

*Wetland Ecosystem Series, 9*

**Fauna of Kopili Hydro Electric Project Site,  
Umrong - North Cachar Hills District, Assam  
and Jaintia Hills District, Meghalaya**

**ZOOLOGICAL SURVEY OF INDIA**

*Wetland Ecosystem Series, 9*

**Fauna of Kopili Hydro Electric Project Site,  
Umrong—North Cachar Hills District, Assam  
and Jaintia Hills District, Meghalaya**

*Edited by the Director, Zoological Survey of India, Kolkata*



सत्यमेव जयते

**Zoological Survey of India  
Kolkata**

## CITATION

Editor—Director. 2008. *Fauna of Kopili Hydro Electric Project Site, Umrong—North Cachar Hills District, Assam and Jaintia Hills District, Meghalaya, Wetland Ecosystem Series*, 9 : 1-91 + 15 Colour Photographs (Published by the Director, *Zool. Surv. India*, Kolkata)

Published – February, 2008

ISBN 978-81-8171-187-8

© Government of India, 2008

### ALL RIGHTS RESERVED

- No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- This book is sold subject to the condition that it shall not, by way of trade, be lent, re-sold hired out or otherwise disposed of without the publisher's consent, in any form of binding or cover other than that in which it is published.
- The correct price of this publication is the price printed on this page. Any revised price indicated by a rubber stamp or by a sticker or by any other means is incorrect and should be unacceptable.

### PRICE

India : Rs. 250.00

Foreign : \$ 15; £ 10

Published at the Publication Division by the Director, Zoological Survey of India, 234/4, A J C Bose Road, 2nd MSO Building, (13th Floor), Nizam Palace, Kolkata-700 020 after laser type setting at Ghosh Enterprises, Kolkata-700 006 and printed at Printtech, Kolkata-700 056.

# Fauna of Kopili Hydro Electric Project Site *Wetland Ecosystem Series*

No. 9

2008

Pages 1-91

## CONTENTS

*Page Nos.*

FAUNA OF KOPILI HYDRO ELECTRIC PROJECT SITE —AN OVERVIEW .....	1-4
—S.J.S. Hattar	
FRESHWATER MONOGONONT ROTIFERS (ROTIFERA : EUROTATORIA : MONOGONONTA) .....	5-22
—Sumita Sharma	
FRESHWATER CLADOCERANS (CRUSTACEA : BRANCHIOPODA : CLADOCERA) .....	23-34
—Sumita Sharma	
CRUSTACEA (DECAPODA : GECARCINUCIDAE : PALAEMONIDAE : ATYIDAE) .....	35-38
—S.S. Ghatak, S.K. Ghosh and M.K. Dev Roy	
INSECTA : DERMAPTERA .....	39-44
—G.K. Srivastava	
INSECTA : HEMIPTERA (WATER BUGS) .....	45-50
—A. Bal	
INSECTA : AQUATIC COLEOPTERA (FAMILY : GYRINIDAE, DYTISCIDAE AND HYDROPHILIDAE) .....	51-57
—P. Mukhopadhyay and S. K. Ghosh	
MOLLUSCA .....	59-68
—S.C. Mitra, M. Hafiz and Ramakrishna	
AMPHIBIA .....	69-71
—N. Sen	
REPTILIA .....	73-76
—R. Mathew	
PISCES .....	77-91
—N. Sen	

## **FAUNA OF KOPILI HYDRO ELECTRIC PROJECT SITE — AN OVERVIEW**

**S. J. S. HATTAR**

*Zoological Survey of India, Eastern Regional Station, Shillong-793 003*

### **INTRODUCTION**

The Kopili Hydro Electric Project in Umrongso, is a twin project consisting of two concrete gravity dams namely Khandong Dam with a maximum height of 66 m on the Kopili river and the Umrong Dam with a maximum height of 30 m on Umrong nallah (stream) and two water conductor systems, one from Kopili reservoir to Khandong Power House and the other from the Umrong reservoir to the Kopili Power House and all other ancilliary structures such as approach channel, intake, bypass tunnel, surge tank, dykes and power station features. The catchment of Kopili river consists of three district zones, namely Kopili catchment in Meghalaya State, Kopili catchment in Assam State and Umrongso catchment.

The catchment is located between 25°7' and 25°32' north latitudes and between 92°12' and 92°50' east longitudes. The catchment of Kopili river upto Khandong Dam spreads over two states, major part being in Meghalaya and a narrow undulating area falling in Assam. The entire catchment is responsible for flash flood in Kopili river particularly in Brahmaputra valley. The altitude of the catchment area varies between 500 m to 1325 m, the major portion located between 1000 m and 1400 m.

Physiographically, Meghalaya represents the remnants of the archaean plateau of the Indian Peninsular shield. The kernal of the plateau is exposed archaean gneiss and schists covered in the central and eastern parts (Kopili catchment) by Pre-Cambrian quartzite and phyllites. The soil of the catchments area are generally acidic in nature and high in iron content.

The intensity of rainfall is usually lower in the areas of falling under the State of Assam. The intensity of rainfall is very high in the Meghalaya side of the project area resulting in problems of soil erosion and the related damages.

Further, clearance of forests followed by cultivation by slash and burn method exhausts the productivity of the soil and leads to accelerated soil erosion on the hill slopes which denudes the forest areas and changes the ecological pattern of the region.

The eastern portions of the catchment of Kopili river located in Assam State is a comparatively narrow belt of mostly wooded area covering about 150 sq. km. The catchment area mainly consists of miscellaneous forest including the proposed protected forest for wildlife conservation, grassy banks with scattered miscellaneous trees near nallahs as well as some patches of low level oak forest. Some portions of the Krungming reserve forest has also been included in the hydel project area and some good patches of miscellaneous forest including Schimaloak type. The hilly forested tracts are being constantly affected by Jhum cultivation. Vast areas of unclassed state forest in the catchment area have in the process been reduced to grassy blanks with scattered trees only.

Catchment of Umrong nallah at Umrongso dam site is 62 sq. km. which is bounded by old Haflong road in the east and the prominent water divides between the Kopili and the Umrong in the west. Though the discharge of the river is not much yet in view of the reservoir being fed by water from the main reservoir for generating power in Kopili Power House, the hydrologic condition of the catchment is of utmost importance to the entire project. The altitude varies from 600 m to 1000 m and the average annual rainfall is about 2700 mm. Soil depth is generally shallow and of low nutrient status.

The forests consist of broad leaved species as well as the new crop of Bajrantoak and Chilauni growing naturally in abundance in the islands in the reservoir have excellent water shed values. The forest areas are occasionally subjected to jhumming.

Kopili river is an important tributary of the mighty Brahmaputra. It originates in the Borail ranges of the North Cachar Hills district of Assam at an altitude of 1525 mts above mean sea level. It traverse some 290 kms to join Brahmaputra on its southern bank near Nagaon in Assam. The Umrong nallah is a tributary of Kopili river in Jaintia Hills district of Meghalaya. The Kopili Hydro Electric Project is built across Kopili river and Umrong nallah. Initiated in 1953 the work on this project was taken up in phases. The main objective of this project is the socio-economic development of the country at large and that of North Eastern Region in particular.

## **FAUNAL RESOURCES**

The task of making an inventory of the faunal elements of the project site was entrusted to Eastern Regional Station of Zoological Survey of India, Shillong. Altogether eight survey tours were conducted to the project site (July, 1998 to October, 2000) and taxonomic studies and identification of the materials collected were done by experts from Eastern Regional Station, Shillong and Head quarters, Kolkata. The following chapters reflect the various faunal groups studied : Rotifera, Freshwater Cladocera, Decapoda, Hemiptera (Water Bugs),



Aquatic coleoptera, Mollusca, Pisces and Amphibia. Since Dermaptera and Reptilia (Snakes) were collected from the catchment areas of the project sites faunal details have been included in the Table-1.

**Table 1. :** Faunal details of the project site.

<b>Taxonomic group</b>	<b>Family</b>	<b>Genera</b>	<b>Species</b>
Rotifera	7	10	30
Cladocera	7	11	15
Crustacea : Decapoda	3	5	6
Insecta : Dermaptera	4	6	7
Insecta : Hemiptera : (Water Bugs)	3	5	11
Insecta : Aquatic Coleoptera	3	6	10
Mollusca	7	9	24
Amphibia	2	4	4
Reptilia	3	5	5
Pisces	10	19	32
<b>Total</b>	<b>49</b>	<b>80</b>	<b>144</b>

**PLATE I**



**Fig. 1. :** Front view of Khandong Dam.



**Fig. 2. :** Opposite view of Khandong Dam.

**PLATE II**



**Fig. 3. :** Khandong reservoir as viewed from the dyke.



**Fig. 4. :** Another view of Khandong reservoir.

**PLATE III**



**Fig. 5. :** Another view of Khandong reservoir.



**Fig. 6. :** View of Umrong reservoir.

**PLATE IV**



**Fig. 7. :** Collection spot at Umrong reservoir.

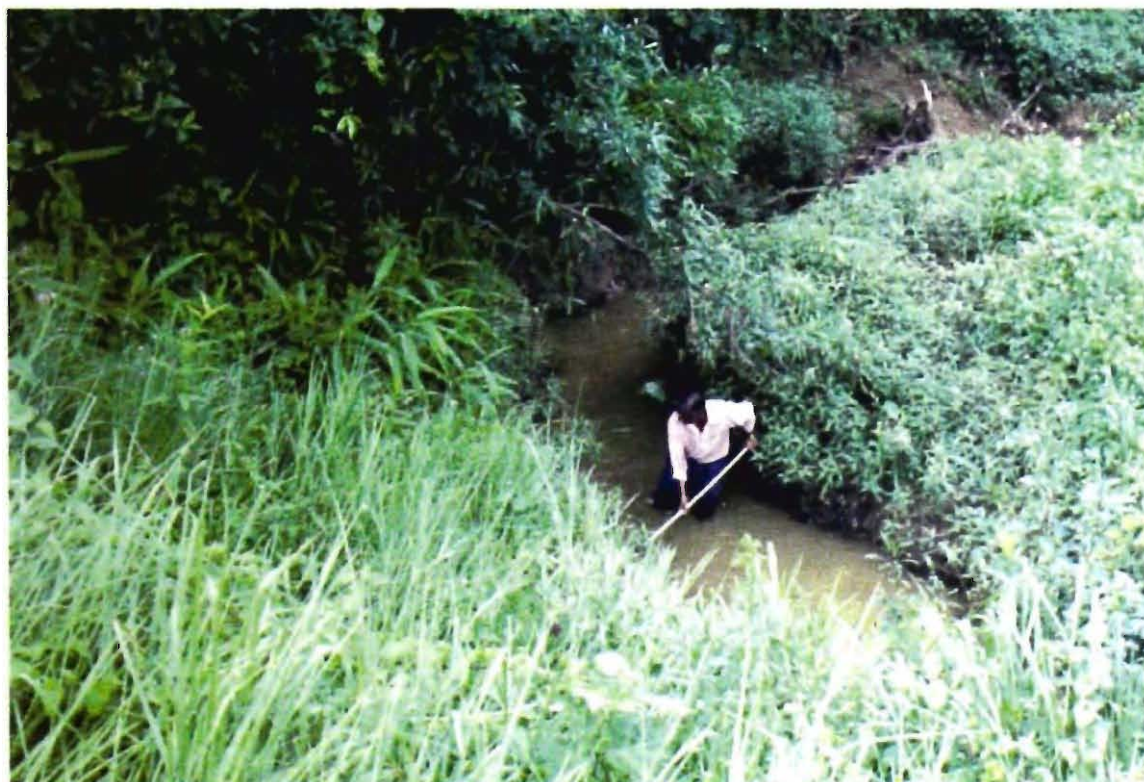


**Fig. 8. :** Another view of Umrong reservoir.

**PLATE V**



**Fig. 9. :** Another view of Umrong reservoir.



**Fig. 10. :** Collection spot at drainage system.

**PLATE VI**



**Fig. 11. :** Thick forest around project site.



**Fig. 12. :** View of Lower Kopili river at Power house site.

**PLATE VII**



**Fig. 13. :** Collection in progress at Lower Kopili river.



**Fig. 14. :** Another clear view of Lower Kopili river.

**PLATE VIII**



**Fig. 15. :** Lower Kopili river as viewed from Hill Top.

## **FRESHWATER MONOGONONT ROTIFERS (ROTIFERA : EUROTATORIA : MONOGONONTA)**

**SUMITA SHARMA**

*Eastern Regional Station, Zoological Survey of India, Shillong-793 003*

### **INTRODUCTION**

Plankton samples collected with a nylobolt plankton net (No. 25) from different water bodies in the study area are analyzed for the present species inventory. The rotifer taxa are screened and isolated and the permanent slides are made in Polyvinyl-alcohol lactophenol mixture. Various species are identified using Leitz-Dialux phase-contrast microscope fitted with a drawing tube and following the works of Koste (1978), Segers (1995), Sharma (1998), and Sharma & Sharma (1999, 2000). Segers (2002) is followed for the recent nomenclature of the Rotifera. Taxonomic notes are made on documented species with remarks on their distribution. All the measurements are given in micrometers (mm). Remarks are made on general nature and composition of the rotifer taxocoenosis.

### **SYSTEMATIC ACCOUNT**

Phylum ROTIFERA

Superclass EUROTATORIA

Class MONOGONONTA

Order PLOIMIDA

Family BRACHIONIDAE Ehrenberg, 1838

1. *Brachionus angularis* Gosse, 1851
2. *B. bidentatus* Anderson, 1889
3. *B. diversicornis* (Daday, 1883)
4. *B. falcatus* Zacharias, 1898
5. *B. forficula* Wierzejski, 1891
6. *B. patulus* O. F. Müller, 1786
7. *B. quadridentatus* (Hermann, 1783)
8. *Keratella cochlearis* Gosse, 1851

9. *K. tropica* (Apstein, 1907)
10. *Platyias quadricornis* (Ehrenberg, 1832)

Family MYTILINIDAE

11. *Mytilina ventralis* (Ehrenberg, 1832)

Family LEPADELLIDAE

12. *Lepadella acuminata* (Ehrenberg, 1834)
13. *L. ovalis* (O. F. Müller, 1786)
14. *L. patella* (O. F. Müller, 1773)

Family LECANIDAE

15. *Lecane aculeata* (Jakubski, 1912)
16. *L. curvicornis* (Murray, 1913)
17. *L. leontina* (Turner, 1892)
18. *L. luna* (O. F. Müller, 1776)
19. *L. ploenensis* (Voigt, 1902)
20. *L. unguolata* (Gosse, 1887)
21. *L. (M.) bulla* (Gosse, 1851)
22. *L. (M.) closterocerca* (Schmarda, 1859)
23. *L. (M.) lunaris* (Ehrenberg, 1832)
24. *L. (M.) quadridentata* (Ehrenberg, 1832)
25. *L. (M.) unguitata* (Fadeev, 1925)

Family TRICHOCERCIDAE

26. *Trichocerca similis* (Wierzejski, 1893)

Order GNESIOTROCHA

Family FILINIIDAE

27. *Filinia longiseta* (Ehrenberg, 1834)

Family TESTUDINELLIDAE

28. *Testudinella emarginula* (Stenroos, 1898)
29. *T. patina* (Hermann, 1783)
30. *Pompholyx sulcata* Hudson, 1885

## SYSTEMATIC LIST

1. *Brachionus angularis* Gosse, 1851

(Fig. 1)

1851. *Brachionus angularis* Gosse, *Ann. Mag. Nat. Hist. Ser. 2*, 8 : 203.*Material examined* : 4 examples (Total length : 90-120; maximum width : 80-96)*Diagnostic characters* : Lorica rigid, stippled and compressed dorso-ventrally. Anterior occipital margin with two median spines flanked by a V-shaped sinus. Foot-opening large and flanked laterally by cuticular protuberances. Posterior spines lacking.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Andhra Pradesh, Maharashtra, Madhya Pradesh, Delhi, Kashmir, Punjab, Haryana and Chandigarh (Union Territory).*Elsewhere* : COSMOPOLITAN.2. *Brachionus bidentatus* Anderson, 1889

(Fig. 2)

1889. *Brachionus bidentata* Anderson, *J. Asiatic Soc. Bengal*, 58 : 352, pl. 21, fig. 13.*Material examined* : 4 examples (Total length : 180-220; maximum width : 105-115).*Diagnostic characters* : Lorica firm, stippled and moderately compressed dorsoventrally. Dorsal and ventral plates joined together for about 3/4 of length of lorica and then diverge to unite with basal plate. Anterior margin with six occipital spines; laterals and medians longer than intermediate occipital spines. Postero-lateral spines almost parallel-sided and variable in length. Foot-opening with a symmetrically projecting sheath.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Andhra Pradesh, Orissa, Punjab and Haryana.*Elsewhere* : PANTROPICAL.3. *Brachionus diversicornis* (Daday, 1883)

(Fig. 3)

1883. *Schizocerca diversicornis* Daday, *Math. Termesz Ertesito Budapest*, 1 : 291.*Material examined* : 3 examples (Total length : 220-280; maximum width : 92-105).*Diagnostic characters* : Lorica elongated and compressed dorso-ventrally. Anterior occipital margin with four spines; median occipital spines short and laterals longer. Posterior spines two, unequal and divergent; the right posterior spine longer than the left.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Haryana and Punjab.*Elsewhere* : COSMOPOLITAN.

4. *Brachionus falcatus* Zacharias, 1898

(Fig. 4)

1898. *Brachionus falcatus* Zacharias, *Biol. Stn. zu Plon*, 6 : 45, taf. IV, fig. 4.*Material examined* : 7 examples (Total length : 210-380; maximum width : 108-130).*Diagnostic characters* : Lorica rigid and compressed dorso-ventrally. Occipital margin with six spines; intermediate occipitals longest and curved ventrally, laterals and medians short and of almost equal length. Posterior spines long, incurved and widely separated at their bases. Foot-opening situated between the bases of posterior spines.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Andhra Pradesh, Madhya Pradesh, Gujarat, Rajasthan, Kerala, Punjab and Haryana.*Elsewhere* : PANTROPICAL.5. *Brachionus forficula* Wierzejski, 1891

(Fig. 5)

1891. *Brachionus forficula* Wierzejski, *Bull. Soc. Zool. France*, 16 : 51, fig. 3.*Material examined* : 3 examples (Total length : 100-125; maximum width : 90-110)*Diagnostic characters* : Lorica rigid, finely stippled and moderately compressed dorsoventrally. Anterior occipital margin with four spines, lateral occipitals longer than medians. Posterior spines stout, inwardly directed and widely separated at their bases; each with a knee-like swelling on inner side near the base.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Andhra Pradesh, Gujarat and Punjab.*Elsewhere* : PANTROPICAL.6. *Brachionus patulus* O. F. Müller, 1786

(Fig. 6)

1786. *Brachionus patulus* O. F. Müller, *Havniae*, 361, Taf. XLVII, fig. 14.*Material examined* : 4 examples (Lorica length : 145-160; maximum width : 150-170).*Diagnostic Characters* : Lorica rigid, sub-rectangular and moderately compressed dorsoventrally; dorsum with reticulate areolations and with a pattern of cuticular ridges. Both occipital and mental margins with short, blunt spines. Posterior spines short and stout. Foot-opening flanked by asymmetrical spines.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Andhra Pradesh, Gujarat, Tamil Nadu, Kerala, Rajasthan, Punjab and Kashmir.*Elsewhere* : COSMOPOLITAN.

7. *Brachionus quadridentatus* Hermann, 1783

(Fig. 7)

1783. *Brachionus quadridentatus* Hermann, *Naturforscher Halle*, 19 : 47, pl. II, fig. 9.

*Material examined* : 7 examples (Total length : 248-260; maximum width : 148-150).

*Diagnostic characters* : Lorica rigid, stippled and moderately compressed dorso-ventrally. Anterior margin with six occipital spines; median occipital spines longest and ventrally curved, laterals longer than intermediates. Postero-lateral spines well developed. Ventro-posterior spines prolonged to form a foot-sheath around the retractile foot.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Andhra Pradesh, Madhya Pradesh, Kerala, Rajasthan, Punjab and Kashmir.

*Elsewhere* : COSMOPOLITAN.

8. *Keratella cochlearis* (Gosse, 1851)

(Fig. 8)

1851. *Anurea cochlearis* Gosse, *Ann. Mag. Nat. Hist. ser. 2*, 8 : 202.

*Material examined* : 10 examples (Lorica length : 90-130; maximum width : 60-80).

*Diagnostic characters* : Lorica elongated-oval, finely stippled and with a median posterior spine of variable length. Anterior margin with six occipital spines; medians longest and ventrally curved, intermediates usually divergent and shorter than laterals. Dorsal plate with a median longitudinal line extending from behind median frontal area; two enclosed plaques on either side of the median line, with two enclosed lateral polygons.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Kerala, Kashmir, Ladak, Punjab and Rajasthan.

*Elsewhere* : COSMOPOLITAN.

9. *Keratella tropica* (Apstein, 1907)

(Fig. 9)

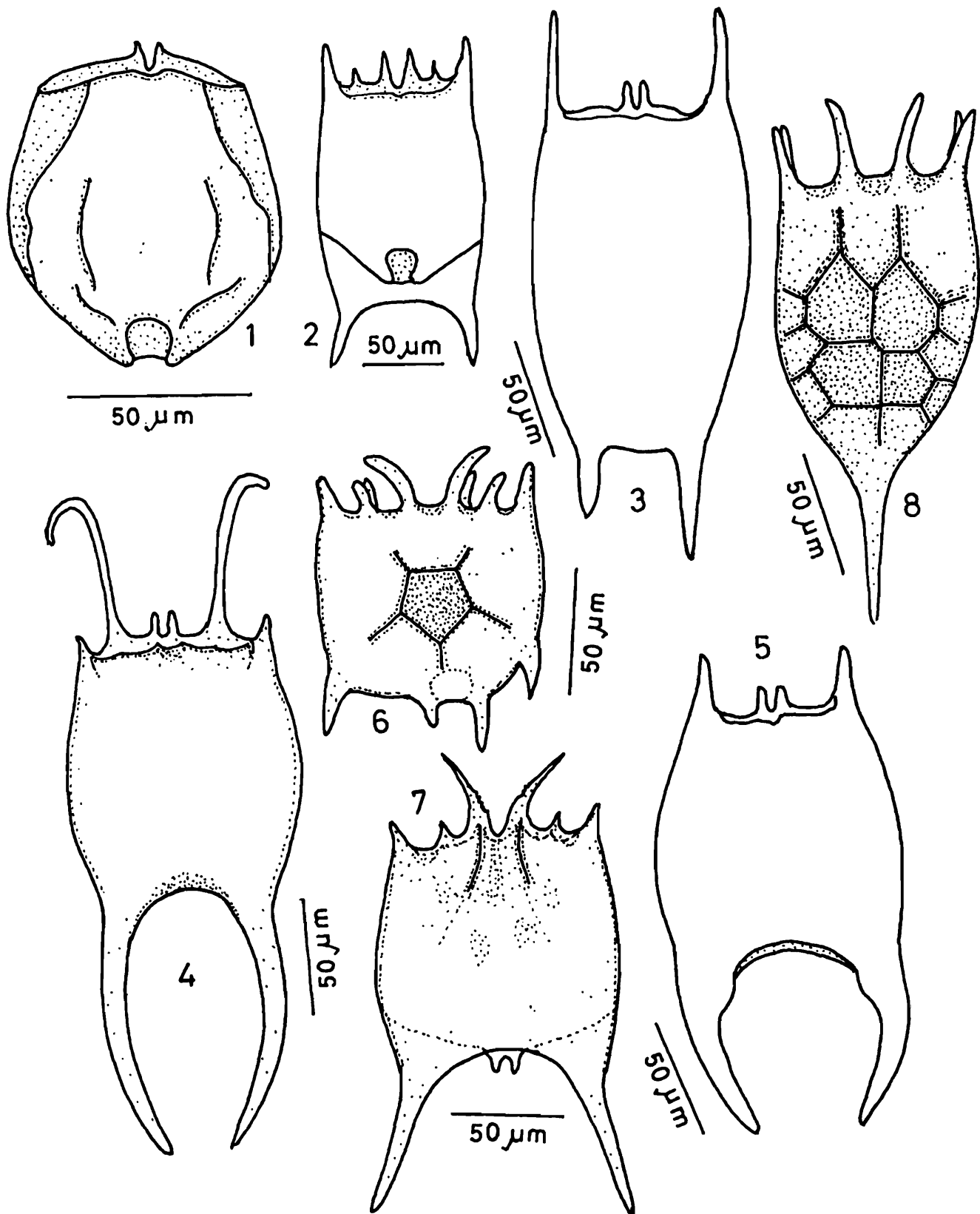
1907. *Anurea vulga* f. *tropica* Apstein, *Zool. Jb. Abt. Syst.*, 25 : 210, fig. F.

*Material examined* : 4 examples (Lorica length : 120-182; maximum width : 80-96).

*Diagnostic characters* : Lorica elongate-oval, stippled and with six occipital spines; medians occipitals longest, pointed and outcurved. Dorsal plate with three median hexagonal plaques and a small (squarish) area between the last median plaque and the posterior margin of lorica. Posterior spines unequal and variable in length; the right spine generally longer than the left.

*Distribution* : INDIA : Meghalaya; Assam, Tripura, West Bengal, Bihar, Orissa, Andhra Pradesh, Madhya Pradesh, Kerala, Gujarat, Rajasthan, Punjab, Haryana, Kashmir and Ladakh.

*Elsewhere* : COSMOPOLITAN.



**Figs. 1-8.** : *Brachionus angularis* Gosse, 1851 : Fig. 1, ventral view; *B. bidentatus* Anderson, 1889; Fig. 2, ventral view; *B. diversicornis* (Daday, 1883); Fig. 3, ventral view; *B. falcatus* Zacharias, 1898; Fig. 4, ventral view; *B. forficula* Wierzejski, 1891; Fig. 5, ventral view; *B. patulus* O. F. Müller, 1786; Fig. 6, dorsal view; *B. quadridentatus* (Hermann, 1783); Fig. 7, dorsal view; *Keratella cochlearis* Gosse, 1851; Fig. 8, dorsal view.

10. *Platyias quadricornis* (Ehrenberg, 1832)

(Fig. 10)

1832. *Noteus quadricornis* Ehrenberg, *Abhandl. Akad. Wiss. Berlin*, (1831) pl. IV, fig. 5.*Material examined* : 2 examples (Total length : 178-230; maximum width : 165-180).*Diagnostic characters* : Lorica rigid, nearly circular, tuberculated and with a dorsal pattern of pentagonal facets. Occipital margin with two stout median spines, with bluntly rounded to nearly truncate tips. Posterior spines short and parallel.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Andhra Pradesh, Kerala, Rajasthan, Punjab, Haryana, Kashmir and Ladakh.*Elsewhere* : COSMOPOLITAN.11. *Mytilina ventralis* (Ehrenberg, 1832)

(Fig. 11)

1832. *Salpina ventralis* Ehrenberg, *Abhandl. Akad. Wiss. Berlin* (1831) : 133, pl. 4, fig. 7.*Material examined* : 2 examples (Lorica length : 180-220).*Diagnostic characters* : Lorica rigid, laterally compressed and anterior 1/3 part of lorica heavily granulated. Antero-ventral corners with a spine on each side. Postero-dorsal and postero-ventral spines short and variable. Toes two and moderately long.*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Andhra Pradesh, Gujarat, Madhya Pradesh, Kerala, Punjab, Kashmir, Ladakh and Rajasthan.*Elsewhere* : COSMOPOLITAN.12. *Lepadella acuminata* (Ehrenberg, 1834)

(Fig. 12)

1834. *Metopedia acuminata* Ehrenberg, *Folio. Berlin* : 210.*Material examined* : 2 examples (Lorica length : 90-110; maximum width : 60-75).*Diagnostic characters* : Lorica broadly oval, compressed dorso-ventrally and its posterior end produced into a pointed spine of variable length. Foot groove oval; toes pointed.*Distribution* : INDIA : Meghalaya, Assam, Arunachal Pradesh, Tripura, West Bengal, Orissa, Bihar and Tamil Nadu.*Elsewhere* : COSMOPOLITAN.13. *Lepadella ovalis* (O. F. Müller, 1786)

(Fig. 13)

1786. *Brachionus ovalis* Müller, *Havniae* : 345, pl. 141, figs. 1-3.*Material examined* : 4 examples (Lorica length : 90-130; maximum width : 80-94).

**Diagnostic characters** : Lorica oval to circular and compressed dorso-ventrally; dorsal plate convex and ventral plate nearly flat. Dorsal and ventral sinus with stippled collars. Foot-groove nearly parallel-sided. Toes relatively short and pointed.

**Distribution** : INDIA : All states in North Eastern region, West Bengal, Orissa, Bihar, Kerala, Punjab, Haryana, Ladakh and Kashmir.

**Elsewhere** : COSMOPOLITAN.

14. *Lepadella patella* (O. F. Müller, 1773)

(Fig. 14)

1773. *Brachionus patella* Müller, *Infusoria*, 341, pl. 8, figs. 15-29.

**Material examined** : 2 examples (Lorica length : 75-105 : maximum width : 60-78).

**Diagnostic characters** : Lorica oval and dorsal plate strongly arched; anterior dorsal and ventral sinus with stippled collars. Foot groove parallel-sided to semicircular and its edges often projecting at the posterior end. Toes pointed.

**Distribution** : INDIA : All states in North Eastern region, West Bengal, Orissa, Bihar, Rajasthan, Gujarat, Punjab, Ladakh and Kashmir.

**Elsewhere** : COSMOPOLITAN.

15. *Lecane aculeata* (Jakubski, 1912)

(Fig. 15)

1912. *Distyla aculeata* Jakubski, *Zool. Anz.*, 39 : 543, figs. 3, 4.

**Material examined** : 2 examples (Length dorsal plate : 55-70; length ventral plate : 60-68; width dorsal plate : 48-54; width ventral plate : 44-48).

**Diagnostic characters** : Lorica elongate-oval, with straight and coincident anterior margins; ventral plate narrower than dorsal plate and with distinct outcurving spines at its external edges. Toes parallel-sided and terminating into slender claws.

**Distribution** : INDIA : Meghalaya, Assam, Tripura, West Bengal, Bihar and Orissa.

**Elsewhere** : PANTROPICAL.

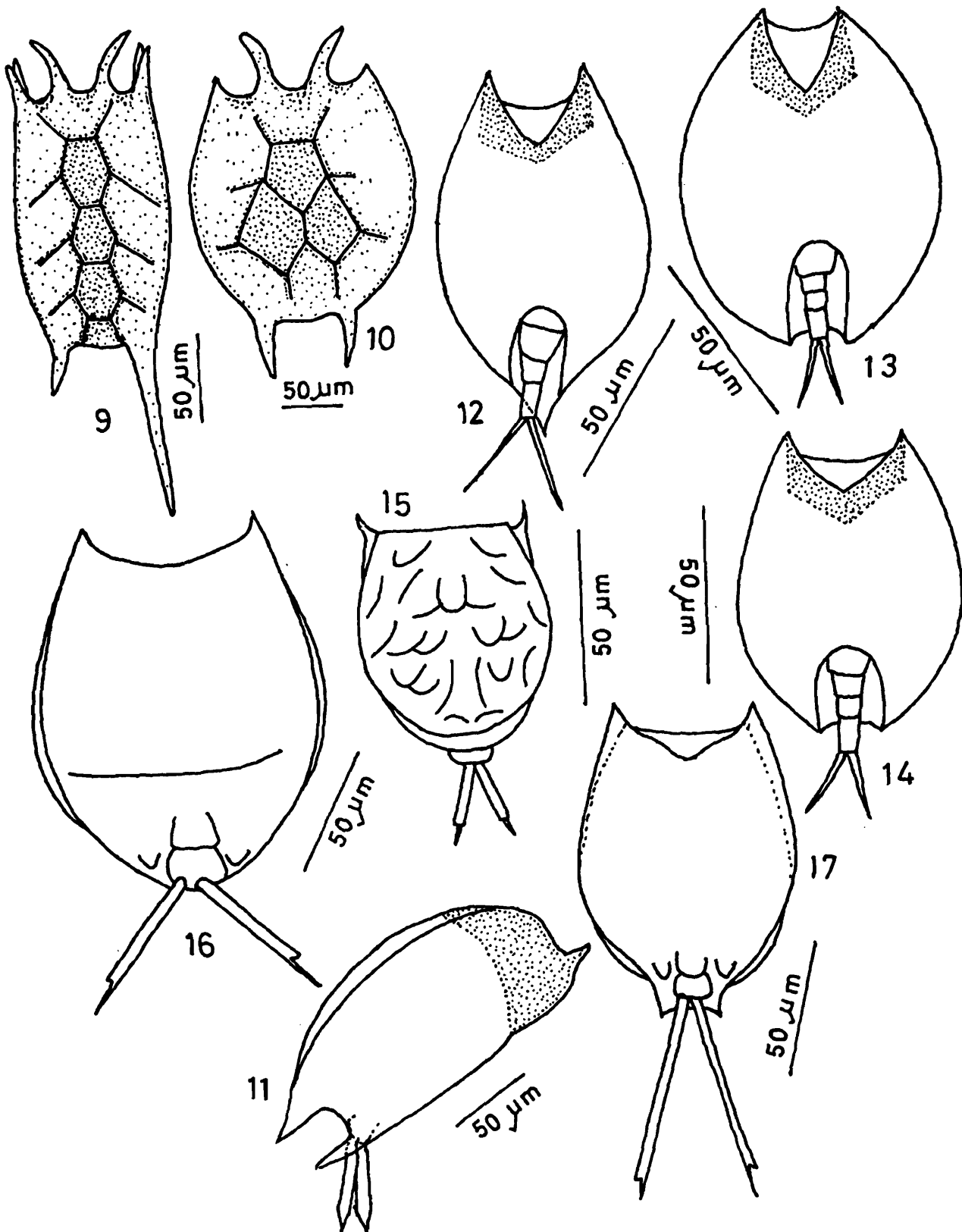
16. *Lecane curvicornis* (Murray, 1913)

(Fig. 16)

1913. *Cathypna curvicornis* Murray, *J. Roy. Micro. Soc.*, 346, pl. XIV, fig. 22.

**Material examined** : 3 examples (Length dorsal plate : 145-150; length ventral plate : 160-172; width dorsal plate : 145-155; width ventral plate : 125-134).

**Diagnostic characters** : Lorica pyriform, anterior margins coincident and with a V-shaped sinus; external angles with prominent spines. Dorsal plate narrower than ventral plate and



**Figs. 9-17.** : *Keratella tropica* (Apstein, 1907) : Fig. 9, dorsal view; *Platytias quadricornis* (Ehrenberg, 1832); Fig. 10, dorsal view; *Mytilina ventralis* (Ehrenberg, 1832); Fig. 11, lateral view; *Lepadella acuminata* (Ehrenberg, 1834); Fig. 12, ventral view; *L. ovalis* (O. F. Müller, 1786); Fig. 13, ventral view; *L. patella* (O.F. Müller, 1773); Fig. 14, ventral view; *Lecane aculeata* (Jakubski, 1912); Fig. 15, dorsal view; *L. curvicornis* (Murray, 1913); Fig. 16, ventral view; *L. leontina* (Turner, 1892); Fig. 17, ventral view.

without any surface markings. Posterior segment small; often rounded. Toes long, claws small and each claw with a basal spicule.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Bihar, Andhra Pradesh, Madhya Pradesh.

*Elsewhere* : TROPICOPOLITAN.

### 17. *Lecane leontina* (Turner, 1892)

(Fig. 17)

1892. *Cathypna leontina* Turner, *Bull. Sci. Lab. Denison Univ. Granville, Ohio*, 6 : 61, pl. I, fig. 12, Figs. 112-113.

*Material examined* : 5 examples (Length dorsal plate : 135-170; length ventral plate : 160-196; width dorsal plate : 115-128; width ventral plate : 120-140).

*Diagnostic characters* : Lorica oblong-ovate, anterior dorsal and ventral sinus broadly V-shaped; ventral plate broader than dorsal plate and with triangular spines at external angles. Posterior segment extending over foot as a tail-like projection. Toes long, parallel-sided and terminating into pointed claws; each claw with a basal spicule.

*Distribution* : INDIA : All the states of North-Eastern India, West Bengal, Orissa, Bihar, Andhra Pradesh, Madhya Pradesh and Punjab.

*Elsewhere* : TROPICOPOLITAN.

### 18. *Lecane luna* (O. F. Müller, 1776)

(Fig. 18)

1776. *Cercaria luna* Müller, *Havniae*, p. 280.

*Material examined* : 4 examples (Length dorsal plate : 120-140; length ventral plate : 135-150; width dorsal plate : 108-120; width ventral plate : 106-114).

*Diagnostic characters* : Lorica ovate to sub circular, dorsal plate broader than ventral plate; anterior ventral sinus V-shaped and with cuspidate external angles. Toes stout, parallel-sided, slightly swollen at bases and with distinct claws; each claw with a distinct basal spicule.

*Distribution* : INDIA : All the states in North-Eastern India, West Bengal, Rajasthan, Punjab, Kashmir and Ladakh.

*Elsewhere* : COSMOPOLITAN.

### 19. *Lecane ploenensis* (Voigt, 1902)

(Fig. 19)

1902. *Distyla ploenensis* Voigt, *Zool. Anz.*, 25 : 679.

*Material examined* : 4 examples (Length dorsal plate : 118-130; length ventral plate : 125-145; width dorsal plate : 90-98; width ventral plate : 80-90).

**Diagnostic characters** : Lorica elongate-oval and with relatively longer spines at anterior external angles. Dorsal plate truncate posteriorly and with strong surface markings. Toes relatively elongated and terminating into acute points.

**Distribution** : INDIA : Meghalaya, Assam, Mizoram, Tripura, West Bengal, Orissa, Bihar, Gujarat and Punjab.

**Elsewhere** : COSMOPOLITAN.

20. *Lecane ungulata* (Gosse, 1887)  
(Fig. 20)

1887. *Cathypna ungulata* Gosse, *J. Roy. Micro. Soc.*, : 361, pl. VIII, fig. 1.

**Material examined** : 4 examples (Length dorsal plate : 190-224; length ventral plate : 240-260; width dorsal plate : 160-180; width ventral plate : 185-200).

**Diagnostic characters** : Lorica large, ovate; anterior margins nearly straight and with characteristic triangular cuspidate spines at external angles. Dorsal plate narrower than ventral plate. Posterior segment large. Toes parallel-sided, with long stout claws; each claw with a prominent basal spicule.

**Distribution** : INDIA : Meghalaya, Assam, Tripura, Mizoram, Nagaland, West Bengal, Orissa, Bihar, Andhra Pradesh, Gujarat and Punjab.

**Elsewhere** : COSMOPOLITAN.

21. *Lecane (Monostyla) bulla* (Gosse, 1851)  
(Fig. 21)

1851. *Monostyla bulla* Goose, *Ann. Mag. Nat. Hist. ser.*, 2, 8 : 220.

**Material examined** : 4 examples (Length dorsal plate : 126-142; length ventral plate : 134-152; width dorsal plate : 96-108; width ventral plate : 90-100).

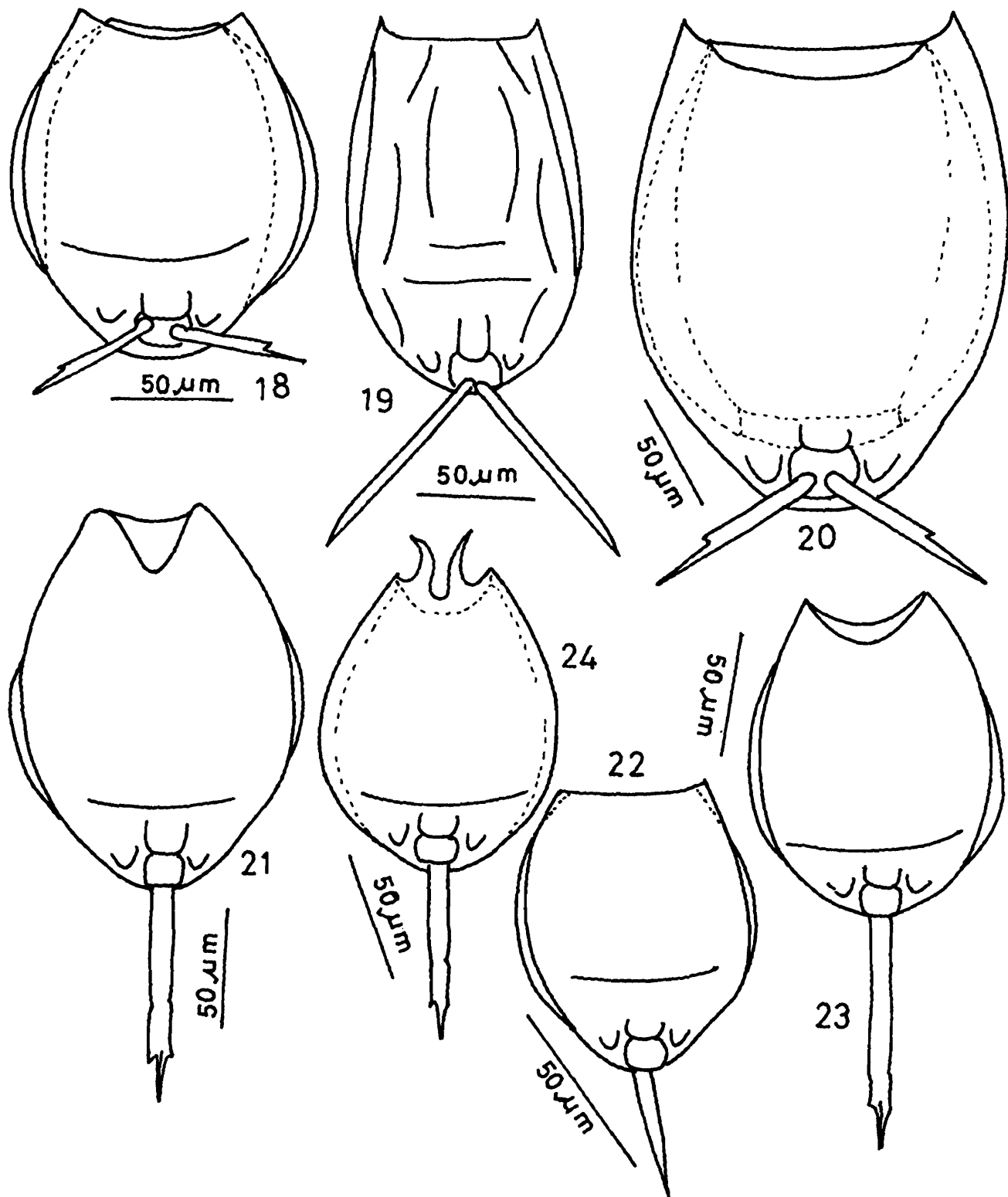
**Diagnostic characters** : Lorica oblong-ovate; anterior dorsal margin with a shallow sinus, anterior ventral margin with a deep sinus flanked with small cusps at external angles. Toes long and terminating into a long and pointed claw with distinct basal spicules; claw with a distinct median line but not divided.

**Distribution** : INDIA : Meghalaya, Assam, Tripura, Mizoram, Nagaland and Arunachal Pradesh, West Bengal, Orissa, Bihar, Andhra Pradesh, Tamil Nadu, Rajasthan, Gujarat, Punjab and Kashmir.

**Elsewhere** : COSMOPOLITAN.

22. *Lecane (Monostyla) closterocerca* (Schmarda, 1859)  
(Fig. 22)

1859. *Monostyla closterocerca* Schmarda, *Leipzig*, 1 : 59, Taf. XIV, fig. 125.



**Figs. 18-24.** : *Lecane luna* (O. F. Müller, 1776) : Fig. 18, ventral view; *L. ploenensis* (Voigt, 1902); Fig. 19, ventral view; *L. ungulata* (Gosse, 1887); Fig. 20, ventral view; *L. (Monostyla) bulla* (Gosse, 1851); Fig. 21, ventral view; *L. (M.) closterocerca* (Schmarda, 1859); Fig. 22, ventral view; *L. (M.) lunaris* (Ehrenberg, 1832); Fig. 23, ventral view; *L. (M.) quadridentata* (Ehrenberg, 1832); Fig. 24, ventral view.

**Material examined** : 5 examples (Length dorsal plate : 60-68; length ventral plate : 62-75; width dorsal plate : 56-68; width ventral plate : 50-62).

**Diagnostic characters** : Lorica broadly oval and anterior margins slightly concave; external angles rounded or produced into small corners. Ventral plate narrower than dorsal plate. Toe parallel-sided for about ½ of its length and then tapering to a slender point.

**Distribution** : INDIA : All states in North-Eastern India, Orissa, Tamil Nadu, Gujarat, Rajasthan, Punjab, Kashmir and Ladakh.

**Elsewhere** : COSMOPOLITAN.

**23. *Lecane (Monostyla) lunaris* (Ehrenberg, 1832)**  
(Fig. 23)

1832. *Lepadella lunaris* Ehrenberg, *Abhandl. Akad. Wiss. Berlin* (1831) : 127.

**Material examined** : 2 examples (Length dorsal plate : 108-120; length ventral plate : 120-126; width dorsal plate : 95-105; width ventral plate : 84-92).

**Diagnostic characters** : Lorica ovate, anterior margins with a shallow sinus; dorsal plate semicircular to pear-shaped, ventral plate broadly oval and narrower than dorsal plate. Toe long, parallel-sided; claw pointed, with a median furrow and two basal spicules.

**Distribution** : INDIA : Meghalaya, Assam, Tripura, Mizoram, Nagaland and Arunachal Pradesh, West Bengal, Orissa, Bihar, Gujarat and Kashmir.

**Elsewhere** : COSMOPOLITAN.

**24. *Lecane (Monostyla) quadridentata* (Ehrenberg, 1832)**  
(Fig. 24)

1832. *Monostyla quadridentata* Ehrenberg, *Abhandl. Akad. Wiss. Berlin*, (1831) : 130.

**Material examined** : 2 examples (Length dorsal plate : 110-142; length ventral plate; 120-152; width dorsal plate : 86-104; width ventral plate : 90-118).

**Diagnostic characters** : Lorica ovate to pyriform, anterior dorsal margin with two outcurved spines, ventral margin with a V-shaped sinus and its external angles produced into minute spines. Dorsal plate narrower than ventral plate. Toe long and parallel-sided; claw pointed and with two distinct basal spicules.

**Distribution** : INDIA : All states in North-Eastern India, West Bengal, Orissa, Bihar, Andhra Pradesh, Madhya Pradesh, Rajasthan, Tamil Nadu, Punjab, Haryana and Kashmir.

**Elsewhere** : COSMOPOLITAN.

**25. *Lecane (Monostyla) unguitata* (Fadeev, 1925)**  
(Fig. 25)

1925. *Monostyla unguitata* Fadeev, *Russ. Hydrobiol. J.*, 4 : 21, fig. 7.

*Material examined* : 2 examples (Length dorsal plate : 110-128; length ventral plate : 120-140; width dorsal plate : 84-96; width ventral plate : 90-108).

*Diagnostic characters* : Lorica circular, anterior opening smaller; anterior dorsal margin straight, anterior ventral margin undulating and with a fairly deep median sinus with rounded external angles. Dorsal plate pyriform and smaller than ventral plate. Toe parallel-sided; claw pointed, with an indistinct furrow and with two distinct basal spicules.

*Distribution* : INDIA : Meghalaya, Assam, Nagaland, Tripura, West Bengal, Orissa, Bihar, Gujarat and Punjab.

*Elsewhere* : PALAEOTROPICAL.

### 26. *Trichocerca similis* (Wierzejski, 1893)

(Fig. 26)

1893. *Coelopus similis* Wierzejski, *Bull. Internat. Acad. Sci., Cracovie* : 406.

*Material examined* : 2 examples (Body length : 148-162).

*Diagnostic characters* : Body long and anterior end with two long spines dorsally separated by a small hump. Dorsal keel extending from base of anterior spines upto about 1/3 the body length. Foot two-segmented; first foot-segment overlapped by the projecting posterior end of lorica. Toes short and unequal, spines present at the base of the toes.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Tamil Nadu and Gujarat.

*Elsewhere* : COSMOPOLITAN.

### 27. *Filinia longiseta* (Ehrenberg, 1834)

(Fig. 27)

1834. *Triarthra longiseta* Ehrenberg, *Folio. Berlin* : 222, pl. 8, fig. 1.

*Material examined* : 2 examples (Body length : 145-170).

*Diagnostic characters* : Body cylindrical and with two long movable antero-lateral setae and one long immobile posterior seta. Anterior setae usually folded ventrally. Posterior seta inserted usually 25mm away from the caudal end of body.

*Distribution* : INDIA : Meghalaya, Assam, Mizoram, Tripura, West Bengal, Bihar, Orissa, Madhya Pradesh, Gujarat, Rajasthan, Punjab and Haryana.

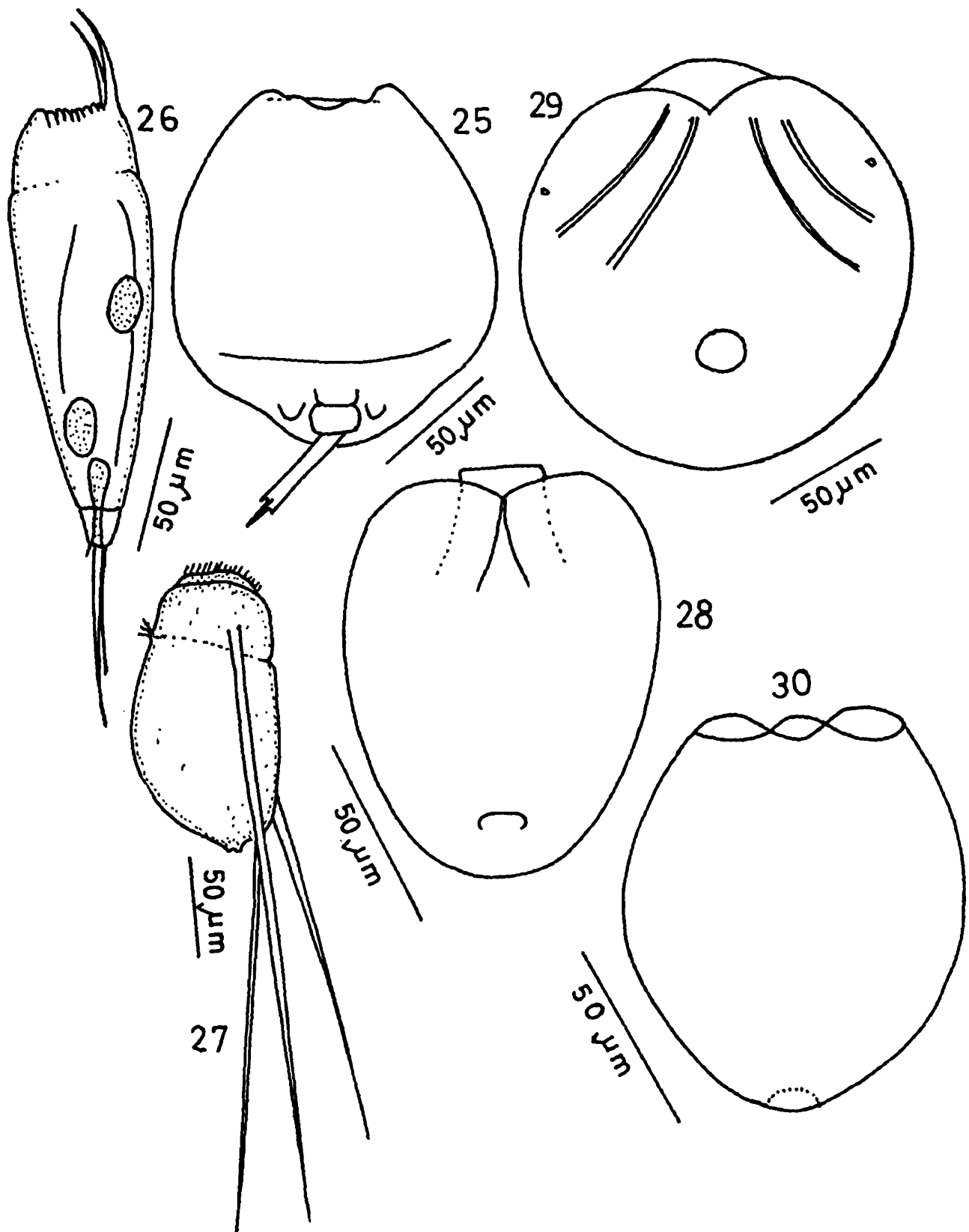
*Elsewhere* : COSMOPOLITAN.

### 28. *Testudinella emarginula* (Stenroos, 1898)

(Fig. 28)

1898. *Pterodina emarginula* Stenroos, *Acta Soc. Fauna et Flora Fennica*, 17 : p. 168, Taf. II, figs. 31, 32.

*Material examined* : 3 examples (Lorica length : 90-105; maximum width : 70-80).



**Figs. 25-30.** : *Lecane (Monostyla) unguitata* (Fadeev, 1925) : Fig. 25, ventral view; *Trichocerca similis* (Wierzejski, 1893); Fig. 26, lateral view; *Filinia longiseta* (Ehrenberg, 1834); Fig. 27, lateral view; *Testudinella emarginula* (Stenroos, 1898); Fig. 28, ventral view; *T. patina* (Hermann, 1783); Fig. 29, ventral view; *Pompholyx sulcata* Hudson, 1885; Fig. 30, dorsal view.

**Diagnostic characters** : Lorica vase-shaped and with maximum width slightly behind its anterior end; biconcave in cross-section. Foot-opening slit-shaped and located near posterior end of lorica.

**Distribution** : INDIA : Meghalaya, Assam, Mizoram, Tripura, West Bengal, Orissa and Bihar.

**Elsewhere** : COSMOPOLITAN.

### 29. *Testudinella patina* (Hermann, 1783)

(Fig. 29)

1783. *Brachionus patina* Hermann, *Naturforscher Halle*, 19 : 48, Taf. 2, fig. 10.

**Material examined** : 3 examples (Lorica length : 150-175; maximum width : 150-165).

**Diagnostic characters** : Lorica almost circular and dorso-ventrally flattened. Dorsum slightly convex and anterior dorsal margin rounded. Lateral antennae situated anterior to middle region of lorica. Foot-opening circular and located in the middle part on the ventral side; foot annulated, retractile, ventrally projecting and with a terminal ciliated cap.

**Distribution** : INDIA : Meghalaya, Assam, Mizoram, Tripura, West Bengal, Orissa, Bihar, Andhra Pradesh, Tamil Nadu, Gujarat, Punjab and Kashmir.

**Elsewhere** : COSMOPOLITAN.

### 30. *Pompholyx sulcata* Hudson, 1885

(Fig. 30)

1885. *Pompholyx sulcata* Hudson, *J. Roy. Micro. Soc.* : 613, pl. XII, figs. 7, 8.

**Material examined** : 3 examples (Lorica length : 100-130; maximum width : 70-85).

**Diagnostic characters** : Lorica broadly oval and tapering behind its middle region; with four longitudinal furrows and divided into dorsal and ventral bulges in cross-section. Anterior occipital margin with a lobe-like projection dorsally; ventral margin with two lateral elevations flanking a shallow median sinus. Cloacal aperture terminal.

**Distribution** : INDIA : Meghalaya, Assam, Mizoram, Tripura, West Bengal, Orissa, Punjab, Bihar, Kashmir and Ladak.

**Elsewhere** : COSMOPOLITAN.

## SUMMARY

Thirty species of monogonont rotifers belonging to seven Eurotatorien families and ten genera are documented in the present study. *Lecanidae* (11 species) > *Brachionidae* (10 species) comprise dominant qualitative component. The greater diversity and common occurrence of the species of two 'tropic-centered' genera namely *Lecane* and *Brachionus* imparts a general

tropical character to the examined taxocoenosis. Cosmopolitan elements (23 species) distinctly out-number other reported species. In addition, the studied collections include four Pantropical, two Tropicopolitan and one Palaeotropical species. Further, the recorded species present a combination of planktonic and periphytic elements.

### REFERENCES

- Anderson, H.H. 1889. Notes on Indian Rotifers. *J. Asiatic Soc. Bengal*, **58** : 345-358.
- Apstein, C. 1907. Das Plankton im Colombo-See auf Ceylon. Sammeluasbeute von A. Borgert, 1904-1905. *Zool. Jb. Abt. Syst.*, **25** : 201-244.
- Daday, E. Von. 1885. Neue Thierarten aus der Susswasserfauna von Budapest. *Termesz Fuzetek, Budapest*, **9** : 127-135, 208-215.
- Ehrenberg, C.G. 1832, Über die Entwicklung und Lebensdauer der Infusionthiere, nebst fernerer Beiträgen zur einer Vergleichung ihrer organischen Systema. *Abhandl. Akad. Wiss. Berlin* (1831) : 1-154.
- Ehrenberg, C.G. 1834. Organischen in der Richtung des kleinstem Raumes. Dritter Beitrage. *Folio. Berlin* : 1-192.
- Fadeev, N. 1925. Materialien zur Rotatorienarten SSSR. Kurze Diagnosen neuer Rotatorien der russischen Fauna (In Russian). *Russ. Hydrobiol. J.*, **4** : 72-74.
- Gosse, P.H. 1851. A catalogue of Rotifera found in Britain, with descriptions of five new genera and thirty-two new species. *Ann. Mag. Nat. Hist. ser. 2*, **8** : 197-203.
- Gosse, P.H. 1887. Twelve new species of Rotifera. *J. Roy. Micro. Soc.* : 361-367.
- Hermann, J. 1783. Helminthologische Bemerkungen. Zweytes Stück. *Naturforscher Halle*, **19** : 31-59.
- Hudson, 1885. On four new species of the genus *Floscularia* and five other new species of Rotifera. *J. Roy. Micro. Soc.*, : 608-614.
- Jakubski, A. 1912. Beiträge zur Kenntnis der Susswassermikrofauna Ostafrikas. I. Die Rädertiere der Usangustepe. *Zool. Anz.*, **39** : 536-550.
- Koste, W. 1978. Rotatoria. Die Rädertiere Mitteleuropas, begründet von Max Voigt. Überordnung Monogononta. Gebrüder Borntraeger, Berlin, Stuttgart. I. Text. (1-673) u II. Tafelbd. (T. 1-234).
- Müller, O.F. 1773. Vermeium terrestrium et fluviatilium seu animalium infusiorum helminthicorum et testaceorum, nom marinorum siccineta historia. Havniae et Lipsisae : I, 1. Infusoria : 1-135.
- Müller, O.F. 1776. Zoologie Fanicae prodromus, seu animalium Daniae et Norvegiae indigenarum characters, nomina, et synonyma imprimis popularium. Havniae : 1-XXXII + 1-282.

- Müller, O.F. 1786. *Animalcula infusoria fluviatilia et marina, quae defexit systematiche descripsit et ad vivum delineari curavit*. Havniae : I-LVI + 1-367.
- Murray, J. 1913. South American Rotifers. *J. Roy. Micro. Soc.*, : 229-246, 341-362, 449-454.
- Schmarda, L.K. 1859. *Neue wirbellose Tiere, beobachtet und gesammelt auf einer Reise um die Erde. 1853-1857*. Leipzig 1 : I-XVII + 1-66.
- Sharma, B.K. 1998. Freshwater Rotifers (Rotifera : Eurotatoria). In : *Fauna of West Bengal. State Fauna Series, 3(13)* : 1-121. Zoological Survey of India, Calcutta.
- Sharma, B.K. and Sharma, S. 1999. Freshwater Rotifers (Rotifera : Eurotatoria). In : *Fauna of Meghalaya. State Fauna Series, 4(9)* : 11-161. Zoological Survey of India, Calcutta.
- Sharma, B.K. and Sharma, S. 2000. Freshwater Rotifers (Rotifera : Eurotatoria). In : *Fauna of Tripura : State Fauna Series, 7(4)* : 163-224. Zoological Survey of India, Calcutta.
- Segers, H. 1995. Rotifera 2. The Lecanidae (Monogononta). *Guides to the identification of the Microinvertebrates of the Continental waters of the World, 2* : 1-226 (H. J. Dumont and T. Nogrady Eds.). SPB Academic Publishing bv. Amsterdam, The Netherlands.
- Segers, H. 2002. The nomenclature of the Rotifera : annotated checklist of valid family-and genus-group names. *J. Nat. Hist.*, **36** : 621-640.
- Stenroos, K.E. 1898. *Das Thierleben in Nurmijärvi-See. Eine faunistisch-biologische Studie*. *Acta Soc. Fauna et Flora Fennica, 17* : 1-259.
- Turner, C.H. 1892. Notes upon the Cladocera, Copepoda, Ostracoda and Rotifera of Cincinnati, with descriptions of new species. *Bull. Sci. Lab. Denison Univ. Granville, Ohio, 6* : 58-74.
- Voigt, M. 1902. Diagnosen bisher unbeschriebener organismen aus Plöner Gewässern. *Zool. Anz.*, **25** : 35-39.
- Wierzejski, A. 1891. Liste des Rotiferes observes en Galicie (Autriche-Hongrie). *Bull. Soc. Zool. France, 16* : 49-52.
- Wierzejski, A. 1893. Rotatoria (wrotki) Galicyi. *Bull. Internat. Acad. Sci., Cracovie (1892)* : 402-407.
- Zacharias, O. 1898. Untersuchungen über das Plankton der Teichgewässer. *Forschungsber. Biol. Stn. zu Plön, 6* : 89-139.

## FRESHWATER CLADOCERANS (CRUSTACEA : BRANCHIOPODA : CLADOCERA)

SUMITA SHARMA

Zoological Survey of India, Eastern Regional Station, Shillong-793 003

### INTRODUCTION

Plankton samples collected with a nylobolt plankton net (No. 25) from different water bodies in the study area are analyzed for the present species inventory. The cladoceran taxa are screened and isolated with a Wild-stereoscopic binocular microscope. Various species and their disarticulated appendages are mounted in Polyvinyl alcohol-lectophenol mixture. The details of head pores and their arrangements in the Chydorids are studied following the technique given by Megard (1965). Various taxa are identified following the works of Smirnov (1971, 1974, 1996), and Michael and Sharma (1988). The drawings are made using a Leitz-Dialux phase-contrast microscope fitted with a drawing-tube attachment. All the measurements are given in millimeters (mm).

The system of classification followed in this account is after Sharma (2001). Taxonomic notes are made on the recorded species as well as on their distribution. Remarks are made on general nature and composition of the cladoceran taxocoenosis.

### SYSTEMATIC LIST

Superclass CRUSTACEA  
Class BRANCHIOPODA  
Superorder CLADOCERA (S. STR.)  
Order CTENOPODA  
Family SIDIDAE

1. *Diaphanosoma excisum* Sars, 1885
2. *D. sarsi* Richard, 1894

Order ANOMOPODA  
Family DAPHNIIDAE

3. *Ceriodaphnia cornuta* Sars, 1885

4. *Scapholeberis kingi* Sars, 1903
5. *Simocephalus acutirostratus* (King, 1853)

Family BOSMINIDAE

6. *Bosmina longirostris* (O. F. Müller, 1785)
7. *Bosminopsis deitersi* Richard, 1895

Family MOINIDAE

8. *Moina micrura* Kurz, 1874

Family MACROTHRICIDAE

9. *Macrothrix laticornis* (Jurine, 1820)

Family CHYDORIDAE

Subfamily CHYDORINAE

10. *Alonella excisa* (Fischer, 1854)
11. *Ephemeroporus barroisi* (Richard, 1894)

Subfamily ALONINAE

12. *Acroperus harpae* (Baird, 1834)
13. *Alona costata* Sars, 1862
14. *A. quadrangularis* (O. F. Müller, 1785)
15. *A. rectangula* Sars, 1862

## SYSTEMATIC ACCOUNT

### 1. *Diaphanosoma excisum* Sars, 1885

(Fig. 1)

1885. *Diaphanosoma excisum* Sars, *Norske. Vidensk. Selsk. Forhandl. Christiana*, **8** : 13-18, pl. 2, figs. 1-3.

*Material examined* : 2 examples (Length : 0.90-1.05 mm.)

*Diagnostic characters* : Body oblong; shell duplicator joining ventral margin of valves nearly at right angles. Head large; eyes relatively large and located in frontal portion of head. Reflex antennae not reaching posterior margin of valves. Postabdomen narrow and with fine hairs. Claw with three basal spines, decreasing in size proximally.

*Distribution* : INDIA : Meghalaya, Assam, West Bengal, Bihar, Rajasthan and Kerala.

*Elsewhere* : TROPICS and SUB-TROPICS.

## 2. *Diaphanosoma sarsi* Richard, 1894

(Fig. 2)

1894. *Diaphanosoma sarsi* Richard, *Revue Biol. Nord. France*, **6** : 365, pl. 15, figs. 1-8.

*Material examined* : 4 examples (Length : 0.90 - 1.20 mm)

*Diagnostic characters* : Body elongate, shell duplicator broad at distal end. Head well defined and rather narrow; eyes exceedingly large and situated near anterior margin of head. Antennules not reaching the posterior end of carapace. Postabdomen narrow; claw with three basal spines, rapidly decreasing in size proximally.

*Distribution* : INDIA : Meghalaya, Assam, West Bengal, Bihar, Uttar Pradesh, Rajasthan, Gujarat, Kerala and little Andaman.

*Elsewhere* : COSMOTROPICAL.

## 3. *Ceriodaphnia cornuta* Sars, 1885

(Fig. 3)

1885. *Ceriodaphnia cornuta* Sars, *Norske. Vidensk. Selsk. Forhandl. Christiana*, **8** : 26-28, pl. 5, figs. 1-3.

*Material examined* : 5 examples (Length : 0.45-0.60 mm.)

*Diagnostic characters* : Body broadly oval, valves distinctly reticulate with large polygons and hexagons. Head produced anteriorly into a short beak and with a short horn dorsally. Eyes large, ocellus small and punctiform. Postabdomen moderately broad, with 5-6 anal spines; claws short, stout and smooth.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Punjab, Haryana, Himachal Pradesh, Rajasthan, Madhya Pradesh, Tamil Nadu, Kerala and little Andaman.

*Elsewhere* : COSMOTROPICAL.

## 4. *Scapholeberis kingi* Sars, 1903

(Figs. 4-5)

1903. *Scapholeberis kingi* Sars, *Arch. Math. Nat.*, **25** : 8-10, pl. I, figs. 2, 2 a-c.

*Material examined* : 4 examples (Length : 0.80-0.90 mm.)

*Diagnostic characters* : Body oval-quadrangular; postero-ventral corner of each valve with a short backwardly directed spine. Valves with distinct transverse striae. Head narrowly rounded anteriorly; cervical sinus well marked. Rostrum short and blunt. Eyes large, ocellus relatively small. Postabdomen short and broad, rounded at posterior end and with 4-5 anal spines. Claw long, stout and with setae on its concave margin.

*Distribution* : INDIA : Meghalaya, Assam, West Bengal, Kashmir, Rajasthan and Tamil Nadu.

*Elsewhere* : AFRICA, AUSTRALIA, NORTH AMERICA, GERMANY and SOUTH ASIA.

#### 5. *Simocephalus acutirostratus* (King, 1853)

(Fig. 6)

1853. *Daphnia elizabethae* var. *acutirostrata* King, *Pap. Proc. R. Soc. Van Diemensland*, 2 : 254, pl. VI.

*Material examined* : 4 examples (Length : 1.70-2.05 mm.)

*Diagnostic characters* : Body broadly oval; head small and produced anteriorly into an acute projection. Eyes moderately large, ocelus small and punctiform. Postabdomen broad, its posterior end forming an expansion in front of anal sinus; with seven anal spines, increasing in size distally. Claw long and slender; with a pecten of 10-12 teeth followed by cilia on its concave margin.

*Distribution* : INDIA : Meghalaya, Assam, West Bengal, Bihar, Maharashtra and Tamil Nadu.

*Elsewhere* : AUSTRALIA, PHILLIPINES and SRI LANKA.

#### 6. *Bosmina longirostris* (O. F. Müller, 1785)

(Fig. 7)

1785. *Lynceus longirostris* O. F. Müller, *Leipsiae et Havaniae* : 76, tab. 10, figs. 7-8.

*Material examined* : 7 examples (Length : 0.52-0.65 mm.)

*Diagnostic characters* : Body almost oval; postero-ventral corner with a backwardly directed spine (mucro). Head large, broadly rounded and more or less arched in front of eyes. Small sensory seta situated nearer to eyes than to base of antennule. Antennules almost parallel to each other and curved. Postabdomen almost quadrate. Claw with proximal pecten of 3-6 spinules and distal pecten of 7-10 spines, continued distally into minute spinules.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Orissa, Bihar, Kashmir and Madhya Pradesh.

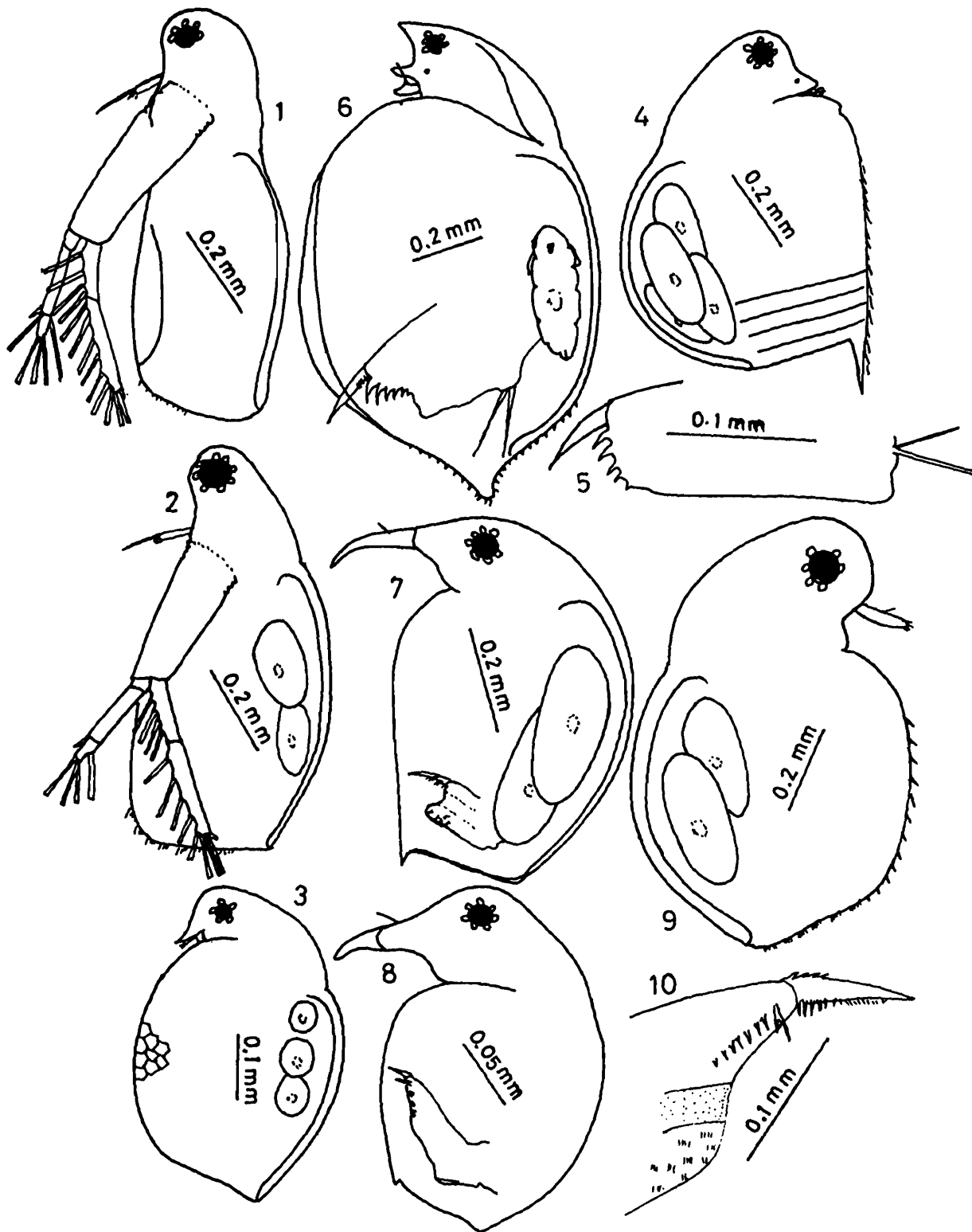
*Elsewhere* : COSMOPOLITAN.

#### 7. *Bosminopsis deitersi* Richard, 1895

(Fig. 8)

1895. *Bosminopsis deitersi* Richard, *Bull. Soc. Zool. France*, 20 : 96, figs. 1-4.

*Material examined* : 2 examples (Length : 0.24-0.28 mm.)



**Figs. 1-10.** : *Diaphanosoma excisum* Sars, 1885. Fig. 1, parthenogenetic female (lateral view); *D. sarsi* Richard, 1895; Fig. 2, parthenogenetic female (lateral view); *Ceriodaphnia cornuta* Sars, 1885; Fig. 3 parthenogenetic female (lateral view); *Scapholeberis kingi* Sars, 1903; Fig. 4, parthenogenetic female (lateral view); Fig. 5. postabdomen; *Simocephalus acutirostrantus* (King, 1853); Fig. 6, parthenogenetic female (lateral view); *Bosmina longirostris* (O. F. Müller, 1785); Fig. 7, parthenogenetic female (lateral view); *Bosminopsis deitersi* Richard, 1895; Fig. 8, parthenogenetic female (lateral view); *Moina micrura* Kurz, 1874; Fig. 9, parthenogenetic female (lateral view); Fig. 10, postabdomen.

**Diagnostic characters** : Body almost oval; postero-ventral corner of each valve with a small mucro-like projection and one or two spinules preceding it. Head very large and produced into a long robust rostrum. Antennules long, united at their bases. Eyes moderately large, located in middle of head and close to its anterior margin. Postabdomen long and tapering distally; with about seven small spines on its post-anal edge, followed by a row of setae proximally. Claw large and with one large basal spine.

**Distribution** : INDIA : Meghalaya, Assam and Tripura, Bihar, Orissa, West Bengal, Delhi, Rajasthan, Madhya Pradesh and Kerala.

**Elsewhere** : ASIA, AFRICA, NORTH and SOUTH AMERICA.

#### 8. *Moina micrura* Kurz, 1874

(Figs. 9-10)

1874. *Moina micrura* Kurz, *Sitz. Acad. Wiss. Wein Math. Natur.*, **69** : 13-15, pl. I, fig. 1.

**Material examined** : 3 examples (Length : 0.95-1.05 mm.)

**Diagnostic characters** : Valves oblong and reticulated; ventral margin of valves with 11-25 long setae. Head with a well developed supra-ocular depression. Antennules long, thin and with a long basal seta. Postabdomen short, slender and with distinct conical part; with a bident tooth and 5-9 feathered teeth, decreasing in size proximally. Claw long, its ventral base with 3-7 "basal dorn"; with setae on its concave margin; proximal setae larger and forming a distinct pecten.

**Distribution** : INDIA : Meghalaya, Assam, West Bengal, Bihar, Punjab, Haryana, Rajasthan, Nilgiri Hills, Tamil Nadu and little Andaman.

**Elsewhere** : APPARENTLY COSMOPOLITAN.

#### 9. *Macrothrix laticornis* (Jurine, 1820)

(Figs. 11-12)

1820. *Monoculus laticornis* Jurine, *Histoire des Monocles. qui se trouvent aux environs de Geneve, Paris* : 151.

**Material examined** : 2 examples (Length : 0.40-0.48 mm.)

**Diagnostic characters** : Body broadly oval; valves crested, reticulated, with distinct serrations in postero-dorsal corner and with a small posterior protuberance. Head evenly arched; head shield widening gently from tip of rostrum onwards, head pore large. Antennules broadening apically; anterior margin with several fine incisions and rows of hairs. Labrum with large triangular process. Postabdomen broad, not bilobed, with numerous fine spines and hairs. Claw small and with setae on its concave margin.

*Distribution* : INDIA : Meghalaya, Assam, Manipur, Mizoram, Tripura, West Bengal, Bihar, Rajasthan, Kerala, little Andamans.

*Elsewhere* : COSMOTROPICAL.

10. *Alonella excisa* (Fischer, 1854)  
(Fig. 13)

1854. *Lynceus excisus* Fischer, *Bull. Soc. Imp. Nat. Mosco.*, 27 : 428, pl. 3, figs. 11-14.

*Material examined* : 2 examples (Length : 0.36-0.42 mm.)

*Diagnostic characters* : Body oval; postero-ventral corner with one blunt corner. Valves with longitudinal lines formed by polygons; fine longitudinal lines and dots inside each polygon. Rostrum moderately long. Labral plate with distinctly convex anterior margin. Ocellus slightly nearer to eye than to apex of rostrum. Postabdomen short, with about 10 anal spines, anal margin with setae; pre-anal corner blunt. Claw with two basal spines.

*Distribution* : INDIA : Meghalaya, Assam, Manipur, Mizoram, Nagaland and Tripura, West Bengal, Bihar, Rajasthan, Kerala, Orissa, Uttaranchal, Madhya Pradesh and Tamil Nadu.

*Elsewhere* : COSMOPOLITAN.

11. *Ephemeroporus barroisi* (Richard, 1894)  
(Figs. 14-15)

1894. *Pleuroxus barroisi* Richard, *Revue Biol. Nord. France*, 6 : 367, figs. 9-12.

*Material examined* : 2 examples (Length : 0.32-0.40 mm.)

*Diagnostic characters* : Body elliptical; postero-ventral corner of each valve with a denticle. Rostrum with an apical notch. Labral plate with 3-5 denticles on anterior margin. Ocellus smaller than eye. Postabdomen short, with 9 unequal anal spines and pre-anal corner projecting. Claw with two basal spines and with setae on its concave margin.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Bihar, Orissa, Gujarat, Tamil Nadu and Kerala.

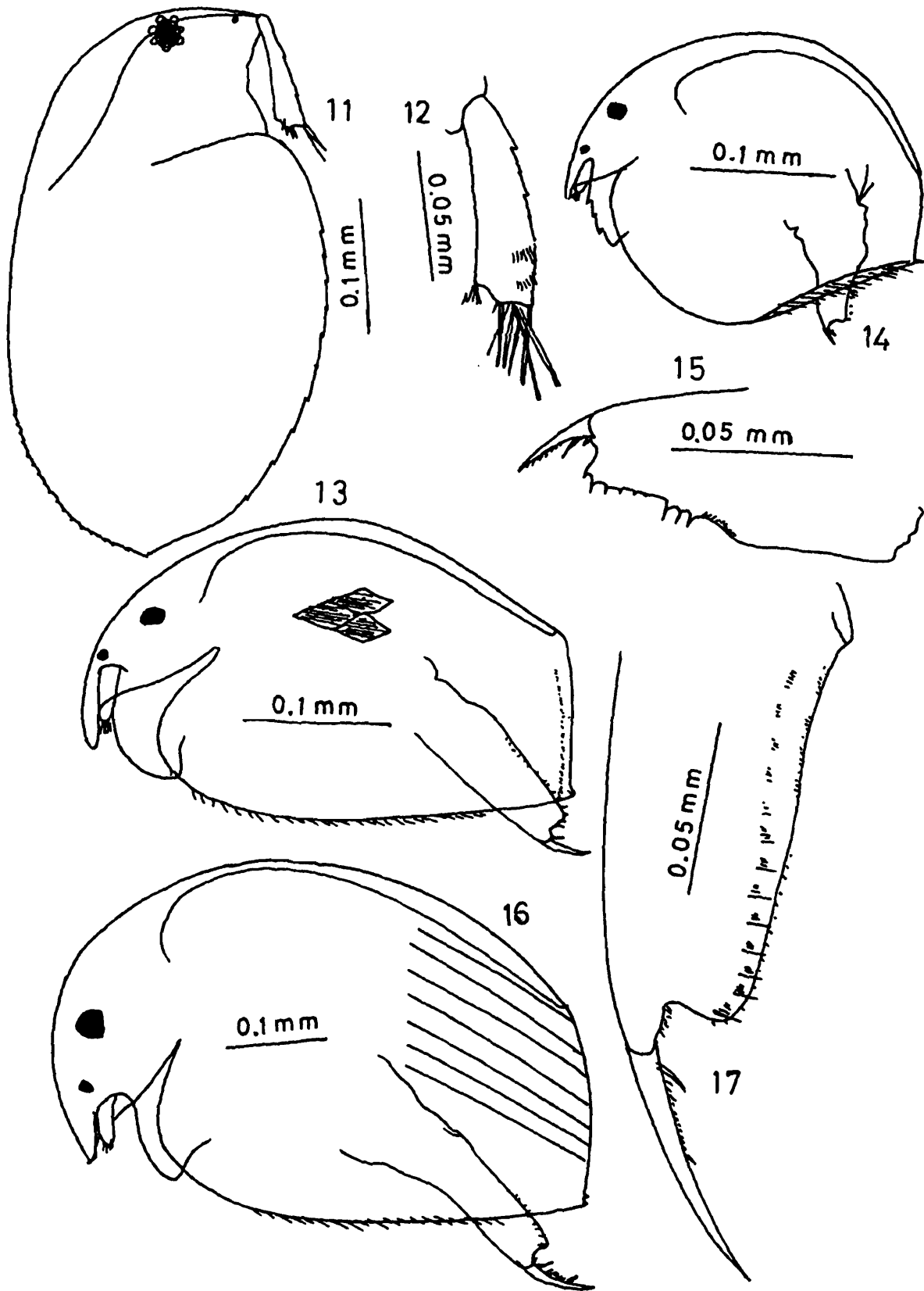
*Elsewhere* : COSMOTROPICAL.

12. *Acroperus harpae* (Baird, 1834)  
(Figs. 16-17)

1834. *Lynceus harpae* Baird, *Hist. Berwickshire Nat Club.* : 100, pl. II, fig. 17.

*Material examined* : 4 examples (Length : 0.56-0.62 mm.)

*Diagnostic characters* : Body ovate; postero-ventral corners of valves with 2-5 denticles. Valves marked with oblique lines. Dorsal keel and head keel present. Head shield with three



**Figs. 11-17. :** *Macrothrix laticornis* (Jurine, 1820). Fig. 11, parthenogenetic female (lateral view); Fig. 12, antennule (enlarged); *Alonella excisa* (Fischer, 1854); Fig. 13, parthenogenetic female (lateral view); *Ephemeroporus barroisi* (Richard, 1894); Fig. 14, parthenogenetic female (lateral view); Fig. 15, postabdomen; *Acroperus harpae* (Baird, 1834); Fig. 16, parthenogenetic female (lateral view); Fig. 17, postabdomen.

connected main head pores, lateral pores situated before anterior main pore; main pores located in crest of head shield. Ocellus smaller than eye and situated nearer to eye than to apex of rostrum. Labral plate triangular, with convex anterior margin and blunt apex. Postabdomen with small anal spines. Lateral setae in groups; distal groups of lateral setae longer. Claw with a basal spine and setae on its proximal margin, distal seta longest.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Kashmir and Tamil Nadu.

*Elsewhere* : COSMOPOLITAN.

### 13. *Alona costata* Sars, 1862

(Figs. 18-19)

1862. *Alona costata* Sars, *Forhandl. Vidensk. Selsk. Christiana* (1861) : 286.

*Material examined* : 2 examples (Length : 0.48-0.56 mm.)

*Diagnostic characters* : Body broadly oval; valves marked with longitudinal lines, with interconnections. Head shield with three main connected head pores and lateral pores with chitinous thickening. Postabdomen short, slightly tapering distally and its dorsal margin nearly straight. Anal spines 11-12 and decreasing proximally; groups of lateral setae present in a row, distal seta longest in each group. Claw with single basal spine.

*Distribution* : INDIA : Meghalaya, Assam, Arunachal Pradesh, Manipur, West Bengal, Himachal Pradesh, Uttar Pradesh and Tamil Nadu.

*Elsewhere* : HOLARCTIC, ETHIOPIAN, INDO-MALAYA and NEOTROPICAL REGIONS.

### 14. *Alona quadrangularis* (O. F. Müller, 1785)

(Figs. 20-21)

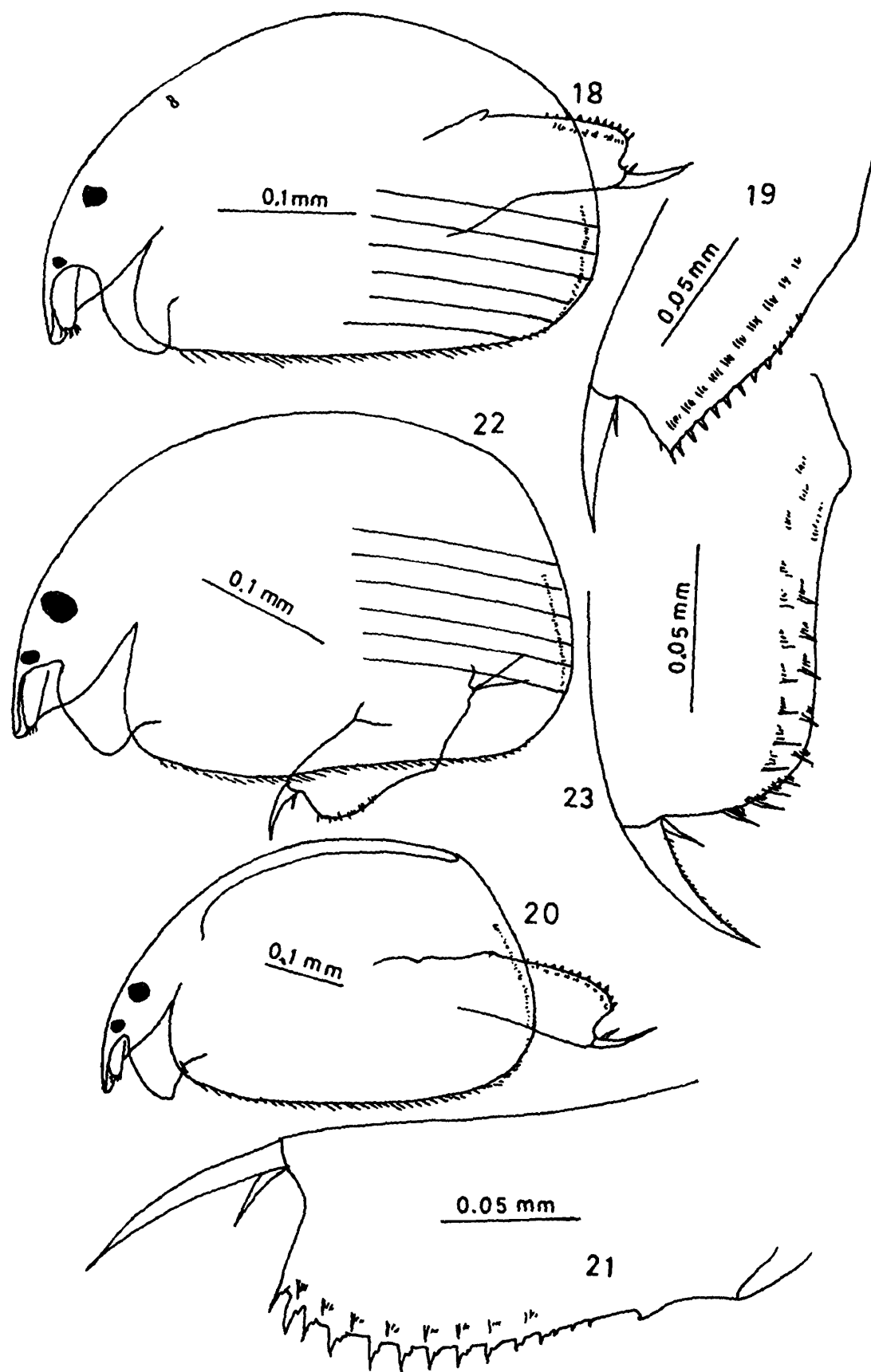
1785. *Lynceus quadrangularis* O. F. Müller, *Leipsiae et Havaniae* : 72 Ä 73, pl. IX, figs. 1-3.

*Material examined* : 2 examples (Length : 0.75-0.80 mm.)

*Diagnostic characters* : Body rectangular; valves marked with longitudinal lines connected by transverse lines. Head shield with three main connected head pores and lateral pores located at level of median main pore. Labral plate with convex anterior margin. Ocellus smaller than eye and situated nearer to eye. Postabdomen broadened distally; with 14-16 anal spines; lateral setae in groups and arranged in a row. Claw with one basal spine.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal and South India.

*Elsewhere* : HOLARCTIC, ETHIOPIAN, INDO-MALAYAN and NEOTROPICAL REGIONS.



**Figs. 18-23.** : *Alona costata* Sars, 1862. Fig. 18, parthenogenetic female (lateral view); Fig. 19, postabdomen; *A. quadrangularis* (O. F. Müller, 1785); Fig. 20, parthenogenetic female (lateral view); Fig. 21, postabdomen; *A. rectangula* Sars, 1862; Fig. 22, parthenogenetic female (lateral view); Fig. 23, postabdomen.

15. *Alona rectangula* Sars, 1862

(Figs. 22-23)

1862. *Alona rectangula* Sars, *Forhandl. Vidensk. Selesk. Christiana* (1861) : 160.*Material examined* : 2 examples (Length : 0.40-0.48 mm.)

*Diagnostic characters* : Body oval; valves marked with longitudinal lines. Labral plate with convex anterior margin. Ocellus slightly smaller than eye and situated halfway between eye and apex of rostrum. Postabdomen with rounded distal end; with 7 anal spines accompanied by setae; distal groups of lateral setae extending beyond distal margin of postabdomen. Claw with a basal spine and with setae on 3/4 of its concave margin.

*Distribution* : INDIA : Meghalaya, Assam, Tripura, West Bengal, Kashmir, Ladak, Gujarat and Rajasthan.

*Elsewhere* : APPARENTLY COSMOPOLITAN.

## SUMMARY

Fifteen species of freshwater Cladocera belonging to six families and twelve genera are recorded in the present study. The majority of the documented species belong to order Anomopoda while Ctenopoda includes only two species of the genus *Diaphanosoma*. The examined taxocoenosis presents a general tropical character with qualitative dominance of Cosmopolitan (9 species) > Cosmotropical (5 species) while it includes only one pantropical element. The recorded species, however, present a combination of planktonic and periphytic elements.

## REFERENCES

- Baird W. 1834. List of Entomostraca found in Berwickshire. *Hist. Berwickshire Nat Club*, 95-100.
- Fischer, S. 1854. Abhandlung uber einige neue Order nicht genau bekannte Arten von Daphniden und Lynceiden als Beitrag zur Fauna Russland. *Bull. Soc. Imp. Nat. Mosco*, 27 : 433-434.
- Jurine, L. 1820. Histoire des Monocles, qui se trouvent aux de Geneve, Paris : 1-260.
- King, R.L. 1853. On some of the species of Daphnidae found in New South Wales. *Pap. Proc. R. Soc. Van Diemansland*, 2 : 243-263.
- Kurz, W. 1874. Uber androgyne Missioidlung bei Cladoceren. *Sitz. Acad. Wiss. Wein Math. Natur.*, 69 : 40-46.
- Megard, R.O. 1965. A chemical technique for disarticulating the exoskeletons of Chydorid Cladocera. *Crustaceana*, 9 : 208-210.

- Michael, R.G. and Sharma, B.K. 1988. *Indian Cladocera (Crustacea : Branchiopoda : Cladocera)*. Fauna of India and adjacent countries Series. Publ. by Zool. Surv. India, Calcutta. 262 pp.
- Müller, O.F. 1785. Entomostraca seu Insecta Testacea, quae in aquis Daniae et Norvegiae reperit, descripsit et iconibus illustravit. Leipsiae et Havaniae : 1-135.
- Richard, J. 1894. Cladoceres recueillis pau de Dr. Theod Borris en Palestine, en Syrie et an Egypt. *Revue Biol. Nord. France*, **6** : 360-378.
- Richard, J. 1895. Description dun nouveau Cladocere, *Bosminopsis deitersi* n. gen. n. sp. *Bull. Soc. Zool. France*, **20** : 96-98.
- Sars, G.O. 1862. Meddeelte en af talrige Afbildninger ledasaget Oversight af de af ham i Omegmen af Christiana iagttagne Crustacea Cladocera. *Forhandl, Vidensk. Selesk. Christiana* (1861) : 144-167.
- Sars, G.O. 1885. On some Australian Cladocera raised from dried mud. *Norske. Vidensk. Selsk. Forhandl. Christiana*, **8** : 1-46.
- Sars, G.O. 1903. Freshwater Entomostraca from China and Sumatra. *Arch. Math. Nat.*, **25** : 1-44.
- Smirnov, N.N. 1971. *The World Chydorid Fauna* (in Russian). USSR Acad. Sci. Zool. Inst. Nova ser. 101, 539 pp. Leningrad.
- Smirnov, N.N. 1974. *The World Macrothricidae* (in Russian). USSR Acad. Sci. Zool. Inst. Nova ser. 104, pp., Leningrad.
- Smirnov, N.N. 1996. Cladocera : The Chydorinae and Sayciinae (Chydoridae) of the World In : *Guides to identification of the Microinvertebrates of the Continental waters of the world* : 11.H.J. Dumont and T. Nogrady (eds.). SPB Academic Publishing bv. Amsterdam, The Netherlands.

**CRUSTACEA**  
**(DECAPODA : GECARCINUCIDAE : PALAEMONIDAE : ATYIDAE)**

**S. S. GHATAK, S. K. GHOSH AND M. K. DEV ROY**

*Zoological Survey of India, FPS Building, Kolkata-700 017*

**INTRODUCTION**

Available literature of this group reveals that although Alcock (1910), Tiwari (1952) and Bott (1970) have reported freshwater crabs and prawns from Assam yet very little work was carried on the taxonomy and zoo-geography of crabs and prawns from the river Kopili. Only Dutta (1998) has reported one species *Sartoriana spinigera* among the six species from the river Kopili.

The present work is an attempt to study the systematics of this group. On examination of this material, three species, *Barytelphusa (Maydelliathelphusa) lugubris lugubris*, *Barytelphusa (Maydelliathelphusa) lugubris falcidigitis*, *Liotelphusa laevis laevis* belonging to one family and two genera and *Macrobrachium hendersoni platyrostris*, *Caridiana* sp. belonging to two families and two genera have been incorporated further from the Kopili river.

*Sartoriana spinigera* has been included with the present study based on the literature. No material of this species could be examined being absent in the collection.

The original reference, taxonomic account of all the species together with zoo-geographical distribution are dealt with.

Among the crustacean fishery, prawns and crabs gain considerable attention particularly on the economic value. Crabs and prawns are caught throughout the year but peak season is the monsoon. They play a major role in the aquatic ecosystem by recycling the dead organic matter. Except marine fishes and crustaceans, the freshwater crabs and prawns form an important source of quality protein to man.

**SYSTEMATIC LIST**

Class CRUSTACEA

Order DECAPODA

Family GECARCINUCIDAE

1. *Barytelphusa (Maydelliathelphusa) lugubris lugubris* (Wood-Mason, 1871)

2. *Barytelphusa (Maydelliathelphusa) lugubris falcidigitis* (Alcock, 1910)
3. *Liotelphusa laevis laevis* (Wood-Mason, 1871)
4. *Sartoriana spinigera* (Wood-Mason, 1871)

Family PALAEMONIDAE

5. *Macrobrachium hendersoni platyrostris* (Tiwari, 1952)

Family ATYIDAE

6. *Caridina* sp.

### SYSTEMATIC ACCOUNT

1. *Barytelphusa (Maydelliathelphusa) lugubris lugubris* (Wood-Mason, 1871)

1871. *Telphusa lugubris* Wood-Mason, *J. asiat. Soc. Bengal*, 40(2) : 197, T-12, F. 5-7.

*Material examined* : 2 examples (males)

*Diagnostic characters* : The color of the preserved specimen in spirit are commonly brownish, sometimes becomes lighter. Flattish carapace having a slight convexity through the individual regions which is longer than breadth. Fine oblique wrinkles are marked inside the borders. Cervical groove is deep and broad. Eyes are generally small and orbits are wide. Antero-lateral borders of the carapace is convex. Abdominal segments of the male are seven in number and looks generally a broad based, distally—contracted triangle with broadly rounded apex. Chelipeds are not equal in male and female. Legs are stronger than the chelipeds.

*Distribution* : INDIA : Meghalaya, Manipur, Assam, Nagaland, Sikkim, Dafla Hills, Teesta Valley, West Bengal.

*Remarks* : Two male specimens of this species are reported here from the Kopili river for the first time. As this species occur in abundance in North-East India, mainly Meghalaya so there is every possibility to have wide diversity of this species through the entire belt of the river Kopili. On the economic point of view, these freshwater crabs are one of the important source of protein to man in the rural areas of India.

2. *Barytelphusa (Maydelliathelphusa) lugubris falcidigitis* (Alcock, 1910)

1910. *Paratelphusa (Barytelphusa) falcidigitis* Alcock, *Cat. Ind. Decap. Crust. Indian Mus.*, 1(2) : 94, T, 7, F. 24.

*Material examined* : 5 examples (3 males, 2 females)

*Diagnostic characters* : The carapace is very decidedly flat and the cervical groove are broader. The lateral epibranchial tooth is smaller and smoother. The post-orbital crest are

sharper. Six segmented male abdomen and the chelipeds have their surface sculpture. The dactylus is very strong and curved. The legs are having strong spines on the edge of the dactyli.

*Distribution* : INDIA : Meghalaya, Nagaland, Assam.

*Remarks* : This species is recorded for the first time from Kopili river.

### 3. *Liotelphusa laevis laevis* (Wood-Mason, 1871)

1871. *Telphusa laevis* Wood-Mason, *J. asiat. Soc. Bengal*, 40 : 201, T. 14, F. 1-6.

*Material examined* : 2 examples (males)

*Diagnostic characters* : Deep square cut carapace, and its surface is smooth. Cervical groove is not very deep. Antero-lateral borders of the carapace having a sub acute or granule epibranchial tooth. Abdomen are seven segmented and a broad based triangle in out line. The chelipeds are unequal in male. Epigastric crests are indistinct and blunt. The expodite is longer than ischium in the external maxillipeds. Legs are bit longer than the smaller chelipeds.

*Distribution* : INDIA : Meghalaya, Assam, Nagaland, West Bengal.

*Remarks* : Literature reveals that this species is widely distributed throughout North-East India. Maximum record of this species is shown in Meghalaya. Only two male specimens of this species are added in addition to the other localities cited under distribution column. This is reported for the first time from the river Kopili.

### 4. *Sartoriana spinigera* (Wood-Mason, 1871)

1871. *Paratelphusa spinigera* Wood-Mason, *J. asiat. Soc. Bengal*, 40(2) : 194, T. 10, F. 14.

*Material examined* : Since there is no specimen of this species in the collection, the same could not be examined.

*Diagnostic characters* : The carapace is broad and convex. The cervical groove is deep and it runs towards the outer ends of the post-orbital crests. In the gastro-cardiac angle of the epibranchial region a dempled oval facet is seen. Orbits are small and the anterolateral border of the carapace is well arched. Epigastric crests are prominent. Chelipeds are not equal in male and female. Legs are stout in nature and not longer than cheliped in either sex.

*Distribution* : INDIA : Meghalaya, Assam, Bihar, Uttar Pradesh, Punjab.

*Elsewhere* : BANGLADESH; PAKISTAN.

*Remarks* : Though the species *Sartoriana spinigera* occur in abundance throughout Meghalaya yet it is not reported from the other localities of Assam.

### 5. *Macrobrachium hendersoni platyrostris* (Tiwari, 1952)

1952. *Palaemon hendersoni platyrostris* Tiwari, *Ann. Mag. nat. Hist.*, 5 : 32.

*Material examined* : 62 examples.

*Diagnostic characters* : Rostrum extends as far as the end of antennular peduncle. Upper edge bears 7-10 teeth usually 8-9 with 2 or 3 teeth on carapace behind orbital border. Lower edge bears 1-4 teeth, usually 2-3 drawn back from the apex. Length of 2<sup>nd</sup> chelipeds rarely exceeds the length of body. Merus is always longer than carpus, carpus is short and conical, palm is much longer than carpus and markedly compressed. Fingers have deep longitudinal grooves with dense pubescence, generally longer than palm. Longest male measuring 75.8 mm and egg bearing female varying from 49-52.5 mm in length.

*Distribution* : INDIA : Arunachal Pradesh, Manipur, Meghalaya, Tripura, West Bengal, Uttaranchal.

*Elsewhere* : MYANMAR; CHINA.

*Remarks* : Hill stream species occurring at lower altitudes, generally not above 1500.

### 6. *Caridina* sp.

*Material examined* : 4 examples.

*Diagnostic characters* : Small narrow, length 15-20 mm, supra orbital or antennal spine on either side of base of rostrum present. Rostrum short almost straight and serrated with more than 15 teeth on upper edge and 4-5 teeth on lower edge. Fingers of chelae with tufts of hairs, carpus short stout wide distally and excavated anteriorly.

## REFERENCES

- Alcock, A. 1910. The Indian freshwater crabs Potamonidae in *Cat. Ind. Decap. Crust., Indian Museum*, 1(2) : 1-130.
- Bott. R. 1970. Die Siibwasser Krabbean von Europa, Asien, Autralien und ihre stammesgeschichte (Crustacea : Decapoda). *Abh. Senckenb nature*, Ges No. 526 : 1-338.
- Tiwari, K.K. 1952. Diagnosis of new species and sub species of the genus *Palaemon* Fabricius (Crustacea : Decapoda) *Ann. Mag. nat. Hist.*, 5 : 27-32.
- Wood-Manson, J. 1871. Contribution to Indian Carcinology on Indian and Malayan Telphusidae Part. 1. *J. asiat. Soc. Bengal*, 40(2) : 189-207.
- Dutta, N.K. 1998. Studies on the systematics and distribution of crabs in Assam. *J. Bom. Nat. Hist. Soc.* Vol., 80 : 545.

## INSECTA : DERMAPTERA

G. K. SRIVASTAVA

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

### INTRODUCTION

This paper is based upon a collection of Dermaptera from Kopili Hydro Electric Project site.

Altogether, seven species belonging to six genera are reported. Four species namely. *Nala lividipes* (Dufour), *Labidura riparia* (Pallas), *Circolabia curvicauda* (Motschulsky) have worldwide distribution and *Eparchus insignis* (Hann) is widely distributed in the Oriental Region. Besides, *Aborolabis emarginata* Srivastava, is at present, known only from NE India whereas *A. pervicina* (Burr) is distributed all along the Himalayas in India, Bhutan and Nepal. The occurrence of all species from the area is quite natural.

### SYSTEMATIC LIST

Class INSECTA

Order DERMAPTERA

Suborder ANISOLABOIDEA

Family ANISOLABIDIDAE

Subfamily ANISOLABIDINAE

1. *Aborolabis pervicina* (Burr)
2. *Aborolabis emarginata* Srivastava
3. *Euborellia annulipes* (Lucas)

Family LABIDURIDAE

4. *Nala lividipes* (Dufour)
5. *Labidura riparia* (Pallas)

Suborder FORFICULOIDEA

Family SPONGIPHORIDAE

6. *Circilabia curvicauda* (Motschulsky)

Family FORFICULIDAE

7. *Eparchus insignis* (Hann)

## SYSTEMATIC LIST

### 1. *Aborolabis pervicina* (Burr)

(Figs. 1-4)

1913. *Anbisolabis pervicina* Burr, *Rec. Indian Mus.*, 8(2) : 137 (Male, Female ; India, Assam and Arunachal Pradesh).

*Material examined* : 3 examples (1 male, 2 females)

*Diagnostic characters* : Male : General color shining reddish to blackish brown. Head triangular; eyes shorter than post-ocular area. Pronotum quadrate, gently widened posteriorly. Abdomen punctate, sides of segments 6<sup>th</sup> to 9<sup>th</sup> acute angled posteriorly, carinate and striate. Penultimate sternite broadly rounded, punctulated, posterior margin truncate. Ultimate tergite and forceps and genitalia as seen in figs. 3-4.

*Female* : Sides of abdominal segments ecarinate and convex; forceps simple and straight.

*Distribution* : INDIA : North-East India and Himachal Pradesh.

### 2. *Aborolabis emarginata* Srivastava

(Figs. 4-8)

1976. *Aborolabis emarginata* Srivastava, *J. zool. Soc. India*, 26 : (1 & 2) : 134, figs. 1 C-E (Male, Female, India : Arunachal Pradesh).

*Material examined* : 5 examples (2 males, 3 females)

*Diagnostic characters* : Male : General color blackish brown. Antennae with three basal and one or two pre-apical segments yellowish. Head about as long as broad; pronotum slightly expanded posteriorly. Apterous; sides of abdominal segments 6<sup>th</sup> to 9<sup>th</sup> acute angled, carina present on 7<sup>th</sup> and 8<sup>th</sup> only. Penultimate sternite with posterior margin broadly emarginated. Ultimate tergite and forceps and genitalia as seen in figs. 7-8.

*Female* : Sides of abdominal segments rounded, ecarinate and forceps simple and straight.

*Distribution* : INDIA : Arunachal Pradesh, Meghalaya and Assam.

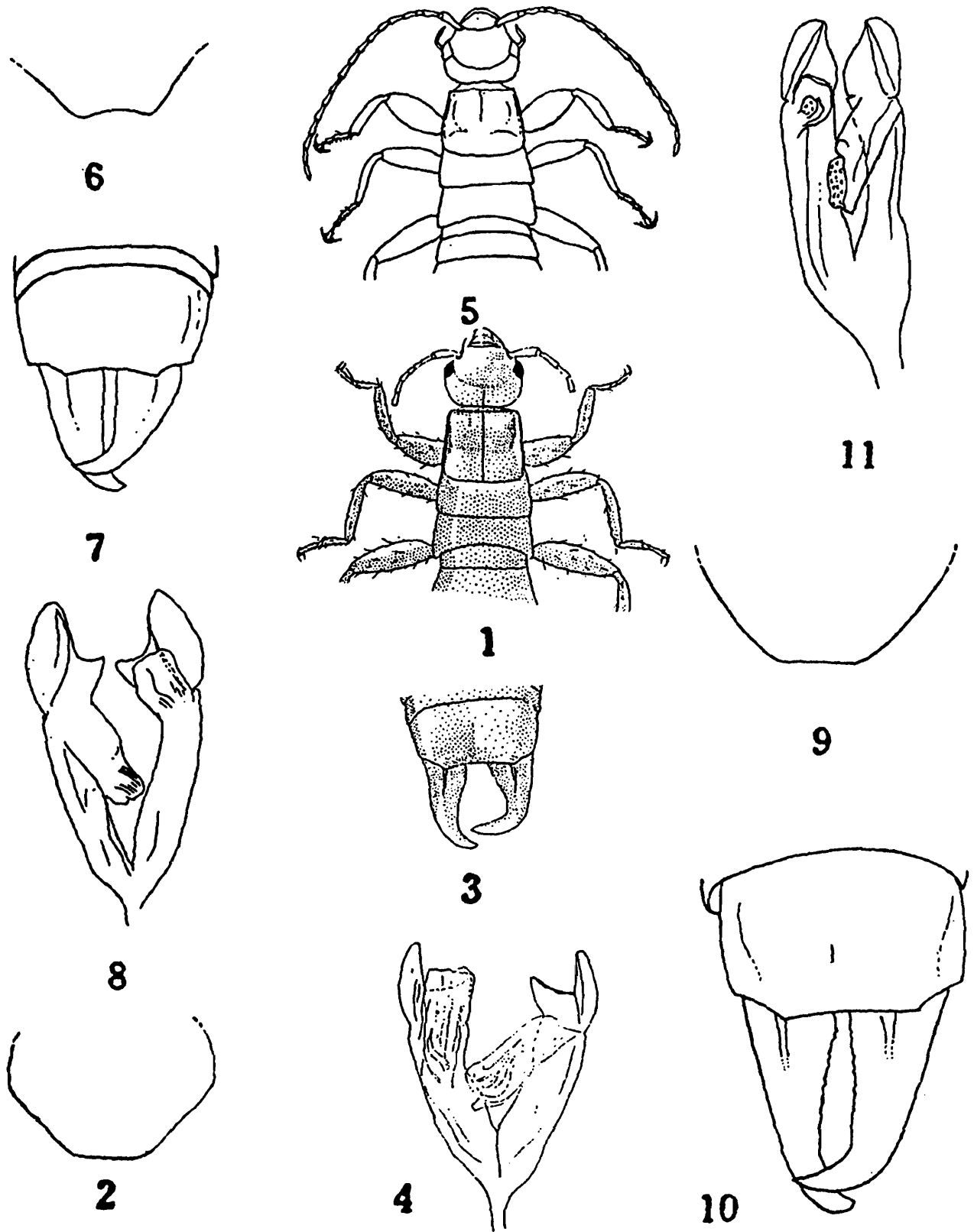
### 3. *Euborellia annulipes* (Lucas)

(Figs. 9-11)

1847. *Forficesila annulipes*, *Annls. Soc. Ent. Fr.*, (2) 5 : 84 Sex ? ; Jardine des Plantes, Paris (Introduced)].

*Material examined* : 14 examples (1 male, 4 females, 9 nymphs)

*Diagnostic characters* : General color shining blackish brown to dark brown; antennae with basal and or two ante-apical segments and sides of pronotum yellow and legs yellow and femora banded with black. Male abdominal segments 6<sup>th</sup> to 9<sup>th</sup> on sides acute angled posteriorly, striate and carinate; penultimate sternite with hind margin briefly rounded;



**Figs. 1-11. :** Figs. 1-11 : *Aborolabis pervicina* (Bur), Male, 1. Anterior portion of body; 2. Posterior portion of Penultimate sternite; 3. Ultimate tergite and forceps; 4. Genitalia; *Aborolabis emarginata* Srivastava, Male, 5. Anterior portion of body; 6. Posterior half of penultimate sternite; 7. Ultimate tergite and forceps; 8. Genitalia; *Euborellia annulipes* (Lucas), Male; 9. Posterior half of penultimate sternite; 10. Ultimate tergite and forceps; 11. Genitalia.

parameres about as broad as long, flat, external apical angle rounded; distal lobes with pads of chitinous teeth.

*Distribution* : Worldwide.

#### 4. *Nala lividipes* (Dufour)

(Figs. 12-13)

1820. *Forficula pallipes* Dufour, *Ann. Gener. Des Phys. Bruxelles*, 4 : 316, pls. 116, figs. 7, 7a and 7b (Male, Female ; lower Catalonia, Spain).

*Material examined* : 1 example (male)

*Diagnostic characters* : General color dull blackish brown to black with varying intensity on various body parts and leg joints dirty yellow. Elytra and wings well developed, former rough and carinate along the costal margin. Male forceps with branches stout, incurved; genitalia with parameres narrowed apically, distal lobes with distinct virga. Ultimate tergite and forceps and genitalia of male as seen in figs. 12-13.

*Distribution* : Worldwide.

#### 5. *Labidura riparia* (Pallas)

(Figs. 14-15)

1773. *Forficula riparia* Pallas, *Reise Russ. Retchs.*, 2 : 727 (Sex ? ; Shores of Irtysh River, Western Siberia).

*Material examined* : 5 examples (2 males, 3 females)

*Diagnostic Characters* : General color 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 in figs. 14-15.

*Distribution* : INDIA : Worldwide.

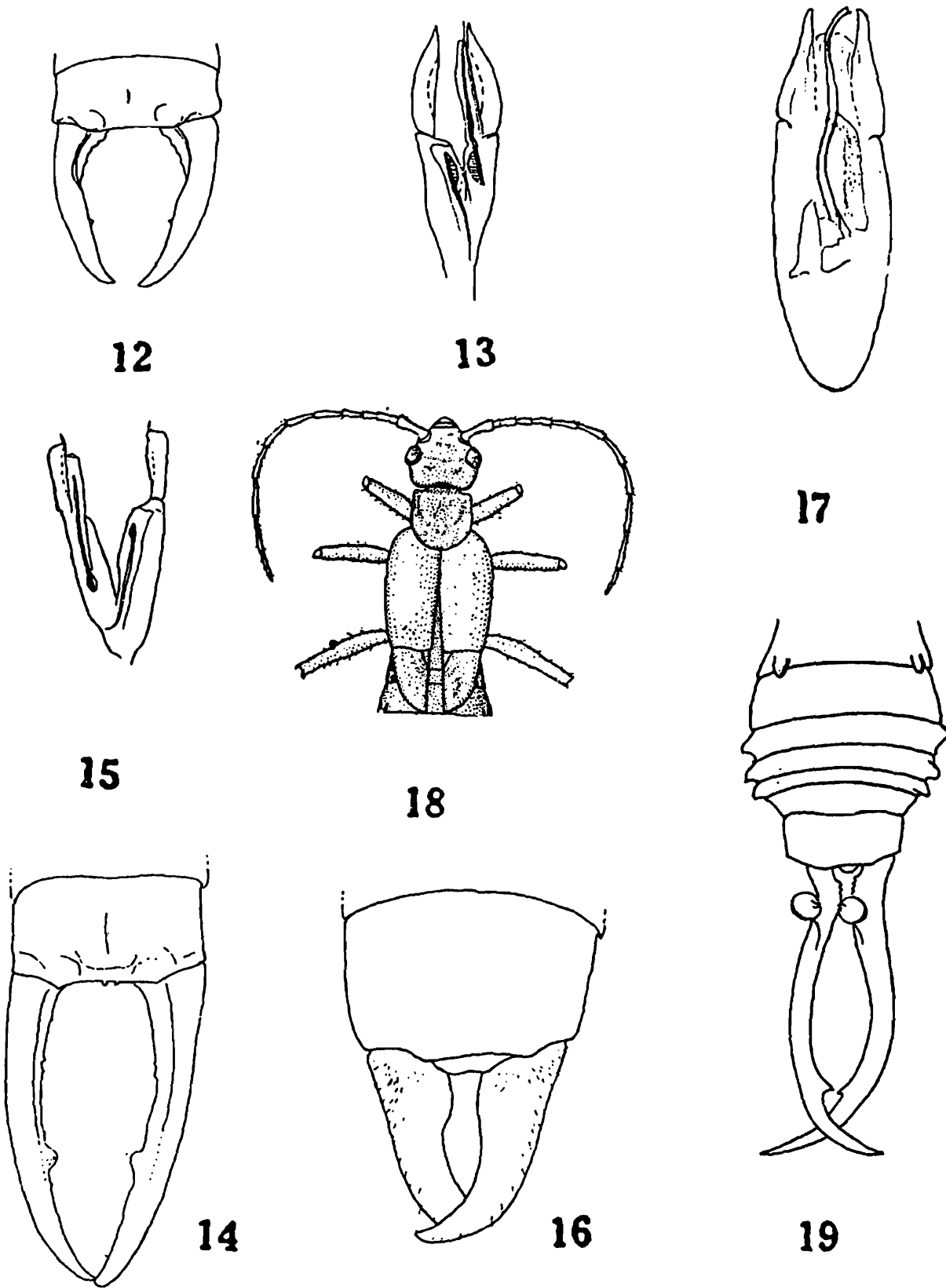
#### 6. *Circilabia curvicauda* (Motschulsky)

(Figs. 16-17)

1863. *Forficesila curvicauda* Motschulsky, *Bull. Soc. Imp. Moscou.*, 36 : 2, pl. 2, fig. 1 (Male, Female; Nura Illia Mountains, Ceylong).

*Material examined* : 1 example (male)

*Diagnostic characters* : Color 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. Head convex, hind



**Figs. 12-19.** : Figs. 12-19 : *Nala lividipes* (Dufour), Male, 12. Ultimate tergite and forceps; 13. Genitalia; *Labidura riparia* (Pallas), Male, 14. Ultimate tergite and forceps; 15. Genitalia; *Circolabia curvicauda* (Motschulsky), Male, 16. Ultimate tergite and forceps; 17. Genitalia; *Eparchus insignis* (Hann), Male, 18. Anterior portion of body; 19. Hind portion of body.

margin emarginated; 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. 16-17.

*Female* : Pygidium narrower and more prominent and forceps simple and straight.

*Distribution* : Worldwide.

### 7. *Eparchus insignis* (Hann)

(Figs. 18-19)

1842. *Forficula insignis* Hann, *Verh. Nat. Gest. Nederl. Overz. Bezitt*, 243, fig. 15 not fig. 14 as mentioned in text (Male, Female; Java).

*Material examined* : 2 examples (females)

*Diagnostic characters* : General color dark brownish black, often lighter, sometimes elytra yellowish brown with a yellow spot. Elytra and wings well developed; legs long and slender, hind tarsi with 1<sup>st</sup> segment distinctly longer than the remaining two segments together. Sides of the abdominal segments 6<sup>th</sup> and 8<sup>th</sup>, in males, tuberculated. Ultimate tergite and forceps of males as seen in fig. 19.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : MYANMAR; SRI LANKA; INDO-CHINA; JAVA; CELEBES AND HAINAN ISLS.

### SUMMARY

Altogether, seven species of Dermaptera belonging to six genera are reported. Four species namely, *Nala lividipes* (Dufour), *Labidura riparia* (Pallas), *Circolabia curvicauda* (Motschulsky) have worldwide distribution and *Eparchus insignis* (Hann) is widely distributed in the Oriental Region. Besides, *Aborolabis emarginata* Srivastava, is at present, known only from NE India whereas *A. pervicina* (Burr) is distributed all along the Himalayas in India, Bhutan and Nepal. The occurrence of all species from the area is quite natural.

### REFERENCE

Srivastava, G.K. and Lahiri, A.R. 1983. Records of some Dermaptera (Insecta) from North Eastern India. *Rec. zool. Surv. India*, **81** : 281-288.

## INSECTA : HEMIPTERA : WATER-BAGS

ANIMESH BAL

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053

### INTRODUCTION

Water-bugs are of two categories, Hydrocorisae or true bugs and Amphibicorisae or semi-aquatic bugs. Hydrocorisae live under water while Amphibicorisae live on the surface of water. Water-bugs are effectively predaceous on zooplanktons and other aquatic micro fauna, fish fry, tadpoles, aquatic insects of suitable sizes. Indian water-bugs are belonging to 15 Heteropteran families of the Order Hemiptera. Till date about 300 species have been recorded from India. The present paper deals with 11 species under 5 genera and 3 families.

First comprehensive faunal studies on Indian water-bugs was carried out by Distant (1902, 1906, 1910) in his monumental volumes of Fauna of British India and recorded about 150 species from the Indian subcontinent. Paiva (1919 a, b), Hafiz & Ribeiro (1938), Hafiz & Pradhan (1947), Brooks (1951), Hungerford & Matsuda (1965), Thirumalai (1986-2006), Bal & Basu (1994, 1999, 2000, 2002, 2003, 2004) contributed on different groups of water-bugs from different parts of India.

### SYSTEMATIC LIST

Following species of water-bugs have been identified from the collections made from the Kopili Hydro-Electric Project site, Umrongso, North Cachar Hills, Assam.

#### SERIES AMPHIBICORISAE

Family GERRIDAE

Subfamily PTILOMERINAE

1. *Ptilomera (Ptilomera) assamensis* Hungerford & Matsuda.

#### SERIES HYDROCORISAE

Family BELOSTOMATIDAE

Subfamily LETHOCERINAE

2. *Lethocerus indicus* (Lep. & Serv.)

## Family NEPIDAE

## Subfamily NEPINAE

3. *Laccotrephus robustus* Stål
4. *Laccoterphes ruber* (Linnaeus)

## Subfamily RANATRINAE

5. *Ranatra gracilis* Dallas
6. *Ranatra longipes* Stål
7. *Ranatra elongata* Fabricius
8. *Ranatra filiformis* Fabricius
9. *Ranatra sordidula* Dohrn
10. *Ranatra varipes* Stål
11. *Cercotmetus pilipes* (Dallas)

## SYSTEMATIC ACCOUNT

1. *Ptilomera (Ptilomera) assamensis* Hungerford and Matsuda

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

*Material examined* : 3 examples (males)

*Diagnostic Characters* : Adult insects may be 13.5-15.0 mm in length, males a little shorter than females; anterior median margins of pronotum with two black spots or a continuous connecting line between them behind the interocular space in both sexes; males with paramere superficially resembling that of *laticaudata* but the distal half of the arm of paramere lacks the definite constrictions present in *laticaudata*; in females the connexival spines usually shorter and flattened slightly beneath the dorsal margin of dorso-lateral lobe of the 7<sup>th</sup> abdominal segment.

*Distribution* : Earlier this species was known from its type localities (Hung. & Mat. 1965). The present paper recorded it from a new habitat.

2. *Lethocerus indicus* (Lep. & Serv.)

1825. *Belostoma indica* Lepeletier & Serville, *Encycl. Meth.* : 272.

*Material examined* : 3 examples (males)

*Diagnostic characters* : Adults may be 62-85 mm in body length; head between eyes with parallel sides; hemelytra with distinct membrane having prominent and thick longitudinal veins; posterior legs provided with thick sets of long swimming hairs on the ventral sides.

*Distribution* : INDIA : Assam, Mizoram, Bihar, Kerala, Orissa, Maharashtra, Meghalaya, Uttar Pradesh, West Bengal.

*Elsewhere* : CHINA; JAVA; MYANMAR; MALAYSIA; PAKISTAN; PHILLIPINES; SRI LANKA; SUMATRA.

### 3. *Laccotrephes robustus* Stål

1870. *Laccotrephes robustus* Stål., *Of vers. K. Vet.—Akad Forh.*, 27 : 706.

*Material examined* : 2 examples (males)

*Diagnostic characters* : Body length 36-44 mm; breadth between posterior pronotal angles 12-12.5 mm; abdominal appendages about equal in length or little longer than the body; abdomen above red blood in colour.

*Distribution* : INDIA : Assam, Meghalaya, Nagaland.

*Elsewhere* : FORMOSA, INDONESIA, MYANMAR, PHILLIPINES.

*Remarks* : This species is being reported for the first time from Assam.

### 4. *Laccotrephes ruber* (Linnaeus)

1764. *Nepa ruber* Linnaeus., *Mus. Lud. Ulr.*, : 165.

*Material examined* : 37 examples (11 males, 26 females)

*Diagnostic characters* : Body length 30-35 mm, breadth between posterior pronotal angles 7-9 mm; abdominal appendages a little longer than the body length; abdomen above yellowish red in colour.

*Distribution* : INDIA : Assam, Meghalaya, Sikkim, Himachal Pradesh, Jammu & Kashmir, Kerala, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.

*Elsewhere* : CHINA, FORMOSA, JAPAN, NEPAL, PAKISTAN.

### 5. *Ranatra gracilis* Dallas

1849. *Ranatra gracilis* Dallas., *Trans. R. ent. Soc. London*, : 10.

*Material examined* : 3 examples (females)

*Diagnostic characters* : Adult insect may attain a length of about 35 mm, while abdominal appendages may be about 8-9 mm. in length. Posterior appendages very short, about 1/4<sup>th</sup> of the body length; head with an acute tubercle between the eyes.

*Distribution* : INDIA : Assam, Meghalaya.

*Elsewhere* : BHUTAN.

### 6. *Ranatra longipes* Stål

1861. *Ranatra longipes* Stål, *Of vers. K. Vet.—Akad Forh.*, **18** : 203.

*Material examined* : 1 example (male)

*Diagnostic characters* : Adult insects may be 22-23 mm. and the abdominal appendages a little shorter than the length of abdomen. Posterior femora very long to reach the extremity of the abdomen in male (a little shorter in female).

*Distribution* : INDIA : Assam, West Bengal, Uttar Pradesh.

*Elsewhere* : BANGLADESH, INDONESIA, CHINA, MALAYSIA, MYANMAR, SRI LANKA, VIETNAM.

### 7. *Ranatra elongata* Fabricius

1790. *Ranatra elongata* Fabricius., *Skrif. Nat. Selsk.*, **1** : 228.

*Material examined* : 4 examples (3 males, 1 female)

*Diagnostic characters* : Anterior femur armed with a large triangular teeth beyond the middle of its length and a pair of small teeth a little before the apex. Body length 42-45 mm, abdominal appendages a little longer about 47 mm; anterior femur armed with one spine like tooth; metasternal process subtriangular and mid-longitudinally foveately sulcate.

*Distribution* : INDIA : Assam, Bihar, Jammu & Kashmir, Kerala, Maharashtra, Orissa, Pondicherry, Tamil Nadu, Uttar Pradesh, West Bengal.

*Elsewhere* : AUSTRALIA, NEPAL, SRI LANKA.

### 8. *Ranatra filiformis* Fabricius

1790. *Ranatra filiformis* Fabricius., *Skrif Nat. Selsk.*, **1** : 228.

*Material examined* : 6 examples (3 males, 3 females)

*Diagnostic characters* : This species is much smaller than *R. elongata* and difficult to identify. Paramere without a tooth on the inner side of the hook in male; interocular space wide. Body length about 27 mm; abdominal appendages a little short, about 23 mm; metasternal process triangular with a distinct mid-longitudinal ridge.

*Distribution* : INDIA : Assam, Kerala, Maharashtra, Orissa, Pondicherry, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal.

*Elsewhere* : NEPAL, PAKISTAN, PHILLIPINES, SRI LANKA.

### 9. *Ranatra sordidula* Dohrn.

1860. *Ranatra sordidula* Dohrn., *Stettin ent. Ztg.*, **21** : 409.

*Material examined* : 1 example (female)

*Diagnostic characters* : Head without any tubercle in between the eyes. Abdominal appendages 2-4 mm shorter than the body length (22-24 mm); metasternal process posteriorly projectile and mid-longitudinally slightly carinated; anterior tibia short; not to touch the tooth of anterior femur.

*Distribution* : INDIA : Assam, Meghalaya, Orissa, West Bengal.

*Elsewhere* : MALAYSIA, SRI LANKA, THAILAND.

#### 10. *Ranatra varipes* Stål

1861. *Ranatra varipes* Stål, *Of vers. K. Vet.—Akad. Forh.*, 18 : 203.

*Material examined* : 2 examples (males)

*Diagnostic characters* : Abdominal appendages 7-8 mm shorter than the body length (19-20 mm); metasternal process posteriorly blunt and mid-longitudinal carination indistinct; anterior tibia long and clearly touching inner tooth of anterior femur.

*Distribution* : INDIA : Assam, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.

*Elsewhere* : MALAY PENNINSULA, MYANMAR, NEPAL, SRI LANKA, THAILAND.

#### 11. *Cercotmetus pilipes* (Dallas)

1849. *Ranatra pilipes* Dallas., *Trans. R. ent. Soc. London*, : 2.

*Material examined* : 5 examples (3 males, 2 females)

*Diagnostic characters* : Body length of adults may be about 41 mm; abdominal appendages about 9 mm in length; head provided with a tubercle on the vertex; elytra not reaching the apex of the abdomen; prosternum with two long deep longitudinal furrows extending to the whole length; anterior femora considerably shorter than the pronotum; intermediate and posterior tibiae and tarsi furnished with a double row of long yellowish hairs on the inner side.

*Distribution* : INDIA : Assam, Meghalaya, Delhi.

*Elsewhere* : Reported for the first time in North-East India.

### SUMMARY

Indian water-bugs belonging to 15 Heteropteran families of the Order—Hemiptera so far recorded about 300 species under 79 genera. The present paper deals with 11 species under 5 genera and 3 families. The species *Cercotmetus pilipes* (Dallas) has been reported for the first time in North-East India.

## REFERENCES

- Bal, Animesh and Basu, R.C. 1994. Insecta : Hemiptera : Belostomatidae, Nepidae, Notonectidae and Pleidae. *Fauna of West Bengal, State Fauna Series, 3 : Part-5 : 535-558.*
- Bal, Animesh and Basu, R.C. 1999. Insecta : Hemiptera : Water-bugs. *Fauna of Meghalaya, State Fauna Series, 4 : Part-4 : 431-461.*
- Bal, Animesh and Basu, R.C. 2002. Insecta : Hemiptera : Water-bugs. *Fauna of Kabar Lake, Wetland Ecosystem Series, 4 : 77-87.*
- Bal, Animesh and Basu, R.C. 2003. Insecta : Hemiptera : Water-bugs. *Fauna of Sikkim, State Fauna Series, 9 : Part-2 : 541-557.*
- Brooks, G.T. 1951. A revision of the genus *Anisops* (Notonectidae : Hemiptera) *Kans. Univ. Sci. Bull., 34(8) : 310-519.*
- Distant, W.L. 1902. *The Fauna of British India including Ceylon and Burma. Rhynchota.* London, **2** : 1-503.
- Distant, W.L. 1906. *The Fauna of British India including Ceylon and Burma. Rhynchota.* London, **3** : 1-503.
- Distant, W.L. 1910. *The Fauna of British India including Ceylon and Burma. Rhynchota.* London, **5** : 1-362.
- Dohrn, A. 1860. Zur Heteropteran Fauna Ceylon's. *Stettin. Ent. Ztg., 21 : 409.*
- Fabricius, J.C. 1790. Nova Insectorum genera. *Skr. Nat. Selsk I., 1 : 1-350.*
- Hafiz, H.A. and Rebeiro, S. 1938. On further collection of aquatic Rhynchota from the Rajmahal Hills, Santal Parganas, Bihar, with description of *Microvelia santala* sp. nov. *Rec. Indian Mus., 41(4) : 423-426.*
- Hafiz, H.A. and Pradhan, K.S. 1947. Notes on a collection of aquatic Rhynchota from the Patna State, Orissa with description of two new species. *Rec. Indian. Mus., 45(4) : 347-376.*
- Hungerford, H.B. and Matsuda, R. 1965. The genus *Ptilomera* Amy. & Serv. (Gerridae : Hemiptera). *Kans. Univ. Sci. Bull., 45(5) : 397-515.*
- Paiva, C.A. 1919a. Aquatic and Semi-aquatic Rhynchota from Satara and Poona Districts. *Rec. Indian Mus., 16 : 152-156.*
- Paiva, C.A. 1919b. Rhynchota from the Garo Hills, Assam. *Rec. Indian Mus., 16(3) : 349-377.*
- Thirumalai, G. 1999. Aquatic and Semi-aquatic Hemiptera of India., *I. A. A. B., 7 : 1-74.*

## **INSECT : AQUATIC COLEOPTERA (FAMILY : GYRINIDAE, DYTISCIDAE AND HYDROPHILIDAE)**

**P. MUKHOPADHYAY AND S. K. GHOSH**

*Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053*

### **INTRODUCTION**

The beetles (Coleoptera : Insecta) adapted to aquatic life, form one of the main constituent of insect fauna of aquatic biota. Of the representatives belonging to 18 families of aquatic Coleoptera known from the world, five families belonging to Suborder Adepaga and eight families of suborder Polyphaga are known from India. Amongst them, the families like Gyrinidae (whirligig beetles), Dytiscidae (predacious diving beetles and Hydrophilidae (Water scavenger beetles) are dominant.

So far the fauna of aquatic coleoptera is concerned, there is no consolidated work on this group from Assam. However, 8 species under 3 genera belonging to three subfamilies of Gyrinidae, 34 species under 13 genera belonging to five subfamilies of Dytiscidae are recorded from Assam. Members of the family Gyrinidae are usually found in freshwater ponds, lake margins, open flowing streams, quiet stream margins, bogs, pools, swamps and roadside ditches whereas the members of the family Dytiscidae are frequent both in stagnant and running waters and inhabits also in both fresh and brackish water. But the water scavenger beetles are truly aquatic inhabitants and form an important constituent of fresh water ecosystem. Of them some are terrestrial or found in moist places like dung, decaying vegetable heaps, rotten banana and such other places.

The major workers who dealt with the family Gyrinidae are Fabricius (1781), Walker (1858, 1859), Motschulsky (1861), Regimbart (1882), Severin (1890), Sharp (1891), Vazirani (1958, 1984), Biswas, *et al.* (1995), Mukhopadhyay, *et al.* (2000), etc.

The workers like Zimmerman (1920) etc. dealt with the family Dytiscidae and Knisch (1924), d, orchymont (1928), Sato (1979), Biswas, *et al.* (1995), Mukhopadhyay, *et al.* (2000), etc. dealt the family Hydrophilidae.

The importance of these three families can also not be ignored because of the scavenging nature of the member of the family Gyrinidae, they feed on the dead insects trapped or floating on the surface of the water. The larvae of the family Dytiscidae, known as water tigers,

destroy the fry of fingerlings of commercial fishes, prey on various aquatic animals including mollusks, worms, tadpoles, small fishes, etc. and also used in fish culture and hydrophilids are scavenging in nature.

Materials of this study are based on a collection made by S. J. S. Hattar and his parties from the Kopili Hydro Electric Project site, North Cachar Hills, Assam during 1998-2000. Present study records 10 species and 6 genera belonging to 3 families of which the genera like *Rhantus* Stephens (Colymbetinae) and *Sandracottus* Sharp (Dytiscinae) of the family Dytiscidae and *Sternolophus* Soiler of Hydrophilidae are first time recorded from Assam. The species viz. *Rhantus* (S. Str.) *taprobanicus* Sharp, *Sandracottus festivus* (Illiger), *Sandracottus manipurensis* Vazirani of Dytiscidae and *Sternolophus rufipes* (F.) of Hydrophilidae are recorded for the first time from Assam (Khondong, Umrong reservoir). Distributional data, material examined and original reference have been provided here.

## SYSTEMATIC LIST

### Family GYRINIDAE

#### Subfamily ENHYDRINAE

1. *Dineutus* (*Spinodineutus*) *spinus* (Fabricius)

### Family DYTISCIDAE

#### Subfamily COLYMBETINAE

2. *Rhantus* (S. Str.) *taprobanicus* Sharp

#### Subfamily DYSTISCINAE

3. *Hydaticus* (*Guignotites*) *fabricii* Macleay
4. *Hydaticus* (*Guignotites*) *vittatus* (Fabricius)
5. *Sandracottus festivus* (Illiger)
6. *Sandracottus manipurensis* Vazirani
7. *Cybister* (*Melanectes*) *posticus* Aube
8. *Cybister* (*Melanectes*) *sugillatus* Erichson
9. *Cybister* (*Melanectes*) *tripunctatus asiaticus* Sharp

### Family HYDROPHILIDAE

#### Subfamily HYDROPHILINAE

10. *Sternolophus rufipes* (Fabricius)

**SYSTEMATIC ACCOUNT****1. *Dineutus (Spinosodineutus) spinosus* (Fabricius)**

1781. *Gyrinus spinosus* Fabricius, *Specis Insectorum* : 298.

1984. *Dineutus (Spinosodineutus) spinosus* (F) : Vazirani, *Fauna of India*, Coleoptera, Fam. Gyrinus and Fam. Haliplidae, pp. 17-20.

*Material examined* : 8 examples

*Diagnostic characters* : Episternum of mesothorax not extending upto elytral epipleurae; pronotum and elytra without any pubescence; scutellum concealed or invisible; elytral striae indistinct; apex of elytra with two spines.

*Distribution* : INDIA : Assam, Meghalaya, Manipur, West Bengal, Bihar, Orissa, Uttar Pradesh, Tamil Nadu.

*Elsewhere* : BANGLADESH, MYANMAR, THAILAND, MALAYASIA, LAOS , VIETNAM.

**2. *Rhantus (S. Str.) taprobanicus* Sharp**

1890. *Rhantus taprobanicus* Sharp, *Trans. Ent. Soc. Lond.*, 1 : 346.

*Material examined* : 1 example

*Diagnostic characters* : Reticulation of ventral side not distinct; normal striae of punctures more spaced; anterior claws thinner.

*Distribution* : INDIA : Assam, Meghalaya, Manipur, West Bengal, Bihar, Uttaranchal, Himachal Pradesh, Rajasthan, Maharashtra, Karnataka, Tamil Nadu, Pondicherry.

*Elsewhere* : PAKISTAN, SRI LANKA.

*Remarks* : The genus *Rhantus* Stephens as well as this species is recorded for the first time from Assam.

**3. *Hydaticus (Guignotites) fabricii* Macleay**

1833. *Hydaticus fabricii* Macleay, *Anulosa Javanica* : 134.

1977. *Hydaticus (Guignotites) fabricii*, Vazirani, *Rec. zool. Surv. India*, Misc. Publ. Occ. Paper No 6 : 76-77.

*Material examined* : 14 examples

*Diagnostic characters* : Head brown with a transverse black band on the posterior border of vertex, pronotum with a transverse, median black band along the posterior corner; elytra reddish yellow, densely speckled with black irrorations more or less condensed near the suture.

*Distribution* : INDIA : Assam, Manipur, Sikkim, West Bengal, Bihar, Orissa, Punjab, Himachal Pradesh, Rajasthan, Maharashtra, Tamil Nadu.

*Elsewhere* : PHILLIPINES, INDONESIA, VIETNAM, MYANMAR, WEST PAKISTAN, NEPAL.

#### 4. *Hydaticus (Guignotites) vittatus* (Fabricius)

1775. *Dytiscus vittatus* F., *Systema entomologiae*, Appendix, Flensburgi and Lipsiae : 825.

1977. *Hydaticus (Guignotites) vittatus*, Vazirani, *Rec. zool. Surv. India*, Misc. Publ. Occ. Paper No 6 : 81.

*Material examined* : 7 examples

*Diagnostic characters* : Head black anteriorly variable to yellow; pronotum black with sides blending into yellow; elytra generally black with two bright golden yellow longitudinal lateral stripes in the basal half; penis provided with a smaller tuft of hairs at the apex on the dorsal side.

*Distribution* : INDIA : Assam, Meghalaya, Manipur, Bihar, Orissa, Kashmir, Uttaranchal, Rajasthan, Madhya Pradesh, Maharashtra, Tamil Nadu.

*Elsewhere* : NEPAL; MYANMAR; SRI LANKA; SIAM.

#### 5. *Sandracottus festivus* (Illiger)

1802. *Dytiscus festivus* Illiger, *Mag. Insektenk*, 1 : 166.

1969. *Sandracottus festivus* (Illiger) : Vazirani, *Ori. Ins.*, 2 (3-4) : 273-274.

*Material examined* : 1 example

*Diagnostic characters* : Head reddish yellow, with the posterior border of the vertex black extending somewhat anteriorly along the inner margin of the eyes; two small oval black spots situated between eyes; pronotum rather ruglose; elytra reddish yellow with brown markings.

*Distribution* : INDIA : Assam, Bihar, Orissa, Himachal Pradesh, Andhra Pradesh, Tamil Nadu.

*Elsewhere* : WEST PAKISTAN.

*Remarks* : The genus *Sandracottus* Sharp and this species is recorded here for the first time from Assam.

#### 6. *Sandracottus manipurensis* Vazirani

1969. *Sandracottus manipurensis* Vazirani, *Orient. Ins.*, 2 (No. 3-4) : 277-278.

*Material examined* : 1 example.

**Diagnostic characters** : Head micro reticulate; reddish yellow with the posterior borders of the vertex black; pronotum black in the middle and reddish yellow on the sides; elytra shining, reddish yellow with black markings.

**Distribution** : INDIA : Assam, Manipur.

**Remarks** : This species is recorded here for the first time from Assam.

### 7. *Cybister (Melanectes) posticus* Aube

1838. *Cybister posticus* Aube, in *Dejean's species Coleoptera*, 6 : 87.

1977. *Cybister (Melanectes) posticus*, Vazirani, *Rec. zool. Surv. India*, Misc. Publ. Occ. Paper No. 6 : 89.

**Material examined** : 3 examples

**Diagnostic characters** : Head black with labrum yellow; pronotum black; elytra black with a reddish spot just before the apex.

**Distribution** : INDIA : Assam, Meghalaya, Manipur, West Bengal, Maharashtra, Orissa, Uttar Pradesh, Delhi.

**Elsewhere** : BANGLADESH; EAST PAKISTAN.

### 8. *Cybister (Melanectes) sugillatus* Erichson

1834. *Cybister sugillatus* Er. 16 : 227.

1899. *Cybister (Melanectes) sugillatus*, Vazirani, *Rec. zool. Surv. India*, Misc. Publ. Occ. Paper No. 6 : 89.

**Material examined** : 27 examples

**Diagnostic characters** : Head black except labrum being brown; pronotum black with indistinct reddish lateral borders; elytra black with an anti-apical reddish spot.

**Distribution** : INDIA : Assam, Manipur, Tripura, Sikkim, West Bengal, Orissa, Uttaranchal, Madhya Pradesh, Maharashtra, Tamil Nadu.

**Elsewhere** : JAPAN; CHINA; PHILLIPINES; INDONESIA; MYANMAR.

### 9. *Cybister (Meganectes) tripunctatus asiaticus* Sharp

1882. *Cybister asiaticus* Sharp, *Sci. Trans. R. Dublin Soc*, 2 : 731.

1977. *Cybister (Meganectes) tripunctatus asiaticus*, Vazirani, *Rec. zool. Surv. India*, Misc. Publ. Occ. Paper No. 6 : 92.

**Material examined** : 31 examples

**Diagnostic characters** : Head black, with greenish metallic iridescens; pronotum shining black with greenish metallic iridescens with yellow lateral stripe; elytra black with greenish metallic iridescens with yellow lateral borders about one and half times as on pronotum.

*Distribution* : INDIA : Assam, Manipur, Tripura, West Bengal, Bihar, Orissa, Jammu & Kashmir, Madhya Pradesh, Andhra Pradesh, Rajasthan, Maharashtra, Uttaranchal, Karnataka, Tamil Nadu, Andaman Island.

*Elsewhere* : WEST PAKISTAN; AFGHANISTAN; NEPAL; SRI LANKA; BANGLADESH; MYANMAR.

#### 10. *Sternolophus rufipes* (Fabricius)

1792. *Hydrophilus rufipes* Fabricius, *Entomon. Syst.* 1 : 183.

*Material examined* : 8 examples

*Diagnostic characters* : All femora clothed at base with a silky procumbent and dense pubescence; antennae with normal club; all ventral segments pubescent without shining spot on the middle of posterior margin of fifth.

*Distribution* : INDIA : Assam, Meghalaya, West Bengal.

*Elsewhere* : EAST ASIA; SUNDA ISLAND.

*Remarks* : This species as well as the genus is recorded here for the first time from Assam.

### SUMMARY

The aquatic coleoptera includes 10 species under 6 genera belonging to 3 families viz., Gyrinidae, Dytiscidae and Hydrophilidae. Of which 3 species viz., *Rhantus* (S. Str.) *taprobanicus* Sharp, *Sandracottus festivus* (Illiger), *Sandracottus manipurensis* Vazirani of Dytiscidae and *Sternolophus rufipes* (F.) of Hydrophilidae are first time reported from Assam (Kondong and Umrong reservoir). The genera like *Sandracottus* Sharp and *Sternolophus* Solier are also recorded for the first time from Assam.

### REFERENCES

- Aube, C. 1838. Species general des Hydrocantheres et Gyriniens in Dejean's species general des Coleoptre, 6, Gyriniens : 656-726.
- Biswas, S., Mukhopadhyay, P. and Saha, S.K. 1995. Insecta : Coleoptera : Adephaga : Fam. Gyrinidae and Fam. Haliplidae. *Zool. Surv. India, State Fauna Series 3 : Fauna of West Bengal, Part 6(A)* : 121-141.
- Fabricius, J.C. 1781. *Species Insectorum.*, 1 : viii + 552.
- Knisch, A. 1924, *Coleopterorum Catalogus* (S. Schenkling edited), 14(79) : 306.
- Motschulsky, V. 1861, Essai d'um Catalogue des Insects le Ceylon. *Bull. Soc. Imp. Moscow*, 34 : 95-155.

- Mukhopadhyay, P., Ghosh, S.K., Saha, S.K. and Biswas, 2000. *Insecta : Coleoptera : Gyrinidae, Dytiscidae and Hydrophilidae. Zool. Surv. India, Fauna of Meghalaya, State Fauna Series, (Part-5) : 792.*
- D'Orchymont, A. 1928. *Catalogue of Indian Insects, Part-14 : 1-146.* Govt. of India Publication.
- Regimbart, M. 1882. Essai Monographique de la Famille des Gyrinidae. *Annls. Soc. ent. Fr., (6)2 : 379-458.*
- Sato, M. 1979. Ergebnisse der Bhutan Expedition 1972. Und Indian Nepal Expedition 1975-1977 des Naturhistorischen Museum in Basel Coleoptera Fam. Georissidae, Hydraenidae and Ptilodactylidae. *Entomologica Bali linesia, 4 : 43-88.*
- Severin, G. 1890. Notes Surles Hydrocanthares due Chotanagpore. *Bull. Soc. Ent. Belg., 34 : 186-199.*
- Sharp, D. 1891. Haliplidae, Dytiscidae, Gyrinidae, Hydrophilidae in Scientific Results 2<sup>nd</sup> Yarkand Mission, Coleoptera, pp. 37-53.
- Vazirani, T.G. 1958. On a collection of Gyrinidae (Coleoptera) in Zoological Survey of India with description of two new species. *Rec. Indian Mus., 54(1 & 2) : 13-18.*
- Vazirani, T.G. 1984. *Fauna of India, Coleoptera : Fam. Gyrinidae and Fam. Haliplidae, v-xi + 140, PTS-III, figs. 1-57.*
- Walker, F. 1858. Characters of some apparently undescribed Ceylon Insects. *Ann. Mag. Nat. Hist., (3) 2 : 202-209.*
- Zimmermann, A. 1920. Dytiscidae, Haliplidae, Hygrobiidae, Amphizoidae. *Coleoptera Cat, 4(71) : 1-326.*



## MOLLUSCA

**S. C. MITRA, M. HAFIZ AND RAMAKRISHNA**

*Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053*

### INTRODUCTION

North-East India with its relative isolation from the rest of the country has its unique faunal composition. From land and freshwater mollusca's point of view the region's importance lies in the fact that more than one third of the total Indian fauna is recorded from here with a high endemicity level. Though molluscan fauna in most of these states have been recently worked out under the State Fauna Series (Mitra, *et al.*, 2006, Mukherjee, *et al.*, 2000, Subba Rao *et al.*, 1995, Surya Rao, *et al.*, 2004; in press) that of Assam has not yet been studied.

The present report is based upon freshwater molluscs collected from the Kopili Hydro Electric Project site by Sri S.J.S. Hattar & Party during July 1998—October 2000.

The classification followed here is after Subba Rao (1989).

### SYSTEMATIC LIST

Class GASTROPODA

Order MESOGASTROPODA

Family VIVIPARIDAE

1. *Bellamya bengalensis* f. *typica* (Lamarck)
2. *Bellamya bengalensis* f. *annandalei* (Kobelt)
3. *Bellamya crassa* (Benson)
4. *Bellamya dissimilis* (Mueller)

Family PILIDAE

5. *Pila theobaldi* (Hanley)

Family THIARIDAE

6. *Brotia (Antimelania) costula* (Rafinesque)
7. *Brotia (Antimelania) costula laevis* (Annandale)
8. *Brotia (Antimelania) costula episcopalis* (L. and H. Lea)

9. *Paludomus (Paludomus) blanfordiana* Nevill
10. *Paludomus (Paludomus) conica* (Gray)
11. *Paludomus (Paludomus) regulata* Benson
12. *Paludomus (Paludomus) reticulata* Blanford
13. *Paludomus (Paludomus) stephanus* (Benson)
14. *Thiara (Melanoides) tuberculata* (Mueller)
15. *Thiara (Tarebia) lineata* (Gray)

Order BASOMMATOPHORA

Family LYMNAEIDAE

16. *Lymnaea (Pseudosuccinea) acuminata* f. *typica* Lamarck
17. *Lymnaea (Pseudosuccinea) acuminata* f. *rufescens* Gray
18. *Lymnaea (Pseudosuccinea) luteola* f. *typica* Lamarck
19. *Lymnaea (Pseudosuccinea) luteola* f. *succinea* Deshayes

Family PLANORBIDAE

20. *Indoplanorbis exustus* (Deshayes)

Class BIVALVIA

Order UNIONOIDA

Family UNIONIDAE

21. *Parreysia (Parreysia) favidens* subsp. *assamensis* Preston
22. *Parreysia (Parreysia) sikkimensis* (Lea)
23. *Parreysia (Radiatula) caerulea* (Lea)

Order VENEROIDA

Family CORBICULIDAE

24. *Corbicula striatella* Deshayes

**SYSTEMATIC ACCOUNT**

Class GASTROPODA

Order MESOGASTROPODA

Family VIVIPARIDAE

1. *Bellamyia bengalensis* f. *typica* (Lamarck)

1822. *Paludina bengalensis* Lamarck, *Hist. Nat. Anim. Sans. Vert.*, 6 (2) : 174.

*Material examined* : 78 examples.

**Diagnostic characters** : Shell univalve and with a horny operculum; moderately large, pyramidal with a circular aperture. With a number of dark spiral bands.

**Distribution** : Commonly distributed throughout India, in all types of stagnant water bodies.

**Elsewhere** : BANGLADESH; MYANMAR & SRI LANKA.

**Remarks** : Shell ovately conical with irregularly arranged dark spiral bands, whorls well rounded, aperture subcircular, umbilical opening narrow.

### 2. *Bellamyia bengalensis* f. *annandalei* (Kobelt)

1908. *Vivipara annandalei* Kobelt, *Nachr. Malak. Ges.*, 60 : 161.

**Material examined** : 12 examples.

**Diagnostic characters** : Shell with a number of dark spiral bands.

**Distribution** : INDIA : Assam, Meghalaya, Andhra Pradesh, Tamil Nadu, West Bengal.

**Remarks** : Shell with rather straight sides, whorls less rounded, aperture anteriorly angulate.

### 3. *Bellamyia crassa* (Benson)

1836. *Palludina crassa* Benson, *J. Asiat. Soc. Beng.*, 5 : 745.

**Material examined** : 2 examples.

**Diagnostic characters** : Shell without spiral bands. Shell thicker, globose with a short and blunt spire; finely striate, umbilical opening prominent, aperture suboval.

**Distribution** : INDIA : Assam, Meghalaya, Orissa, Uttar Pradesh, West Bengal.

**Elsewhere** : BANGLADESH.

### 4. *Bellamyia dissimilis* (Mueller)

1774. *Nerita dissimilis* Müller, *Hist. Verm. Pest.*, pt 2 : 184.

**Material examined** : 134 examples.

**Diagnostic characters** : Shell without spiral bands. Shell broadly ovate, narrowly perforate, last whorl subangulate at the periphery, greenish with a blackish lip of aperture.

**Distribution** : Common throughout India.

**Elsewhere** : BANGLADESH; MALAYSIA; MYANMAR; PAKISTAN; SRI LANKA.

## Family PILIDAE

### 5. *Pila theobaldi* (Hanley)

1875. *Ampullaria theobaldi* Hanley, *Proc. Zool. Soc. Lond.*, p. 608.

*Material examined* : 55 examples.

*Diagnostic characters* : Shell large to very large with an inflated last whorl, suture impressed, umbilicus distinctly open; differs from other common Indian species of the genus in not having coloured bands inside the aperture.

*Distribution* : INDIA : Assam, Manipur, Meghalaya.

*Elsewhere* : MYANMAR.

*Remarks* : This species was for the first time recorded from India (Meghalaya) by Subba Rao *et al.* (1995) and has subsequently been recorded from Manipur by Surya Rao *et al.* (2004). Now it is being for the first time recorded from Assam.

#### Family THIARIDAE

##### 6. *Brotia (Antimelania) costula* (Rafinesque)

1833. *Melania costula* Rafinesque, *Atlanta. J.*, 5 : 166.

*Material examined* : 308 examples.

*Diagnostic characters* : Shell large, reaching above 5 cms. in length, whorls 12-14, sculptured with spiral ridges or nodules and prominent axial ribs; sometimes with spines.

*Distribution* : INDIA : Arunachal Pradesh, Assam, Meghalaya, Mizoram, Tripura, Andhra Pradesh, West Bengal.

*Elsewhere* : BANGLADESH; INDONESIA; MALAYSIA; MYANMAR.

*Remarks* : A very variable shell, depending on variations in shell characters, a number of varieties were described. Most of these varieties were recorded from North-east Indian regions. The material studied include the following two varieties.

##### 7. *Brotia (A.) costula laevis* (Annandale)

1921. *Acrostoma variabilis* var. *laevis* Annandale, *Rec. Indian Mus.*, 22 : 560, pl. 6, figs. 3-4.

*Material examined* : 18 examples.

*Diagnostic characters* : Shell almost smooth, sculpture consists of faint spiral striae on lower whorls.

*Distribution* : INDIA : Assam, Manipur, Meghalaya.

##### 8. *Brotia (A.) costula episcopalis* (L. & H. Lea)

1850. *Tiara (Melanoides) episcopalis* L. & H. Lea, *Proc. Zool. Soc. Lond.*, p. 184.

*Material examined* : 15 examples.

*Diagnostic characters* : Shell strongly sculptured with 2-3 elevated rows of pointed nodules on each whorl giving it a shouldered appearance.

*Distribution* : INDIA : Assam, Meghalaya.

*Elsewhere* : MALAYSIA; MYANMAR.

#### 9. *Paludomus (Paludomus) blanfordiana* Nevill

1877. *Paludomus blanfordiana* Nevill, *J. Asiat. Soc. Beng.*, 46(2) : 37.

*Material examined* : 7 examples.

*Diagnostic characters* : Shell ovately globose, golden yellow in color, last whorl well rounded with three chocolate bands which show through the aperture, also marked by faint spiral striae, spire short.

*Distribution* : INDIA : Throughout North-eastern Region.

*Elsewhere* : MYANMAR.

#### 10. *Paludomus (Paludomus) conica* (Gray)

1834. *Melania conica* Gray, *Griffith cuvier, Moll.*, p. 14, fig. 5.

*Material examined* : 1201 examples.

*Diagnostic characters* : Shell globosely conical, larger in size, yellowish brown to dark brown in color, last whorl with a few spiral markings, concentrated near the suture, sometimes with a few dark bands.

*Distribution* : INDIA : Throughout North-eastern region.

*Elsewhere* : BANGLADESH; BHUTAN.

*Remarks* : The species shows variations in shell characters and possesses a number of infra-specific forms including a variety *kopiliensis* described from the river Kopili, Assam which was however not present among this material studie.

#### 11. *Paludomus (Paludomus) regulata* Benson

1856. *Paludomus regulata* Benson, *Ann. Mag. Nat. Hist.*, (2) 17 : 496.

*Material examined* : 10 examples.

*Diagnostic characters* : Shell fairly large, globosely conical, spire sharply elongate, last whorl with four brown bands, the second one broadest, sculptured with spiral grooves throughout.

*Distribution* : INDIA : Assam, Meghalaya.

*Elsewhere* : MYANMAR.

*Remarks* : This species is for first time recorded from Assam.

### 12. *Paludomus (Paludomus) reticulata* Blanford

1870. *Paludomus reticulata* Blanford, *J. Asiat. Soc. Beng.*, 39(2) : 9, pl. 13m fig. 1.

*Material examined* : 104 examples.

*Diagnostic characters* : Shell smaller and more globose, conspicuously sculptured by reticulate striations forming small, sharp granules.

*Distribution* : INDIA : Assam, Meghalaya.

### 13. *Paludomus (Paludomus) stephanus* (Benson)

1836. *Melania stephanus* Benson, *J. Asiat. Soc. Beng.*, 36 : 747.

*Material examined* : 3 examples.

*Diagnostic characters* : Shell large, globosely conical, whorls rather shouldered above, bearing a crown of short and pointed spines; faint reticulating ridges present.

*Distribution* : INDIA : Assam, Meghalaya.

*Elsewhere* : BANGLADESH.

*Remarks* : Recorded for the first time from Assam.

### 14. *Thiara (Melanoides) tuberculata* (Mueller)

1774. *Nerita tuberculata* Mueller., *Hist. Verm. Terr. Fluv.*, 2 : 191.

*Material examined* : 2 examples.

*Diagnostic characters* : Shell narrowly elongate with a high and pointed spire, whorls well rounded, strongly sculptured with spiral striae and vertical ribs, brown dots and flames irregularly arranged on shell surface.

*Distribution* : INDIA : Throughout the country except Kashmir, in all types of water bodies.

*Elsewhere* : SOUTH-ASIA; NORTH & SOUTH AFRICA; NORTH AUSTRALIA.

### 15. *Thiara (tarebia) lineata* (Gray)

1828. *Helix lineata* Gray, In *Wood's index Test. Suppl.*, p. 24, fig. 68.

*Material examined* : 9 examples.

*Diagnostic characters* : Shell elongately conical, distinctly sculptured by spiral and vertical ribs, marked by dark spiral lines.

*Distribution* : INDIA : Common throughout except the North-western part.

*Elsewhere* : BANGLADESH; BHUTAN; MYANMAR; SRI LANKA.

Order BASOMMATOPHORA  
Family LYMNAEIDAE

**16. *Lymnaea (Pseudosuccinea) acuminata f. typica* Lamarck**

1822. *Limnaea acuminata* Lamarck, *Hist. Nat. Anim. Sans. Vert.*, 6(2) : 160.

*Material examined* : 38 examples.

*Diagnostic characters* : Outer lip much expanded and rounded in outline, spire short and acuminate. Shell very light and fragile, ovate with a short and pointed spire, last whorl large and inflated, columella twisted, aperture wide.

*Distribution* : INDIA : Common throughout in water bodies with abundant vegetations.

*Elsewhere* : BANGLADESH; MYANMAR; PAKISTAN.

*Remarks* : This form is actually distinguished from others on the basis of a few negative characters (Annandale & Rao, 1925).

**17. *Lymnaea (Pseudosuccinea) acuminata f. rufescens* Gray**

1820. *Limnaea rufescens* Gray, in Sowerby's *Genera of shells*, 1 : pl. 178, fig. 2.

*Material examined* : 15 examples.

*Diagnostic characters* : Shell comparatively narrower and more elongate, outer lip uniformly less expanded, with a reddish tinge.

*Distribution* : INDIA : Common throughout.

**18. *Lymnaea (Pseudosuccinea) luteola f. typica* Lamarck**

1822. *Limnaea luteola* Lamarck, *Hist. Nat. Anim. Sans. Vert.*, 6(2) : 160.

*Material examined* : 43 examples.

*Diagnostic characters* : Outer lip less expanded and rather straight in outline, spire longer and less acuminate.

*Distribution* : INDIA : Common throughout, also occurs in temporary water bodies.

*Elsewhere* : Shell thin, ovate, narrower than in preceding species, last whorl less inflated and laterally compressed, spire longer and gradually tapering, aperture narrower.

**19. *Lymnaea (Pseudosuccinea) luteola f. succinea* Deshayes**

1834. *Limnaea succinea* Deshayes, *Voy. Dans. Ind. Belangar. zool.*, pl. ii, figs. 13-14.

*Material examined* : 5 examples.

*Diagnostic characters* : Shell smaller than in *f. typica*, less produced, last whorl without lateral compression and tapering above.

*Distribution* : INDIA : Assam, Andhra Pradesh, Kashmir, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal.

#### Family PLANORBIDAE

##### 20. *Indoplanorbis exustus* (Deshayes)

1834. *Planorbis excustus* Deshayes, In Belangar, *Voy. Indes-Orientales*, p. 417, pl. 1, figs. 11-13.

*Material examined* : 19 examples.

*Diagnostic characters* : Shell fairly large, thick, depressedly coiled, suture deeply impressed, aperture ear-shaped. Being air-breathers snails of both the genera *Lymnaea* and *Indoplanorbis* usually occur adjacent to the surface-level of water or even just above the surface sometimes.

*Distribution* : INDIA : Common throughout.

*Elsewhere* : INDONESIA; MALAYSIA; MYANMAR; PAKISTAN; SRI LANKA; THAILAND.

Class BIVALVIA

Order UNIONOIDA

Family UNIONIDAE

##### 21. *Parreysia (Parreysia) favidens* subsp. *assamensis* Preston

1912. *Parreysia favidens* var. *assamensis* Preston, *Rec. Indian. Mus.*, 7 : 299.

*Material examined* : 2 examples.

*Diagnostic characters* : Shell thick, fairly large, inflated, convexly elongate, greenish, anteriorly rounded, broadly angulate on posterior end; umbo anteriorly placed; cardinal teeth strong and broad. Differs from the typical form being more rounded anteriorly.

*Distribution* : INDIA : Assam, Bihar.

##### 22. *Parreysia (Parreysia) sikkimensis* (Lea)

1859. *Unio sikkimensis* Lea, *Proc. Acad. Nat. Sci. Philad.*, 3 : 151.

*Material examined* : 1 example

*Diagnostic characters* : Shell roundly ovate and broad, anteriorly rounded, broad and truncate posteriorly; umbo almost centrally placed.

*Distribution* : INDIA : Assam, Sikkim, West Bengal (Siliguri).

### 23. *Parreysia (Radiatula) caerulea* (Lea)

1831. *Unio caeruleus* Lea, *Trans. Amer. Phil. Soc.*, 4 : 95, pl. 13, fig. 25.

*Material examined* : 1 example

*Diagnostic characters* : Shell variable in shape and sculpture, rather narrowly elongate, dorsal margin usually straight and gradually sloping, anteriorly rounded, posteriorly angulate, umbonal carina distinct, with zigzag markings in umbonal region.

*Distribution* : INDIA : Assam, Manipur, Meghalaya, Tripura, Bihar, Orissa, Punjab, Uttar Pradesh, West Bengal.

*Elsewhere* : BANGLADESH; MYANMAR; NEPAL.

### 24. *Corbicula striatella* Deshayes

1854. *Corbicula striatella* Deshayes, *Proc. Zool. Soc. Lond.*, 22 : 344.

*Material examined* : 13 examples.

*Diagnostic characters* : Shell thick and tumid, triangularly ovate, dorsal margin arched, ventral convex, umbo prominent, distinctly sculptured with strong concentric ridges; shining yellowish to dark brown in color.

*Distribution* : It is the commonest Indian species, widely occurring throughout the country.

*Elsewhere* : AFGHANISTAN; MYANMAR; PAKISTAN.

## SUMMARY

Assam shares a number of freshwater bivalve genera with Myanmar, China, Thailand, like *Physunio*, *Scabis*, *Solenia*, *Trapezoideus*, etc. Another bivalve genus *Parreysia* is represented in the state by approximately 12 species, type localities of some of which are in Assam. Among the species collected from the Project area, *Brotia costula laevis* and *Paludomus reticulata* are not recorded from outside north-east India. Seven species are distributed over the north-east and also the adjacent Indo-Malayan region (Malaysia, Myanmar, Indonesia). Others are all commonly distributed in rest of the country. The gastropod family Thiariidae is very largely represented by five species. Two species *Brotia (Antemelania) costula* and *Paludomus conia* seem to be abundantly available and have been collected in large numbers.

## REFERENCES

Mitra, S.C., Barua, S., Mukhopadhyay, A.K. and Ramakrishna, 2006. *Mollusca : Zoological Survey of India, State Fauna Series 12 : Fauna of Nagaland : 55-66.*

- Mookherjee, H.P., Thakur, D.K., Mitra, S.C. and Barua, S. 2000. Mollusca : Zoological Survey of India, State Fauna Series 7 : *Fauna of Tripura*, part 4 : 323-355. Text figs. 1-9, pls. I-II.
- Subba Rao, N.V. 1989. Handbook : *Freshwater molluscs of India*, pp. 1-289, Figs. 1-642.
- Subba Rao, N.V., Mitra, S.C., Dey, A. and Maitra, S. 1995. Mollusca : Zoological Survey of India, *Fauna of Meghalaya, State Fauna Series*, 4(Part-8) : 1-88.
- Surya Rao, K.V., Mookherjee, H.P., Mitra, S.C., Manna, R.N. and Barua, S. 2004. Mollusca : Zoological Survey of India, State Fauna Series 10 : *Fauna of Manipur* part-3 : 69-118.
- Surya Rao, K.V., Mitra, S.C. and Dey, A. 2007. Mollusca : *Fauna of Mizoram, State Fauna Series*, 4(Part-8) : 1-88. Zool. Surv. India.

## AMBHIBIA

NIBEDITA SEN

Zoological Survey of India, Eastern Regional Station, Shillong-793 003

### INTRODUCTION

240 examples of amphibia were collected from different localities of the project site belonging to 4 species under 2 families and 1 order. For each species, number of examples, size range, locality and distribution is mentioned.

The systematic arrangement and nomenclatural status followed after Dutta (1997).

### SYSTEMATIC LIST

Phylum CHORDATA

Class AMPHIBIA

Order ANURA

Family BUFONIDAE

1. *Bufo melanostictus* Schneider

Family RANIDAE

2. *Euphlyctis cyanophlyctis* (Schneider)
3. *Fejervarya limnocharis* (Gravenhorst)
4. *Hoplobatrachus tigerinus* (Daudin)

### SYSTEMATIC ACCOUNT

1. *Bufo melanostictus* Schneider, 1799

1799. *Bufo melanostictus* Schneider, *Hist. Amph.*, 1, Jena Vol. 8 : 216 (Type locality : "Ex India Orientalis").

*Material examined* : 23 examples (Snout-vent length : 36 mm-105 mm).

*Diagnostic characters* : Head with a canthal, preorbital, supra orbital, post orbital and a short supra tympanic bony ridges. Dorsally brown or yellowish brown; sometimes with black spots. Tips of warts and ridges of head usually deep brown to black. Ventrally smooth, yellowish, more or less spotted with brown. Tibio tarsal articulation reaching eyes. Tympanum large, very distinct, more than  $\frac{2}{3}$ rd diameter of eye. Toes blunt,  $\frac{1}{2}$  webbed.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : CHINA; HONGKONG; INDONESIA; MALAYSIA; MYANMAR; NEPAL ; PAKISTAN; PHILIPPINES; THAILAND; SRI LANKA.

*Remarks* : Commonly occurring species. Abundance is more during Summer. Though it is a common species in this region, it's status is at present vulnerable.

### 2. *Euphlyctis cyanophlyctis* (Schneider, 1799)

1799. *Rana cyanophlyctis* Schneider, *Hist. Amph.* Vol. 8 : 137 (Type locality : "Eastern India").

*Material examined* : 142 examples (Snout-vent length : 15 mm-60 mm)

*Diagnostic characters* : Dorsum greyish, brownish or olive; skin with small tubercles and warts, spotted or marked with black. Venter smooth, white or pale yellowish, speckled with blackish dots. Laterally with a distinct row of pores. Fingers and toes pointed; toes fully webbed. Tibio tarsal articulation reaches a little beyond eyes.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : AFGHANISTAN; BANGLADESH; BHUTAN; MYANMAR; NEPAL; PAKISTAN; SOUTH ARABIA; SRI LANKA.

*Remarks* : Commonly occurring species throughout all the seasons.

### 3. *Fejervarya limnocharis* (Gravenhorst, 1829)

1829. *Rana limnocharis* Gravenhorst, *Del. Mus. Zool* : 42 (Type locality : "Java" Indonesia).

*Material examined* : 77 examples (Snout-vent length : 12 mm-37 mm)

*Diagnostic characters* : Head slightly broader than long; snout oval protruding. Tympanum distinct,  $\frac{1}{2}$  diameter of eye. Pineal ocellus present. Tips of fingers and toes pointed. Toe webbing moderate,  $\frac{1}{2}$  webbed; dermal fringe along fifth toe well developed. Tibio tarsal articulation reaching tip of snout. Inner metatarsal tubercle short, prominent; outer absent. Dorsum light brown to black or olive with distinct or variable markings. Dorsal chevron present, a distinct thin or thick, complete or incomplete; mid dorsal vertebral line present or absent.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : BANGLADESH; BORNEO; SOUTH-WEST CHINA; INDONESIA; SOUTH-EAST JAPAN; JAVA; MALAY PENINSULA; MYANMAR; NEPAL; PHILIPPINES; PAKISTAN; SRI LANKA; SUMATRA; TAIWAN; THAILAND; VIETNAM.

*Remarks* : Commonly occurring species throughout all the seasons. Though it is a common species in this region, but it's status is at present vulnerable.

#### 4. *Hoplobatrachus tigerinus* (Daudin, 1803)

1803. *Rana tigerina* Daudin, *Hist. Rain. Gren. Crap.* : 64 (Type locality : "Bengal").

*Material examined* : 1 example (Snout-vent length : 34 mm)

*Diagnostic characters* : Dorsum with regular longitudinal folds; dorsally yellowish, green or olive with dark spots, narrow yellow vertical streak often present. Tibio tarsal articulation reaching eye or between eye and nostrils, sometimes beyond *snout*; *heels* overlapping. Toes fully webbed. Inner meta tarsal tubercle blunt, feebly compressed; no outer meta tarsal tubercle.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : BANGLADESH; CHINA; INDO-CHINA; MADAGASCAR (introduced); MYANMAR; NEPAL; PAKISTAN; SRI LANKA.

*Remarks* : Rarely occurring in the area under report. It's status is at present **vulnerable**.

#### SUMMARY

The amphibia belonging to 4 species under 2 families and 1 order have been recorded. Out of 4 species, 3 species are vulnerable in status. Dominating species are *Euphlyctis cyanophlyctis* and *Fejervarya limnocharis*.

#### REFERENCE

Dutta, S.K. 1997. Amphibians of India and Sri Lanka (Checklist and Bibliography) pp. 342 + I-xxii.



## REPTILIA

ROSAMMA MATHEW

*Zoological Survey of India, Eastern Regional Station, Shillong-793 003*

### INTRODUCTION

5 examples of snakes belonging to 5 species, 5 genera under 3 families and 1 order were identified, out of which only *Xenochrophis piscator* (Schneider) may be considered as semiaquatic. Other species have been included since they happened to be collected from the Project site.

Classification followed is that of Das (1977).

### SYSTEMATIC LIST

Phylum CHORDATA

Class REPTILIA

Order SQUAMATA

Family COLUBRIDAE

1. *Elaphe radiata* (Schlegel)
2. *Psammodynastes pulverulentus* (Boie)

Family NATRICIDAE

3. *Xenochrophis piscator* (Schneider)

Family ELAPIDAE

4. *Ophiophagus hannah* (Cantor)
5. *Naja kaouthia* Lesson

### SYSTEMATIC ACCOUNT

1. *Elaphe radiata* (Schlegel)

1837. *Coluber radiatus* Schlegel, *Phys. Serp*, ii, p. 135, pl. v, figs., 5 and 6.

*Material examined* : 1 example (970 mm TL).

*Diagnostic characters* : Scales in 21 or 19 rows, somewhat distinctly keeled; ventrals 222-250, strongly angulate laterally; subcaudals 82-108; Anal—1; head shield complete; fawn or yellowish brown above with a reddish tinge in life with our black stripes on the anterior half of the body, commencing a short distance behind the neck; head copper-brown; a black bar across the occiput and three black streaks, radiating from below and behind the eye; capable of expanding in a vertical direction, the anterior portion of the body.

*Distribution* : INDIA : Manipur, Meghalaya, Mizoram, Nagaland, Eastern Himalayas.

*Elsewhere* : INDO-CHINESE SUB-REGION; MALAY ARCHIPELAGO.

### 2. *Psammodynastes pulverulentus* (Boie)

1827. *Psammophis pulverulenta* Boie, *Isis*, p. 547.

*Material examined* : 1 example (1480 mm TL).

*Diagnostic characters* : 2 maxillary teeth enlarged anteriorly, snout short truncate and slightly turned up in the adult; scales in 17 rows, ventrals 146-175, sub caudals 44-71; Anal-1, head with dark symmetrical markings; dorsum light or dark brown or blackish with small black spots or streaks; ventrally powdered with brown or grey.

*Distribution* : INDIA : Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, West Bengal.

*Elsewhere* : THE WHOLE OF INDO CHINESE REGION; CHINA; HAINAN; MALAY ARCHIPELAGO; NEPAL.

### 3. *Xenochrophis piscator* (Schneider)

1779. *Hydrus piscator* Schneider, *Hist. Amph*, i : 247.

*Material examined* : 1 example (310 mm TL).

*Diagnostic characters* : Scales in 19 rows, strongly keeled; ventrals 122-158, sub caudals 70-97; Anal-2; Olivaceous above with black spots quincuncially arranged; belly whitish, ventrals edged with black.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : CHINA; HAINAN; HONG KONG; LAOS; MYANMAR; PAKISTAN; SRI LANKA.

### 4. *Ophiophagus hannah* (Cantor)

1836. *Hamadrayas hannah* Cantor, *Asiat. Research*, xix, p. 187.

*Material examined* : 1 example (575 mm TL).

*Diagnostic characters* : Scales in 17:15:15 rows; ventrals 252, caudals 84, anterior four shields single, the remaining in pairs; Dorsum black with fifty four white cross bars (forty on body and fourteen on tail)-these are chevron shaped and pointing forwards on the anterior part of the body, more or less transverse behind and on the sides of the body they expand; head with four bars, one on the top of the snout, one in front of and one behind the eye, and a fourth crescentic one on the back of the head; the hinder bars are composed of a series of spots; whitish below with narrow black cross-bars.

*Distribution* : INDIA : Assam, Meghalaya, Mizoram, Bihar, Orissa, West Bengal, Western Ghats.

*Elsewhere* : THE WHOLE OF INDO CHINESE REGION, CHINA, MALAYA PENINSULA AND ARCHIPELAGO, MYANMAR, PHILIPPINES, SIAM, FRENCH-INDOCHINA.

#### 5. *Naja kaouthia* Lesson

1831. *Naja kaouthia* Lesson, *Bull. Sci. Nat.* XXV, p. 122.

*Material examined* : 1 example (420 mm TL).

*Diagnostic characters* : Scales in 19-23 often 21 rows; ventrals 164-197, caudals 43-61; Anal-1; The hood is monocellate, throat with or without one or more pairs of lateral spots, Dorsally light or dark grayish, brownish, reddish brown, or blackish brown, olive, black, yellowish, creamish, uniform or banded.

*Distribution* : INDIA : Assam, Meghalaya, Andamans, Orissa, West Bengal, Eastern Himalayas.

*Elsewhere* : NEPAL; THE WHOLE OF INDO CHINA.

#### SUMMARY

Among snakes, 5 species under 3 families and 1 order have been recorded.

#### ACKNOWLEDGEMENTS

The authors are grateful to Dr. J.R.B. Alfred, Ex-Director, Zoological Survey of India, Kolkata for permission to undertake the study. Special thanks to North-East Electric Power Corporation (NEEPCO), Shillong for help and assistance in conducting the surveys.

**REFERENCES**

- Das, I. 1977. Checklist of the Reptiles of India with English common names., *Hamadryad* : 22(1) : 32-45.
- Smith, M.A. 1943. Fauna of British India, Ceylon and Burma, including the whole of Indo-Chinese Sub-region. Reptilia and Amphibia, III Serpentes; 11. 583, London (Taylor & Smith).

## **PISCES**

**NIBEDITA SEN**

*Zoological Survey of India, Eastern Regional Station, Shillong-793 003*

### **INTRODUCTION**

3513 examples of fishes have been collected during eight surveys undertaken in different localities of project areas. In all 32 species under 19 genera, 10 families and 4 orders have been recorded from the area. Seasonwise (Winter, Summer, Monsoon) occurrence of different species have been mentioned to get a picture of their availability. For each species, number of examples, size range, locality and distribution is mentioned.

The systematic arrangement and nomenclatural status followed after Jayaram (1999).

The systematic list is as follows :

### **SYSTEMATIC LIST**

Phylum **CHORDATA**

Class **ACTINOPTERYGII**

Order **CYPRINIFORMES**

Family **CYPRINIDAE**

1. *Salmostoma bacaila* (Hamilton-Buchanan)
2. *Esomus danricus* (Hamilton-Buchanan)
3. *Danio aequipinnatus* (McClelland)
4. *Danio dangila* (Hamilton-Buchanan)
5. *Brachydanio acuticephala* (Hora)
6. *Brachydanio rerio* (Hamilton-Buchanan)
7. *Amblypharyngodon mola* (Hamilton-Buchanan)
8. *Cyprinus carpio var. communis* Linnaeus
9. *Tor putitora* (Hamilton-Buchanan)
10. *Neolissocheilus hexagonolepis* (McClelland)
11. *Neolissocheilus hexastichus* (McClelland)
12. *Puntius conchoniis* (Hamilton-Buchanan)

13. *Puntius shalynius* Yazdani and Talukdar
14. *Puntius sophore* (Hamilton-Buchanan)
15. *Puntius terio* (Hamilton-Buchanan)
16. *Puntius ticto* (Hamilton-Buchanan)
17. *Garra annandalei* Hora

Family PSILORHYNCHIDAE

18. *Psilorhynchus gracilis* Rainboth

Family BALITORIDAE

19. *Schistura arunachalensis* (Menon)
20. *Schistura scaturigina* (McClelland)
21. *Schistura sikmaiensis* (Hora)
22. *Schistura vinciguerrae* (Hora)

Family COBITIDAE

23. *Lepidocephalus guntea* (Hamilton-Buchanan)

Order SILURIFORMES

Family CLARIIDAE

24. *Clarias batrachus* (Linnaeus)

Family HETEROPNEUSTIDAE

25. *Heteropneustes fossilis* (Bloch)

Family OLYRIDAE

26. *Olyra horae* (Prashad and Mukherji)
27. *Olyra longicaudata* McClelland

Order CYPRINODONTIFORMES

Family APLOCHEILIDAE

28. *Aplocheilus panchax* (Hamilton-Buchanan)

Order PERCIFORMES

Family NANDIDAE

29. *Badis badis* (Hamilton-Buchanan)

Family CHANNIDAE

30. *Channa orientalis* Schneider
31. *Channa punctatus* (Bloch)
32. *Channa stewartii* (Playfair)

**SYSTEMATIC ACCOUNT****1. *Salmostoma bacaila* (Hamilton-Buchanan)**

1822. *Cyprinus bacaila* Hamilton-Buchanan, *Fishes of Ganges* : 265, 384, pl. 8, fig. 76. (Type locality : freshwater rivers of Gangetic provinces).

*Material examined* : 26 examples (83 mm-133 mm TL).

*Diagnostic characters* : Barbels absent. Pectoral axial scale not thickened along its lower border. Lateral line curved gently downward above pectoral fin with 86-110 scales. Dorsal fin with 7-8 branched rays; anal fin with 10-13 branched rays. Lateral transverse scales 17-19/4-6. Dorsal fin inserted well in advance of anal fin.

*Distribution* : INDIA : Throughout India except Kerala, Karnataka and Tamil Nadu.

*Elsewhere* : BANGLADESH; MYANMAR; NEPAL; PAKISTAN.

*Remarks* : Commonly occurring species during Winter and Summer. Have some commercial value.

**2. *Esomus danricus* (Hamilton-Buchanan)**

1822. *Cyprinus danrica* Hamilton-Buchanan, *Fishes of Ganges*, : 325, 390, pl. 16, fig. 88. (Type locality : ponds and ditches of Bengal)

*Material examined* : 2 examples (38 mm-49 mm TL).

*Diagnostic characters* : Dorsal fin inserted opposite between anal and pelvic fins. Lateral line incomplete or absent, piercing only 4-6 scales anteriorly. Sides generally with a broad lateral dark band.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : BANGLADESH; MALAYA; MYANMAR; NEPAL; PAKISTAN; SRI LANKA; THAILAND; SOUTH VIETNAM (MEKONG BASIN).

*Remarks* : Recorded only two specimens during summer only. Rarely occurring in the area under report.

**3. *Danio aequipinnatus* (McClelland)**

1839. *Perilampus aequipinnatus* McClelland, *Asiat. Res.*, 19 (2) : 393, pl. 60, fig. 1 (Type Locality : Assam).

*Material examined* : 194 examples (15 mm-82 mm TL).

*Diagnostic characters* : Anterior rim of orbit with a small backwardly directed spine. Barbels 2 pairs, shorter than eye diameter. Dorsal fin with 8-11 branched rays. Several well marked and uniform lateral bands present. Lateral line complete with 34-37 scales.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : BANGLADESH; MYANMAR; NEPAL; SRI LANKA; THAILAND.

*Remarks* : Commonly occurring species of the area throughout all the seasons. Abundance is very less during Monsoon. It is an ornamental fish.

#### 4. *Danio dangila* (Hamilton-Buchanan)

1822. *Cyprinus dangila* Hamilton-Buchanan, *Fishes of Ganges* : 321, 390 (Type locality Mountain streams of Mongher, Bihar).

*Material examined* : 3 examples (26 mm-59 mm TL).

*Diagnostic Characters* : Anterior rim of orbit without spine. Barbels 2 pairs, longer than eye diameter. Dorsal fin with 8-10 branched rays. Body with dark lateral bands breaking up into network anteriorly. Lateral line with 36-42 scales.

*Distribution* : INDIA : Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, Eastern Himalayas, West Bengal, Bihar, Uttar Pradesh, Madhya Pradesh.

*Elsewhere* : BANGLADESH; MYANMAR; NEPAL.

*Remarks* : Though it is a commonly occurring species in the hilly region of N. E. India it's abundance in the region under report is rare. It is an ornamental fish.

#### 5. *Brachydanio acuticephala* (Hora)

1921. *Danio (Brachydanio) acuticephala* Hora, *Rec. Indian Mus.*, 22 : 193, fig. 4. (Type Locality : small streams and ponds of Yaribuk, Manipur valley).

*Material examined* : 4 examples (26 mm-37 mm TL).

*Diagnostic characters* : Body elongate, subcylindrical. Lateral line incomplete, not extending to anal fin. Barbels absent. No black mark near upper angle of gill opening. Dorsal fin with 6-7 branched rays.

*Distribution* : INDIA : Assam, Arunachal Pradesh, Manipur, Nagaland.

*Elsewhere* : Same as above.

*Remarks* : Recorded only 4 specimens during winter only. Rarely occurring in the area under report. It is an ornamental fish. It's status is vulnerable.

#### 6. *Brachydanio rerio* (Hamilton-Buchanan)

1822. *Cyprinus rerio* Hamilton-Buchanan, *Fishes of Ganges* : 323, 390 (Type locality : Kosi river, Uttar Pradesh)

*Material examined* : 568 examples (13 mm-40 mm TL).

*Diagnostic characters* : Barbels 2 pairs, well developed. Body with four prominent golden coloured bands from head to caudal fin. Dorsal fin with 6-7 branched rays.

**Distribution** : INDIA : Throughout India.

**Elsewhere** : BANGLADESH; MYANMAR; NEPAL; PAKISTAN.

**Remarks** : Very commonly occurring throughout the seasons. It's abundance during Monsoon is very less. It is an ornamental fish.

#### 7. *Amblypharyngodon mola* (Hamilton-Buchanan)

1822. *Cyprinus mola* Hamilton-Buchanan, *Fishes of Ganges* : 334, 392., pl. 38, fig. 92. (Type locality : ponds and rivers of Gangetic Provinces).

**Material examined** : 219 examples (22 mm-73 mm TL).

**Diagnostic characters** : Lateral line incomplete, with 65-91 scales. Lateral transverse scales 12/8-10. A silvery lateral band and dark markings on dorsal, anal and caudal fins. Branched pectoral fin rays 13-15.

**Distribution** : INDIA : Throughout India except Malabar.

**Elsewhere** : BANGLADESH; MYANMAR; NEPAL; PAKISTAN; SRI LANKA.

**Remarks** : Commonly occurring species during Winter and Summer. Have commercial value.

#### 8. *Cyprinus carpio communis* Linnaeus

1758. *Cyprinus carpio* Linnaeus, *Systema Naturae*, ed. 10, 1 : 320 (Type locality : Europe).

**Material examined** : 1 example (215 mm TL).

**Diagnostic characters** : Body fully covered by regularly arranged rows of scales. Lateral line inconspicuous with 33-35 scales.

**Distribution** : INDIA : Introduced in India (Throughout)

**Elsewhere** : Naturally found all through CHINA; KOREA; JAPAN; TAIWAN; EUROPE ; AMERICA.

**Remarks** : Commonly cultured in all the water bodies. Have commercial value.

#### 9. *Tor putitora* (Hamilton-Buchanan)

1822. *Cyprinus putitora* Hamilton-Buchanan, *Fishes of Ganges* : 303, 388. (Type locality : eastern parts of Bengal).

**Material examined** : 5 examples (17 mm-20 mm TL).

**Diagnostic characters** : Length of head considerably greater than body depth. Dorsal fin inserted midway between snout and caudal fin base, with 8-10 branched rays, length of its spine equal to body depth. Anal fin with 5-6 rays. Lateral line complete with 25-29 scales.

**Distribution** : INDIA : Throughout North-East India. All along the Himalayas including Kashmir.

**Elsewhere** : AFGHANISTAN; BANGLADESH; NEPAL; PAKISTAN.

**Remarks** : Rarely occurring in the region under report. Only 5 small specimens could be collected during Monsoon. Have commercial value. It's status is endangered.

#### 10. *Neolissocheilus hexagonolepis* (McClelland)

1839. *Barbus hexagonolepis* McClelland, *Asiat. Res.*, 19(2) : 270, 340, pl. 41, fig. 3. (Type locality : upper Assam).

**Material examined** : 26 examples (30 mm-255 mm TL).

**Diagnostic characters** : Dorsal fin with 9-10 branched rays, last unbranched ray osseous but never serrated. Anal fin with 5-6 branched rays. Lateral line complete with 28-32 scales. Mouth nearly truncate, lower jaw edge sharp. Sides of snout and cheeks studded with large tubercles.

**Distribution** : INDIA : Throughout North-East India; Darjeeling, Eastern Himalayas.

**Elsewhere** : BANGLADESH; CHINA; MALAYSIA; MYANMAR; NEPAL; SUMATRA ; THAILAND; PAKISTAN; VIETNAM.

**Remarks** : Though occurring throughout the seasons, it's abundance is very less. Have commercial value.

#### 11. *Neolissocheilus hexastichus* (McClelland)

1839. *Barbus hexastichus* McClelland, *Asiat. Res.*, 19(2) : 269, 333, pl. 39, fig. 2. (Type locality : great rivers in the plains of India)

**Material examined** : 20 examples (75 mm-157 mm TL).

**Diagnostic characters** : Mouth rounded smoothly, edge of lower jaw blunt. Dorsal fin spine strong, insertion of dorsal fin nearer tip of snout than caudal base. Lower labial fold continuous. Lateral line scales 25-26. No tubercles on snout or cheek. Dorsal with 9 branched rays; anal fin with 5 branched rays.

**Distribution** : INDIA : Assam, Arunachal Pradesh, Meghalaya, Mizoram, Nagaland.

**Elsewhere** : MYANMAR.

**Remarks** : Not very commonly occurring species like *hexagonolepis*. Have some commercial value. It's status is vulnerable.

#### 12. *Puntius conchoni* (Hamilton-Buchanan)

1822. *Cyprinus conchoni* Hamilton-Buchanan, *Fishes of Ganges* : 317, 389, (Type locality : ponds of north-east Bengal; Kosi river and Ami river).

**Material examined** : 733 examples (15 mm-83 mm TL).

**Diagnostic characters** : Barbels absent. Dorsal fin spine short, strong, osseous and serrated; with 7-8 branched rays. Anal fin with 5 branched rays. Lateral line incomplete with 24-26 scales. Two blotches on body; anterior spot sometimes may be absent.

**Distribution** : INDIA : Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, West Bengal, Bihar, Uttar Pradesh, Punjab, Orissa, Eastern and Western Himalayas, Darjeeling, Deccan.

**Elsewhere** : AFGHANISTAN; BANGLADESH; NEPAL; PAKISTAN.

**Remarks** : Occurring abundantly during Winter and Summer but could not be collected during Monsoon. Have commercial value as minor carps. Though it is a commonly occurring species of this region, it's status is vulnerable.

### 13. *Puntius shalynius* Yazdani and Talukdar

1975. *Puntius shalynius* Yazdani and Talukdar, *J. Bombay nat. Hist. Soc.*, 72(1) : 218. (Type locality : Barapani lake near Shillong, Meghalaya).

**Material examined** : 73 examples (12 mm-68 mm TL).

**Diagnostic characters** : Barbels absent. Dorsal fin spine serrated, with 7-8 branched rays. Anal fin with 5-6 branched rays. A thin blue horizontal line along mid body present; two spots on side of caudal peduncle. Lateral line incomplete with 20-23 scales.

**Distribution** : INDIA : Assam, Arunachal Pradesh, Manipur, Meghalaya.

**Elsewhere** : Same as above.

**Remarks** : Though occurring throughout the seasons but it's abundance and commercial value is very less in comparison to other *Puntius* spp. Though common in occurrence in N. E. India, it's status is vulnerable at National level.

### 14. *Puntius sophore* (Hamilton-Buchanan)

1822. *Cyprinus sophore* Hamilton-Buchanan, *Fishes of Ganges* : 310, 389, pl. 19, fig. 86. (Type locality : ponds and rivers in the Gangetic provinces).

**Material examined** : 68 examples (30 mm-95 mm TL).

**Diagnostic characters** : Barbels absent. Body not very deep; dorsal fin spine smooth, with 8-9 branched rays. Anal fin with 5-6 branched rays. Dark blotch on caudal peduncle. Complete lateral line with 22-27 scales.

**Distribution** : INDIA : Throughout India.

*Elsewhere* : BANGLADESH; MYANMAR; NEPAL; PAKISTAN; YUNAN; SRI LANKA.

*Remarks* : Not very commonly occurring in the area under report. Have commercial value.

#### 15. *Puntius terio* (Hamilton-Buchanan)

1822. *Cyprinus terio* Hamilton-Buchanan, *Fishes of Ganges* : 313, 389. (Type locality : north-east Bengal).

*Material examined* : 9 examples (18 mm-22 mm TL)..

*Diagnostic characters* : Barbels absent. Dorsal fin as high as body depth; its spine strong, osseous and smooth; with 8 branched rays. Anal fin with 5 branched rays. Each scales with a number of the black spots, most numerous anteriorly. A black blotch over posterior extremity of anal fin; sometimes extended in median as far as tail. Lateral line incomplete with 22-23 scales.

*Distribution* : INDIA : Assam, Manipur, Meghalaya, Mizoram, Tripura, West Bengal to Punjab, Orissa.

*Elsewhere* : BANGLADESH; PAKISTAN.

*Remarks* : It's abundance is very less. Occurring sometimes together with *conchonius*, and *ticto*. Less commercial importance.

#### 16. *Puntius ticto* (Hamilton-Buchanan)

1822. *Cyprinus ticto* Hamilton-Buchanan, *Fishes of Ganges* : 314, 389, pl. 8, fig. 87. (Type locality : South-eastern parts of Bengal).

*Material examined* : 55 examples (32 mm-80 mm TL).

*Diagnostic characters* : Barbels absent. Dorsal fin spine strong, osseous, serrated with 8 branched rays. Two blotches on body, first on anterior part either above pectoral fin or adjacent to dorsal fin; another on posterior part of anal fin. Lateral line incomplete with 23-25 scales.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : BANGLADESH; MYANMAR; NEPAL; PAKISTAN; SRI LANKA; THAILAND.

*Remarks* : Commercially important species. It's abundance is less in the area under report.

#### 17. *Garra annandalei* Hora

1921. *Garra annandalei* Hora, *Rec. Indian Mus.*, 22(5) : 657 (Type locality : Mahananda river, below Darjeeling).

*Material examined* : 1 example (38 mm TL).

**Diagnostic characters** : Snout without proboscis. Tip of snout not marked off by a deep transverse groove. Dorsal fin inserted nearer tip of snout than caudal fin base with 7-8 branched rays. Anal fin with 5 branched rays. Dorsal and Caudal fins without any marking. Distance between vent to anal fin 2.62-3.21 in that between origin of pelvic and anal fins. Lateral line with 33-34 scales.

**Distribution** : INDIA : Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Bihar, Darjeeling, Himalayas, North Bengal.

**Elsewhere** : BANGLADESH; EASTERN NEPAL.

**Remarks** : Rarely occurring in the area under report. No commercial value but have some ornamental value.

#### 18. *Psilorhynchus gracilis* Rainboth

1983. *Psilorhynchus gracilis* Rainboth, *Proc. Calif. Acad. Sci.*, **43**(6) : 69, figs. 2 & 3 (Type locality : Jubuneswari river at Badarganj, Bangladesh).

**Material examined** : 1 example (43 mm TL).

**Diagnostic characters** : Gape of mouth much less than mandible length. Branched dorsal fin rays 8-9. Simple pectoral fin rays 4-5. Lateral line scales 33-36.

**Distribution** : INDIA : Assam, Meghalaya, Mizoram.

**Elsewhere** : BANGLADESH (Gangetic lowland streams).

**Remarks** : Rarely occurring in the area under report. No commercial value but have some ornamental value.

#### 19. *Schistura arunachalensis* (Menon)

1987. *Noemacheilus arunachalensis* Menon (nee Datta and Barman), *Fauna of India, Pisces*, **4** : 129, pl. 16, fig. 10 (Type locality : Riwa river at Nampong, Tirap district, Arunachal Pradesh).

**Material examined** : 1 example (33 mm TL).

**Diagnostic characters** : Dorsal fin placed nearer caudal fin base than snout. Body with 10-11 regular bands. Lateral line incomplete. Caudal fin forked. Dorsal fin with 8 branched rays.

**Distribution** : INDIA : Assam, Arunachal Pradesh.

**Elsewhere** : Same as above.

**Remarks** : Rarely occurring species. No commercial value but have some ornamental value. It's status is endangered at National level.

### 20. *Schistura scaturigina* (McClelland)

1839. *Cobitis (Schistura) scaturigina* McClelland, *Asiat. Res.*, 19 : 308, 443, pl. 53, fig. 6 (Type locality : Assam).

*Material examined* : 4 examples (29 mm-62 mm TL).

*Diagnostic characters* : Dorsal fin inserted midway between snout and caudal fin base; with 8 branched rays, its edge straight. Body with 11 bands across lateral line interspaced with narrow short bands from above. Caudal and dorsal fins with spots.

*Distribution* : INDIA : Assam, Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, Tripura, Eastern Himalayas, Darjeeling, Uttar Pradesh.

*Elsewhere* : NEPAL.

*Remarks* : Rarely occurring in the area under report. No commercial value but have some ornamental value. It's status is vulnerable.

### 21. *Schistura sikmaiensis* (Hora)

1921. *Nemacheilus sikmaiensis* Hora, *Rec. Indian Mus.*, 22(3) : 201, pl. 9, fig. 4 and pl. 10, figs. 1, 1a (Type locality : Sikmai stream near Palel, Manipur).

*Material examined* : 3 examples (33 mm-54 mm TL).

*Diagnostic characters* : Dorsal fin inserted midway between snout and caudal fin base; with 8 branched rays. Body with 17-20 bars, posterior ones conspicuously wider than interspace. A black spot at base of dorsal fin. Lateral line incomplete. Caudal fin forked.

*Distribution* : INDIA : Assam, Arunachal Pradesh, Manipur, Meghalaya, Nagaland.

*Elsewhere* : MYANMAR.

*Remarks* : Rarely occurring in the area under report. No commercial value but have some ornamental value. It's status is endangered at National level.

### 22. *Schistura vinciguerrae* (Hora)

1935. *Nemachilus vinciguerrae* Hora, *Rec. Indian Mus.*, 37(1) : 62, pl. 3, fig. 12 (Type locality : S. Shan state).

*Material examined* : 1 example (80 mm TL).

*Diagnostic characters* : Dorsal fin inserted nearer caudal fin base than snout; with 8 or 9 branched rays. Caudal forked. Body with 17 vertical bands. Lateral line complete.

*Distribution* : INDIA : Assam, Manipur.

*Elsewhere* : As above.

*Remarks* : Rarely occurring species in the area under report. No commercial value but have some ornamental value. It's status is endangered at National level.

### 23. *Lepidocephalus guntea* (Hamilton-Buchanan)

1822. *Cobitis guntea* Hamilton-Buchanan, *Fishes of Ganges* : 353, 394 (Type locality : ponds and freshwaters of Bengal).

*Material examined* : 6 examples (31 mm-50 mm TL).

*Diagnostic characters* : Body not very elongate, depth less than 6.0 in standard length. A dark lateral band or spots on body. Dorsal inserted somewhat posterior to pelvic fins. Caudal fin convex or truncate. Bands on caudal in form of rows of dark spots. Dorsal fin placed midway between snout tip and caudal fin base. One dark spot placed slightly above middle of caudal fin base.

*Distribution* : INDIA : Throughout India except Karnataka, Kerala and South of Krishna.

*Elsewhere* : BANGLADESH; NEPAL; PAKISTAN; THAILAND; MYANMAR.

*Remarks* : Not very commonly occurring in the area under report. Have little commercial value as well as ornamental value.

### 24. *Clarias batrachus* (Linnaeus)

1758. *Silurus batrachus* Linnaeus, *Systema Naturae* : 1 ed. 10 : 305 (Type locality : Asia and Africa).

*Material examined* : 12 examples (26 mm-144 mm TL).

*Diagnostic characters* : Distance from dorsal fin base to base of occipital process 4.5-6.0 in head length. Occipital process angular and narrow. Pectoral fin spine strong, Finely serrated on both edges, often rough externally.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : BANGLADESH; BALI; BORNEO; HONGKONG; INDO-CHINA; SOUTH CHINA; JAVA; LOMBOK; MALAYA ARCHIPELAGO; MYANMAR; NEPAL; PAKISTAN; PHILLIPINES; SINGAPORE; SRI LANKA; SUMATRA; THAILAND.

*Remarks* : Not very commonly occurring in the area under report. It's abundance is more during Winter. Have commercial importance. It's status is vulnerable.

### 25. *Heteropneustes fossilis* (Bloch)

1794. *Silurus fossilis* Bloch, *Naturgesch. Ausl. Fishche*, 8 : 46, pl. 370, fig. 2 (Type locality : Tranquebar, Tamil Nadu).

*Material examined* : 91 examples (28 mm-146 mm TL).

*Diagnostic characters* : Anal fin separated from caudal by deep notch. Occipital process not reaching base of dorsal. Dorsal without spine. Pectoral fins with strong spine, serrated along inner edge and with a few serrations at its anterior end externally.

**Distribution** : INDIA : Throughout India.

**Elsewhere** : BANGLADESH; INDO-CHINA; LAOS; MYANMAR; NEPAL; PAKISTAN; SRI LANKA; THAILAND.

**Remarks** : Commonly occurring species. It's abundance is more during Winter. Have commercial importance. It's status is vulnerable at National level.

#### 26. *Olyra horae* (Prashad and Mukherjee)

1929. *Amblyceps horae* Prashad and Mukherjee, *Rec. Indian Mus.*, 31 : 173, fig. 1 and pl. 7, fig. 1 (Type locality : Indawgyi lake, Upper Burma).

**Material examined** : 88 examples (22 mm-115 mm TL).

**Diagnostic characters** : Caudal fin forked. Upper lobe of caudal fin not very long than lower lobe.

**Distribution** : INDIA : Assam, Meghalaya, Nagaland.

**Elsewhere** : MYANMAR.

**Remarks** : Commonly occurring in the area under report. It is interesting to note that in other region of N. E. India it's occurrence is rare. It's abundance is more during Summer. No commercial value.

#### 27. *Olyra longicaudata* McClelland

1842. *Olyra longicaudata* McClelland, *Calcutta Jour. Nat. Hist.*, 2 : 588, pl. 21, fig. 1 (Type locality : Khasi hills, Meghalaya).

**Material examined** : 74 examples (38 mm-124 mm TL).

**Diagnostic characters** : Caudal fin forked. Upper lobe of caudal fin almost twice as long as lower. Body depth 9-11 times in standard length. Anal fin rays 18-23.

**Distribution** : INDIA : Assam, Arunachal Pradesh, Meghalaya, Nagaland, Tripura, Darjeeling Himalayas.

**Elsewhere** : MYANMAR.

**Remarks** : It's abundance is more during Summer. In other parts of N. E. India it's occurrence is rare. It may be inferred that a good number of population of *Olyra* spp. is having some restricted territorial distribution in the area under report. No commercial value but have some ornamental value.

#### 28. *Aplocheilus panchax* (Hamilton-Buchanan)

1822. *Esox panchax* Hamilton-Buchanan, *Fishes of Ganges* : 211, 380, pl. 3, fig. 69 (Type locality : Bengal).

**Material examined** : 1 example (24 mm TL).

**Diagnostic characters** : Eye diameter equal to inter orbital width. Pelvic fins without prolonged ray. 30-34 scales in longitudinal series.

**Distribution** : INDIA : Assam, Meghalaya, Tripura, Bihar, West Bengal, Uttar Pradesh, Orissa, East Punjab, Madhya Pradesh, Andaman.

**Elsewhere** : BANGLADESH; MYANMAR; THAILAND TO MALAY ARCHIPELAGO; PAKISTAN; SIAM; SRI LANKA.

**Remarks** : Rarely occurring in the area under report. Single specimen could be collected during Monsoon. No commercial value but have some ornamental value.

### 29. *Badis badis* (Hamilton-Buchanan)

1822. *Labrus badis* Hamilton-Buchanan, *Fishes of Ganges* : 70, 368, pl. 25, fig. 23 (Type locality : Gangetic provinces).

**Material examined** : 1007 examples (15 mm-76 mm TL).

**Diagnostic characters** : Body with bands or spots. Dorsal fin with 16-18 spines and 7-10 rays. Anal fin with 3 spines and 6-8 rays. Caudal fin wedged shaped. Lateral line interrupted or absent with 26-33 scales in lateral series.

**Distribution** : INDIA : Throughout India.

**Elsewhere** : BANGLADESH; MYANMAR; NEPAL; PAKISTAN.

**Remarks** : Very commonly occurring species in the area under report. Abundance is more during Summer. No commercial value but have some ornamental value.

### 30. *Channa orientalis* Schneider

1801. *Channa orientalis* Schneider, *Syst. Ichthyol.*, 496, pl. 90, fig. 2 (Type locality : India).

**Material examined** : 139 examples (13 mm-108 mm TL).

**Diagnostic characters** : 4-5 scales between orbit and angle of preopercle; predorsal scales 12-13. Anal fin with 17-23 rays, no black spots on scales. Dorsal fin with 29-37 rays. Length of pelvic fins less than half of pectoral fins. Pectoral fins with bluish vertical bands. Chin marbled. Lateral line with 37-50 scales.

**Distribution** : INDIA : Throughout India.

**Elsewhere** : AFGHANISTAN; BANGLADESH; HAINAN; INDO-CHINA; IRAN; MALAYA ARCHIPELAGO; MYANMAR; NEPAL; PAKISTAN; SIAM; SRI LANKA; TAIWAN; THAILAND; YUNNAN.

**Remarks** : Commonly occurring species. Have some commercial value. It's status is vulnerable at National level.

### 31. *Channa punctatus* (Bloch)

1793. *Ophiocephalus punctatus* Bloch, *Naturges ausland. Fische*, (7) : 139, pl. 358 (Type locality : rivers and lakes of Coromandal Coast).

*Material examined* : 73 examples (31 mm-128 mm TL).

*Diagnostic characters* : 4-5 scales between orbit and angle of preopercle, predorsal scales 12-13. Length of pelvic fins more than half of pectoral fins. Pectoral fins plain. Dorsal fin with 28-33 rays; anal fin with 20-23 rays. Lateral line scales 37-40.

*Distribution* : INDIA : Throughout India.

*Elsewhere* : AFGHANISTAN; BANGLADESH; CHINA; MALAYA; MYANMAR; NEPAL; PAKISTAN; POLYNESIA; SRI LANKA; TAHITI.

*Remarks* : Commonly occurring species. Have commercial value.

### 32. *Channa stewartii* (Playfair)

1867. *Ophiocephalus stewartii* Playfair, *Proc. zool. Soc. London*, 14, pl. 77, fig. 3 (Type locality : Cachar, Assam).

*Material examined* : 5 examples (55 mm-82 mm TL).

*Diagnostic characters* : 4-5 scales between orbit and angle of preopercle, predorsal scales 12-13. Length of pelvic fins less than half of pectoral fins; pectoral fins spotted in zones with darker and lighter patches; chin marbled. Circular black spots each occupying part of scales. Dorsal fin with 34-40 rays; base of dorsal fin iridescent blue in life. Anal fin with 21-27 rays. Lateral line scales 40-50.

*Distribution* : INDIA : Assam, Arunachal Pradesh, Meghalaya, Tripura, Eastern Himalayas, Bihar, West Bengal.

*Elsewhere* : NEPAL.

*Remarks* : Not very commonly occurring species in the area under report. Have some commercial value.

## SUMMARY

The fishes belonging to 32 species under 19 genera, 10 families and 4 orders have been recorded from the project area. Major percentage of species belonging to the family Cyprinidae (53.13%) followed by Balitoridae (12.50%), Channidae (9.37%), Olyridae (6.22%), Psilorhynchidae (3.13%), Cobitidae (3.13%), Clariidae (3.13%), Heteropneustidae (3.13%), Aplocheilidae (3.13%) and Nandidae (3.13%). Statuswise 8 vulnerable (*Brachydanio acuticephala*, *Neolissocheilus hexastichus*, *Puntius conchoni*, *Puntius shalynius*, *Schistura*

*scaturigina*, *Clarias batrachus*, *Heteropneustes fossilis*, *Channa orientalis*) and 4 endangered (*Tor putitora*, *Schistura arunachalensis*, *Schistura sikmaiensis*, *Schistura vinciguerrae*) species are occurring in this area. Most commonly occurring species are *Badis badis*, *Puntius conchoni*, *Brachydanio rerio*, *Amblypharyngodon mola*, *Danio aequipinnatus*, *Channa orientalis*, *Channa punctatus*, *Heteropneustes fossilis* and *Olyra* spp. Commercially important species are *Cyprinus* sp., *Neolissocheilus* spp., *Puntius* spp., *Amblypharyngodon* sp., *Salmostoma* sp., *Heteropneustes* sp., *Clarias* sp. and *Channa* spp. Ornamental species like *Danio* sp., *Brachydanio* spp., *Schistura* spp., *Lepidocephalus* sp., *Olyra* spp., *Aplocheilus* sp. and *Badis* sp. are noteworthy.

### REFERENCE

Jayaram, K.C. 1999. *The Freshwater fishes of the Indian region*, Narendra Publishing House, Delhi, pp. Xxvii + 551.