteroptera under the Infraorder Nepomorpha and Gerromorpha are distributed in almost all kinds of ecological niches with diverse climatic conditions, including both marine and freshwater habitats. They are the important components of freshwater ecosystem as they play a major role in the food web of this particular ecosystem. Globally, among the 17 major families of aquatic Heteroptera, 16 families comprising of 79 genera and 292 species are represented in India.

The present paper has dealt with seven new records of aquatic and semi-aquatic Heteroptera from India, of which five species were recorded from the State of West Bengal, which is important in the sense of adding five species to the fauna of West Bengal and two species from Orissa, a part of Eastern Ghats. During the preparations of the manuscript, the authors consulted a few scientific literatures and books *viz.*, Distant (1903, 1906, 1910), Pradhan (1950), Bal and Basu (1994, 1997, 2000, 2002, 2003 & 2004), Lansbury (1972, 1973), Hungerford and Matsuda (1965), Thirumalai (1986, 1989, 1992, 1994, 1999, 2000, 2002, 2007).

MATERIALS AND METHODS

The present work has been carried out in the Districts of Darjeeling and Jalpaiguri in the State of West Bengal and Devkund water falls under Simlipal forest range (District-Mayurbhanj) in the State of Orissa during the period of 2011-2012. Darjeeling District encompasses Darjeeling Himalaya region which is an important part of Eastern Himalaya with diverse climatic zones and habitats favouring high degree of biodiversity. While Jalpaiguri District represents the sub-Himalaya region. The study area under the Simlipal forest range falls under the Eastern Ghats. As a matter of fact, many more species are likely to be identified and yet to be explored from this unique habitats.

Materials were collected from different types of freshwater ecosystems such as streams, rivers, lakes, ponds etc. using long-handled water net with close meshed nylon threads. The collected materials were preserved in 70% ethyl alcohol, brought to the laboratory with proper labelling and examined under stereoscopic Binocular Microscope. The photographs of the specimen are taken by LeicaM205. All the specimens are registered and submitted in the National Zoological Collection of Zoological Survey of India, Kolkata.

SYSTEMATIC INDEX OF SEVEN NEW RECORDS FROM EASTERN INDIA

Class INSECTA

Order HEMIPTERA

Suborder HETEROPTERA

Infraorder NEPOMORPHA Popov, 1968

Superfamily NEPOIDEA Latreille, 1802

Family NEPIDAE Latreille, 1802

Subfamily RANATRINAE Douglas & Scott, 1865

Tribe RANATRINI Douglas & Scott, 1865

Genus *Ranatra* Fabricius, 1790

1. Species *Ranatra varipes atropha* Montandon, 1903

Genus *Cercotmetus* Amyot & Serville, 1843

2. Species *Cercotmetus pilipes* (Dallas, 1850)

Superfamily NAUCOROIDEA Leach, 1815

Family APHELOCHEIRIDAE Fieber, 1851

Subfamily APHELOCHEIRINAE Fieber, 1851

Genus *Aphelocheirus* Westwood, 1833

3. Species *Aphelocheirus (Aphelocheirus) pradhanae* Zettel, 1998

Infraorder GERROMORPHA Popov, 1971

Superfamily GERROIDEA Reuter, 1910

Family GERRIDAE Leach, 1815

Subfamily PTILOMERINAE Bianchi, 1896

Genus *Heterobates* Bianchi, 1896

4. Species *Heterobates rihandi* (Pradhan, 1950)

Genus *Ptilomera* Amyot & Serville, 1843

5. Species *Ptilomera (Ptilomera) assamensis* Hungerford & Matsuda, 1965

6. Species *Ptilomera (Ptilomera) agroides* Schmidt, 1926

Subfamily HALOBATINAE Bianchi, 1896

Tribe METROCORINI Matsuda, 1960

Genus *Metrocoris* Mayr, 1865

7. Species *Metrocoris communoides* Chen & Nieser, 1993

DESCRIPTION OF SPECIES

Family NEPIDAE

Subfamily RANATRINAE

1. *Ranatra varipes atropha* Montandon, 1903
1903. *Ranatra atropha* Montandon, *Bull. Soc. Sci. Bucarest*, **12**: 105
1907. *Ranatra varipes atropha* Montandon, *Ann. Soc. Ent. France*, **76**: 57

Materials examined: 2FF, Bhimbar Lake besides Sayedabad Tea Estate, Darjeeling District, West Bengal, 16.IX.2011, Coll: S. Basu.

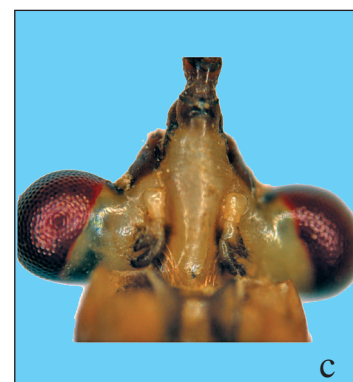
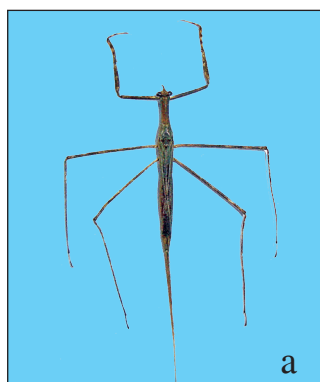
Diagnostic characters: Brownish in colour; adults may attain a length of about 18.5-23mm excluding respiratory siphon; respiratory siphon always shorter than the body length ranging between 14-18 mm; second and third segments of antenna with a few scarcely distributed stout spines; anterior lobe of prothorax about twice as long as posterior lobe, which is slightly curved dorsoventrally; prothorax with a prominent keel ventrally; mesosternum with a conspicuous median keel; fore femora broad with a medium-sized tooth. Measurements of different body parts as provided in Table 1.

Table 1. Measurements of different body parts of *Ranatra varipes atropha* Montandon, 1903

CHARACTERS	MEASUREMENTS	
	Length	Width
Head	1.45 mm	0.83mm
Eyes	0.61 mm	0.68mm
Rostrum	1.82mm	—
Antenna (1 st +2 nd +3 rd segment)	0.49 mm	—

Table 1. *contd.*

CHARACTERS	MEASUREMENTS	
	Length	Width
Pronotum and Mesonotum	4.62 mm	1.0 mm
Mesosternal keel	2.21 mm	1.94 mm
Foreleg	13.2 mm	–
Wing	11.7 mm	–
Abdomen	12 mm	2.06 mm
Ovipositor	1.8 mm	–
Last Abdominal segment	2.04 mm	–

1. *Ranatra varipes atropha* Montandon, 1903: a. Dorsal view of female, b. Mesosternal keel, c. Antenna

Type Locality: Montandon (1903) described this species without mentioning the type locality. But, Lansbury (1972) in his 'Review of the Oriental species of *Ranatra* Fabricius' mentioned the localities of examined materials such as Madras, Pondicherry of Southern India, Titilagarh of Bihar, India.

Distribution: Assam, Bihar, Karnataka, Madhya Pradesh, Pondicherry, Tamilnadu, West Bengal (Dist. Darjeeling).

Remarks: *Ranatra varipes atropha* Montandon is closely related to *Ranatra varipes varipes*, but can be distinguished by mesosternal keel and reduced antennal structure.

2. *Cercotmetus pilipes* (Dallas, 1850)

1850. *Ranatra* (*Cercotmetus*) *pilipes* Dallas, *Trans. R. ent. soc. Lond.*, **1**: 9

1903. *Cercotmetus pilipes* (Dallas): Montandon, *Bull. Soc. Sci. Bucarest*, **12**: 110

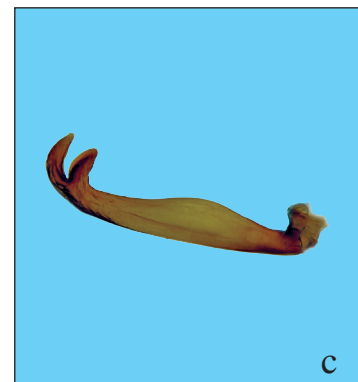
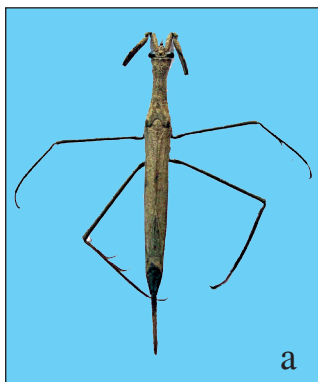
1906. *Cercotmetus pilipes* (Dallas): Distant, *Fauna Brit. India, Rhynchota*, **3**: 23

Materials examined: 2MM; Pond near Baradighi, Malbazar, Jalpaiguri District, West Bengal; 17.IX.2011; Coll: S. Basu.

Diagnostic characters: Luteous in colour; body length of adults generally ranges from 40-41 mm; respiratory siphon around four times shorter than the body length; eyes large, prominent and rounded; head with a prominent tubercle on the vertex; wing membrane well-developed and elytra not reaching the abdominal apex; Fore femora shorter than the pronotum; mid and hind tibia and tarsi with spines and long yellow hairs arranged in double rows; parameres are stout and structures are species-specific. Measurements of different body parts are depicted in Table 2.

Table 2. Measurements of different body parts of *Cercotmetus pilipes* (Dallas, 1850)

CHARACTERS	MEASUREMENTS	
	Length	Width
Head	1.95 mm	1.26 mm
Eyes	0.85 mm	0.96 mm
Rostrum	2.43mm.	–
Antenna (Total length)	0.63 mm	–
Metasternal process	4.13 mm	3.17 mm
Foreleg	17.27mm	–
Wings with Hemelytra	18.69mm	–
Abdomen	21.74mm	2.89 mm
Last abdominal segment	3.05 mm	1.61 mm
Abdominal appendages	8.19 mm	–



2. *Cercotmetus pilipes* (Dallas, 1850): a. Dorsal view of male, b. Genitalia with anal appendages, c. Right paramere of male

Type Locality: According to Kumari and Nair (1984), the Holotype collected by Dall (1849) from Bhutan.

Distribution: Delhi, Karnataka, Kerala, West Bengal (Dist. Jalpaiguri).

Remarks: This aquatic nepid collected from a fishing pond of Malbazar, Jalpaiguri District of West Bengal and found to be predated on a freshwater prawn.

Family APHELOCHEIRIDAE

Subfamily APHELOCHEIRINAE

Genus *Aphelocheirus* Westwood

3. *Aphelocheirus (Aphelocheirus) pradhanae*
Zettel, 1998

1998. *Aphelocheirus pradhanae* Zettel, *Ann. Naturhist. Mus. Wien*, **100**: 81

Materials examined: 1F, Stagnant pool, Durbin forest, Ghoombhanjang, Darjeeling district, West Bengal; 22.III.1973; Coll: P. K. Maiti.

Diagnostic characters: Body length 7.8-8.8 mm. Hemelytra narrowly separated from each other in brachypterous forms; width of hemelytra more than its length; head 0.95 times as long as wide; width of body across 3rd abdominal segment 4.8-5.7 mm.; pronotum 3.45 times as broad as long; propleura rounded bluntly with inner propleural projection notched apically; abdominal ventrites without spine-like bristles; female subgenital plate rounded at apex with long thick hair tufts at distal half and without distinct sub-apical hair cluster. Measurements of different body parts as provided in Table 3.

Table 3. Measurements of different body parts of *Aphelocheirus (Aphelocheirus) pradhanae* Zettel, 1998

CHARACTERS	MEASUREMENTS	
	Length	Width
Body	8.4 mm	4.83 mm
Eyes	0.8 mm	0.3 mm
Rostrum	3.2 mm	–
Antenna (Total length)	1.51 mm	–
Head	1.46 mm	1.02 mm
Maximum width of 3 rd abdominal segment		4.66 mm
Foreleg	4.95 mm	–
Hemelytra	.98 mm	1.94 mm
Abdomen	4.43 mm	4.93 mm
Last abdominal segment	1.36 mm	1.91 mm



3. *Aphelocheirus (Aphelocheirus) pradhanae* Zettel, 1998: a. Dorsal View of female, b. Female Sub-genital Plate, c. Head and pronotum of female

Type locality: Holotype male was from Godavari, Botanical gardens, Nepal. While, paratypes were from Gopaldhara, Rungpong valley, Sikkim.

Distribution: Sikkim, West Bengal (Dist. Darjeeling).

Remarks: The *Aphelocheirus* sp. of the family Aphelocheiridae is commonly known as tropical benthic water bugs and they are restricted in riffles, streams with algal bloom and stones, gravels. They give painful bite with their long rostrum.

Family GERRIDAE

Subfamily PTILOMERINAE

4. *Heterobates rihandi* (Pradhan, 1950)

1950. *Teratobates rihandi* Pradhan, *Rec. Indian Mus.*, **48**: 103
2002. *Heterobates rihandi* (Pradhan): Thirumalai, *Rec. zool. Surv. India*, **100** (1-2): 68

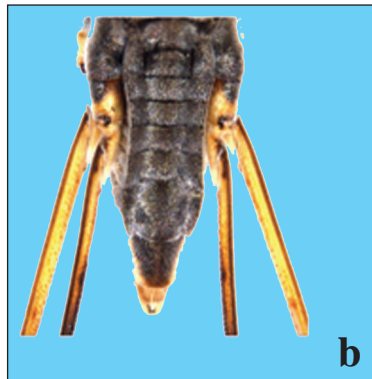
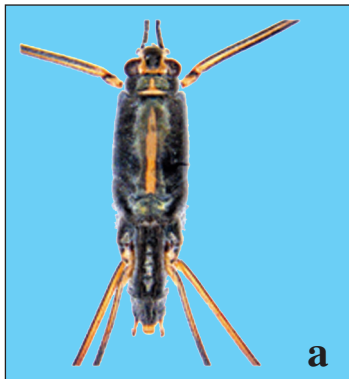
Materials examined: 1M,1F; Sukhahjhora, near Malbazar, Jalpaiguri District, West Bengal; 11.IX.2011; Coll: S. Basu; 5FF, 4MM, 3 nymphs; Murti River, Jalpaiguri District, West Bengal; 9.III.2011; Coll; S. Basu; 1M,1F; Teesta River, near Sevoke Coronation bridge, Darjeeling, West Bengal; 14.III.2011; Coll: S. Basu; 3 MM, 3 FF, Murti River, in front of Murti Banani Bunglow, Jalpaiguri District, West Bengal; 10.III.2011; Coll: S.Basu; 2MM, Mal River, Jalpaiguri District, West Bengal; 11.IX.2011; Coll: S. Basu; 1M, 3FF, 1nymph; Dhupjhora, Murti River, within Gorumara National Park, Jalpaiguri District, West Bengal; 17.III.2012; Coll; S. Basu; 10MM, 2FF, 21nymphs; Mahananda River, Mahananda Wildlife Sanctuary, Darjeeling District, West Bengal; 20.III.2012; Coll: S. Basu; 4 FF; Murti River, near Medla camp, within Gorumara National Park, Jalpaiguri District, West Bengal; 17.III.2012; Coll: S. Basu.

Diagnostic characters: Body black in colour; body length of adults ranges from 6.9-7.3 mm; eyes castaneous, large and prominent; first antennal segment much longer than the rests three segments together; pronotum with an inverted 'T' shaped

pale yellow markings touching the posterior margin; mesonotum with a yellow longitudinal markings at the middle; mid tibia provided with fringed long hairs inwardly. Measurements of different body parts as in Table 4.

Table 4. Measurements of different body parts of *Heterobates rihandi* (Pradhan):

CHARACTERS	MEASUREMENTS	
	Length	Width
Head	0.85 mm	0.45 mm
Eyes	0.46 mm	0.22 mm
Rostrum	1.47 mm.	–
Antenna (Total length)	5.1 mm	–
Pronotum	0.58 mm	1.02 mm
Meso and Metanotum	1.9 mm	1.37 mm
Foreleg (total length)	8.06 mm	–
Abdomen	2.75 mm	0.89 mm
Last abdominal segment (male)	0.62 mm	0.46 mm



4. *Heterobates rihandi* (Pradhan, 1950): a. Dorsal view of female, b. Dorsal view of Genital segment of male, c. Male genitalia with paramere

Type Locality: Rihand Dam, Mirzapur, Uttar Pradesh.

Distribution: Uttar Pradesh, Arunachal Pradesh, Himachal Pradesh, West Bengal (Dist. Darjeeling and Jalpaiguri).

Remarks: This species is well-distributed in the rivers and streams of North Bengal. The specimens are deposited in National Zoological Collection of Zoological Survey of India, Kolkata.

5. *Ptilomera (Ptilomera) assamensis*

Hungerford & Matsuda, 1965

1965. *Ptilomera (Ptilomera) assamensis* Hungerford & Matsuda, *Kans. Univ. Sci. Bull.*, **45**(5): 421

Materials examined: 2MM, 1 nymph; Sukhahjhora, near Malbazar, Jalpaiguri district, West Bengal; 11.IX.2011; Coll: S. Basu; 1M, 1F, 1 nymph; Murti River in front of Chapramari Railgate, Jalpaiguri District, West Bengal, 10.III.2011; Coll: S. Basu; 1 apterous F; Rabijhora, near Teesta, Darjeeling District, West Bengal; 13.IX.2011; Coll: S. Basu.

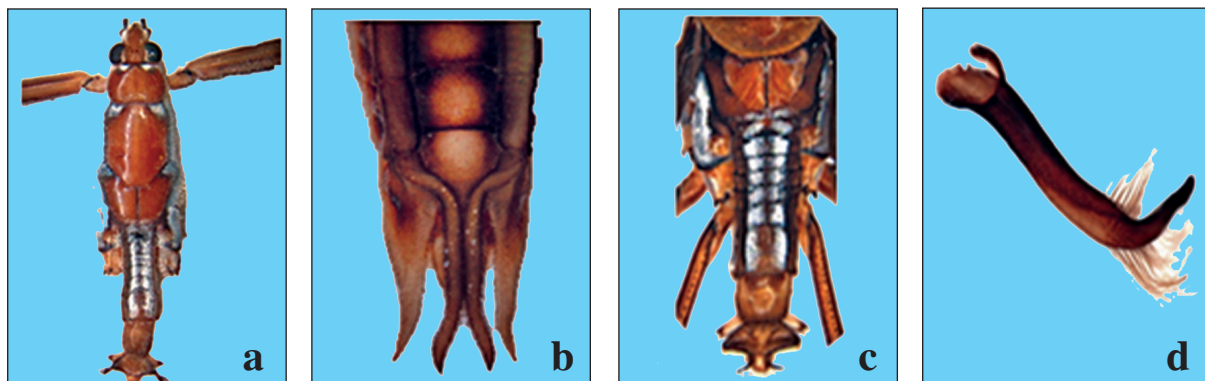
Diagnosis: Body yellowish brown in colour; adult insects may attain a length of about 13.6-14.5mm; first antennal segment generally longer than second, third and fourth antennal segment together; Males having broad suranal plate with

median lobe; but as long as or longer than the distal width of lateral wings and surpassing the lateral wings caudally; pygophore relatively short with apex truncated and the dorsolateral projections are short and broad basally; parameres are species-

specific with much of its shaft hidden beneath the median lobe; in females, the slanted turned base of connexival spine overlaps the caudo-lateral edge of seventh abdominal tergite slightly. Measurements of body parts are provided in Table 5.

Table 5. Measurements of different body parts of *Ptilomera (Ptilomera) assamensis* Hungerford & Matsuda:

CHARACTERS	MEASUREMENTS	
	Length	Width
Head	1.41 mm	0.87 mm
Eyes	0.79 mm	0.43 mm
Rostrum	1.94 mm	–
Antenna (Total length)	8.81 mm	–
Pronotum	1.0 mm	2.0 mm
Meso and Metanotum	2.69 mm	2.37 mm
Foreleg (total length)	13.65 mm	–
Wings	8.58 mm	–
Abdomen	5.91 mm	1.1 mm
Last abdominal segment (male)	1.63 mm	0.90 mm



5. *Ptilomera (Ptilomera) assamensis* Hungerford & Matsuda, 1965: a. Male dorsal view, b. Dorsal view of female genital segments, c. Dorsal view of male genital segments, d. Paramere of male

Type locality: Male holotype, allotype and paratypes were from Assam, collected by W. F. Badgley, in the year 1906.

Distribution: Assam, Arunachal Pradesh, West Bengal (Dist. Darjeeling and Jalpaiguri).

Remarks: This species is closely related to *Ptilomera (Ptilomera) laticaudata* and difficult to identify with the female specimens, while male specimen can be identified by its distinct paramere structures, position and with endosomal structures.

6. *Ptilomera (Ptilomera) agroides* Schmidt, 1926

1926. *Ptilomera agroides* Schmidt, *Ent. Mitt.*, **15**(1): 63.

1960. *Ptilomera (Ptilomera) agroides* Schmidt: Matsuda, *Kans. Univ. Sci. Bull.*, **41**(2): 269.

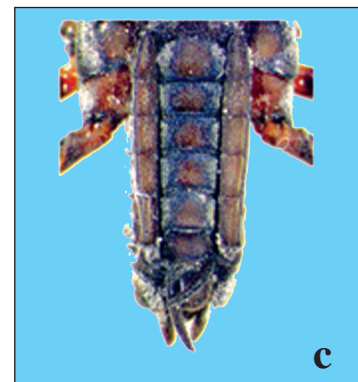
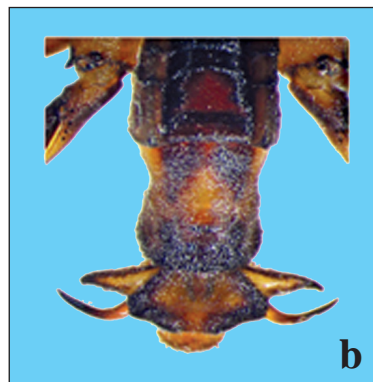
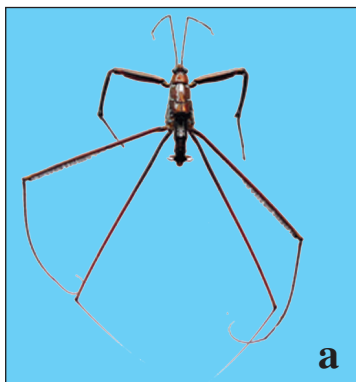
Materials examined: 2M, 4F; Water falls in Devkund, Mayurbhanj district, Orissa; 22.I.2011; Coll: S. Basu.

Diagnosis: *Apterous male:* Adult male attain 16-17 mm in body length; colour is typical for this species i.e. usually dark brown approaching black; thoracic region with a black longitudinal band laterally; fore femur stout and with two black shiny protuberances near its middle; silvery pilosity in the venter is prominent; Median lobe of suranal plate is broadly rounded; dorso-lateral

projection of pygofer surpasses the lateral wings of suranal plate by half of their length and with this character it can be easily separated from the other species; parameres are long with pointed tip turning forward. Measurements of body parts of male as provided in Table 6.

Table 6. Measurements of different body parts *Ptilomera (Ptilomera) agroides* Schmidt

CHARACTERS	MEASUREMENTS	
	Length	Width
Head	1.81 mm	0.883 mm
Eyes	1.02 mm	0.76 mm
Rostrum	2.64 mm	–
Antenna (Total length)	10.2 mm	–
Pronotum	1.74 mm	2.64 mm
Meso and Metanotum	4.63 mm	3.7 mm
Foreleg (total length)	17.56 mm	–
Abdomen	6.17 mm	2.23 mm
Last abdominal segment or genital segment (male)	2.89 mm	1.35 mm



6. *Ptilomera (Ptilomera) agroides* Schmidt, 1926: a. Dorsal view of male, b. Dorsal view of male genital segment, c. Dorsal view of female genital segment

Apterous female: Body length of adult female generally ranges from 14-15 mm; body colour is almost similar to male; connexival spines arise beneath the edge of connexivum with its tip reaching the caudal end of dorso-lateral lobe; Dorso-lateral lobe is short with its tip slightly surpassing the ninth abdominal tergite; The lateral projections of seventh abdominal segment extend beyond the connexival spine.

Type locality: Apterous male from Trichinopoli (Current: Tiruchirapally) at Southern India and an apterous female from Tranquebar (Current: Tarangambadii.), Tamilnadu, types of which were now in Polish Academy of Sciences in Warsaw, Poland. Other materials examined from

different parts of South India viz. Shovaroy hills, Yercaud (4500 ft); Nagalur (4000 ft); Anamalai hills, Cinchona (3500 ft); Kollar, Nilgiri hills, Tamilnadu (Hungerford and Matsuda, 1965).

Distribution: Karnataka, Kerala, Maharashtra, Tamilnadu, Madhya Pradesh, Orissa (Dist. Mayurbhanj).

Remarks: The torrential water striders of the Genus *Ptilomera* Amyot and Serville include five species from India. Among these *Ptilomera (Ptilomera) agroides* Schimdt was thought to be endemic from the Western Ghats (Karnataka, Kerala, Maharashtra, Tamilnadu which is situated within 8° & 22°N latitude and 73° & 81°E longitude; Thirumalai and Krishnan, 2000)

of India. Hitherto they known to have extended distribution in Central India (Jabalpur district; 23°10'N,79°57'E, of Madhya Pradesh; Thirumalai *et al.*, 2008). The present report of *Ptilomera (Ptilomera) agroides* Schmidt from Simlipal Tiger Reserve is interesting that this species now occurs in the present locality which forms part of Northern Eastern Ghats. However, the first report to the Eastern Ghats (Tamilnadu and Karnataka) had been made by Thirumalai in the year 1989 (Todehalla river, Anchetty (500 m); Chinnar river, Kottapatti–Vannathiparai (337 m); Sitteri-Horur road, Maamarathuodi (430-620 m); Shevroy hills, Bommidi Section, Dharmapuri district (450).

Subfamily HALOBATINAE

7. *Metrocoris communoides* Chen & Nieser, 1993

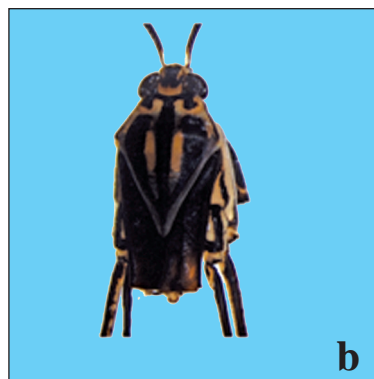
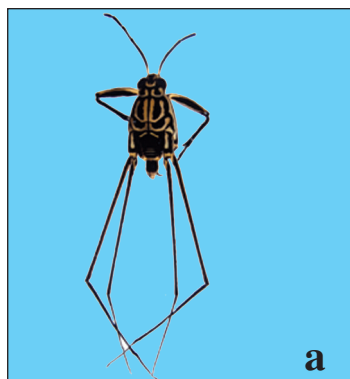
1993. *Metrocoris communoides* Chen & Nieser, *Steenstrupia*, 19(2): 51.

Materials Examined: 1M, 1F, Devkund waterfalls, Mayurbhanj district, Orissa, 19.II.2011; Coll: S. Basu; 1M,1F, Panchalingeshwar, Orissa, 19.II.2011; Coll: S. Basu; 1 macropterous M, 1 apterous M, 1 apterous F, 9 nymphs, Devkund waterfalls, Mayurbhanj district, Orissa, 22.I.2011, Coll: S. Basu.

Diagnosis: Body length ranges between 4.7-4.9 mm in males and in females 4.2-4.3 mm.; body colour is typical black with some yellow conspicuous markings; inter-ocular dark mark rectangular and bifid upward and downward; second segment of antenna slightly shorter than the third segment; male fore femur broad with a small sub-apical tooth ventrally; female fore femur slender; male parameres are curved with apex rounded; female sternum VII large with apical half forming a tongue-like lobe and tufts of dark hairs on the connexival apex. The measurements of different body parts are provided in the Table 7.

Table 7. Measurements of different body parts of *Metrocoris communoides* Chen & Nieser, 1993

CHARACTERS	MEASUREMENTS	
	Length	Width
Head	1.20 mm	0.76 mm
Eyes	0.56 mm	0.34 mm
Rostrum	0.97 mm	–
Antenna (Total length)	3.69 mm	–
Pronotum	0.41 mm	1.14 mm
Mesonotum and Metanotum	1.55 mm	1.92 mm
Foreleg (Total length)	5.66 mm	–
Abdomen	2.14 mm	1.20 mm
Last abdominal segment (male)	1.16 mm	0.61 mm



7. *Metrocoris communoides* Chen & Nieser, 1993: a. Dorsal view of male, b. Dorsal view of macropterous male, c. Dorsal view of male foreleg

Type Locality: Apterous male Holotype from Shevaroy hills, Yercaud, Tamilnadu.

Distributions: Tamilnadu, Himachal Pradesh, Orissa (Dist. Mayurbhanj).

Remarks: They are abundantly distributed in the State of Orissa.

DISCUSSION

Seven species belonging to six genera of the three families namely, Aphelocheiridae, Gerridae and Nepidae were examined, that enrich the faunal diversity of Eastern India. As the concerned field areas are the part of Darjeeling Himalaya, Jalpaiguri sub-Himalaya regions of West Bengal, and Orissa which is a part of Eastern Ghats, it is expected that many more species of aquatic and semi-aquatic Heteroptera are yet to be identified or yet to be described. Biodiversity within inland aquatic ecosystems especially in the Eastern Ghats and in the Eastern Himalaya region is both highly diverse of great regional importance to livelihoods and economics. Ecosystem requirements in favour of biodiversity are usually not considered in the development planning processes. The lack of poor representation of biodiversity, the lack of information on inadequate representation of biodiversity is another main reason for development of planning processes. However, detailed information about species distribution is fundamental to understand the local, regional and global patterns of diversity and how these

patterns change overtime (Rosenzweig, 1995; Ricklefs, 2004; Lomolino *et al.*, 2006). Although distributions for some taxa are well established, our knowledge about the geographical distribution of most species is incomplete (Whittaker *et al.*, 2005; Gagnon and Turgeon, 2001).

SUMMARY

Seven species under six genera and three families of aquatic and semi-aquatic Heteroptera with their diagnostic characters and their distribution in India are documented here. These species are reported for the first time from two eastern Indian States like West Bengal and Orissa. The systematic position and synonyms of species are also provided in the present communication.

ACKNOWLEDGEMENTS

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