

Faunal Diversity of Aquatic Invertebrates of Deepor Beel (a Ramsar site), Assam, Northeast India

SUMITA SHARMA AND B. K. SHARMA



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Faunal Diversity of Aquatic Invertebrates of Deepor Beel (A Ramsar site), Assam, Northeast India

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1. INTRODUCTION

The floodplain lakes, an integral component of the major riverine systems globally, deserve special mention for their rich aquatic diversity and biotic production potential (Odum, 1978; Mitsch and Gosselink, 1986). These biotopes are known to exhibit notable environmental heterogeneity and habitat diversity as they often combine salient features of lentic and lotic ecosystems as well as of aquatic and semi-aquatic environs. The floodplain lakes form important aquatic resources of India (area : 0.20 million ha) and cover a water spread area of 0.12 million ha of northeast India in particular.

Various floodplain lakes of India are under severe environmental stress because of general habitat degradation, encroachment of land for agriculture and human settlements, and various anthropogenic activities which, in turn, threaten their aquatic biota. This generalization also holds true for the floodplain lakes (*beels* and *tals*) of northeast India majority of which are neglected even for inventorization of their aquatic biodiversity. Hence, conservation of these interesting ecotones, their natural biological resources and sustainable utilization of their aquatic production need priority attention.

Hydro-biological studies in freshwater ecosystems of India began nearly one century ago but there is yet limited information on aquatic biodiversity of the floodplain lakes of this country in general and on composition of their littoral and limnetic invertebrate communities in particular. Certain related works in the Indian floodplain wetlands are those by Khan (1987), Khan (2002, 2003), Patil (2002) and Siddiqui and Ramakrishna (2002). On the other hand, the authors (Sharma and Sharma, 2001a, 2005a, 2007, 2008, 2009a, 2010a, 2010b, 2010c, 2011a, 2012; Sharma, 2005, 2009a, 2009b, 2010a) have undertaken investigations on zooplankton diversity of the floodplain lakes of northeastern India.

The present study attempts to document invertebrate diversity of Deepor Beel- one of the largest floodplain lake of the Brahmaputra river basin of Assam and an important wetland of northeastern India. This beel was notified as wildlife sanctuary in January, 1989 and was declared as a Ramsar site in August, 2002. During an earlier limnological survey of this floodplain lake, undertaken during November 2002-October 2003, the authors analyzed zooplankton and reported 110 species of Phylum Rotifera (Sharma and Sharma, 2005a) as well as 45 species of Cladocera (Sharma and Sharma, 2008) including certain interesting taxa in spite of sampling limitations.

Realizing the biodiversity importance of this Ramsar site based on our initial findings vis-à-vis the role of extensive sampling, we undertook a detailed limnological reconnaissance of Deepor Beel (August 2008-July 2010) with an objective to study diversity, abundance and ecology of plankton communities particularly zooplankton. The term 'zooplankton' is used in

this account to include limnetic (euplanktonic) organisms as well as facultative zooplankton including littoral-periphytonic and littoral-benthic species occasionally occurring in plankton collections. In view of general paucity of information on aquatic invertebrates of Deepor Beel (www.wwfindia.org), this study is also extended to macro-invertebrates associated with various aquatic hydrophytes occurring in this Ramsar site.

The faunal diversity of different groups of Zooplankton and facultative zooplankton of Deepor Beel namely Protozoa, Rotifera, Micro-Crustacea (Cladocera, Copepoda and Ostracoda) and Gastrotricha is analyzed presently based on extensive monthly collections and their species inventories are provided. In addition, the collections are analyzed for macro-invertebrates *i.e.*, freshwater Mollusca and aquatic insects (Hemiptera, Ephemeroptera, Plecoptera and Coleoptera). In all eleven groups of aquatic invertebrates are included in this study. The species of Rotifera and Cladocera recorded in our earlier (November 2002-October 2003) collections are also considered for up-dating the species lists and for inter-comparisons. Besides, temporal and spatial variations in zooplankton richness of this wetland are analyzed.

All the species documented from Deepor Beel are briefly diagnosed and their distribution in India is indicated. The nature and composition of faunal diversity of the different groups are discussed. Remarks are made on globally important biogeographical elements as well as on occurrence and distribution on species of regional interest. A total of 315 species belonging to 150 genera and 73 families represented in this account provide exhaustive picture of invertebrate diversity known till date from any Ramsar site or floodplain lake or any freshwater ecosystem of India. This study incorporates the results of our biodiversity investigations while a detailed limnological account of Deepor beel is being dealt with separately.

2. MATERIALS AND METHODS

A. The study site

Deepor Beel (Long. : 91°35'-91°43' E, Lat. : 26°05'-26°11' N; altitude : 42 m ASL) is located about 10 km southwest of Guwahati city in Kamrup district of Assam state of Northeastern India (Fig. 1-2). It is one of the largest and most important beel in the Brahmaputra valley of lower Assam and is a representative wetland type found within the Burma Monsoon Forest Biogeographic province. It is an open lake basin connected with a set of inflow and out flow channels and is flanked by Rani Reserve Forest on one side and NH-37 on its other fringe. Originally, this floodplain lake had its natural linkages with the river Brahmaputra through the Sola Beel and the swampy areas of Pandu to the northeast. Due to construction of NH-37, residential buildings and Railway line the main link has already been disrupted and it remains as a small secondary channel. A perennial stream originating from Basistha runs through the heart of the beel and joins the river Brahmaputra through Khanamukh towards north of the Beel. The stream is also fed by Bharalu River.

This Ramsar site is spread over an area of 40.14 sq km during the monsoon (including encroached/reclaimed/developed area of 30.8 sq km). It is currently estimated to cover an area of c 9.27 sq km; however, the actual water body is only 4.1 sq km while its depth ranges about 0.6 m to 1.5 m depending on the monsoon or dry season. The dominant aquatic plants of this wetland are *Eichhornia crassipes*, *Pistia stratiotes*, *Ottelia alismoides*, *Lemna minor*, *Potamogeton crispus*, *Vallisneria spiralis*, *Hydrilla verticillata*, *Ipomoea reptans*, *Azolla pinnata*, *Spirodela polyrhiza*, *Eleocharis plantaginea*, *Nymphaea alba*, *N. rubra* and *Sagittaria sagittifolia*. In addition, the giant water lily (*Euryale ferox*) profusely grows in certain parts of this beel. The lake shore vegetation includes *Eupatorium odoratum*, *Achyranthes aspera*, *Cyperus esculentus*, *Phragmites karka*, *Vitex trifolia*, *Accium basilium*, *Saccharum spontaneum*, and *Imperata arundinacea*. Dominant tree species in the nearby deciduous forests include *Tectona grandis*, *Ficus bengalensis*, and *Bombax malabaricum*.

Deepor Beel has both biological and environmental importance besides being the only major storm water storage basin for Guwahati city. This Ramsar site is reported to support a number of IUCN red-listed species (www.wwfindia.org) including globally threatened species of birds like Spot billed Pelican (*Pelicanus philippensis*), Lesser Adjutant Stork (*Leptoptilos javanicus*), Baer's Pochard (*Aythya baeri*), Palas Sea Eagle (*Haliaeetus leucogaster*), and Greater Adjutant Stork (*Leptoptilos dubius*). This water body is considered as one of the staging sites for migratory birds in India and shows one of the large congregations of aquatic birds in Assam during winter. Because of the richness of avian fauna, Deepor Beel was selected as one of the Important Bird Area (IBA) sites by Birdlife International. This floodplain lake has been designated as a Ramsar Site in August 2002. It supports 50 fish species belonging to 19 families; some important fishes of this beel are *Labeo rohita*, *L. ceatetus*, *L. gonius*, *Notopterus chitala*, *N. kapirot*, *Channa striatus*, *Ophiocephalus gachua*, *Heteropneustes fossilis*, *Wallago attu*, *Anabas testudineus*, *Clarias batrachus*, *Mystus seenghala*, *M. vitatus*, *Kryptopterus biscirrhatus*, and *Ompok bimaculatus*. Herds of Wild Asian elephants (*Elephas maximus*) still visit the beel despite its proximity to Guwahati city. There are no comprehensive reports on Herpeto fauna of Deepor beel; however, preliminary survey (www.wwfindia.org) revealed the presence of about 20 amphibian, 12 lizards, 18 snakes and 6 turtle and tortoise species.

The water area of Deepor beel itself offers a variety of habitats throughout the year as the water regime changes. During the summer, large part of the beel is covered by water hyacinth, aquatic grasses, water lilies and others submerged, emergent and floating vegetation. The highland areas, which are completely dry during winter, are also covered by aquatic and semi-aquatic vegetation. The water regime touches the surrounding boundaries, such as, edges of hilly terrain and National Highways, etc., during peak of the monsoon season. During the winter a variety of habitat, such as, deep open water area (hydrophase), marshy lands, mud flat, emergent vegetation, water hyacinth patches, wet-grassland patches,

paddy field area, dry grassland areas, and scattered forest areas, etc. are noticed in this wetland.

Deepor beel supports an important fishery, providing a means of livelihood for a number of local families, and is used for domestic water supply. *Nymphaea* nuts, flowers, etc., are harvested for sale in the local markets, and these constitute valuable natural crops. The seeds of Giant water lily - *Euryale ferox*, annually leased by the government revenue department, are also another major revenue earning source after fish. Several commercial species, such as, ornamental fish, aquarium plants and medicinal plant species are also available within the beel ecosystem. Orchids of commercial value are to be found in the adjacent forest. The neighboring forests harbor valuable trees, such as, *Shorea robusta* and many others. Local people traditionally utilize the beel to collect fodder for domestic cattle, natural food, such as, vegetables, flowers, aquatic seeds, fish, molluses and other essential requirements.

B. Methods of collection

ZOOPLANKTON

1. This study was initiated by one of the authors (BKS) during an earlier limnological survey (November 2002-October 2003) of Deepor Beel with sampling done at two selected stations (Fig. 3).
2. A more detailed limnological reconnaissance (August 2008-July 2010) of this Ramsar site is again undertaken presently by BKS and the collections are made at six selected sampling stations (Fig. 3).
3. Monthly qualitative plankton samples were collected, during both the study periods, from different sampling stations by towing nylobolt plankton net (No. 25).
4. All plankton collections were preserved in 5% formalin.

Other Groups

1. Freshwater Mollusca were collected following Subba Rao (1989), Ramakrishna and Dey (2007). They were handpicked or collected with a hand-net. The live specimens were narcotized by boiling water and preserved in 70% alcohol. In addition, air dried shells were preserved.
2. Aquatic Insects (Hemiptera and other groups) were collected and preserved following Cherian *et al.* (2004).
3. Freshwater Mollusca and different groups of Aquatic Insects Hemiptera and other insect groups were randomly collected during August 2008-July 2010.

B. Methods of study and Identification

ZOOPLANKTON

1. All the plankton samples were screened with a Wild stereoscopic binocular microscope for isolation of zooplankton taxa.

2. Permanent mounts of various zooplankton species and their specific parts or appendages were prepared in polyvinyl alcohol-lactophenol mixture.
3. Micro-photographs were taken with a Leica DM 1000 image analyzer. The measurements were given in micrometers (μm).
4. Rotifera were identified following the works of Kutikova (1970, 2002), Koste (1978), Koste and Shiel (1987, 1989, 1990), Shiel and Koste (1992, 1993), Segers (1995), De Smet (1997), Sharma (1983, 1987a, 1987b, 1998a, 2001), Nogrady and Pourriot (1995), Sharma and Sharma (1997, 1999a, 2000, 2008) and Nogrady and Segers (2002). The system of Rotifera classification followed in this account is after Segers (2002) and comments on the distribution of various rotifer taxa were made following Segers (2007).
5. Cladocera were identified following the monographs of Smirnov (1971, 1974, 1996a), Smirnov and Timms (1983), Michael and Sharma (1988), Korovchinsky (1992), Sharma and Sharma (1999b, 2008), Orlova-Bienkowskaja (2001) and Korinek (2002). The system of Cladocera classification followed in this account is after Negrea *et al.* (1999) and Dumont and Negrea (2002).
6. Copepoda were identified following the works of Ranga Reddy (1994, 2001), Alekseev (2002) and Ueda and Reid (2004). Alekseev (2002) is followed for recent classification of this group.
7. Ostracoda were identified following Victor and Fernando (1989) and Victor (2002). The system of classification followed presently is after Victor (2002).
8. Protozoa were identified following (Das *et al.*, 1993, 1995, 2000, 2003, 2004). Rhizopoda were identified following the works of Deflandre (1959) and Chattopadhyay and Das (2003) and Sharma and Sharma (2008).
9. Gastrotricha were identified following Brunson (1959) and Sharma (1980, 1987c).
10. Monthly richness of Zooplankton at various sampling stations, its variations in different months as well as between individual stations (ranges, mean $\pm$ S.D) and total monthly richness in Deepor Beel were recorded. The significance of their temporal variations was ascertained by ANOVA.
11. The percentage similarities between zooplankton richness were computed *vide* Sørensen's index. The hierarchical cluster analysis of monthly zooplankton community similarities was done using SPSS (version 11).

Other Groups

1. Freshwater Mollusca were identified following the works of Subba Rao (1989), Ramakrishna and Dey (2007), and Mitra *et al.* (2008). The system of classification followed is after Ramakrishna and Dey (2007).

2. Subramanian and Sivaramakrishnan (2007) were followed for general classification and identification of different groups of aquatic insects.
3. Aquatic Hemiptera were identified following Bal and Basu (1994a, 1994b, 1998) and Bal (2008); Ephemeroptera following Srivastava (1993); Plecoptera following Das *et al.*, (1993) and Coleoptera were identified following Biswas *et al.*, (1995), Mukhopadhyay *et al.*, (2000) and Mukhopadhyay and Ghosh (2008).
4. The relevant checklists (www.zsi.org) were consulted to ascertain recent nomenclatural status of various taxa.

The present observations are based mainly on plankton samples and other materials collected by one of the authors (BKS) and deposited in the holdings of Freshwater Biology Laboratory, Department of Zoology, North-Eastern Hill University, Shillong. All these materials are indicated as BKS collections elsewhere in this study. In addition, specimens of Rotifera and Cladocera examined by the senior author from the samples of North Eastern Regional Centre, Zoological Survey of India, Shillong are indicated as SS collections.

3. SYSTEMATIC ACCOUNT

Three hundred and fifteen (315) species of freshwater invertebrates belonging to 11 groups and spread over 150 genera and 73 families (Table-1) are documented from Deepor Beel. A detailed systematic list of the recorded species is presented hereunder :

Table 1 : Group-wise break-up of taxa recorded from Deepor Beel

Groups ↓	Taxa →	Species	Genera	Families
Protozoa		46	26	21
Rotifera		146	37	19
Cladocera		58	39	07
Copepoda		07	06	02
Ostracoda		09	08	02
Gastrotricha		03	02	01
Mollusca		13	07	06
Hemiptera		15	10	07
Ephemeroptera		05	05	03
Plecoptera		06	05	02
Coleoptera		07	05	03
Total No. of taxa		315	150	73

A. SYSTEMATIC LIST OF THE RECORDED SPECIES**PROTOZOA**

Subkingdom PROTOZOA
Phylum SARCOMASTIGOPHORA
Subphylum SARCODINA
Superclass RHIZOPODA
Class LOBOSEA
Order ARCELLINIDA
Family ARCELLIDAE

1. *Arcella discoides* Ehrenberg, 1843
2. *A. hemispherica* Perty, 1809
3. *A. vulgaris* Ehrenberg, 1830

Family CENTROPYXIDAE

4. *Centropyxis aculeata* (Ehrenberg, 1830)
5. *C. ecornis* (Ehrenberg, 1843)
6. *C. oblonga* (Deflandre, 1929)
7. *C. orbicularis* Deflandre, 1929
8. *Cyclopyxis eurysterna* (Deflandre, 1929)

Family DIFFLUGIDAE

9. *Diffugia acuminata* Ehrenberg, 1838
10. *D. corona* Wallich, 1864
11. *D. oblonga* Ehrenberg, 1838
12. *D. tuberculata* (Wallich, 1864)
13. *D. urceolata* Carter, 1864

Family NEBELIDAE

14. *Lesquereusia spiralis* (Ehrenberg, 1830)

Class FILOSEA

Order GROMIIDA

Family CYPHODERIIDAE

15. *Cyphoderia ampulla* (Ehrenberg, 1840)

Family EUGLEPHIDAE

16. *Assulina muscorum* Greet, 1888*
17. *A. seminulum* (Ehrenberg, 1848)*
18. *Euglypha acanthophora* Dujardin, 1841
19. *E. laevis* (Ehrenberg, 1845)
20. *E. tuberculata* Dujardin, 1841

21. *Trinema lineare* Penard, 1840

Class HELIOZOA
Order ACTINOPHRYIDA
Family ACTINOPHRYIDAE

22. *Actinophrys sol* Ehrenberg, 1830*

Subphylum MASTIGOPHORA
Superclass PHYTOMASTIGOPHORA
Order DINOFLAGELLIDA
Family GYMNODINIIDAE

23. *Gymnodinium aeruginosum* Stein, 1966*

Family PERIDINIDAE

24. *Ceratium hirudinella* O. F. Müller, 1773

25. *Peridinium tabulatum* Claparede & Lachmann, 1973

Order EUGLENIDA
Family EUGLENIDAE

26. *Euglena acus* Ehrenberg, 1832

27. *E. oxyuris* Schmarda, 1931

28. *Phacus acuminata* Stoles, 1885

29. *P. pleuronectes* (O. F. Müller, 1773)

30. *Trachelomonas hispida* (Perty, 1925)*

31. *T. urceolata* Stokes, 1888*

Phylum CILIOPHORA
Class KINETOFRAGMINOPHORA
Order PROSTOMATIDA
Family COLEPIDAE

32. *Coleps hirtus* (O. F. Müller, 1786)*

Family ENCHELYIDAE

33. *Dileptus anser* (O. F. Müller, 1773)*

34. *Lacrymaria olor* (O. F. Müller, 1786)*

Family TRACHELIDAE

35. *Trachelius ovum* (O. F. Müller, 1786)*

Order COLPODIDA
Family COLPODIDAE

36. *Colpoda cucullus* (O. F. Müller, 1773)

Class OLIOGOHYMENOPHOREA

Order HYMENOSTOMATIDA

Family PARAMECIIDAE

37. *Paramecium caudatum* Ehrenberg, 1893

Family FRONTONIIDAE

38. *Frontonia acuminata* Ehrenberg, 1893*

39. *F. depressea* (Stokes, 1886)*

Order PERITRICHIDA

Family VORTICELLIDAE

40. *Vorticella aequilata* Kahl, 1935*

41. *V. companula* Ehrenberg, 1831

Class POLYHYMENOPHOREA

Order HYPOTRICHIDA

Family SPIROSTOMITIDAE

42. *Spirostomum ambiguum* Ehrenberg, 1835*

Family SPIROFILIDAE

43. *Stichotricha socialis* Gruber, 1880*

Family OXYTRICHIDAE

44. *Oxytricha fallax* Stein, 1859*

Family EUPLOTIDAE

45. *Euplotes muscicola* Kahl, 1932*

46. *E. plumipes* Stokes, 1854*

* New record from Assam

ROTIFERA

Phylum ROTIFERA

Class EUROTATORIA

Subclass MONOGONONTA

Order PLOIMA

Family BRACHIONIDAE

1. *Anuraeopsis fissa* Gosse, 1851

2. *A. navicula* Rousselet, 1911*

3. *Brachionus angularis* Gosse, 1851

4. *B. bidentatus* Anderson, 1889 #

5. *B. budapestinensis* Daday, 1885 **

6. *B. calyciflorus* Pallas, 1766

- B. calyciflorus f. anuraeiformis* (Brehm, 1909)
- B. calyciflorus f. ampiceros* (Ehrenberg, 1838)
- B. calyciflorus f. dorcas* (Gosse, 1851)
- 7. *B. caudatus* Barrois & Daday, 1894
 - B. caudatus aculeatus* (Hauer, 1937)
 - B. caudatus personatus* (Ahlstrom, 1940)
- 8. *B. dichotomus reductus* Koste & Shiel, 1980*
- 9. *B. diversicornis* (Daday, 1883)
- 10. *B. donneri* Brehm, 1851#
- 11. *B. durgae* Dhanapathi, 1974*
- 12. *B. falcatus* Zacharias, 1898
- 13. *B. forficula* Wierzejski, 1891
- 14. *B. mirabilis* Daday, 1897
- 15. *B. quadridentatus quadridentatus* Hermann, 1783
 - B. quadridentatus melheni* Barrois & Daday, 1894
 - B. quadridentatus brevispinus* (Ehrenberg, 1832)
 - B. quadridentatus cluniorbicularis* (Skorikov, 1894)
 - B. quadridentatus rhenanus* (Lauterborn, 1893)
- 16. *B. rubens* Ehrenberg, 1838#
- 17. *Keratella cochlearis* (Gosse, 1851)
- 18. *K. edmondsoni* Ahlstrom, 1943*
- 19. *K. lenzi* Hauer, 1953
- 20. *K. procurva* (Thorpe, 1891)**
- 21. *K. quadrata* (O.F. Muller, 1786)#
- 22. *K. tecta* (Gosse, 1851)**
- 23. *K. tropica* (Apstein, 1907)
- 24. *Platyias leloupi* Gillard, 1957*
- 25. *P. quadricornis* (Ehrenberg, 1832)
- 26. *Platyonus patulus* (O.F. Muller, 1786)
 - P. patulus macracanthus* (Daday, 1905)

Family EPIPHANIDAE

- 27. *Epiphanes brachionus* (Ehrenberg, 1837)

Family EUCHLANIDAE

- 28. *Beauchampiella eudactylota* (Gosse, 1886)
- 29. *Euchlanis dilatata* Ehrenberg, 1832
- 30. *E. incisa* Carlin, 1939
- 31. *E. triquetra* Ehrenberg, 1838

32. *Dipleuchlanis propatula* (Gosse, 1886)

33. *Tripleuchlanis plicata* (Levander, 1894)

Family MYTILINIDAE

34. *Lophocharis salpina* (Ehrenberg, 1834)

35. *Mytilina acanthophora* Hauer, 1938 *

36. *M. bisulcata* (Lucks, 1912)

37. *M. ventralis* (Ehrenberg, 1830)

M. ventralis longidactyla Wulfert, 1965

Family TRICHOTRIIDAE

38. *Macrochaetus collinsi* (Gosse, 1867)**

39. *M. longipes* Myers, 1934*

40. *M. sericus* (Thorpe, 1893)

41. *Trichotria tetractis* (Ehrenberg, 1830)

Family LEPADELLIDAE

42. *Colurella obtusa* (Gosse, 1886)

43. *C. sulcata* (Stenroos, 1898)*

44. *C. uncinata* (O.F. Muller, 1773)

45. *Lepadella acuminata* (Ehrenberg, 1894)

46. *L. apsida* Harring, 1916

47. *L. benjamini* Harring, 1916*

48. *L. biloba* Hauer, 1938

49. *L. costatoides* Segers, 1992**

50. *L. dactyliseta* (Stenroos, 1898)**

51. *L. discoidea* Segers, 1993

52. *L. eurysterna* Myers, 1942*

53. *L. minuta* (Weber & Montet, 1918)

54. *L. ovalis* (O.F. Muller, 1786)

55. *L. patella* (O.F. Muller, 1773)

56. *L. rhomboides* (Gosse, 1886)

57. *L. rhomboidula* (Bryce, 1832)#

58. *L. triptera* Ehrenberg, 1832

L. triptera alata (Myers, 1934)#

59. *L. (H.) apsicora* Myers, 1934

60. *L. (H.) ehrenbergi* (Perty, 1850)

61. *L. (H.) heterostyla* (Murray, 1913)

62. *Squatinella mutica* (Ehrenberg, 1832)#

Family LECANIDAE

63. *Lecane aculeata* (Jakubski, 1912)
64. *L. arcula* Harring, 1914*
65. *L. crepida* Harring, 1914
66. *L. curvicornis* (Murray, 1913)
67. *L. doryssa* Harring, 1914*
68. *L. flexilis* (Gosse, 1886)
69. *L. haliclysta* Harring & Myers, 1926*
70. *L. hastata* (Murray, 1913)#
71. *L. hornemanni* (Ehrenberg, 1834)
72. *L. inermis* (Bryce, 1892)
73. *L. lateralis* Sharma, 1978*
74. *L. leontina* (Turner, 1892)
75. *L. ludwigii* (Eckstein, 1883)
76. *L. luna* (O.F.Müller, 1776)
77. *L. nana* (Murray, 1913)**
78. *L. nitida* (Murray, 1913)
79. *L. ohioensis* (Herrick, 1885)
80. *L. papuana* (Murray, 1913)
81. *L. paxiana* Hauer, 1940***
82. *L. pertica* Harring & Myers, 1926
83. *L. ploenensis* (Voigt, 1902)
84. *L. pusilla* Harring, 1914**
85. *L. signifera* (Jennings, 1896)
86. *L. sola* Hauer, 1936#
87. *L. tenuiseta* Harring, 1914***
88. *L. ungulata* (Gosse, 1887)
89. *L. (Hemimonostyla) blachei* Berzins, 1973*
90. *L. (Hm.) inopinata* Harring & Myers, 1926
91. *L. (Hm.) sympoda* Hauer, 1929**
92. *L. (Monostyla) bulla* (Gosse, 1851)
93. *L. (M.) closterocerca* (Schmarda, 1859)
94. *L. (M.) decipiens* (Murray, 1913)#
95. *L. (M.) furcata* (Murray, 1913)
96. *L. (M.) hamata* (Stokes, 1896)
97. *L. (M.) lunaris* (Ehrenberg, 1832)
98. *L. (M.) monostyla* (Daday, 1897)
99. *L. (M.) obtusa* (Murray, 1913)

- 100. *L. (M.) pyriformis* (Daday, 1905)
- 101. *L. (M.) quadridentata* (Ehrenberg, 1830)
- 102. *L. (M.) stenroosi* (Meissner, 1908)
- 103. *L. (M.) thienemanni* (Hauer, 1938)#
- 104. *L. (M.) unguitata* (Fadeev, 1925)

Family NOTOMMATIDAE

- 105. *Cephalodella forficula* (Ehrenberg, 1830)
- 106. *C. gibba* (Ehrenberg, 1830)
- 107. *C. mucronata* Myers, 1934#
- 108. *Monommata longiseta* (O.F. Müller, 1786)
- 109. *Notommata spinata* Koste & Shiel, 1991*

Family SCARIDIIDAE

- 110. *Scaridium longicaudum* (O. F. Müller, 1786)

Family TRICHOCERCIDAE

- 111. *Trichocerca bicristata* (Gosse, 1887)*
- 112. *T. capucina* (Wierzejski & Zacharias, 1893)
- 113. *T. cylindrica* (Imhof, 1891)
- 114. *T. elongata* (Gosse, 1886) #
- 115. *T. flagellata* Hauer, 1937*
- 116. *T. iernis* (Gosse, 1887)**
- 117. *T. longiseta* (Schränk, 1802)
- 118. *T. porcellus* (Gosse, 1851) #
- 119. *T. pusilla* (Jennings, 1903)*
- 120. *T. rattus* (O.F.Müller, 1776)
- 121. *T. similis* (Wierzejski, 1893)
- 122. *T. sulcata* (Jennings, 1894)**

Family ASPLANCHNIDAE

- 123. *Asplanchna priodonta* Gosse, 1850

Family SYNCHAETIDAE

- 124. *Polyarthra vulgaris* Carlin, 1943

Family DICRANOPHORIDAE

- 125. *Dicranophoroides caudatus* (Ehrenberg, 1834)*

Order FLOSCULARIACEAE

Family FLOSCULARIDAE

- 126. *Floscularia ringens* (Linnaeus, 1758)
- 127. *Lacinularia flosculosa* (O. F. Müller, 1773)

128. *Limnias ceratophylli* Schrank, 1803
 129. *Sinatherina socialis* (Linne, 1758)
 130. *S. spinosa* (Thorpe, 1893)

Family CONOCHILIDAE

131. *Conochilus unicornis* Rousselet, 1892

Family HEXARTHRIIDAE

132. *Hexarthra mira* (Hudson, 1871)

Family TESTUDINELLIDAE

133. *Testudinella brevicaudata* Yamamoto, 1951#
 134. *T. emarginula* (Stenroos, 1898)
 135. *T. greeni* Koste, 1981
 136. *T. parva* (Ternetz, 1892)**
 137. *T. patina* (Hermann, 1783)
 138. *Pompholyx sulcata* Hudson, 1885

Family TROCHOSPHAERIDAE

139. *Filinia brachiata* (Rousselet, 1901)#
 140. *F. camascela* Myers, 1938
 141. *F. longiseta* (Ehrenberg, 1834)
 142. *F. opoliensis* (Zacharias, 1898)
 143. *F. pejlari* Hutchinson, 1964#
 144. *Trochosphaera aequatorialis* Semper, 1872

Subclass DIGONONTA

Order BDELLOIDEA

Family PHILODINIDAE

145. *Rotaria neptunia* (Ehrenberg, 1830)
 146. *R. rotatoria* (Pallas, 1766)

*New record from Deepor Beel (*vide* Sharma & Sharma, 2011a)

**New record from Deepor (present in 2008-2010 samples)

***New record from Northeastern India

#noticed only in our earlier (2002-2003) samples

CLADOCERA

Superclass CRUSTACEA

Class BRANCHIOPODA

Superorder CLADOCERA (*s. str.*)

Order CTENOPODA

Family SIDIDAE

1. *Diaphanosoma excisum* Sars, 1885
2. *D. sarsi* Richard, 1895
3. *D. senegal* Gauthier, 1951*
4. *Pseudosida bidentata* Herrick, 1884
5. *Sarsilatona serricauda* (Sars, 1901)*
6. *Sida crystallina* (O. F. Muller, 1776)

Order ANOMOPODA

Family DAPHNIIDAE

7. *Ceriodaphnia cornuta* Sars, 1885
8. *C. reticulata* (Jurine, 1820)
9. *Daphnia lumholtzi* Sars, 1885
10. *D. pulex* Leydig, 1860 emend. Scourfield, 1942*
11. *Scapholeberis kingi* Sars, 1901
12. *Simocephalus (Echinocaudus) acutirostratus* (King, 1853)
13. *S. (Coronocephalus) serrulatus* (Koch, 1841)
14. *S. (Simocephalus) mixtus* Sars, 1903

Family BOSMINIDAE

15. *Bosmina longirostris* (O. F. Muller, 1776)
16. *Bosminopsis deitersi* Richard, 1895

Family MOINIDAE

17. *Moina micrura* Kurz, 1874
18. *Moinodaphnia macleayi* (King, 1853)

Family MACROTHRICIDAE

19. *Macrothrix laticornis* (Fischer, 1857)
20. *M. spinosa* King, 1853*
21. *M. triserialis* (Brady, 1886)
22. *Grimaldina brazzai* Richard, 1892
23. *Guernella raphaelis* Richard, 1892*
24. *Streblocerus serricaudatus* (Fischer, 1849)*

Family ILYOCRYPTIDAE

25. *Ilyocryptus spinifer* Herrick, 1882

Family CHYDORIDAE

Subfamily CHYDORINAE

26. *Alonella clathratula* Sars, 1886*
27. *A. excisa* (Fischer, 1854)
28. *A. nana* (Baird, 1850)*

29. *Chydorus faviformis* Birge, 1893
30. *C. reticulatus* (O. F. Muller, 1776)
31. *C. sphaericus* (O. F. Muller, 1776)
32. *Dadaya macrops* (Daday, 1898)
33. *Disperalona caudata* Smirnov, 1996*
34. *Dunhevedia crassa* King, 1853
35. *D. serrata* Daday, 1898*
36. *Ephemeroporus barroisi* (Richard, 1894)
37. *Picripleuroxus similis* Vavra, 1900*
38. *Pseudochydorus globosus* (Baird, 1843)*

Subfamily ALONINAE

39. *Arcoperus harpae* (Baird, 1834)
40. *Alona affinis* (Leydig, 1860)
41. *A. cheni* Sinev, 1999
42. *A. guttata guttata* Sars, 1862
 A. guttata tuberculata Kurz, 1875*
43. *A. macronyx* (Daday, 1898)**
44. *A. quadrangularis* (O. F. Muller, 1776)
45. *Anthalona harti* Van Damme, Sinev & Dumont, 2011
46. *Camptocercus uncinatus* Smirnov, 1973
47. *Coronatella anodonta* (Daday, 1905)**
48. *C. rectangula* Sars, 1862
49. *Euryalona orientalis* (Daday, 1898)
50. *Graptoleberis testudinaria* (Fischer, 1854)
51. *Karualona karua* (King, 1853)
52. *Kurzia* (*Rostrokurzia*) *brevilabris* Rajapaksa & Fernando, 1986#
53. *K. (R.) longirostris* (Daday, 1898)
54. *Leberis diphanus* (King, 1853)*
55. *Leydigia acanthocercoides* (Fischer, 1854)
56. *Leydigiopsis curvirostris* Sars, 1901
57. *Notoalona globulosa* (Daday, 1898)
58. *Oxyurella singalensis* (Daday, 1898)

*New record from Deepor Beel

**New record from Assam

#New record from India

COPEPODA

Phylum ARTHROPODA
 Superclass CRUSTACEA
 Class COPEPODA
 Order CALANOIDA
 Family DIAPTOMIDAE
 Subfamily DIAPTOMINAE

1. *Heliodiaptomus contortus* (Gurney, 1907)
2. *H. viduus* (Gurney, 1916)
3. *Neodiaptomus schmackeri* (Poppe & Richard, 1892)

Order CYCLOPOIDA
 Family CYCLOPIDAE
 Subfamily EUCYCLOPINAE

4. *Tropocyclops prasinus* (Fischer, 1860)

Subfamily CYCLOPINAE

5. *Mesocyclops leuckarti* (Claus, 1857)
6. *Microcyclops varicans* Sars, 1863
7. *Thermocyclops decipiens* Kiefer, 1929

OSTRACODA

Phylum ARTHROPODA
 Superclass CRUSTACEA
 Class OSTRACODA
 Order PODOCOPODA
 Suborder PODOCOPA
 Superfamily CYPRIDACEA
 Family CYPRIDIDAE
 Subfamily CYPRIDINAE

1. *Cypris subglobulosa* Sowerby, 1840

Subfamily EUCYPRIDINAE

2. *Strandesia indica* Hartmann, 1964**

Subfamily CYPRINOTINAE

3. *Hemicypris anomala* (Klie, 1838)**

Subfamily HERPETOCYPRIDINAE

4. *Stenocypris major* (Baird, 1859)*
5. *S. sewelli* Klie, 1838*

Family CYPRIDOPSIDAE
Subfamily CYPRIDOPSINAE

6. *Cypridopsis dispar* Hartmann, 1964**
7. *Onchocypris pustulosa* Gurney, 1926**
8. *Pseudocypretta maculata* Klie, 1932**

Subfamily CYPRETTINAE

9. *Cypretta fontinalis* Hartmann, 1965**

* New record from Assam

** New record from Northeast India

GASTROTRICHA

Phylum GASTROTRICHA
Family CHAETONOTIDAE

1. *Chaetonotus anomalus* Brunson, 1950
2. *C. gastrocyaneus* Brunson, 1950
3. *C. similis* Zelinka, 1889

MOLLUSCA

Phylum MOLLUSCA
Class GASTROPODA
Subclass PROSOBRANCHIA
Order MESOGASTROPODA
Superfamily VIVIPAROIDEA
Family VIVIPARIDAE
Subfamily BELLAMYINAE

1. *Bellamyia bengalensis* f. *typica* (Lamarck, 1822)
B. bengalensis f. *annandalei* (Kobelt, 1908)*
2. *B. crassa* (Benson, 1836)
3. *B. dissimilis* (Müller, 1774)

Family AMPULLARIIDAE

4. *Pila globosa* (Swainson, 1822)
5. *P. theobaldi* (Hanley, 1875)*

Family PLEUROCERIDAE
Subfamily MELANATRIINAE

6. *Brotia (Antimelania) costula* (Rafinesque, 1833)

Subfamily PALUDOMINAE

7. *Paludomus (Paludomus) blanfordiana* Nevill, 1877

8. *P. (P.) conica* (Gray, 1834)

9. *P. (P.) reticulata* Blanford, 1856

Subclass PULMONATA

Order BASOMMATOPHORA

Superfamily LYMNAEOIDEA

Family LYMNAEIDAE

10. *Lymnea (Pseudosuccinea) acuminata* f. *typica* Lamarck, 1822

L. (P.) acuminata f. *gracilior* Martens, 1881

L. (P.) acuminata f. *rufescens* Gray, 1822

11. *L. (P.) luteola* Lamarck, 1822

Superfamily PLANORBOIDEA

Family PLANORBIDAE

Subfamily PLANORBINAE

12. *Gyraulus convexiusculus* (Hutton, 1849)

Family BULLINIDAE

Subfamily BULLININAE

13. *Indoplanorbis exustus* (Deshayes, 1834)

*New record from Assam.

AQUATIC INSECTS

HEMIPTERA

Phylum ARTHROPODA

Class INSECTA

Order HEMIPTERA

Suborder HETEROPTERA

Infraorder NEPOMORPHA

Family NEPIDAE

Subfamily NEPINAE

Tribe NEPINI

1. *Laccotrephes griseus* (Guerin-Meneville, 1844)

2. *L. ruber* (Linnaeus, 1764)

Subfamily RANATRINAE

Tribe RANATRINI

3. *Ranatra elongata* Fabricius, 1790*

4. *R. filiformis* Fabricius, 1790

5. *R. gracilius* Dallas, 1849

6. *R. longipes* Stal, 1861

7. *R. varipes* Stal, 1861*

Family BELOSTOMATIDAE

Subfamily LETHOCERINAE

8. *Lethocerus indicus* (Lepeletier & Serville, 1825)

Family NOTONECTIDAE

Subfamily ANISOPINAE

Tribe ANISOPINI

9. *Anisops sardeus* Herrich-Shafer, 1850

Subfamily NOTONECTINAE

10. *Nychia marshalli* Scott, 1872

Infraorder GERROMORPHA

Family GERRIDAE

Subfamily GERRINAE

Tribe GERRINI

11. *Limnogonus nitidus* (Mayr, 1865)12. *Aquarius adelaidis* (Dohrn, 1860)*

Family HYDROMETRIDAE

Subfamily HYDROMETRINAE

13. *Hydrometra greeni* Kirkaldy, 1898

Family VELLIDAE

Subfamily MICROVELIINAE

Tribe MICROVELIINI

14. *Microvelia* (*Microvelia*) *annandalei* Distant, 1909*

Family MESOVELLIDAE

Subfamily MESOVELIINAE

15. *Mesovelia vittigera* Horvath, 1895

*New records from Assam.

PLECOPTERA

Phylum ARTHROPODA

Class INSECTA

Order PLECOPTERA

Suborder ARCTOPERLARIA

Superfamily NEMOUROIDEA

Family NEMOURIDAE

Subfamily AMPHINEMOURINAE

1. *Amphinemoura luteipes* Kimmins, 1947
2. *Indonemoura adunca* (Harper, 1975)**
3. *I. assami* (Aubert, 1967)
4. *Mesonemoura filigera* (Kimmins, 1947)**

Subfamily NEMOURINAE

5. *Nemoura mangicauda* Zwick & Sivee, 1980**

Family PERLIDAE

6. *Perla xenocola* Banks, 1914**

**New records from Northeast India.

EPHEMEROPTERA

Phylum ARTHROPODA

Class INSECTA

Order EPHEMEROPTERA

Suborder PISCIFORMA

Family BAETIDAE

Subfamily BAETINAE

1. *Baetis tigroides* Gillies, 1949**

Subfamily CLOENINAE

2. *Cloeon marginale* (Hagen, 1859)**
3. *Procloeon harveyi* Kimmins, 1947**

Suborder RECTRACHAETA

Family CAENIDAE

Subfamily CAENINAE

4. *Caenis perpusilla* Walker, 1853**

Suborder SETISURA

Family HEPTAGENIIDAE

Subfamily HEPTAGENIINAE

5. *Ecdyonurus indicus* Hubbard, 1937*

*New records from Assam

**New records from Northeast India

COLEOPTERA

Phylum ARTHROPODA

Class INSECTA

Order COLEOPTERA

Family DYTISCIDAE

Subfamily DYTISCINAE

Tribe CYBISTERINI

1. *Cybister (Meganectes) posticus* Aube, 1832
2. *C. (M.) sugillatus* Erichson, 1934

Tribe HYDATICINI

3. *Hydaticus (Guignotites) fabricii* Macleoy, 1833
4. *H. (G.) vittatus* (Fabricius, 1775)

Subfamily COLYMBETINAE

Tribe COLYBETINI

5. *Rhantus taprobanicus* Sharp, 1890

Family GYRINIDAE

Subfamily ENHYDRINAE

6. *Dineatus (Spinosodineatus) spinosus* (Fabricius, 1781)

Family HYDROPHILIDAE

Subfamily HYDROPHILINAE

7. *Sternolophus rufipes* (Fabricius, 1792)

B. TAXONOMIC NOTES**a. PROTOZOA**

Subkingdom PROTOZOA

Protozoa are represented by members of phyla Sarcomastigophora and Ciliophora in the present study.

Phylum SARCOMASTIGOPHORA

Flagellates and amoebae, cells naked or with test; some amoeboid types with flagellate stages and some flagellates with characteristic amoeboid stages.

This phylum is represented by two sub-phyla in the present study.

Subphylum SARCODINA

Protozoa progressing by amoeboid movement, or sessile; pseudopodia usually evident; flagella occur rarely.

Sarcodina includes the members of super-class Rhizopoda in this account.

Superclass RHIZOPODA

Protozoa with pseudopodia or fine long radial pseudopodia or complex external shell (test); pseudopodia without axial filaments; mostly free living.

Rhizopoda are represented by three classes namely Lobosea, Filosea and Heliozoa in the samples collected from Deepor Beel.

Class LOBOSEA

Pseudopodia form broad lobes or finger-like projections, rarely branching, never fine and thread-like. Only one order belonging to Lobosea is represented in our study.

Order ARCELLINIDA

Amoebae with shell (test) made of a substance secreted by the animal or of particulate material-sand grains, diatom frustules etc.; pseudopodia protrude through a definite aperture.

This order is represented by four families in our collections from Deepor Beel.

Family ARCELLIDAE

Test membranous, rigid, encrusted with chitinous particles; having a distinct oral aperture

This family is represented by only one genus in the present account.

Genus *Arcella* Ehrenberg, 1832

Characters : Test membranous, rigid, yellowish or brown; either smooth or in some cases variously ornamented, encrusted with chitinous particles. Circular or oval in shape in dorsal or ventral view and plano-convex to hemispherical in lateral view. Oral aperture central, usually circular, rarely of different shape; turned inwards and appearing as an inverted funnel; nuclei two or more.

This genus is represented by three species in the examined samples.

1. *Arcella discoides* Ehrenberg, 1843

(Fig. 4)

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 17.10.2008; 5 examples, 14.11.2008; 2 examples, 19.02.2009; 4 examples; 24.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 2 examples. 24.07.2009; 4 examples, 19.09.2009; 3 examples, 27.11.2009; 5 examples, 26.02.2010; 2 examples, 14.04.2010; 4 examples, 21.05.2010, 8 examples, 30.06.2010; 7 examples, 21.07.2010.

Characters : Test yellow, smooth, flattened, circular in front view and plano-convex in lateral view; height about 1/3 to 1/4 of its diameter. Oral aperture large and circular.

Distribution : India : Arunachal Pradesh, Assam, Meghalaya, Mizoram, Tripura, Nagaland, Sikkim and West Bengal.

2. *Arcella hemispherica* Perty, 1809

Material examined : BKS collections: 3 examples, 19.08.2008; 2 examples, 17.10.2008; 4 examples, 19.01.2009; 3 examples, 21.03.2009; 2 examples, 24.07.2009; 3 examples, 31.05.2009; 2 examples, 27.11.2009; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Test yellow, distinctly hemispherical and circular in lateral and front views. Surface of test with more or less fine areoles.

Distribution : India : Andhra Pradesh, Assam, Manipur, Orissa and West Bengal.

3. *Arcella vulgaris* Ehrenberg, 1830

(Fig. 5)

Material examined : BKS collections: 2 examples 19.08.2008; 5 examples, 12.09.2008; 3 examples, 12.12.2008; 2 examples, 21.03.2009; 5 examples, 15.05.2009; 4 examples, 24.07.2009; 2 examples, 19.09.2009; 3 examples, 29.01.2010; 3 examples, 19.03.2010; 4 examples, 21.07.2010.

Characters : Test light yellow, discoid or hemispherical in front or lateral views; height about half of its diameter; test surface with large areoles. Mouth circular and central.

Distribution : India : Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Manipur, Nagaland, Sikkim and West Bengal.

Family CENTROPYXIDAE

Test with mineral and organic particles. Symmetry of test dorso-ventral; oral aperture at one side of test (eccentric).

This family is represented by three genera our collections from Deepor Beel.

Genus *Centropyxis* Stein, 1857

Characters : Test mostly membranous, encrusted with foreign particles or covered with sandy material; dorso-ventrally flattened, swollen at posterior portion and tapering towards aperture region. Oral aperture eccentric, invaginated and without a raised rim.

Four species of *Centropyxis* are observed in the presently examined samples.

4. *Centropyxis aculeata* (Ehrenberg, 1830)

(Fig. 6)

Material examined : BKS collections : 5 examples, 12.09.2008; 5 examples, 17.10.2008; 3 examples, 14.11.2008; 5 examples, 19.01.2009; 2 examples, 19.02.2009; 3 examples, 31.05.2009; 4 examples, 30.06.2009; 5 examples, 21.07.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 5 examples, 29.10.2010; 4 examples, 19.03.2010; 3 examples, 31.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Test brownish, cap-shaped; encrusted with quartz crystals and sometimes with admixture of diatoms and sand particles. Fundus obtusely rounded and usually with 4-6 divergent spines at the border, arranged in a single and somewhat regular row.

Distribution : India : Andhra Pradesh Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Mizoram, Manipur, Nagaland and West Bengal.

5. *Centropyxis ecornis* (Ehrenberg, 1843)

(Fig. 7)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 21.03.2009; 3 examples, 24.04.2009; 4 examples,

24.07.2009; 3 examples, 19.09.2009; 3 examples, 26.02.2010; 4 examples, 14.04.2010; 2 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Test large, discoid or elliptical; without any spine and covered with quartz grains. Dorsal surface slightly arched and more elevated at posterior part. Oral aperture circular and much eccentric.

Distribution : India : Assam, Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, Uttaranchal and West Bengal.

6. *Centropyxis oblonga* (Deflandre, 1929)

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 27.10.2009; 3 examples, 29.10.2010; 3 examples, 21.07.2010.

Characters : Test grayish, oblong-elliptical or oval; with 3-6 divergent spines located in the distal part. Fundus of the test more elevated. Oral aperture elliptical and eccentric.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Manipur and Sikkim.

7. *Centropyxis orbicularis* Deflandre, 1929

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 24.04.2009; 2 examples, 19.09.2009; 4 examples, 30.12.2009.

Characters : Test almost circular in ventral view and semi-circular in lateral view, ventral surface flat; oral aperture semi-circular, plagiostomic; test with large stony particles.

Distribution : India : Andhra Pradesh, Assam and Uttaranchal.

Genus *Cyclopyxis* Deflandre, 1929

Characters : Test mostly membranous, with encrusted foreign particles or covered with sandy material; regularly arched. Oral aperture centrally located.

This genus is represented by only one species in the examined material.

8. *Cyclopyxis eurysterna* (Deflandre, 1929)

Material examined : BKS collections: 3 examples, 19.09.2008; 3 examples, 14.11.2008; 3 examples, 21.03.2009; 2 examples, 21.07.2010.

Characters : Test brownish, encrusted with quartz particles; hemispherical in lateral view. Oral aperture central, circular and slightly invaginated with regular smooth edge.

Distribution : India : Assam, Arunachal Pradesh and Orissa.

Family DIFFLUGIDAE

Test with foreign particles and without any plate or scale; with axial symmetry. Oral aperture at extremity of the test (terminal).

This family is represented by only one genus in the examined collections.

Genus ***Diffugia*** Leclerc, 1815

Characters : Test made of or containing sandy particles, globular to elongate pyriform or acuminate in shape; possessing axial symmetry. Oral aperture at the extremity of the test.

Five species belonging to the genus *Diffugia* are recorded in the present study.

9. ***Diffugia acuminata*** Ehrenberg, 1838

(Fig. 8)

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 17.10.2008; 2 examples, 19.02.2009; 3 examples, 21.03.2009; 3 examples, 24.04.2009; 3 examples, 26.06.2009; 4 examples, 24.07.2009; 2 examples, 31.08.2009; 2 examples, 31.08.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 2 examples, 26.02.2010; 4 examples, 14.04.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Test cylindrical, with pointed 'horn' like extension; horn straight and differentiated from the base. Quartz crystals big; some even projecting out of the margin.

Distribution : India : Andhra Pradesh, Assam, Manipur, Meghalaya, and West Bengal.

10. ***Diffugia corona*** Wallich, 1864

(Fig. 9)

Material examined : BKS collections : 2 examples, 12.09.2008; 3 examples, 26.06.2009; 3 examples, 27.10.2009; 4 examples, 19.03.2010; 2 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Test broadly spherical, slightly narrow near oral aperture; with 5-10 smooth test spines formed by quartz crystals. Oral aperture wide and crenulated.

Distribution : India : Assam, Manipur and West Bengal.

11. ***Diffugia oblonga*** Ehrenberg, 1838

(Fig. 10)

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 14.11.2008; 2 examples, 19.02.2009; 4 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 3 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 4 examples, 21.07.2010.

Characters : Test typically oblong, with smooth margins and rounded base; composed of big angular quartz crystals. Oral aperture circular and without any lobe.

Distribution : India : Assam, Meghalaya, Manipur, West Bengal and Andhra Pradesh.

12. ***Diffugia tuberculata*** (Wallich, 1864)

(Fig. 11)

Material examined : BKS collections: 5 examples, 19.08.2008; 5 examples, 12.09.2008; 3 examples, 21.03.2009; 3 examples, 24.04.2009; 3 examples, 15.05.2009; 4 examples,

24.07.2009; 2 examples, 31.08.2009; 3 examples, 27.10.2009; 2 examples, 30.12.2009; 3 examples, 26.02.2010; 3 examples, 30.06.2010; 4 examples, 21.07.2010.

Characters : Test ovoid, with wide base; oral aperture hexagonal and surrounded by a short collar; test covered with tubercles and small platelets uniting the tubercles.

Distribution : India : Assam and Meghalaya.

13. *Diffugia urceolata* Carter, 1864

(Fig. 12)

Material examined : BKS collections : 2 examples, 17.10.2008; 2 examples, 31.08.2009; 3 examples, 30.12.2009; 3 examples, 19.02.2010; 4 examples, 21.05.2010.

Characters : Test ovoid-spherical, composed of angular quartz crystals and diatoms. Oral aperture circular; its collar around re-curved or rolled towards exterior.

Distribution : India : Assam, Manipur and West Bengal.

Family NEBELIDAE

Test with plates or scales secreted by cytoplasm; sometimes with foreign particles.

The samples collected from Assam include five genera belonging to this family.

Genus *Lesquereusia* Schlumberger, 1845

Characters : Test compressed, semi-spiral in appearance, with interlacing curved or vermiform pellets; test with said grains.

Only one species belonging to this genus is recorded in the examined material.

14. *Lesquereusia spiralis* (Ehrenberg, 1830)

(Fig. 13)

Material examined : BKS collections: 4 examples, 19.08.2008; 2 examples, 14.1.2008; 3 examples, 12.12.2008; 3 examples, 19.03.2009; 4 examples, 15.05.2009; 2 examples, 24.07.2009; 3 examples, 31.08. 2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 29.01.2010; 3 examples, 19.03.2010; 4 examples, 14.11.2010; 2 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Test transparent, semi-spiral and composed of closely arranged vermiform pellets; neck continued in a straight line down to mouth. Oral aperture circular.

Distribution : India : Andhra Pradesh, Assam, Manipur, Meghalaya and West Bengal.

Class FILOSEA

Pseudopodia filiform, pointed, branched and anastomosing. This class is represented by only one order in the present study.

Order GROMIIDA

Testate amoebae with very fine, thread-like branching pseudopodia. Two families belonging to this order are represented in the collections examined from Deepor Beel.

Family CYPHODERIIDAE

Test formed of thin membrane, covered with discs or scales and devoid of any adherent external matter. Oral aperture terminal and oblique.

Only one genus belonging to this family is observed in the examined material.

Genus *Cyphoderia* Schumberger, 1848

Characters : Test retort shaped, curved and devoid of adherent extraneous matter; test formed of thin chitinous membrane covered with discs or scales. Oral aperture terminal, oblique, usually circular; neck generally recurved, never furnished with a disc-shaped collar.

Only one species belonging to this genus is reported in the present account.

15. *Cyphoderia ampulla* (Ehrenberg, 1840)

(Fig. 14)

Material examined : BKS collections: 2 examples, 12.09.2008; 2 examples, 19.09.2009.

Characters : Test yellowish or brownish, covered with distinct circular or oval scales or plates; oral aperture circular, terminal, with a curved neck; fundus obtusely rounded.

Distribution : India : Assam, Maharashtra and Uttaranchal.

Family EUGLEPHIDAE

Test composed of siliceous scales or plates cemented together. Body hyaline, pseudopodia filiform, often branching, sometimes anatomizing.

This family is represented by three genera in the material examined.

Genus *Assulina* Ehrenberg, 1872

Characters : Test avoid, glabrous and compressed; composed of elliptical, imbricate siliceous scales arranged more or less regularly in diagonal rows. Aperture terminal, truncate or with a short neck; bordered by thin chitinous finely dentate membrane.

Two species belonging to *Assulina* are noticed in the collections from Deepor Beel.

16. *Assulina muscorum* Greef, 1888

(Fig. 15)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 15.05.2009; 2 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 27.11.2009; 3 examples, 30.06.2010; 2 examples, 21.07.2010.

Characters : Test yellowish, oval, compressed and truncate anteriorly; composed of imbricate oval platelets usually arranged in alternating diagonal rows. Terminal, elliptical aperture bordered by a thin chitinous membrane with undulate margin.

Distribution : India : Arunachal Pradesh, Himachal Pradesh, Manipur, Mizoram, Sikkim, Tripura and West Bengal.

17. ***Assulina seminulum*** (Ehrenberg, 1848) Leidy, 1879

(Fig. 16)

Material examined : BKS collections : 2 examples, 12.09.2008; 2 examples, 19.09.2008; 2 examples, 21.07.2010.

Characters : Test yellow or brown, pyriform or ovoid, compressed and composed of imbricate oval or elliptical siliceous platelets. Aperture terminal, oval and bordered by a thin chitinous membrane with irregularly dentate margin.

Distribution : India : Andhra Pradesh, Manipur, Sikkim, Nagaland and West Bengal.

Genus ***Euglypha*** Dujardin, 1841

Characters : Test hyaline, ovoid or elongated, circular or elliptical; formed of circular, oval or scutiform siliceous, imbricate platelets arranged in alternating longitudinal rows. Oral aperture terminally bordered by serrated or denticulate scales.

Euglypha is represented by three species in the present study.

18. ***Euglypha acanthophora*** Dujardin, 1841

(Fig. 17)

Material examined : BKS collections : 4 examples, 19.08.2008; 3 examples, 12.09.2008; 2 examples, 19.01.2009; 4 examples, 21.03.2009; 3 examples, 14.04.2010; 2 examples, 30.06.2010; 4 examples, 21.07.2010.

Characters : Test ovoid; aperture circular, bordered by finely serrated platelets. Test platelets elliptical, posterior half and at the base of fundus prolonged into 4-7 spines.

Distribution : India : Andhra Pradesh, Assam, Mizoram, Meghalaya, Nagaland and West Bengal.

19. ***Euglypha laevis*** (Ehrenberg, 1845)

(Fig. 18)

Material examined : BKS collections : 2 examples, 19.08.2008; 2 examples, 14.11.08; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 19.09.2009; 2 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Test oviform, glabrous and elliptical or sub-circular; aperture elliptical or sub-circular, bordered by a single row of platelets pointed terminally. Test platelets oval.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Tripura, Sikkim, Uttaranchal and West Bengal.

20. ***Euglypha tuberculata*** Dujardin, 1841

(Fig. 19)

Material examined : BKS collections : 3 examples, 17.10.2008; 4 examples, 21.03.2009; 2 examples, 19.09.2009; 3 examples, 21.05.2010.

Characters : Test elongate-oviform, glabrous; test platelets round or oval, imbricating and forming a hexagonal pattern. Aperture circular, bordered by 8-12 finely serrated platelets.

Distribution : India : Andhra Pradesh, Assam, Arunachal Pradesh, Jammu and Kashmir, Himachal Pradesh, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal.

Genus ***Trinema*** Dujardin, 1841

Characters : Test small, hyaline, oviform or elongate and compressed anteriorly; covered with circular siliceous platelets. Oral aperture circular, sub-terminal and invaginated.

One species belonging to *Trinema* are the samples examined from Deepor Beel.

21. ***Trinema lineare*** Penard, 1840

(Fig. 20)

Material examined : BKS collections : 2 examples, 17.10.2008; 2 examples, 26.06.2009; 3 examples, 31.08.2009.

Characters : Test small, hyaline, elongate, composed of small circular platelets. Oral aperture circular, oblique, invaginated and bordered by toothed platelets.

Distribution : India : Assam, Arunachal Pradesh, Himachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Sikkim, Tripura and West Bengal.

Class HELIOZOA

Sessile Protozoa; individuals spherical, with radiating hair-like pseudopodia, often supported by stiffened axial fibers.

This class includes only one order in the present account.

Order ACTINOPHRYIDA

Pseudopodia radiating, with axial filaments arising from a central nucleus; without central corpuscle.

Only one family belonging to this order is represented in the collections examined from Deepor Beel.

Family ACTINOPHRYIDAE

Axopods radiating, cytoplasm highly vacuolated, skeletal structure lacking. Only one genus of this family is recorded in this study.

Genus ***Actinophrys*** Ehrenberg, 1838

Characters : Axopods straight, numerous; axial filaments terminating at surface of nucleus; nucleus central.

Only one species of *Actinophrys* is noticed in our collections from Deepor Beel.

22. *Actinophrys sol* Ehrenberg, 1830

(Fig. 21)

Material examined : BKS collections : 2 examples, 19.08.2008; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 4 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Body spherical, ectoplasm vacuolated, protoplasm highly vacuolated; axial filaments arising from membrane of the single nucleus.

Distribution : India : Manipur and West Bengal.

Sub-phylum MASTIGOPHORA

Solitary or colonial Protozoa with one or more flagella during their free-living stages, not normally progressing by amoeboid motion.

This sub-phylum includes super-class Phytomastigophora in this study.

Superclass PHYTOMASTIGOPHORA

Plant flagellates processing photosynthetic pigments. This sub-class includes only the representatives of one order in this account.

Order DINOFLAGELLIDA

Cells with numerous tiny brown or red plastids, or un-pigmented; two flagella originate from a groove around the cell's equator, one lies in the groove and the other trails from a longitudinal groove.

This order includes members of two families in the presently examined collections.

Family GYMNODINIIDAE

Cells naked with simple but distinct half to four turns of annulus; with or without chromatophores.

One genus of this family is recorded in the samples collected from Deepor Beel.

Genus *Gymnodinium* Stein, 1866

Characters : Solitary cells with two flagella attached to one side; one emerging posteriorly from a longitudinal groove, the other lies in a groove. Mostly with small brown plastids but some species are colorless.

This genus is represented by only one species in the present study.

23. *Gymnodinium aeruginosum* Stein, 1866

(Fig. 22)

Material examined : BKS collections : 2 examples, 21.03.2009; 3 examples, 24.07.2009; 3 examples, 21.07.2010.

Characters : Pellicle delicate, sub-circular, bilaterally symmetrical; green chromatophores numerous, stigma few.

Distribution : India : Manipur.

Family PERIDINIDAE

Cells covered by theca comprising of several variously sculptured and highly perforated plates; annulus usually at equator and covered by a plate.

Two genera belonging to this family are reported in the present account.

Genus *Ceratium* Schrank, 1866

Characters : Solitary cells, usually with brown plastids and with two flagella attached to one side; one emerging posteriorly from a longitudinal groove, the other lies in a groove. Theca consists of a number of plates, some drawn out to form spikes.

One species belonging to the genus *Ceratium* is recorded in this study.

24. *Ceratium hirudinella* O. F. Müller, 1773

(Fig. 23)

Material examined : BKS collections : 8 examples, 19.08.2008; 10 examples, 21.03.2009; 7 examples, 15.05.2009; 9 examples, 29.02.2010; 10 examples, 19.03.2010; 8 examples, 21.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Shell with 3 or more spikes (spines), epicone with one considerably long spine, hypocone with 2 or 3 shorter spines.

Distribution : India : Assam, Meghalaya, Manipur and West Bengal.

Genus *Peridinium* Ehrenberg, 1838

Characters : Forms colorless or with broad plastids. Solitary, pear-shaped or broadly spherical cells with two flagella; one emerging posteriorly from a longitudinal groove, the other lies in a groove. Cell wall with a number of plates with conspicuous joints.

The genus *Peridinium* is represented by one species in the present study.

25. *Peridinium tabulatum* Claparede & Lachmann, 1973

Material examined : BKS collections : 7 examples 12.12.2008; 5 examples, 19.02.2009; 5 examples, 15.05.2009; 3 examples, 30.12.2009; 8 examples, 29.01.2010; 6 examples, 19.02.2010; 4 examples, 21.05.2010; 3 examples, 30.06.2010; 7 examples, 21.07.2010.

Characters : Cells spherical to ovoid, annulus slightly spiral and with projecting rims.

Distribution : India : Manipur and West Bengal.

Order EUGLENIDA

Flagellated unicellular solitary forms; usually with green plastids. This order is represented by one family in the present study.

Family EUGLENIDAE

With one flagellum emerging from the vestibulum and directed anteriorly; stigma usually present.

This family is represented by three genera in the collections examined from Deepor Beel.

Genus ***Euglena*** Ehrenberg, 1838

Characters : Typically elongated single cells with a long flagellum, many green plastids and a prominent red stigma.

Two species of the genus *Euglena* are recorded in this study.

26. ***Euglena acus*** Ehrenberg, 1832

(Fig. 24)

Material examined : BKS collections : 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 21.03.2009; 4 examples, 27.11.2009; 5 examples, 30.12.2009; 3 examples, 29.01.2010; 4 examples, 26.2.2010; 3 examples, 19.02.2010.

Characters : Body elongate spindle-shaped, posterior end pointed; flagellum long, paramylon bodies 8-10, rod-shaped and arranged in two groups in either half of the body.

Distribution : India : Andhra Pradesh, Assam, Manipur, Rajasthan and West Bengal.

27. ***Euglena oxyuris*** Schmarda, 1931

(Fig. 25)

Material examined : BKS collections : 3 examples, 14.11.2008; 3 examples, 19.02.2009; 2 examples, 24.04.2009; 4 examples, 27.10.2009; 3 examples, 27.11.2009; 2 examples, 19.03.2010; 3 examples, 21.05.2010.

Characters : Body long, cylindrical, twisted and with pointed posterior end; two oval ring-shaped paramylon bodies, one on either side of the nucleus.

Distribution : India : Andhra Pradesh, Manipur and West Bengal.

Genus ***Phacus*** Dujardin, 1840

Characters : Green solitary cells with one flagellum; cell wall rigid, the cell flattened with its posterior end drawn into a point. Cell twisted in some species or divided longitudinally into lobes in some others.

This genus is represented by two species in the examined collections.

28. ***Phacus acuminata*** Stoles, 1885

(Fig. 26)

Material examined : BKS collections : 2 examples, 19.01.2009; 3 examples, 24.04.2009; 2 examples, 19.02.2009; 2 examples, 30.12.2009; 2 examples, 19.03.2010; 3 examples, 21.05.2010.

Characters : Body flattened, broadly pear-shaped, longitudinally striated and with distinct caudal projection; flagellum long, paramylon body single and small.

Distribution : India : Andhra Pradesh, Assam, Manipur and West Bengal.

29. ***Phacus pleuronectes*** (O. F. Müller, 1773)

(Fig. 27)

Material examined : BKS collections : 2 examples, 19.02.2009; 2 examples, 30.12.2009; 2 examples, 29.10.2010.

Characters : Body flattened, pear-shaped, with a prominent ridge on the convex side extending posteriorly and caudal projection slightly curved; paramylon body single, circular and located near the center.

Distribution : India : Manipur and West Bengal.

Genus ***Trachelomonas*** Ehrenberg, 1838

Characters : Small spherical green cell with one long flagellum; the cells enclosed in a brownish outer shell which usually obscures the green pigments.

Two species belonging to *Trachelomonas* are observed in our collections.

30. ***Trachelomonas hispida*** (Perty, 1925)

Material examined : BKS collections : 3 examples, 12.12.2008; 2 examples, 30.12.2009; 2 examples, 29.01.2010.

Characters : Shell brown, oval and covered with distinct sharp pointed spines; aperture for flagella wide, not covered with spine.

Distribution : India : Manipur and West Bengal.

31. ***Trachelomonas urceolata*** Stokes, 1888

Material examined : BKS collections : 2 examples, 19.01.2009; 2 examples, 30.12.2009.

Characters : Lorica vase-shaped, smooth and with a short neck.

Distribution : India : Manipur.

Phylum CILIOPHORA

Free-living, sessile, epizoic or externally parasitic protozoans partially or wholly covered with cilia; cilia may be fused to form ciliary organelle.

Ciliophora includes members of three classes in the material collected from Deepor Beel.

Class KINETOFRAGMINOPHORA

Free-swimming ciliates which lack compound ciliary organelle; the peristomial cilia specialized in some but never conspicuous.

This class is represented by two orders in the present study.

Order PROSTOMATIDA

Mouth at or very near anterior end, usually provided with trichites.

Three families of Prostomatida are noticed in the examined collections.

Family COLEPIDAE

Body barrel-shaped bearing armored plates in longitudinal rows. This family is represented by one genus in the present account.

The examined collections indicate one genus belonging to this family.

Genus *Coleps* Nitzsch, 1817

Characters : Body barrel-shaped, protected by many small plates which often bear spines.

Only one species belonging to *Coleps* is noticed in our collections.

32. *Coleps hirtus* (O. F. Müller, 1786)

Material examined : BKS collections : 2 examples, 19.01.2009; 2 examples, 29.01.2010.

Characters : Body barrel-shaped; ectoplamic plates 18-20, posterior extremity with three spinous projections; macronucleus spherical and sub-central; contractile vacuole single, located at posterior end of body.

Distribution : India : Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Rajasthan, Sikkim, Tripura and West Bengal.

Family ENCHELYIDAE

Body of variable shape, anterior end not truncate; cytostome in many species located at distal end of long flexible neck.

This family is represented by two genera in the present study.

Genus *Dileptus* Dujardin, 1840

Characters : Body cylindrical and with a long proboscis; total length up to 200 mm.

Only one species of this genus is noticed in the collections examined from Deepor Beel.

33. *Dileptus anser* (O. F. Müller, 1773)

Material examined : BKS collections : 2 examples, 21.03.2009.

Characters : Body elongate with a tail-like projection at the anterior end, neck elongated and contractile; cytostome funnel-shaped and located at the base of the neck; macro-nuclei many, discoid and scattered; contractile vacuoles many and arranged in a row.

Distribution : India : Manipur, Rajasthan and West Bengal.

Genus *Lacrymaria* Ehrenberg, 1830

Characters : Body and neck extremely contractile; neck can extend from almost nothing up to several times the body length; total length up to 500 µm.

The examined collections indicate only one species of *Lacrymaria*.

34. *Lacrymaria olor* (O. F. Müller, 1786)

(Fig. 28)

Material examined : BKS collections : 3 examples, 19.02.2009; 2 examples, 29.01.2010; 3 examples, 19.03.2010.

Characters : Body elongate, posterior portion cylindrical and with pointed posterior end; neck long and highly contractile; oral cone well developed; contractile vacuoles two and located on either end of cylindrical body portion; macro-nucleus with rounded parts united together.

Distribution : India : Manipur, Rajasthan, Orissa and West Bengal.

Family TRACHELIDAE

Characters : Cytostome at the base of proboscis, located at considerable distance from anterior end of the body.

This family is represented by one genus in the present study.

Genus : *Trachelius* Schrank, 1803

Characters : Oval to spherical, anterior end drawn out into a relatively short finger-like process or a snout; posterior end rounded; round cytostome at the base of neck; contractile vacuoles many.

This genus is represented by only one species in the present study.

35. *Trachelius ovum* (O. F. Müller, 1786)

Material examined : BKS collections : 2 examples, 21.03.2009; 2 examples, 26.02.2010.

Characters : Body spheroid to ellipsoid, anterior end with finger-like proboscis curved dorsally and posterior end broadly rounded; cytostome located at the end of proboscis; macro-nucleus sausage-shaped; contractile vacuoles many.

Distribution : India : Manipur, Rajasthan and West Bengal.

Order COLPODIDA

This order is represented by one family in the present study.

Family COLPODIDAE

Body reniform with distorted ciliary rows; no conspicuous ciliary tuft at posterior end.

Only one genus belonging to this family is recorded in this study.

Genus *Coploda* O. F. Müller, 1773

Characters : Body bean-shaped with the mouth situated in a cavity on one side.

36. *Colpoda cucullus* (O. F. Müller, 1773)

Material examined : BKS collections : 2 examples, 24.04.2009.

Characters : Body kidney-shaped; cytostome located nearly in the middle of the body; frontal dentations 8-10, meridians 29-34; macro-nucleus oval; contractile vacuole single and posterior.

Distribution : India : Arunachal Pradesh, Assam, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Punjab, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Class OLIOGOHYMENOPHOREA

Ciliates with normal cilia on the body (lacking in most peritrichs); with ciliary organelle on the pristome.

This class includes one order in the present study.

Order HYMENOSTOMATIDA

Free-swimming or parasitic ciliates with normal cilia on the body and a small mouth cavity with an undulating membrane and three membranelle.

Only one family of this order is recorded from Deepor Beel.

Family PARAMECIIDAE

Pre-buccal cavity conspicuous leading to equatorially local buccal cavity with two peniculi; cytostome not expansible; contractile vacuole single.

Only one genus belonging to this family is recorded in the present study.

Genus *Paramecium* Hill, 1752

Characters : Body cigar-shaped, pristome long, broad and slightly oblique; cytopharynx moderately long, with a row of fine cilia attached to its dorsal wall.

This genus is represented by one species in the examined collections.

37. *Paramecium caudatum* Ehrenberg, 1893

Material examined : BKS collections : 2 examples, 19.01.2009; 3 examples, 19.02.2009; 3 examples, 20.01.2010.

Characters : Body cigar-shaped, anterior end broader and rounded and posterior end tapering; macro-nucleus egg-shaped, micro-nucleus single and lying close to macro-nucleus; two contractile vacuoles each with radial canals, one lying in the anterior one-third while the other in the posterior one-third of the body.

Distribution : India : Assam, Jammu & Kashmir, Meghalaya, Manipur, Rajasthan, Orissa, Tripura, Uttar Pradesh and West Bengal.

Family FRONTONIIDAE

Pre-buccal area shallow or absent, three peniculi in buccal cavity; cytostome expansible; contractile vacuole single.

This family includes one genus in the present study.

Genus ***Frontonia*** Ehrenberg, 1838

Characters : Body ellipsoid, cytostome lying in the anterior third of the ventral surface; large undulating membrane in the left oral margin; macro-nucleus oval or ellipsoidal, central and obliquely placed; contractile vacuole single, centrally located, with or without radial canals.

Two species of this genus are recorded in the samples collected from Deepor Beel.

38. ***Frontonia acuminata*** Ehrenberg, 1893

Material examined : BKS collections : 2 examples, 24.04.2009.

Characters : Body ovoid, strongly compressed and with acuminate posterior end; macro-nucleus ellipsoid with a large micro-nucleus; contractile vacuole single with 2-3 excretory pores located near the middle region of the body.

Distribution : India : Manipur.

39. ***Frontonia depressa*** (Stokes, 1886)

Material examined : BKS collections : March, 21.03.2009.

Characters : Body ovoid, compressed; single contractile vacuole with strong radial; canals located near the middle; macro-nucleus small, sausage-shaped with single micro-nucleus.

Distribution : India : Manipur, Sikkim and West Bengal.

Order PERITRICHIDA

Distinctive ciliates with cylindrical or bell-shaped bodies lacking normal cilia; peristome encircled by an elaborate belt of membranelle resembling an undulating membrane; sessile or epizoic, rarely free-swimming in adult stage, often colonial.

This order is represented by only one family in the present study.

Family VORTICELLIDAE

Colonial (except in two genera), with contractile stalk; in colonial forms zooids not independently contractile (except in one species).

One genus belonging to this family is recorded in the present study.

Genus ***Vorticella*** Linnaeus, 1767

Characters : Individuals gregarious and often forming densely-packed groups; bell-shaped, on a long spirally contractile stalk; sometimes epizoic.

This genus is represented by two species in this study.

40. ***Vorticella aequilata*** Kahl, 1935

Material examined : BKS collections: 4 examples, 21.03.2009.

Characters : Body cylindrical, cuticular margin striated; peristomial margin wider than the maximum body length; macro-nucleus elongated lying longitudinally; contractile vacuole single.

Distribution : India : Tripura.

41. ***Vorticella companula*** Ehrenberg, 1831

(Fig. 29)

Material examined : BKS collections: 4 examples, 19.02.2009; 3 examples, 21.03.2009; 3 examples 29.01.2010; 3 examples, 19.02.2010.

Characters : Body broadly companulate, peristomial margin thick and dilated, cuticular surface smooth and elastic; macro-nucleus band shaped; stalk thick and about 4-6 time the body length.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Manipur and West Bengal.

Class POLYHYMENOPHOREA

Free-swimming ciliates with highly specialized ciliation consisting mostly of ciliary organelle; always with a row of membranelle in the pristome region, typically arranged spirally; most genera with cirri on the body.

Order HYPOTRICHIDA

Locomotor cirri on ventral surface; also cilia present in some forms. This order is represented by one family in this study.

Family SPIROSTOMITIDAE

Body large, elongated and cylindrical or pyriform, highly contractile; peristomial field long and narrow.

One genus of this family is recorded in the present account.

Genus ***Spirostomum*** Ehrenberg, 1833

Characters : Body elongated cylindrical, pristome without any twist and undulating membrane; contractile vacuole large, terminal and extending forward as straight canal.

This genus is represented by one species in the examined collections.

42. ***Spirostomum ambiguum*** Ehrenberg, 1835

Material examined : BKS collections : 3 examples, 21.05.2010.

Characters : Body much elongated and cylindrical, length more than ten times its width; pristome extending up to or even beyond the middle of the body; macro-nucleus elongated; contractile vacuole very large and terminal, with a straight canal.

Distribution : India : Manipur, West Bengal and Jammu & Kashmir.

Family SPIROFILIDAE

Vertical cirri inconspicuous, numerous and arranged in helically spiral rows.

One genus belonging to this family is reported in this study.

Genus *Stichotricha* Perty, 1852

Characters : Body slender, with beak-like narrowed pristome extending over one-fourth but usually not up to half of the body length.

The collections from Deepor Beel indicate one species belonging to this genus.

43. *Stichotricha socialis* Gruber, 1880

Material examined : BKS collections : 2 examples, 30.12.2009.

Characters : Body slender, ovoid; anterior end gradually annulated and posterior end rounded; pristome extending more than half of the body length; four spiral rows of ventral cirri present.

Distribution : India : Meghalaya, Manipur, Tripura and West Bengal.

Family OXYTRICHIDAE

Distinctive rows of right and left marginal cirri restricted to anterior third or quarter of the elongated body.

This family is represented by one genus in the present study.

Genus *Oxytricha* Bory, 1926

Characters : Body ellipsoid and flexible; frontal cirri eight, both ventral and anal cirri five each, caudal cirri short or absent; marginal cirri may or may not be continuous along posterior border; macro-nucleus bipartite, rarely single or in four parts.

The genus *Oxytricha* is represented by one species in the examined collections.

44. *Oxytricha fallax* Stein, 1859

Material examined : BKS collections : 2 examples, 19.01.2009; 2 examples, 30.12.2009; 2 examples, 26.02.2010.

Characters : Body ellipsoid with convex lefty and right sides; posterior half broader and broadly rounded; macro-nucleus usually in two parts; contractile vacuole single and located in the anterior half of the body.

Distribution : India : Meghalaya, Manipur, Tripura and West Bengal.

Family EUPLOTIDAE

Adoral zone well developed, transverse frontal cirri often well developed, anal cirri inconspicuous.

One genus belonging to this family is included in the present account.

Genus *Euplotes* Ehrenberg, 1830

Characters : Body ovoid, pristome well developed and broadly triangular, ventral surface flattened, dorsal surface convex, longitudinally ridged; fronto-ventral cirri more than nine, anal cirri well developed and five in number, caudal cirri four and scattered.

The collections examined from Deepor Beel include two species of *Euplotes*.

45. *Euplotes muscicola* Kahl, 1932

Material examined : BKS collections : 2 examples, 27.10.2009; 2 examples, 14.04.2010.

Characters : Body oval, elongated; pristome narrow and extending up to about three-fourth of anterior left of the ventral surface of the body; peristomial lip slender; dorsal cirri 10, fronto-ventral cirri 9, transverse cirri 5 and caudal cirri 4; macro-nucleus angular and somewhat closed.

Distribution : India : Arunachal Pradesh, Manipur, Sikkim and Tripura.

46. *Euplotes plumipes* Stokes, 1854

Material examined : BKS collections : 2 examples, 29.01.2010; 2 examples, 21.05.2010.

Characters : Body ellipsoid, ventral surface plain, dorsal surface slightly convex, with protruding neck; pristome triangular, extending up to about three-fourth of the middle of dorsal body surface; dorso-lateral cirri 10, fronto-ventral cirri 9, transverse cirri 5 and caudal cirri 4; macro-nucleus '3' shaped.

Distribution : India : Arunachal Pradesh, Manipur, Rajasthan and West Bengal.

b. ROTIFERA

Phylum ROTIFERA

Characterized by diagnostic corona and trophi. Usually micro-organisms; solitary, free-living, colonial or sessile forms.

The members of this phylum belong to two classes; of these, only subclass Eurotatoria is recorded in the present study.

Class EUROTATORIA

Ovary with vitellarium. Reproduction parthenogenetic, bisexual or asexual. Eurotatoria include freshwater and brackish rotifers.

Eurotatoria are represented by sub-classes Monogononta and Bdelloidea in this account.

Subclass MONOGONONTA

Ovary unpaired. Reproduction mostly parthenogenetic, at times bisexual. Forms usually free-swimming.

Two orders of the monogonont rotifers namely Ploima and Flosculariacea are represented in Deepor Beel.

Order PLOIMA

Loricata or illoricate; shape variable. Corona of diverse types; never of *Hexarthra*-, *Conochilus*- or *Collotheca*- type. Trophi malleate, cardate, forcipate, virgate or incudate. Foot, if present, with paired or unpaired toes. Forms creeping, free-swimming, free living, epibionts or ecto-parasites; not in colonies.

This order is represented by thirteen families in the present study.

Family BRACHIONIDAE

Only trunk covered with lorica; dorsal and ventral plates of lorica closely fused laterally. Foot present or absent. Trophi malleate. Corona of *Brachionus*-or *Euchlanis* -type. Funnel shaped mouth in buccal area.

Five genera i.e., *Anuraeopsis*, *Brachionus*, *Keratella*, *Platylabus* and *Platyonus* of the Brachionidae are observed in the samples collected from Deepor Beel.

Genus *Anuraeopsis* Lauterborn, 1900

Characters : Lorica thin, ovate or navicular and rounded or obtusely truncate posteriorly. Dorsal and ventral plates of lorica joined laterally by a soft membrane. Foot absent.

Two species of *Anuraeopsis* are recorded in the present study.

1. *Anuraeopsis fissa* Gosse, 1851

Material examined : BKS collections: 4 examples, 19.08.2008; 5 examples, 12.09.2008; 5 examples, 17.10.2008; 3 examples, 14.11.2008; 5 examples, 12.12.2008; 5 examples, 15.05.2009; 4 examples, 19.09.2009; 3 examples, 27.10.2009; 5 examples, 27.11.2009; 4 examples, 14.04.2010; 5 examples, 21.05.2010; 8 examples, 30.06.2010; 7 examples, 21.07.2010.

Characters : Lorica ovate, finely stippled, obtusely pointed posteriorly and without any surface markings or crests. Anterior dorsal margin with a shallow sinus. Ventral plate projecting slightly laterally beyond the dorsal plate in the anterior region.

Distribution : India : Assam, Bihar, Chandigarh, Gujarat, Haryana, Kerala, Meghalaya, Punjab, Orissa, Rajasthan, Tamil Nadu, Tripura and West Bengal.

2. *Anuraeopsis navicula* Rousselet, 1911

Material examined : BKS collections : 2 examples, 26.06.2009; 3 examples, 21.07.2010.

Characters : Lorica elongated, finely granulated and with slightly serrated anterior margin; ventral plate narrower. Cloacal opening small.

Distribution : India : Assam and West Bengal. Recorded from Deepor Beel by Sharma and Sharma (2011a).

Genus **Brachionus** Pallas, 1766

Characters : Lorica separated into dorsal and ventral plate; basal plate developed in some species. Anterior occipital margin with two, four or six spines. Postero-lateral and postero-median spines present in some species. Foot-opening at the posterior end of lorica between the basis of posterior spines, if present. Foot long, flexible, annulated and retractile; toes two.

Fourteen species of this genus are included in this account.

3. **Brachionus angularis** Gosse, 1851

Material examined : BKS collections : 3 examples, 14.11.2008; 5 examples, 15.05.2009; 3 examples, 19.09.2009; 3 examples, 27.11.2009; 5 examples, 21.05.2010; 7 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Lorica rigid, stippled and dorso-ventrally compressed; with a pattern of cuticular plates. 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 : Andhra Pradesh, Assam, Bihar, Chandigarh, Delhi, Haryana, Kashmir, Maharashtra, Madhya Pradesh, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

4. **Brachionus bidentatus** Anderson, 1889

Material examined : BKS collections : 4 examples, 21.07.2010.

Characters : Lorica stippled and moderately compressed dorso-ventrally. 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; lateral and median spines longer than intermediate occipital spines. Postero-lateral spines almost parallel-sided and variable in length. Foot-opening with a symmetrically projecting sheath.

Distribution : India : Andhra Pradesh, Assam, Haryana, Meghalaya, Punjab, Orissa, Tamil Nadu, Tripura and West Bengal.

5. **Brachionus budapestinensis** Daday, 1885

Material examined : BKS collections : 3 examples, 17.10.2008; 5 examples, 21.05.2010; 5 examples, 30.06.2010.

Characters : Lorica oval and covered with minute tubercles. Dorsal plate with an ornamentation of cuticular ridges. Anterior occipital margin with four spines; median occipital spines longer than laterals. Caudal spines lacking. Foot-opening small v-shaped dorsally and a large oval opening ventrally.

Distribution : India : Assam, Madhya Pradesh, Meghalaya, Punjab, Tripura and West Bengal.

6. *Brachionus calyciflorus* Pallas, 1766

Material examined : BKS collections : 9 examples, 19.08. 2008; 6 examples, 12.09.2008; 7 examples, 17.10.2008; 5 examples, 12.12.2008; 7 examples, 15.05.2009; 4 examples, 19.09.2009; 5 examples, 27.22.2009; 4 examples, 19.03.2010; 5 examples, 14.04.2010; 7 examples, 31.05.2010; 4 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/325, 06.07.2008; 1 example, IV/ROT/ERS/332, 19.08.2008; 1 example, IV/ROT/ERS/343, 12.09.2008; 1 example, IV/ROT/ERS/394, 25.07.2009; 1 example, IV/ROT/ERS/418, 18.09.2009; 1 example, IV/ROT/ERS/455, 27.01.2010.

Characters : Lorica flexible and oval; with four broad-based occipital spines. Posterior and postero-lateral spines present or absent, usually of variable length.

This species is represented by three cyclomorphic forms i.e., *B. calyciflorus* f. *dorcas* (Gosse), *B. calyciflorus* f. *amphiceros* (Ehrenberg) and *B. calyciflorus* f. *anuraeiformis* (Brehm) presently.

Distribution : India : Andhra Pradesh, Assam, Madhya Pradesh, Meghalaya, Orissa, Punjab, Tripura and West Bengal.

7. *Brachionus caudatus aculeatus* (Hauer, 1937)

Material examined : BKS collections : 4 examples, 19.08.2008; 3 examples, 15.05.2009; 2 examples, 19.09.2009; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Lorica stippled, moderately compressed and with a pattern of cuticular ridges. Lateral occipital spines longer than medians. Posterior spines in the plane axis of the body.

Distribution : India : Assam, Haryana, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

7a. *Brachionus caudatus personatus* (Ahlstrom, 1940)

Material examined : BKS collections : 5 examples, 19.08.2008; 3 examples, 14.11.2008; 3 examples, 12.12.2008; 5 examples, 15.05.2009; 4 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 5 examples, 14.04.2010; 5 examples, 21.05.2010; 7 examples, 30.06.2010; 7 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/484, 14.04.2010.

Characters : Lorica heavily stippled, moderately compressed and with a pattern of cuticular ridges. Lateral occipital spines longer than medians. Posterior spines in the plane axis of the body.

Distribution : India : Assam, Haryana, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

8. *Brachionus dichotomus reductus* Koste & Shiel, 1980

(Fig. 30)

Material examined : BKS collections : 3 examples, 19.08.2008; 5 examples, 12.09.2010; 5 examples, 17.10.2008; 5 examples, 15.05.2009; 5 examples, 31.08.2009; 4 examples, 21.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/439, 27.11.2009; 1 example, IV/ROT/ERS/485, 14.40.2010.

Characters : Lorica dorso-ventrally compressed, stippled, and with maximum width in its posterior region. Anterior occipital margin with distinct median spines of variable length. Posterior spines moderately long and divergent.

Distribution : India : Assam, Meghalaya and Tripura. Recorded from Deepor Beel by Sharma and Sharma (2011a).

9. *Brachionus diversicornis* (Daday, 1883)

Material examined : BKS collections : 4 examples, 17.10.2008; 5 examples, 14.11.2008; 5 examples, 27.11.2009.

SS collections : 1 example, IV/ROT/ERS/440, 27.11.2009.

Characters : Lorica elongated, compressed dorso-ventrally; anterior occipital margin with four spines; medians short and laterals longer. Posterior spines two and divergent; the right spine longer than the left. Foot-opening between the bases of posterior spines; a tongue-like projection of dorsal plate overhanging the foot-opening.

Distribution : India : Assam, Bihar, Haryana, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

10. *Brachionus donneri* Brehm, 1851

Material examined : Not observed in 2008-10 collections.

Characters : Lorica oval, strongly compressed dorso-ventrally; anterior occipital margin with six blunt spines and ventral margin with four short blunt spines. Foot-opening deep and flanked with distinct club-shaped projections.

Distribution : India : Assam, Meghalaya, Tamil Nadu, Tripura and West Bengal.

11. *Brachionus durgae* Dhanapathi, 1974

(Fig. 31)

Material examined : BKS collections : 4 examples, 19.08.2008; 4 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Lorica almost oval, smooth, compressed dorso-ventrally. Anterior occipital margin with six saw-tooth like spines of nearly equal length. Foot-opening situated ventrally in posterior region.

Distribution : India : Assam, Andhra Pradesh, Orissa and Tamil Nadu. Recorded from Deepor Beel by Sharma and Sharma (2011a).

12. ***Brachionus falcatus*** Zacharias, 1898

Material examined : BKS collections : 5 examples, 19.08.2008; 7 examples, 12.09.2008; 5 examples, 17.10.2008; 5 examples, 14.11.2008; 5 examples, 12.12.2008; 6 examples, 21.03.2009; 5 examples, 15.05.2009; 5 examples, 26.06.2009; 6 examples, 24.07.2009; 5 examples, 31.08.2009; 5 examples, 19.09.2009; 5 examples, 27.11.2009; 5 examples, 21.05.2010; 5 examples, 30.06.2010; 7 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/298, 04.07.2008; 1 example, IV/ROT/ERS/338, 19.09.2008; 1 example, IV/ROT/ERS/352, 14.11.2008; 1 example, IV/ROT/ERS/371, 19.02.2009; 1 example, IV/ROT/ERS/486, 14.04.2010.

Characters : Lorica compressed dorso-ventrally; occipital margin with six spines; intermediate spines longest and curved ventrally, laterals and medians of almost equal length. Posterior spines long incurved and widely separated at their bases.

Distribution : India : Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Kerala, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

13. ***Brachionus forficula*** Wierzejski, 1891

Material examined : BKS collections : 5 examples, 17.10.2008; 5 examples, 14.11.2008; 4 examples, 12.12.2008; 6 examples, 21.03.2009; 5 examples, 27.10.2009; 7 examples, 27.10.2009; 5 examples, 14.04.2010; 5 examples, 30.06.2010; 7 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/353, 14.11.2008; 1 example, IV/ROT/ERS/432, 28.10.2009; 1 example, IV/ROT/ERS/447, 30.12.2009; 1 example, IV/ROT/ERS/456, 27.01.2010.

Characters : Lorica moderately compressed dorso-ventrally, finely stippled; occipital margin with four spines, laterals 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 : Andhra Pradesh, Assam, Bihar, Gujarat, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

14. ***Brachionus mirabilis*** Daday, 1897

Material examined : BKS collections : 3 examples, 24.04.2009; 2 examples, 15.05.2009; 2 examples, 19.09.2009; 2 examples, 14.04.2010; 2 examples, 21.05.2010; 2 examples, 21.07.2010.

Characters : Lorica stippled and moderately compressed; occipital margin with six spines; medians longest and curved outwards. Ventral plate of lorica produced into two posterior

spines extending backwards at an angle of 45°. Foot-opening located between the bases of ventral spines and surrounded by a sheath.

Distribution : India : Assam, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

15. ***Brachionus quadridentatus*** Hermann, 1783

Material examined : BKS collections: 5 examples, 19.08.2008; 5 examples, 12.09.2008; 7 examples, 17.10.2008; 10 examples, 12.12.2008; 5 examples, 19.02.2009; 5 examples, 24.04.2009; 7 examples, 15.05.2009; 5 examples, 26.06.2009; 5 examples, 24.07.2009; examples, 19.09.2009; 4 examples, 27.10.2009; 3 examples, 27.22.2009; 5 examples, 30.12.2009; 5 examples, 29.01.2010; 4 examples, 26.02.2010; 5 examples, 19.03.2010; 4 examples, 14.04.2010; 4 examples, 21.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 2 examples, IV/ROT/ERS/315, 05.07.2008; 1 example, IV/ROT/ERS/433, 28.10.2009; 1 example, IV/ROT/ERS/474, 14.04.2010.

Characters : Lorica stippled, moderately compressed dorso-ventrally. Occipital margin with six spines; median 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.

Besides typical specimens, this species includes specimens of *B. quadridentatus quadridentatus* Hermann, *B. quadridentatus cluniorbicularis* (Skorikov), *B. quadridentatus brevispinus* (Ehrenberg), *B. quadridentatus melheni* Barrois & Daday and *B. quadridentatus rhenanus* (Lauterborn).

Distribution : India : Andhra Pradesh, Assam, Bihar, Jammu & Kashmir, Kerala, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

16. ***Brachionus rubens*** Ehrenberg, 1838

Material examined : not observed in our 2008-10 collections.

Characters : Lorica oval, compressed dorso-ventrally; occipital margin with six spines; median and intermediate spines with peculiar asymmetrical shape, each spine with narrow anterior part, then rounding outwards and forming a broad base; median occipitals somewhat longer than others.

Distribution : India : Assam, Haryana, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Genus ***Keratella*** Bory de St.Vincent, 1822

Characters : Lorica with a dorsal and a ventral plate; dorsal plate with characteristic facets and more or less distinctly granulated. Occipital margin with four or six spines. Posterior spines often present, one or two; single posterior spines usually median.

Seven species of *Keratella* are documented from Deepor Beel.

17. ***Keratella cochlearis*** (Gosse, 1851)

Material examined : BKS collections : 3 examples, 14.11.2008; 5 examples, 12.12.2008; 7 examples, 27.10.2009; 5 examples, 27.11.2009; 5 examples, 30.12.2009; 7 examples, 21.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/360, 12.12.2008.

Characters : Lorica elongated-oval, finely stippled and with a median posterior spine of variable length. Occipital margin with six spines; medians longest and ventrally curved, intermediates 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 : Assam, Jammu & Kashmir, Kerala, Ladak, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

18. ***Keratella edmondsoni*** Ahlstrom, 1943

(Fig. 32)

Material examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 12.12.2008; 3 examples, 27.10.2009.

Characters : Lorica elongated, granulated; with six occipital spines, median longest and curved. Dorsal plate with characteristic pattern of carinal plaques. Posterior spines equal and divergent spines.

Distribution : India : Assam, Orissa and Rajasthan. Recorded from Deepor Beel by Sharma and Sharma (2011a).

19. ***Keratella lenzi*** Hauer, 1953

Material examined : BKS collections : 4 examples, 24.04.2009; 5 examples, 15.05.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 5 examples, 11.04.2010; 5 examples, 31.05.2010; 4 examples, 30.06.2010.

SS collections : 1 example, IV/ROT/ERS/361, 12.12.2008.

Characters : Lorica oval, rounded posteriorly; occipital margin with six spines, medians longest, sickle-shaped and ventrally curved. Dorsum with three median plaques, the ultimate plaque elongated and its arms running towards the posterior margin in form of a divergent crest.

Distribution : India : Assam, Meghalaya, Orissa, Punjab Tripura and West Bengal.

20. ***Keratella procurva*** (Thorpe, 1891)

(Fig. 33)

Material examined : BKS collections : 5 examples, 21.05.2010.

Characters : Lorica finely stippled and compressed dorso-ventrally. Dorsal plate with three median plaques; posterior-most plaque pentagonal and terminating in a short median

line extending up to posterior margin of lorica. Posterior spines small, subequal and widely separated at their bases.

Distribution : India : Assam, Jammu & Kashmir, Kerala, Ladak, Orissa and West Bengal.

21. ***Keratella quadrata*** (O.F. Muller, 1786)

Material examined : BKS collections : 3 examples, 12.09.2008.

Characters : Lorica almost rectangular; six occipital spines, medians longest and curved. Dorsal plate with three median hexagonal plaques behind anterior median area; lateral plaques arranged symmetrically on either side of median plaques. Posterior spines long, sub equal, widely separated at their base and parallel or divergent.

Distribution : India : Assam, Kashmir, Kerala, Ladak, Tamil Nadu and West Bengal.

22. ***Keratella tecta*** (Gosse, 1851)

(Fig. 34)

Material examined : BKS collections: 5 examples, 12.12.2008; 5 examples, 21.05.2010.

Characters : Lorica aerolated, obtuse caudally. Median occipital spines curved ventrally strongly. Median frontal plaque pentagonal. Median keel straight and plaques near symmetrical.

Invariably considered as an infra-subspecific ecotypic variant of *K. cochlearis*, it is presently retained as a distinct species following Segers (2007).

Distribution : India : New record from India (Sharma and Sharma, 2012).

23. ***Keratella tropica*** (Apstein, 1907)

Material examined : BKS collections : 5 examples, 19.98.2008; 4 examples, 17.10.2008; 5 examples, 14.11.2008; 5 examples, 12.12.2008; 5 examples, 19.01.2009; 4 examples, 21.03.2009; 5 examples, 24.04.2009; 5 examples, 15.05.2009; 3 examples, 26.06.2009; 4 examples, 24.07.2009; 4 examples, 31.08.2009; 4 examples, 19.09.2009; 4 examples, 27.10.2009; 5 examples, 27.11.2009; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/327, 06.07.2008; 1 example, IV/ROT/ERS/347, 17.10.2008; 1 example, IV/ROT/ERS/380, 26.06.2009; 1 example, IV/ROT/ERS/441, 19.09.2009.

Characters : Lorica elongate-oval, stippled and with six occipital spines; medians longest, pointed and out-curved. 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, the right spine generally longer than the left.

Distribution : India : Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu & Kashmir, Kerala, Madhya Pradesh, Meghalaya, Ladak, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Genus *Platytias* Harring, 1913

Characters : Lorica separated into a dorsal and a ventral plate. Anterior and posterior margins of lorica with two spines each. Mental margin variable. Foot jointed and retractile, foot-opening located in ventral plate; toes two.

Two species of this genus are observed in the present collections.

24. *Platytias leloupi* Gillard, 1957

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 27.10.2009.

Characters : Lorica broadly circular, granulated, moderately compressed dorso-centrally; occipital margin with two blunt spines, posterior end with two long, parallel spines. Dorsum with distinct keel under the triangular frontal dorsal plaque.

Distribution : India : Assam, Manipur and Tamil Nadu. Recorded from Deepor Beel by Sharma and Sharma (2011a).

25. *Platytias quadricornis* (Ehrenberg, 1832)

Material examined : BKS collections : 4 examples, 12.09.2008; 5 examples, 17.10.2008; 5 examples, 19.02.2009; 5 examples, 21.03.2009; 5 examples, 24.04.2009; 5 examples, 26.06.2009; 4 examples, 24.04.2009; 5 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.11.2009; 5 examples, 29.01.2010; 4 examples, 26.02.2010; 5 examples, 5 examples, 14.04.2010; 5 examples, 31.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/372, 19.02.2009; 1 example, IV/ROT/ERS/408, 19.09.2009; 1 example, IV/ROT/ERS/419, 19.09.2009; 1 example, IV/ROT/ERS/488, 21.05.2010.

Characters : Lorica nearly circular, tuberculate and dorsum with 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 : Andhra Pradesh, Assam, Bihar, Haryana, Jammu & Kashmir, Kerala, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Genus *Platyonus* Segers *et al.* 1993

Characters : Lorica rigid, relatively high, with anterior and posterior spines, with or without a dorsal pattern of facets or plaques. Foot terminal, pseudo-segmented, bearing two equally long toes. Trophi malleate, with almost totally fused sub equal unci; proximal cavities of manubria close, anterior processes on rami present. Shaft of manubrium nearly straight. Eye present.

Only one species of *Platyonus* is noticed in our collections from Deepor Beel.

26. *Platyonus patulus* (O.F. Muller, 1786)

Material examined : BKS collections : 5 examples, 19.08.2008, 5 examples, 12.09.2008; 5 examples, 17.10.2008; 5 examples, 14.11.2008; 4 examples, 12.12.2008; 5 examples,

21.03.2009; 5 examples, 24.04.2009; 5 examples, 26.06.2009; 4 examples, 24.07.2009; 5 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.11.2009; 4 examples, 30.12.2009; 5 examples, 29.01.2010; 4 examples, 26.02.2010; 5 examples, 19.03.2010; 5 examples, 14.04.2010; 5 examples, 31.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/339, 19.08.2008; 1 example, IV/ROT/ERS/464, 26.02.2010; 1 example, IV/ROT/ERS/362, 12.12.2008; 1 example, IV/ROT/ERS/448, 29.12.2009; 1 example, IV/ROT/ERS/464, 26.02.2010.

Characters : Lorica sub-rectangular and moderately compressed dorso-ventrally; dorsum with reticulate areolations and with a pattern of cuticular ridges. Occipital and mental margins with short, blunt spines. Posterior spines short and stout. Foot-opening flanked by asymmetrical spines.

Distribution : India : Andhra Pradesh, Assam, Gujarat, Jammu & Kashmir, Kerala, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

26a. *Platyonus patulus macracanthus* (Daday, 1905)

Material examined : BKS collections : 3 examples, 19.08.2008, 4 examples, 12.09.2008; 5 examples, 17.10.2008; 3 examples, 14.11.2008; 5 examples, 21.03.2009; 3 examples, 24.04.2009; 5 examples, 26.06.2009; 5 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.11.2009; 4 examples, 30.12.2009; 5 examples, 29.01.2010; 4 examples, 26.02.2010; 5 examples, 19.03.2010; 5 examples, 14.04.2010; 5 examples, 31.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/307, 05.07.2008; 1 example, IV/ROT/ERS/373, 19.01.2009; 1 example, IV/ROT/ERS/381, 26.06.2009; 1 example, IV/ROT/ERS/420, 27.10.2009.

Characters : Lorica sub-rectangular and moderately compressed dorso-ventrally. Posterior spines distinctly elongated.

Distribution : India : Assam, Meghalaya, Orissa, Tripura and West Bengal.

Family EPIPHANIDAE

Body loricate; mouth in funnel-shaped buccal area. Foot off-set from trunk in *Epiphanes*.

This family is represented by only genus *Epiphanes* in the present study.

Genus *Epiphanes* Ehrenberg, 1832

Characters : Body conical, cylindrical or sacciform; toes short and with large foot- glands. Corona consists of short buccal area, circum-apical band and stiff cilia on apical field; mouth in a funnel. Certain species show stiffened integument and reduction of foot.

This genus is represented by one species in the present study.

27. *Epiphanes brachionus* (Ehrenberg, 1837)

Material examined : BKS collections : 3 examples, 12.09.2008; 4 examples, 17.10.2008; 3 examples, 31.08.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Body sacciform, semi-loricata; integument soft. Foot distinct, with three pseudo-segments, toes short. Pseudo-lorica with short lateral spines in some specimens.

Distribution : India : Assam, Delhi and Jammu & Kashmir.

Family EUCHLANIDAE

Lorica thin or strong, dorsal and ventral plates bound together by a thin membrane; with or without lateral sulci. Dorsal plate with or without longitudinal groove. Toes very long and baton-shaped or small blade-shaped. Trophi malleate.

Four genera of Euchlanidae are observed in the present study.

Genus *Beauchampiella* Remane, 1929

Characters : Lorica thin, pear-shaped, dorsally bulged and without any lateral sulcus. Toes very long and baton-shaped.

This genus is represented by only one species in Deepor Beel.

28. *Beauchampiella eudactylota* (Gosse, 1886)

Material examined : BKS collections : 3 examples, 15.05.2009; 3 examples, 26.06.2009; 2 examples, 31.08.2009; 2 examples, 27.11.2009; 2 examples, 26.02.2010; 3 examples, 14.04.2010.

Characters : Body pear-shaped and with a distinct dorsal bulge. Muscle bands supporting body and foot distinct. Foot 2-segmented; first segment thick and stout, second segment elongated. Toes long, baton-shaped and slightly swollen near the tips.

Distribution : India : Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Meghalaya, Orissa, Tripura and West Bengal.

Genus *Euchlanis* Ehrenberg, 1832

Characters : Lorica thin, dorsal and ventral plates bounded by a thin membrane. Dorsal plate usually arched, with or without dorsal keel; ventral plate generally flat. Foot short, two-segmented; toes short and with pointed tips. Trophi modified malleate.

Three species of Euchlanis are recorded in our collections from Deepor Beel.

29. *Euchlanis dilatata* Ehrenberg, 1832

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 2 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 24.04.2009; 3 examples, 15.05.2009; 4 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 4

examples, 30.12.2009, 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 2 examples, 14.04.2010; 3 examples, 31.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/354, 14.11.2008; 1 example, IV/ROT/ERS/363, 12.12.2008; 1 example, IV/ROT/ERS/374, 19.02.2009; 1 example, IV/ROT/ERS/395, 25.07.2009; 1 example, IV/ROT/ERS/421, 19.09.2009; 1 example, IV/ROT/ERS/442, 27.10.2009; 1 example, IV/ROT/ERS/449, 27.11.2009; 1 example, IV/ROT/ERS/465, 26.02.2010, 1 example, IV/ROT/ERS/489, 21.05.2010.

Characters : Lorica oval, truncate anteriorly and rounded posteriorly. Dorsal plate arched and with a shallow notch at its posterior end. Ventral plate flat, smaller and narrower than dorsal plate. Toes parallel-sided and with pointed tips.

Distribution : India : Assam, Bihar, Gujarat, Jammu & Kashmir, Ladak, Meghalaya, Orissa, Punjab, Tripura and West Bengal.

30. *Euchlanis incisa* Carlin, 1939

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 2 examples, 19.09.2009; 2 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Lorica oval, triangular in cross-section, truncate anteriorly and rounded posteriorly. Dorsal plate extending laterally, with a V-shaped notch at posterior end and with a median keel extending from anterior to its posterior end. Ventral plate flat, smaller than dorsal plate. Toes slender, rod-like and with pointed tips.

Distribution : India : Assam, Tamil Nadu and West Bengal.

31. *Euchlanis triquetra* Ehrenberg, 1838

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 2 examples, 26.06.2009; 2 examples, 24.07.2009; 3 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.10.2009; 2 examples, 26.02.2010; 2 examples, 14.04.2010; 2 examples, 31.05.2010; 3 examples, 30.06.2010.

Characters : Lorica elliptical, truncate posteriorly and with lateral flanges; dorsal keel strong dorsal and extending from anterior to posterior end of lorica. Toes slender, rod-shaped and with pointed tips.

Distribution : India : Assam, Bihar, Meghalaya, Tamil Nadu, Tripura and West Bengal.

Genus *Dipleuchlanis* De Beauchamp, 1910

Characters : Ventral plate narrower than dorsal plate. Lateral sulci forming a deep groove. Unci with 7-10 teeth each.

Dipleuchlanis is represented by one species in the present study.

32. *Dipleuchlanis propatula* (Gosse, 1886)

Material examined : BKS collections : 3 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 2 examples, 26.06.2009; 2 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 19.09.2009; 4 examples, 27.10.2009; 3 examples, 27.11.2009; 2 examples, 14.04.2010; 2 examples, 31.05.2010; 3 examples, 30.06.2010.

SS collections : 1 example, IV/ROT/ERS/316, 05.07.2008; 1 example, IV/ROT/ERS/443, 27.11.2009; 1 example, IV/ROT/ERS/476, 14.04.2010; 1 example, IV/ROT/ERS/490, 21.05.2010.

Characters : Lorica oval or ovoid and compressed dorso-ventrally; with straight or slightly concave anterior end. Dorsal plate concave and smaller than ventral plate. Lateral sulci deep. Toes long, cylindrical, parallel-sided and with pointed tips.

Distribution : India : Assam, Bihar, Kerala, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

Genus *Tripleuchlanis* Myers, 1930

Characters : Lorica without dorsal sulcus. Lateral sulci wide, with stiff flange projecting laterally. Foot three-segmented and projecting posteriorly.

Only one species of *Tripleuchlanis* is recorded in the present study.

33. *Tripleuchlanis plicata* (Levander, 1894)

(Fig. 35)

Material examined : BKS collections : 2 examples, 19.08.2008; 2 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 24.07.2009; 2 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/348, 17.10.2008.

Characters : Lorica ovoid, with double cuticular folds between dorsal and ventral plates. Foot robust, three-segmented and projecting beyond lorica. Toes short, parallel-sided and with pointed tips.

Distribution : India : Andhra Pradesh, Assam, Tamil Nadu and West Bengal.

Family MYTILINIDAE

Trophi malleate. Lorica with or without anterior and posterior spines. Dorsal surface of lorica with a median longitudinal sulcus.

Two genera of this family are observed in the samples collected from Deepor Beel.

Genus *Lophocharis* Ehrenberg, 1838

Characters : Lorica ornamented with distinct pattern and cavities, without any anterior or posterior spines, without dorsal sulcus and with one strong keel. Toes short.

The examined material includes only one species belonging to *Lophocharis*.

34. *Lophocharis salpina* (Ehrenberg, 1834)

Material examined : BKS collections : 3 examples, 24.07.2009; 2 examples, 26.02.2010; 3 examples, 21.05.2010.

Characters : Lorica triangular in cross-section and anterior margin of lorica strongly serrated. Dorsal keel distinct and with transverse folds. Foot-groove ventral; toes thin pointed and ventrally directed.

Distribution : India : Assam and Meghalaya.

Genus ***Mytilina*** Bory de St. Vincent, 1826

Characters : Lorica laterally flattened, with double dorsal keel and with spines on all four corners; spines, at times, completely or partly reduced. Toes thin and slender. Corona similar to *Euchlanis*-type.

Three species of *Mytilina* are observed in the examined material.

35. *Mytilina acanthophora* Hauer, 1938

(Fig. 36)

Material examined : BKS collections : 1 example, 21.03.2009; 2 examples, 26.06.2009; 2 examples, 19.09.2009.

Characters : Lorica strong, granulated, dorsally arched and laterally compressed. Anterior ventral corner of lorica with distinct triangular cups, posterior end with deep invagination. Toes long, parallel-sided and terminating into acute points.

Distribution : India : Assam, Punjab, Tamil Nadu and West Bengal.

36. *Mytilina bisulcata* (Lucks, 1912)

(Fig. 37)

Material examined : BKS collections : 2 examples, 12.09.2008; 2 examples, 15.05.2009; 2 examples, 26.06.2009; 3 examples, 24.07.2009; 2 examples, 21.05.2010.

Characters : Anterior end of lorica with two folds; almost rounded in cross section and dorsal keel with three stumps. Dorsal sulcus indistinct. Toes long, slender and with distinct slender spines.

Distribution : India : Assam, Meghalaya, Orissa, Tripura and West Bengal.

37. *Mytilina ventralis* (Ehrenberg, 1830)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 2 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 4 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.10.2009; 4 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 2 examples, 14.04.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/382, 26.06.2009; 1 example, IV/ROT/ERS/396, 25.07.2009; 1 example, IV/ROT/ERS/450, 29.12.2009; 1 example, IV/ROT/ERS/466, 26.02.2010.

Characters : Anterior 1/3 part of lorica heavily granulated. Antero-ventral corners with a spine on each side. Postero-dorsal and postero-ventral spines short. Toes two, moderately long.

Distribution : India : Andhra Pradesh, Assam, Bihar, Gujarat, Jammu & Kashmir, Kerala, Ladak, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu Tripura and West Bengal.

37a. *Mytilina ventralis longidactyla* Wulfert, 1965

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 4 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 2 examples, 14.04.2010; 3 examples, 31.05.2010; 3 examples, 30.06.2010.

Characters : Lorica elongated; posterior median and ventral spines distinctly elongated. Toes parallel sided and with pointed tips.

Distribution : India : Assam, Gujarat and West Bengal.

Family TRICHOTRIIDAE

Trophi malleate. Head, trunk and foot clearly defined and with lorica. Trunk laterally broad, slightly granulated, often with spines on dorsum.

This family is represented by two genera in the present study.

Genus *Macrochaetus* Perty, 1850

Characters : Body scutellate, strongly loricate and granulate; its margins serrate or with spines. Dorsum with several pairs of mobile spines; spines also present on posterior margin of lorica and on anal segment. Foot two-segmented; toes two and thin.

Three species of *Macrochaetus* are observed in our collections.

38. *Macrochaetus collinsi* (Gosse, 1867)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 19.01.2009; 3 examples, 21.03.2009; 4 examples, 19.09.2009.

Characters : Lorica horse-shoe shaped, moderately compressed and with serrated external edges. Dorsum with four dorsal and four posterior spines. Anal segment with two anal spines.

Distribution : India : Assam, Meghalaya, Rajasthan and West Bengal.

39. *Macrochaetus longipes* Myers, 1934

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 26.08.2009; 2 examples, 24.07.2009; 2 examples, 31.08.2009; 3 examples,

19.09.2009; 2 examples, 27.10.2009; 3 examples, 27.11.2009; 2 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/397, 25.07.2009.

Characters : Lorica shield-shaped and granulated and compressed; with serrate external margins and characterized by 12 long spines. Head protruded. Anal segment flanked by long spines. Toes long and pointed.

Distribution : India : Assam and Meghalaya. Recorded from Deepor Beel by Sharma and Sharma (2011a).

40. *Macrochaetus sericus* (Thorpe, 1893)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 2 examples, 19.01.2008; 2 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.07.2009; 2 examples, 31.08.2009; 3 examples, 19.09.2009; 2 examples, 27.10.2009; 3 examples, 27.11.2009; 2 examples, 26.02.2010; 3 examples, 21.07.2010.

Characters : Lorica horse-shoe shaped, granulated and with small spines at its external angles. Dorsum with eight spines arranged symmetrically along its mid-line; median caudal spines deeply inserted. First foot-segment with flattened cuticle and two separated spines.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Madhya Pradesh, Orissa, Tamil Nadu and West Bengal.

Genus *Trichotria* Bory de St. Vincent, 1827

Characters : Head, trunk and foot strongly loricate. Foot mobile, 3-segmented; second foot-segment with spines of variable length. Toes long, slender and ending into pointed tips.

Only one species belonging to this genus is documented in the present study.

41. *Trichotria tetractis* (Ehrenberg, 1830)

Material examined : BKS collections : 4 examples, 19.08.2008; 2 examples, 12.09.2009; 3 examples, 17.10.2008; 2 examples, 19.01.2009; 2 examples, 19.02.2009; 3 examples, 21.03.2009; 2 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 2 examples, 27.11.2009; 2 examples, 30.12.2009; 3 examples, 29.01.2010; 2 examples, 26.02.2010; 3 examples, 19.03.2010; 4 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/409, 19.09.2009; 1 example, IV/ROT/ERS/435, 28.10.2009; 1 example, IV/ROT/ERS/451, 30.12.2009; 1 example, IV/ROT/ERS/478, 20.03.2010.

Characters : Lorica heavily stippled; antero-dorsal corners with small spines. Dorsum with pattern of carinal plates and ridges. Second foot-segment longest. Toes long and terminate into acute points.

Distribution : India : Andhra Pradesh, Assam, Gujarat, Jammu & Kashmir, Kerala, Madhya Pradesh, Meghalaya, Orissa, Punjab, Tripura and West Bengal.

Family LEPADELLIDAE

Corona with broad lateral lamellae and with hood. Lorica comprised of one or two plates, dorso-ventrally or laterally compressed; with or without ventral and dorsal furrows. Trophi modified malleate.

This family is represented by three genera in our collections from Deepor Beel.

Genus *Colurella* Bory de St. Vincent, 1824

Characters : Lorica laterally compressed and consists of a single plate; with a ventral median longitudinal cleft. Head plate small and retractile. Foot 3-segmented; toes pointed. Corona similar to *Euchlanis*-type.

Three species of *Colurella* are noticed in the samples collected from Deepor Beel.

42. *Colurella obtusa* (Gosse, 1886)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 2 examples, 19.01.2009; 2 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 19.09.2009; 3 examples, 27.10.2010; 2 examples, 21.05.2010; 4 examples, 21.07.2010.

Characters : Lorica small, oval and with obtuse posterior angles. Foot-opening relatively broad. Toes slender and pointed.

Distribution : India : Assam, Meghalaya, Punjab, Tamil Nadu, Tripura and West Bengal.

43. *Colurella sulcata* (Stenroos, 1898)

Material examined : BKS collections : 4 examples 24.07.2009.

Characters : Lorica elongated, with a longitudinal cleft; anterior margins of lorica rounded, posterior angles not produced. Foot and toes forwardly directed; toes long.

Distribution : India : Assam, Gujarat, Meghalaya, Orissa, Tripura and West Bengal. Recorded from Deepor Beel by Sharma and Sharma (2011).

44. *Colurella uncinata* (O.F. Muller, 1773)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 4 examples, 30.12.2009, 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 31.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/479, 20.03.2010.

Characters : Lorica ovate; posterior angles produced and downwardly directed, edges drawn closer. Toes two, slender and pointed.

Distribution : India : Assam, Meghalaya, Tamil Nadu, Tripura and West Bengal.

Genus ***Lepadella*** Bory de St. Vincent, 1826

Characters : Lorica oval, ovate, pear shaped or circular and moderately to strongly compressed dorso-ventrally; with characteristic head and foot openings. Anterior end often with a stippled collar. Dorsal plate flat, arched or with a keel. Foot 3-segmented; toes long and pointed. Corona consists of a single line of cilia, with lateral tufts on buccal field. Trophi malleate.

Amongst three subgenera of this genus, only two i.e., *Lepadella* (toes of equal length), and *Heterolepadella* (toes of unequal length) are recorded from Deepor Beel and these include 14 and 3 species respectively.

45. ***Lepadella acuminata*** (Ehrenberg, 1894)

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 24.07.2009; 3 examples, 27.10.2009.

Characters : Lorica oval; evenly arched dorsally. Anterior dorsal margin nearly straight or with a shallow sinus and ventral sinus V-shaped; stippled collar present. Foot groove wide. Toes slender and pointed.

Distribution : India : Assam, Meghalaya, Tamil Nadu, Tripura and West Bengal.

46. ***Lepadella apsida*** Harring, 1916

Material examined : BKS collections : 3 examples, 12.12.2008; 3 examples, 19.02.2009; 3 examples, 21.03.2009; 2 examples, 26.06.2009; 3 examples, 31.08. 2009; 3 examples, 19.09.2009.

Characters : Lorica circular; dorsal sinus lacking, ventral sinus circular and without any stippled collar. Dorsal plate arched, ventral plate nearly flat. Foot-groove rounded U-shaped; toes short and pointed.

Distribution : India : Assam, Meghalaya, Punjab, Tripura and West Bengal.

47. ***Lepadella benjamini*** Harring, 1916

(Fig. 38)

Material examined : BKS collections : 4 examples, 24.07.2009; 3 examples, 21.05.2010; 4 examples, 30.06.2010.

Characters : Lorica oval, bulged in cross-section and with maximum width in its middle region. Head aperture nearly tubular, and its rim ventrally directed; anterior dorsal margin nearly straight and ventral margin with U-shaped sinus. Posterior end of lorica slightly concave. Foot-groove with divergent sides. Distal foot-segment projecting beyond lorica. Toes long, pointed and ventrally curved.

Distribution : India : Assam and Manipur. Recorded from Deepor Beel by Sharma and Sharma (2011a).

48. ***Lepadella biloba*** Hauer, 1938
(Fig. 39)

Material examined : BKS collections : 3 examples, 12.09.2008; 2 examples, 14.11.2008; 3 examples, 21.03.2009; 2 examples, 27.10.2009; 2 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 21.07.2010.

Characters : Lorica broadly ovoid; dorsal plate strongly arched, ventral plate flat. Foot-groove nearly parallel-sided and with acutely pointed posterior projections; foot-opening reflexed dorsally; toes moderately long and acutely pointed.

Distribution : India : Assam and Meghalaya.

49. ***Lepadella costatoides*** Segers, 1992
(Fig. 40)

Material examined : BKS collections : 4 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 21.05.2010; 4 examples, 21.07.2010.

Characters : Lorica oval, dorsally arched and with three pairs of longitudinal ridges on dorsum. Anterior dorsal and ventral sinus relatively shallow; stippled collars present. Posterior end of lorica with nearly straight margin flanked by symmetrical and blunt postero-lateral projections. Foot-groove widened distally. Toes long and pointed.

Distribution : India : Assam and Meghalaya.

50. ***Lepadella dactyliseta*** (Stenroos, 1898)
(Fig. 41)

Material examined : BKS collections : 2 examples, 19.08.2008; 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 26.06.2009; 2 examples, 19.09.2009; 2 examples, 27.10.2009; 4 examples, 30.12.2009.

Characters : Lorica oval, dorsal plate strongly arched and ventral plate nearly flat. Anterior dorsal margin without sinus, nearly straight or slightly arched. Ventral margin ventrally directed in lateral view and with V-shaped sinus, with a stippled collar. Foot-groove deep. Toes moderately long, pointed and ventrally directed.

Distribution : India : Assam, Meghalaya and Tamil Nadu.

51. ***Lepadella discoidea*** Segers, 1993

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 26.06.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 2 examples, 30.12.2009.

Characters : Lorica circular and compressed dorso-ventrally. Dorsal plate domed and ventral plate flat. Head aperture with a semicircular sinus dorsally and a deep V-shaped

ventral sinus. Posterior edge of lorica slightly concave. Foot 3-segmented; distal foot-segment longest. Toes long and pointed.

Distribution : India : Assam, Delhi and Meghalaya.

52. ***Lepadella eurysterna*** Myers, 1942

Material examined : BKS collections : 3 examples, 19.02.2009; 3 examples, 27.10.2009.

Characters : Lorica oval; dorsal plate arched. Dorsal sinus U-shaped. Ventral sinus V-shaped. Posterior margin convex in the region of foot-opening. Toes elongated and pointed.

Distribution : India : Assam, Delhi and Meghalaya. Recorded from Deepor Beel by Sharma and Sharma (2011a).

53. ***Lepadella minuta*** (Weber & Montet, 1918)

(Fig. 42)

Material examined : BKS collections : 2 examples, 14.11.2008; 3 examples, 12.12.2008; 2 examples, 26.06.2009; 3 examples, 19.03.2010.

Characters : Lorica elongate-oval. Anterior dorsal margin straight, ventral margin with a shallow sinus and with distinct external angles. Foot-groove semi-circular. Toes pointed.

Distribution : India : Assam, Meghalaya and Tamil Nadu.

54. ***Lepadella ovalis*** (O.F. Muller, 1786)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 14.11.2008; 2 examples, 19.01.2009, 3 examples, 19.02.2009; 3 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 27.11.2009; 2 examples, 30.12.2009, 3 examples, 20.01.2010; 4 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/257, 27.01.2010.

Characters : Lorica oval to circular, 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, Bihar, Haryana, Jammu & Kashmir, Kerala, West Bengal, Ladak, Orissa, Punjab, Tamil Nadu and West Bengal.

55. ***Lepadella patella*** (O.F. Muller, 1773)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Lorica oval, 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 the states in North Eastern India, Bihar, Gujarat, Jammu & Kashmir, Ladak, Orissa, Punjab, Rajasthan, Tamil Nadu and West Bengal.

56. *Lepadella rhomboides* (Gosse, 1886)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 4 examples, 12.12.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 19.03.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Lorica rhomboid-oval; dorsal plate with moderately high median keel, sides of keel strongly convex and meet centrally at an obtuse angle forming a faint ridge. Foot groove variable. Foot long. Toes slender and pointed.

Distribution : India : Assam, Gujarat, Meghalaya, Manipur, Mizoram, Nagaland, Punjab, Tamil Nadu, Tripura and West Bengal.

57. *Lepadella rhomboidula* (Bryce, 1832)

Material examined : Not observed in 2008-10 collections.

Characters : Lorica rhomboidal, with moderately high dorsal keel. Dorsal sinus lacking. Ventral sinus shallow and semicircular. Foot-groove inverted U-shaped; toes short and pointed.

Distribution : India : Assam and West Bengal.

58. *Lepadella triptera* Ehrenberg, 1832

Material examined : BKS collections : 4 examples, 12.12.2008; 3 examples, 31.08.2009; 3 examples, 21.05.2010.

Characters : Lorica small and broadly circular or rhombic. Dorsal plate with a high and thin median keel. Anterior end of dorsal plate with a shallow notch, ventral sinus broad and U-shaped. Posterior end of lorica obtusely pointed. Foot-groove nearly oval. Toes short and pointed.

Distribution : India : Assam, Ladak, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

58a. *Lepadella triptera alata* (Myers, 1934)

Material examined : not observed in 2008-10 collections.

Characters : Lorica small, rhombic, broadest in its middle region. Dorsal surface vaulted, with high median keel and slightly produced posterior end. Head aperture small, with a slight

median notch dorsally and shallow U-shaped sinus ventrally. Foot-opening small and oval. Toes short and pointed.

Distribution : India : Assam.

59. *Lepadella (Heterolepadella) apsicora* Myers, 1934

(Fig. 43)

Material examined : BKS collections : 2 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 2 examples, 12.12.2008; 2 examples, 15.05.2009; 3 examples, 21.07.2010.

Characters : Lorica oval. Dorsal sinus shallow and ventral sinus V-shaped, both with stippled collars. Dorsal plate moderately arched, ventral plate flat. Last foot segment longest. Toes two, unequal; right toe longer than the left and toes often twisted.

Distribution : India : Assam, Meghalaya, Tripura and West Bengal.

60. *Lepadella (Heterolepadella) ehrenbergi* (Perty, 1850)

(Fig. 44)

Material examined : BKS collections : 2 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 3 examples, 21.07.2010.

Characters : Lorica rhomboid ovate. Dorsal plate convex in central region and relatively flat laterally. Lateral angles with median spurs curving outwards and forwards. Posterior margin concave. Foot-groove broader posteriorly; toes unequal and pointed.

Distribution : India : Assam, Meghalaya, Nagaland, Orissa, Tamil Nadu, Tripura and West Bengal.

61. *Lepadella (Heterolepadella) heterostyla* (Murray, 1913)

(Fig. 45)

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 24.07.2009; 3 examples, 31.08.2009.

Characters : Lorica rhomboidal and its edges curving upwards from the blunt lateral angles towards the anterior margin. Dorsal plate strongly convex in its median region. Posterior angles with semicircular emarginations. Toes unequal and pointed.

Distribution : India : Assam, Bihar, Meghalaya, Mizoram, Orissa, Tamil Nadu, Tripura, and West Bengal.

Genus *Squatinella* Bory de St.Vincent, 1826

Characters : Body transparent and with thin lorica. Head and corona enclosed by semicircular head shield. Corona with a ciliated buccal field. Two distinct eye spots present. Trophi weak and malleate. Foot long and three-segmented; toes equal, slender and with pointed tips.

The examined collections include only one species belonging to this genus.

62. *Squatinella mutica* (Ehrenberg, 1832)

Material examined : SS collections : 1 example, IV/ROT/ERS/410, 19.09.2009.

Characters : Body with semicircular head shield; trunk oblong-ovate. First foot-segment covered by a shield-like projection of dorsal plate. Toes long, slender and acutely pointed.

Distribution : India : Assam, Ladak, Meghalaya, Tripura and West Bengal.

Family LECANIDAE

Body loricate and consists of dorsal and ventral plates. Trophi malleate, modified for suction. Buccal area very simple. Foot one or two-jointed; toes one or two.

Genus *Lecane* Nitzsch, 1827

Characters : Lorica oval, pear or shield-shaped, with dorsal and ventral plates and usually compressed dorso-ventrally. Antero-lateral edges of lorica prolonged into angles or short spines in some species; posterior and rounded or extended into a process. Foot short, two segmented; only second foot-joint mobile. Toes one or two, in the latter case completely or partially fused; often with short and pointed claws.

Lecane is divided into three subgenera namely *Lecane* (s. str.), *Hemimonostyla* and *Monostyla*; all these are represented in the collections examined from Deepor Beel. Further, these include 26, 3 and 13 species respectively.

63. *Lecane aculeata* (Jakubski, 1912)

(Fig. 46)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 2 examples, 12.12.2008; 2 examples, 21.03.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 21.05.2010.

Characters : Lorica elongate-oval, compressed; with straight and coincident anterior margins; ventral plate narrower than dorsal plate and with distinct out-curving spines at its external edges. Posterior segment small and rounded. Toes parallel-sided and terminating into slender claws.

Distribution : India : Assam, Meghalaya, Orissa, Tamil Nadu Tripura and West Bengal.

64. *Lecane arcua* Haring, 1914

(Fig. 47)

Material examined : BKS collections : 2 examples, 12.09.2008; 2 examples, 19.09.2009; 3 examples, 27.10.2009.

Characters : Lorica small, elongate-oval; with straight and coincident anterior margins. Ventral plate with relatively shorter and less elongated antero-lateral occipital spines. Toes parallel-sided; claw small and slender.

Distribution : India : Assam and Meghalaya. Recorded from Deepor Beel by Sharma and Sharma (2011a).

65. *Lecane crepida* Harring, 1914

Material examined : BKS collections : 4 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 19.03.2010; 3 examples, 21.07.2010.

Characters : Lorica elongated, parallel-sided, anterior margins straight and coincident; external angles of ventral plate with anteriorly directed spines. Dorsal plate smaller than ventral plate. Second foot-joint projecting beyond lorica. Toes parallel-sided; each toe with a distinct and pointed claw.

Distribution : India : Assam, Gujarat, Meghalaya, Punjab, Tamil Nadu, Tripura and West Bengal.

66. *Lecane curvicornis* (Murray, 1913)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/300, 04.07.2008; 1 example, IV/ROT/ERS/364, 12.12.2008; 1 example, IV/ROT/ERS/398, 25.07.2009; 1 example, IV/ROT/ERS/422, 18.09.2009; 1 example, IV/ROT/ERS/444, 28.11.2009; 1 example, IV/ROT/ERS/459, 27.01.2010.

Characters : Lorica pyriform and compressed; anterior margins coincident and with a V-shaped sinus; external angles with prominent spines. Dorsal plate narrower than ventral plate and without any surface markings. Posterior segment small; often rounded. Toes long, claws small and each claw with a basal spicule.

Distribution : India : Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Meghalaya, Manipur, Tamil Nadu, Tripura and West Bengal.

67. *Lecane doryssa* Harring, 1914

(Fig. 48)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 15.05.2009; 2 examples, 26.06.2009; 3 examples,

24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 4 examples, 27.10.2009; 3 examples, 27.11.2009; 4 examples, 21.05.2010.

Characters : Lorica with fewer surface markings; anterior occipital margins straight and coincident; dorsal plate broader than ventral plate. Posterior segment large. Toes slender and with thin, pointed and undifferentiated claws.

Distribution : India : Assam and Meghalaya. Recorded from Deepor Beel by Sharma and Sharma (2011a).

68. *Lecane flexilis* (Gosse, 1886)

Material examined : BKS collections : 2 examples, 17.10.2008; 3 examples, 31.08.2009; 3 examples, 19.09.2009; 3 examples, 27.10.2009.

Characters : Lorica semicircular, strongly gibbous and with straight anterior margins; with small triangular spines at ventral external angles. Dorsal plate strongly arched in posterior region. Ventral plate flexible, narrower than dorsal plate and with a few folds and markings. Posterior segment rounded. Toes short, tapering to small and dorsally curved claws.

Distribution : India : Assam, Gujarat, Meghalaya, Tamil Nadu and West Bengal.

69. *Lecane haliclysta* Harring & Myers, 1926

(Fig. 49)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 24.07.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.06.2010.

Characters : Lorica elongate-oval and with straight anterior margins; anterior ventral margin with small spines at external angles. Dorsal and ventral plates with surface markings. Ventral plate relatively narrow than dorsal plate. Toes moderately long, parallel-side for more than 3/4 of their length and then terminating into small undifferentiated and acutely pointed claws.

Distribution : India : Assam and Meghalaya. Recorded from Deepor Beel by Sharma and Sharma (2011a).

70. *Lecane hastata* (Murray, 1913)

Material examined : Not observed in 2008-10 collections.

Characters : Lorica oval, anterior margins coincident and anterior external angles of ventral plate with two small spines. Dorsal plate smaller than ventral plate. Toes parallel-sided, slightly swollen at their free ends; claws distinct, with swollen bases.

Distribution : India : Assam, Meghalaya, Tripura and West Bengal.

71. *Lecane hornemanni* (Ehrenberg, 1834)

Material examined : BKS collections : 2 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples,

31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 21.07.2010.

Characters : Lorica ovate, anterior margins coincident and without spines at external angles. Dorsal plate semicircular and broader than ventral plate. Posterior segment large and extending beyond the dorsal plate. Toes stout; tapering gradually to acute and slightly curved points.

Distribution : India : Andhra Pradesh, Assam, Gujarat, Jammu & Kashmir, Meghalaya, Tamil Nadu, Tripura and West Bengal.

72. *Lecane inermis* (Bryce, 1892)

Material examined : BKS collections : 2 examples, 17.10.2008; 2 examples, 21.03.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 2 examples, 27.11.2009; 3 examples, 20.01.2010; 2 examples, 30.06.2010.

Characters : Lorica elongated and flexible; anterior margins straight, coincident and without spines at anterior external angles. Dorsal and ventral plates equally broad. Lateral sulci indistinct. Toes small, claws long and pointed.

Distribution : India : Assam, Meghalaya, Tamil Nadu, Tripura and West Bengal.

73. *Lecane lateralis* Sharma, 1978 (Fig. 50)

Material examined : BKS collections : 5 examples, 17.10.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 20.01.2010; 3 examples, 21.05.2010; 4 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Lorica ovate; anterior dorsal margin concave and anterior ventral margin with a shallow sinus flanked by undulating sides. Dorsal plate smaller than ventral plate. Ventral plate with characteristic postero-lateral extensions. Toes long, parallel-sided along $\frac{3}{4}$ of their lengths, then tapering and terminating into stout claws; each claw with one basal spicule.

Distribution : India : Assam, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal. Recorded from Deepor Beel by Sharma and Sharma (2011a).

74. *Lecane leontina* (Turner, 1892)

Material examined : BKS collections : 7 examples, 19.08.2008; 5 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 5 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 5 examples, 30.06.2010; 6 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/309, 05.07.2008; 1 example, IV/ROT/ERS/328, 06.07.2008; 1 example, IV/ROT/ERS/333, 19.08.2008; 1 example, IV/ROT/ERS/383, 26.06.2009; 1 example, IV/ROT/ERS/445, 28.11.2009; 1 example, IV/ROT/ERS/460, 27.01.2010; 1 example, IV/ROT/ERS/463, 27.02.2010.

Characters : Lorica ovate; anterior dorsal margin concave and anterior ventral margin with a shallow sinus flanked by undulating sides. Dorsal plate smaller than ventral plate. Ventral plate with characteristic postero-lateral extensions. Toes long, parallel-sided along $\frac{3}{4}$ of their lengths, then tapering and terminating into stout claws; each claw with one basal spicule.

Distribution : India : Assam, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

75. *Lecane ludwigii* (Eckstein, 1883)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 20.01.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Lorica oval; anterior margins coincident and with prominent spines at ventral external angles. Dorsal plate truncate posteriorly and broader than ventral plate. Posterior segment produced into a long, triangular spine. Toes long, slender, parallel-sided and terminating into distinct conical points.

Distribution : India : Andhra Pradesh, Assam, Bihar, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

76. *Lecane luna* (O.F.Müller, 1776)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/301, 04.07.2008; 1 example, IV/ROT/ERS/400, 25.07.2009.

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 and with distinct claws; each claw with a distinct basal spicule.

Distribution : India : All states of North-Eastern region, Bihar, Gujarat, Jammu & Kashmir, Ladak, Orissa, Punjab, Rajasthan, Tamil Nadu and West Bengal.

77. *Lecane nana* (Murray, 1913)

Material examined : BKS collections : 2 examples, 19.08.2008; 2 examples, 21.03.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 2 examples, 21.07.2010.

Characters : Lorica sub-circular; anterior margins coincident and external angles produced into distinct edges. Ventral plate narrower than dorsal plate, parallel-sided anteriorly and then tapering. Toes slender and produced into curved, pointed tips.

Distribution : India : Assam, Gujarat, Meghalaya, Rajasthan, Tamil Nadu, Tripura, and West Bengal.

78. *Lecane nitida* (Murray, 1913)

(Fig. 51)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 4 examples, 21.07.2010.

Characters : Dorsal and ventral plates with a strong pattern of surface markings. Anterior dorsal margin with a number of folds.

Distribution : India : Assam, Meghalaya, Tamil Nadu and West Bengal.

79. *Lecane ohioensis* (Herrick, 1885)

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 2 examples, 21.07.2010.

Characters : Lorica oval and anterior external margins with stout spines; dorsal plate truncate posteriorly, ventral plate narrower than dorsal plate. Posterior segment with a spade-shaped process. Toes long, parallel and with short, pointed tips.

Distribution : India : Assam, Meghalaya, Tripura and West Bengal.

80. *Lecane papuana* (Murray, 1913)

Material examined : BKS collections : 5 examples, 19.08.2008; 7 examples, 12.09.2008; 3 examples, 17.10.2008; 5 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 5 examples, 21.03.2009; 3 examples, 26.06.2009; 5 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 26.02.2010; 5 examples, 19.03.2010; 5 examples, 14.04.2010; 3 examples, 21.05.2010; 6 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/355, 14.11.2008; 1 example, IV/ROT/ERS/453, 30.12.2009; 1 example, IV/ROT/ERS/469, 27.02.2010.

Characters : Lorica oval; anterior dorsal margin straight, anterior ventral margin with a shallow median sinus flanked by undulating sides. Posterior segment small and rounded. Toes long, parallel-sided and terminating into small claws; each claw with a distinct basal spicule.

Distribution : India : Assam, Bihar, Jammu & Kashmir, Ladak, Meghalaya, Manipur, Nagaland, Orissa, Tamil Nadu, Tripura and West Bengal.

81. *Lecane paxiana* Hauer, 1940

(Fig. 52)

Material examined : BKS collections : 2 examples, 12.09.2008; 3 examples, 24.07.2009; 2 examples, 19.09.2009.

Characters : Lorica small and stiff. Dorsal plate slightly wider anterior and medially wider than ventral plate; antero-lateral corners angulated, anterior margins not coincident. Dorsal and ventral plates without surface markings. Ventral plate longer than wide. Lateral sulci shallow. Foot plate broad, coxal plates rounded triangular. Toes fused basally; pseudoclaws distinct and inwardly located.

Distribution : India : Delhi.

82. *Lecane pertica* Harring & Myers, 1926

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 31.08.2009.

Characters : Lorica elongate-oval, anterior margins coincident and with small spines at external angles. Dorsal plate oval, broader than ventral plate and with few surface markings. Ventral plate with a few markings. Toes long, parallel-sided and with long, pointed tips.

Distribution : India : Assam, Meghalaya, Tripura and West Bengal.

83. *Lecane ploenensis* (Voigt, 1902)

Material examined : BKS collections : 2 examples, 19.08.2008; 3 examples, 12.09.2008; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 2 examples, 21.07.2010.

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 : Assam, Gujarat, Meghalaya, Mizoram, Punjab, Tamil Nadu, Tripura and West Bengal.

84. *Lecane pusilla* Harring, 1914

(Fig. 53)

Material examined : BKS collections : 3 examples, 12.09.2008; 4 examples, 24.07.2009.

Characters : Lorica vase-shaped; anterior margins straight, coincident and without spines at external angles. Dorsal plate distinctly faceted, ventral plate with less conspicuous pattern;

lateral sulci deep. Ventral plate narrow than dorsal plate. Posterior segment rounded. Toes long, slender, parallel-sided and terminating into recurved, acute claws.

Distribution : India : Assam.

85. *Lecane signifera* (Jennings, 1896)

Material examined : BKS collections : 4 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 4 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/310, 05.07.2008; 1 example, IV/ROT/ERS/423, 18.09.2009.

Characters : Lorica oblong; anterior margins straight, coincident and with small spines at external angles. Dorsal plate rounded posteriorly and with rounded surface markings. Ventral plate narrower than dorsal plate. Toes long, parallel-sided and with pointed tips.

Distribution : India : Assam, Bihar, Meghalaya, Tripura and West Bengal.

86. *Lecane sola* Hauer, 1936

Material examined : Not observed in 2008-10 collections.

Characters : Lorica oval, with straight and coincident anterior margins. Dorsal plate with distinct pattern. Ventral plate smaller than dorsal plate and with small spines at its external angles. Second foot-segment projecting beyond posterior end of lorica. Toes parallel-sided for about half of their length and then tapering to pointed tips.

Distribution : India : Assam, Tamil Nadu and Tripura.

87. *Lecane tenuiseta* Harring, 1914

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 12.12.2008; 2 examples, 19.09.2009; 2 examples, 30.06.2010.

Characters : Lorica elongate; anterior margins coincident, antero-lateral angles angulate. Dorsal plate smooth, anteriorly narrow and ventrally as wide as ventral plate. Ventral plate longer than wide, with few longitudinal folds. Lateral sulci deep. Foot pseudo-segment not projecting. Toes parallel-sided and with distinct long claws.

Distribution : India : Delhi.

88. *Lecane unguolata* (Gosse, 1887)

Material examined : BKS collections : 4 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 26.06.2009; 3 examples,

24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 21.05.2010; 4 examples, 30.06.2010; 4 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/384, 26.06.2009.

Characters : Lorica ovate; anterior margins 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 : Andhra Pradesh, Assam, Bihar, Gujarat, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

89. *Lecane (Hemimonostyla) blachei* Berzins, 1973

(Fig. 54)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 5 examples, 24.07.2009; 3 examples, 14.04.2010; 4 examples, 21.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Lorica oval, compressed; anterior dorsal margin nearly straight, ventral margin with a shallow median sinus flanked by undulating sides and blunt external angles. Dorsal plate smaller than ventral plate and with distinct surface markings. Toes fused partly at base, claws with distinct basal spines.

Distribution : India : Assam and Delhi. Recorded from Deepor Beel by Sharma and Sharma (2011a).

90. *Lecane (Hemimonostyla) inopinata* Harring & Myers, 1926

(Fig. 55)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 4 examples, 12.12.2008; 4 examples, 21.03.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.06.2010; 4 examples, 21.07.2010.

Characters : Lorica oval, anterior margins straight and coincident. Dorsal plate oval, truncate posteriorly and without any surface markings. Ventral plate narrower than dorsal plate and with a few longitudinal ridges. Toes fused for about 1/3 of their length and tapering into distinct, curved claws.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Orissa, Tamil Nadu, Tripura, and West Bengal.

91. *Lecane (Hemimonostyla) sympoda* Hauer, 1929

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 21.03.2009; 3 examples, 17.10.2008.

Characters : Lorica oval; anterior margins straight and coincident and with small spines at ventral external angles. Dorsal plate narrow anteriorly and wider than the ventral plate in the middle region and with surface ornamentation. Ventral plate with incomplete longitudinal and transverse folds. Posterior segment large and rounded. Toes fused proximally over third or half and bearing completely separated claws.

Distribution : India : Assam, Gujarat, Tamil Nadu and West Bengal.

92. *Lecane (Monostyla) bulla* (Gosse, 1851)

Material examined : BKS collections : 5 examples, 19.08.2008; 7 examples, 12.09.2008; 5 examples, 17.10.2008; 8 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 5 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 10 examples, 19.03.2010; 9 examples, 14.04.2010; 5 examples, 21.05.2010; 7 examples, 30.06.2010; 6 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/375, 19.02.2009; 1 example, IV/ROT/ERS/436, 25.10.2009; 1 example, IV/ROT/ERS/452, 30.12.2009; 1 example, IV/ROT/ERS/467, 26.02.2010.

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 : North-Eastern India, West Bengal, Orissa, Bihar, Andhra Pradesh, Tamil Nadu, Rajasthan, Gujarat, Punjab and Kashmir.

93. *Lecane (Monostyla) closterocerca* (Schmarda, 1859)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/308, 05.07.2008; 1 example, IV/ROT/ERS/458, 29.01.2010.

Characters : Lorica broadly oval; anterior margins concave and coincident; external angles produced into small corners. Ventral plate narrower than dorsal plate. Toe parallel-sided for about 1/2 of its length and then tapering to a slender point.

Distribution : India : North-Eastern India, Orissa, Tamil Nadu, Gujarat, Rajasthan, Punjab, Kashmir and Ladak.

94. *Lecane (Monostyla) decipiens* (Murray, 1913)

Material examined : SS collections : 1 example, IV/ROT/ERS/399, 24.07.2009.

Characters : Lorica elongate-oval; anterior margins coincident and with a deep U-shaped sinus flanked by two acute triangular cusps at external angles. Dorsal plate oval and broader than ventral plate. Posterior segment small and rounded. Toe slender parallel-sided for about half of its length and then tapering to an acute point.

Distribution : India : Assam, Meghalaya, West Bengal, Orissa, Punjab and Tamil Nadu.

95. *Lecane (Monostyla) furcata* (Murray, 1913)

Material examined : BKS collections : 4 examples, 19.08.2008; 5 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 4 examples, 21.05.2010; 3 examples, 30.06.2010; 4 examples, 21.07.2010.

Characters : Lorica broadly oval; anterior dorsal and ventral margins straight and coincident. Ventral plate parallel-sided and narrower than dorsal plate. Toe short, stout and with two small, divergent and pointed claws.

Distribution : India : Assam, Meghalaya, Mizoram and West Bengal.

96. *Lecane (Monostyla) hamata* (Stokes, 1896)

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 12.09.2008; 6 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 4 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/480, 14.04.2010; 1 example, IV/ROT/ERS/491, 21.05.2010.

Characters : Lorica elongate-oval; anterior dorsal margin with a shallow sinus, ventral margin with a deep V-shaped sinus and with acute angled distinct cusps at its external angles. Ventral plate narrower than dorsal plate. Toe parallel-sided about half of its length and then tapering to an acute point.

Distribution : India : Assam, Meghalaya, Tripura, Mizoram, West Bengal, Orissa, Tamil Nadu, Gujarat, Rajasthan, Punjab and Kashmir.

97. *Lecane (Monostyla) lunaris* (Ehrenberg, 1832)

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 12.09.2008; 5 examples, 17.10.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 4 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.11.2009; 4 examples, 30.12.2009; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 5 examples, 21.05.2010; 6 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Lorica ovate; anterior margins with a shallow sinus; dorsal plate semi-circular to pear-shaped, ventral plate narrower than dorsal plate. Posterior segment rounded posteriorly. Toe long, parallel-sided; claw pointed, with a median furrow and two basal denticles.

Distribution : India : All the states of North-Eastern India, Bihar, Gujarat, Kashmir, Orissa, Tamil Nadu and West Bengal.

98. *Lecane (Monostyla) monostyla* (Daday, 1897)

Material examined : BKS collections : 3 examples, 17.10.2008.

Characters : Lorica oval, with straight and coincident anterior margins; dorsal plate with lateral spine-like processes, ventral plate with very small spines at external angles. Toe parallel-sided for 3/4 of its length and then tapering to an acute point.

Distribution : India : Assam, Meghalaya, Tripura, Kerala and Tamil Nadu.

99. *Lecane (Monostyla) obtusa* (Murray, 1913)

Material examined : BKS collections : 5 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 21.07.2010.

Characters : Lorica oval; anterior margins straight, coincident and with minute spines at external angles. Ventral plate narrow than dorsal late. Toe cylindrical, slightly swollen in its middle region; claw pointed, with basal spicules.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Tamil Nadu, Tripura and West Bengal.

100. *Lecane (Monostyla) pyriformis* (Daday, 1905)

Material examined : BKS collections : 3 examples, 12.12.2008; 3 examples, 30.12.2009.

Characters : Lorica oval, anterior margins straight, coincident and with rounded external angles; ventral plate narrower than dorsal plate. Toe parallel-sided for some distance and then tapering into a slender tip.

Distribution : India : Assam, Bihar, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

101. *Lecane (Monostyla) quadridentata* (Ehrenberg, 1830)

Material examined : BKS collections : 6 examples, 19.08.2008; 5 examples, 12.09.2008; 7 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 5 examples, 21.03.2009; 4 examples, 24.04.2009; 3 examples, 15.05.2009; 5 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 7 examples, 27.10.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 5 examples, 21.05.2010; 5 examples, 30.06.2010; 6 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/302, 04.07.2008; 1 example, IV/ROT/ERS/365, 12.12.2008; 1 example, IV/ROT/ERS/481, 14.04.2010; 1 example, IV/ROT/ERS/493, 21.05.2010.

Characters : Lorica ovate, anterior dorsal margin with two out-curved spines, ventral margin with a V-shaped sinus and its external angles produced into minute spines. Toe long and parallel-sided; claw pointed and with two distinct basal spicules.

Distribution : India : Andhra Pradesh, Assam, Bihar, Haryana, Jammu & Kashmir, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Tamil Nadu and West Bengal.

102. *Lecane (Monostyla) stenroosi* (Meissner, 1908)

Material examined : BKS collections : 4 examples, 19.08.2008; 3 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 5 examples, 21.05.2010.

SS collections : 1 example, IV/ROT/ERS/411, 19.02.2009.

Characters : Lorica ovate to circular. Anterior dorsal margin straight, ventral margin with a shallow median sinus flanked by sharp inwardly directed spines. Dorsal plate smaller than ventral plate and its lateral margins reaching anterior end of lorica. Lateral sulci deep. Posterior segment small and rounded posteriorly. Toe stout, enlarged basally and then nearly parallel-sided and with two separate pseudo-claws.

Distribution : India : Andhra Pradesh, Gujarat, Tamil Nadu and West Bengal.

103. *Lecane (Monostyla) thienemanni* (Hauer, 1938)

Material examined : Not observed in 2008-10 collections.

Characters : Lorica elongate-oval; anterior dorsal margin straight, ventral margin with a shallow sinus and with stout triangular spines at external angles. Dorsal plate broader than ventral plate. Toe parallel-sided for about half of its length and then tapering to an acute point.

Distribution : India : Assam, Gujarat, Meghalaya, Orissa, Tripura and West Bengal.

104. *Lecane (Monostyla) unguitata* (Fadeev, 1925)

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 12.09.2008; 4 examples, 17.10.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 5 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 4 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/384, 26.06.2009.

Characters : Lorica circular; anterior dorsal margin straight, 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 : Assam, Bihar, Gujarat, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

Family NOTOMMATIDAE

Corona ventral (*Notommata*-type), often with ciliated auricles. Trunk usually spindle-shaped. Foot generally not clearly set off from the body. Trophi virgate and modified for suction.

Four genera of this family are observed in the present account.

Genus *Cephalodella* Bory de St. Vincent, 1826

Characters : Body cylindrical, slightly curved and cuticle somewhat stiffened; with a thin dorsal and a ventral plate. Foot short, toes slightly bent and pointed. Corona consists of a simple circum-apical band of cilia and with ventral buccal field. Trophi virgate, variously shaped in different species.

This genus is represented by three species in the present study.

105. *Cephalodella forficula* (Ehrenberg, 1830)

Material examined : BKS collections : 3 examples, 26.06.2009; 3 examples, 20.01.2010.

Characters : Body elongate, spindle-shaped, slightly compressed laterally; head distinct. Lorica plates distinct; sulci narrow and parallel-sided. Foot distinct. Toes short, stout, widely spaced at base, curved and acutely pointed; with characteristic knob-like basal spine and another small spine. Sub-unci fan shaped.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Tamil Nadu, Tripura and West Bengal.

106. *Cephalodella gibba* (Ehrenberg, 1830)

Material examined : BKS collections : 3 examples, 31.08.2009.

Characters : Body elongated and gibbous dorsally. Lorica plates distinct; sulci narrow anteriorly and widening distally. Toes long, curved, gradually tapering and with conical tips. Rami symmetrical, free ends of manubria curved.

Distribution : India : Assam, Gujarat, Jammu & Kashmir, Ladak, Meghalaya, Tamil Nadu, Tripura and West Bengal.

107. *Cephalodella mucronata* Myaers, 1934

Material examined : 3 examples, 31.08.2009.

Characters : Body elongate, dorsally arched and laterally compressed. Lorica extending beyond end of foot. Longitudinal sulci deep. Foot sheath with triangular ventral point and deep dorsal spine. Toes very long, slender, recurved and tapering to pointed tips.

Distribution : India : Assam, Meghalaya, Orissa and West Bengal.

Genus *Monommata* Bartsch, 1870

Characters : Body cylindrical or fusiform. Cuticle thin and firm, laterally and dorsally with longitudinal striae. Foot indistinctly two segment; toes distinctly long, unequal; right toe longer than left. Trophi variable simple virgate to intermediate between virgate and forcipate type. Corona with marginal whorl of cilia, lateral auricle like tufts, un-ciliated apical field and ciliate buccal field.

This genus is represented by one species in the samples collected from Deepor Beel.

108. *Monommata longiseta* (O.F. Müller, 1786)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 21.03.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 26.02.2010.

SS collections : 1 example, IV/ROT/ERS/412, 19.09.2009.

Characters : Body elongate, head short; integument marked with closely space striae. Toes long and unequal. Rami bent at right angle in middle and each ramus with a long slender tooth. Right uncus with three slender teeth and left uncus with two teeth. Fulcrum without basal apophysis. Manubria broad proximally and rod like distally.

Distribution : India : Assam, Meghalaya and West Bengal.

Genus *Notommata* Ehrenberg, 1930

Characters : Body cylindrical, spindle-shaped, sac-like, conical or with lateral alae; neck suture evident. Transverse and longitudinal folds on the trunk. Two-segmented foot ends in two more or less tapering toes. Foot often covered by cuticular expansion and frequently bears a sensory papilla or a short spur between toes. Corona *Notommata*-type. Trophi virgate,

asymmetric in most species. Retro-cerebral organ generally well developed. Cerebral eye spots present or absent

Notommata is represented by one species in the present study.

109. *Notommata spinata* Koste & Shiel, 1991

(Fig. 56)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 31.08.2009; 2 examples, 19.09.2009.

Characters : Body laterally expanded into two distinct alae and without dorsal hump. Lateral tip of each ala armed with stout triangular cusp. Head and neck sutures distinct. Foot two-segmented; toes conical, long and tapering to point. Triangular tail commences at level of lateral antennae, with distal end a blunt point at beginning of first foot joint. Trophi modified virgate, asymmetric. Fulcrum expanded into fan at distal end. Manubria curved posteriorly and dilated distally. Retro-cerebral sac long, sub-cerebral sac large.

Distribution : India : Assam. Recorded from Deepor Beel by Sharma and Sharma (2011a).

Family SCARIDIIDAE

Trophi virgate. Unci projecting through mouth opening; tips curved outwards. Corona modified *Notommata*-type, retractable, laterally bordered by pairs of lobes. Trochus specialized, with stiff setae.

This family includes genus *Scaridium* in the present study.

Genus *Scaridium* Ehrenberg, 1830

Characters : Body cylindrical; lorica thin. Foot three-segmented, terminal foot-segment longest, strong and striated foot muscles present; toes very long and equal. Corona simple, with ventral ciliated zone. Trophi modified virgate.

Only one species belonging to this genus is noticed in our collections.

110. *Scaridium longicaudum* (O. F. Müller, 1786)

Material examined : BKS collections : 4 examples, 12.12.2008; 3 examples, 21.03.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 19.03.2010.

SS collections : 1 example, IV/ROT/ERS/461, 29.01.2010.

Characters : Lorica thin and cylindrical; foot three-segmented, distal segment longest. Toes almost as long as foot, parallel-sided and with blunt tips. Trophi symmetrical, modified virgate; rami teeth large and alulae rounded, fulcrum with well developed basal plate, manubrium relatively broad and with straight ventral margin.

Distribution : India : Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tamil Nadu and West Bengal.

Family TRICHOCERCIDAE

Body cylindrical, asymmetrical and spindle-shaped or sacciform; often with a keel or striated area. Foot present, reduced or absent; with equal or unequal bristle-like toes. Corona of *Asplanchna*- or *Notommata*-type. Trophi virgate and asymmetrical.

This family is represented by genus *Trichocerca* in the examined material.

Genus *Trichocerca* (Lamarck, 1801)

Characters : Body elongated, cylindrical and asymmetrical; lorica thin to rigid and with one or two keels or striated areas. Foot short; with equal or unequal toes, sub-styles sometimes present. Corona simple, one or two palps on the apical buccal field. Trophi virgate, more or less asymmetrical.

Twelve species of *Trichocerca* are recorded in the examined collections.

111. *Trichocerca bicristata* (Gosse, 1887)

(Fig. 57)

Material examined : BKS collections : 5 examples, 12.09.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 5 examples, 21.05.2010; 4 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/385, 26.06.2009; 1 example, IV/ROT/ERS/470, 27.02.2010.

Characters : Lorica elongated; with two characteristic distinct keels extending unto 2/3 the length of dorsum, separated by wide depression of dorsum. Left toe longer than body, right toe reduced; substyles present. Trophi asymmetrical; manubria terminally crooked and one side curved, supra-rami large, left ramus with two pointed alulae.

Distribution : India : Assam, Bihar, Orissa and Tamil Nadu. Recorded from Deepor Beel by Sharma and Sharma (2011a).

112. *Trichocerca capucina* (Wierzejski & Zacharias, 1893)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Body cylindrical and with a dorsal keel. Head long, with five palps and two tentacles; with a dorsal plate-like projection and a number of folds. Left toe about 1/2 of the body length, right toe small. Trophi almost symmetrical; right manubrium more robust.

Distribution : India : Assam, Meghalaya and Tripura.

113. *Trichocerca cylindrica* (Imhof, 1891)

Material examined : BKS collections : 3 examples, 19.02.2009; 3 examples, 19.03.2010; 2 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/424, 18.09.2009.

Characters : Body elongated and cylindrical; anterior end with a median dorsal spine. Lorica thin, with a striated area and a single dorsal keel. Left toe almost as long as lorica; right toe reduced to a small scaly spine. Trophi symmetrical, manubria with curved free ends, unci moderately broad and rami curved.

Distribution : India : Assam, Jammu & Kashmir, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

114. *Trichocerca elongata* (Gosse, 1886)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 26.02.2010.

SS collections : 1 example, IV/ROT/ERS/437, 28.10.2009.

Characters : Body elongated, cylindrical and with two keels extending unto 1/3 to 2/5 of the body length. Foot short and distinct. Left toe about 1/2 of the total length; right toe about 1/3 of the left toe and substyles present.

Distribution : India : Assam, Meghalaya and Tripura.

115. *Trichocerca flagellata* Hauer, 1937

(Fig. 58)

Material examined : BKS collections : 3 examples, 24.07.2009; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Body ovoid, head indistinctly demarcated; anterior margin raised in a smooth curve on the right side. Keel high vaulted with wide striated area extending to the beginning of the short foot opening. Left toe longer and slightly sigmoid, right toe reduced and stylet present. Trophi robust and with strongly crooked fulcrum and left manubrium.

Distribution : India : Assam, Meghalaya and Tamil Nadu. Recorded from Deepor Beel by Sharma and Sharma (2011a).

116. *Trichocerca iernis* (Gosse, 1887)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 4 examples, 12.12.2008; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 5 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 4 examples, 21.07.2010.

Characters : Body cylindrical, slightly curved and with a short spine at anterior margin of lorica; head separated from trunk by a transverse fold. Striated keel extending from anterior margin to end of abdomen. Left toe nearly $\frac{3}{4}$ of body length, right toe short, basal stylet present. Left manubrium not crooked, supra-rami small and left uncus bidentate.

Distribution : India : Assam, Jammu & Kashmir and Tamil Nadu.

117. *Trichocerca longiseta* (Schränk, 1802)

(Fig. 59)

Material examined : BKS collections : 2 examples, 21.03.2009; 3 examples, 31.08.2009.*Characters* : Lorica long and cylindrical; anterior margin with a long spine, another half long spine and two small projections. Head with longitudinal folds in contracted specimens. Keel and striated area extending up to middle of the trunk. Left toe equal to about half of the body length or more and right toe small; substyles present. Left manubrium long, terminally thickened and curved inwards. Left ramus with pointed alula; supra-rami with acute points.*Distribution* : India : Assam, Jammu & Kashmir, Ladak, Meghalaya, Tripura and West Bengal.118. *Trichocerca porcellus* (Gosse, 1851)*Material examined* : BKS collections : 3 examples, 19.08.2008; 3 examples, 21.05.2010.*Characters* : Body short, curved; head with two anterior dorsal cusps, right one slightly longer. Striated keel extending backwards from the base of the largest tooth. Foot partly enclosed within lorica. Toes two; left toe longer. Trophi asymmetrical; left manubrium robust, right manubrium a slender rod and left ramus alula much longer than right.*Distribution* : India : Assam and Tamil Nadu.119. *Trichocerca pusilla* (Jennings, 1903)*Material examined* : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 15.05.2009; 2 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 21.05.2010; 3 examples, 21.07.2010.*Characters* : Body short and cylindrical; with distinct head and without any crest or striated area. Anterior end straight but with longitudinal folds in contracted specimens. Toes unequal; left toe long and ventrally directed, right toe very small.*Distribution* : India : Assam, Meghalaya, Bihar, Orissa, Tripura and West Bengal. Recorded from Deepor Beel by Sharma and Sharma (2011a).120. *Trichocerca rattus* (O.F.Müller, 1776)

(Fig. 60)

Material examined : BKS collections : 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/454, 30.12.2009; 1 example, IV/ROT/ERS/462, 28.02.2010.

Characters : Body elongated and with a broad striated keel extending up to half of its length. Left toe smaller than body; right toe reduced. Trophi asymmetrical; right manubrium slightly reduced, right ramus obtuse, left ramus strong, plank-shaped and with broad free end.

Distribution : India : Assam, Gujarat, Jammu & Kashmir, Ladak, Meghalaya, Punjab, Tamil Nadu Tripura and West Bengal.

121. *Trichocerca similis* (Wierzejski, 1893)

(Fig. 61)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 4 examples, 12.12.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/425, 18.09.2009; 1 example, IV/ROT/ERS/471, 27.02.2010.

Characters : Body long and anterior end with two long spines dorsally separated by a small hump. Dorsal keel extending from base of anterior spines up to 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 : Assam, Gujarat, Meghalaya, Manipur, Orissa, Tamil Nadu, Tripura and West Bengal.

122. *Trichocerca sulcata* (Jennings, 1894)

Material examined : BKS collections : 3 examples, 14.11.2008; 3 examples, 31.08.2009; 3 examples, 20.01.2010.

Characters : Lorica short, cylindrical and dorsally curved; anterior end with a number of longitudinal folds. Striated area extending up to 2/3 of the dorsum. Foot ventrally displaced. Toes small and ventrally curved. Trophi asymmetrical; fulcrum robust, left manubrium distally dilated, right manubria short and slender rod; ramus with enlarged bifurcate alula.

Distribution : India : Assam, Meghalaya and Tripura.

Family ASPLANCHNIDAE

Body without lorica; cuticle thin and transparent. Foot absent or present. Corona consists of a simple girdle of arcs and tufts of cirri around head and a very small area around mouth. Intestine, cloaca and anus present or absent. Trophi incudate. Often viviparous.

This family is represented by only one genus in the present account.

Genus *Asplanchna* Gosse, 1850

Characters : Body illoricate, transparent; sacciform, bell-shaped or with humps or projections. Foot absent; pedal glands sometimes present. Corona consists of a broken single ring of cilia. Vitellarium horse-shoe shaped or globose.

This genus is represented by only one species in our collections from Deepor Beel.

123. *Asplanchna priodonta* Gosse, 1850

Material examined : BKS collections : 7 examples, 12.09.2008; 8 examples, 17.10.2008; 3 examples, 14.11.2008; 7 examples, 15.05.2009; 9 examples, 24.07.2009; 7 examples, 31.08.2009; 9 examples, 27.10.2009; 5 examples, 27.11.2009; 7 examples, 30.06.2010; 10 examples, 21.07.2010.

Characters : Body rounded to sacciform in its shape. Protonephredia with four flame bulbs each. Contractile vesicle small and rounded. Vitellarium rounded and with eight nuclei. Rami serrate on inner side, broad at free ends and each with lateral prolongation at the base.

Distribution : India : Assam, Bihar, Gujarat, Jammu & Kashmir, Meghalaya, Manipur, Tamil Nadu, Tripura and West Bengal.

Family SYNCHAETIDAE

Body rounded to sacciform in its shape. Protonephredia with four flame bulbs each. Contractile vesicle small and rounded. Vitellarium rounded and with eight nuclei. Rami serrate on inner side, broad at free ends and each with lateral prolongation at the base.

Synchaetidae is represented by only one genus in the present study.

Genus *Polyarthra* Ehrenberg, 1834

Characters : Body illoricate, slightly flattened dorso-ventrally and with four groups of three feathered sword-shaped serrate blades or paddles each; two groups dorso-lateral and two groups ventro-lateral. Corona with a circumapical band of cilia and two cylindrical ciliated antennae. Trophi large and virgate. Cerebral eye large and red. Vitellarium with 4, 8 or 12 nuclei. Foot lacking.

Only one species belonging to this genus is observed in present study.

124. *Polyarthra vulgaris* Carlin, 1943

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 14.11.2008; 7 examples, 12.12.2008; 7 examples, 19.01.2009; 3 examples, 19.02.2009; 5 examples, 21.03.2009; 7 examples, 15.05.2009; 7 examples, 26.06.2009; 7 examples, 31.08.2009; 4 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 6 examples, 20.01.2010; 7 examples, 14.04.2010; 5 examples, 21.05.2010; 9 examples, 30.06.2010.

SS collections : 1 example, IV/ROT/ERS/495, 21.05.2010.

Characters : Body cylindrical and with paired ventral appendages; blades pinnate to feather-shaped and slightly longer than body; each blade with a distinct mid-rib and lateral ribs. Apical field with two ciliated antennae. Vitellarium with eight nuclei.

Distribution : India : Assam, Bihar, Meghalaya, Manipur, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

Family DICRANOPHORIDAE

Forms illoricate or partly loricate. Corona similar to *Notommata*-type, under a hook-like rostrum; mouth almost in center of corona; lateral tufts like auricles. Trophi forcipate and protrusible.

The family Dicranophoridae is represented by only one genus in the present study.

Genus *Dicranophoroides* De Smet, 1997

Characters : Body elongate, vase-shaped, fusiform or cylindrical; cuticle stiff. Head demarcated. Trunk with longitudinal lines or ridges and lateral sulci. A narrow tail projecting over foot. Foot small, conical; toes short or long, tapering to acute tip or ending into acute claw. Trophi symmetrical, forcipate. Rami lyrate; axis of each ramus composed of a sub-basal chamber only. Fulcrum triangular or elongate-triangular. Unci single-toothed. Manubria straight or slightly curved; posterior end curved and slightly expanded.

Only one species of this genus recorded from Deepor Beel.

125. *Dicranophoroides caudatus* (Ehrenberg, 1834)

Material examined : BKS collections : 3 examples, 26.06.2009; 2 examples, 19.09.2009; 2 examples, 20.01.2010; 3 examples, 26.02.2010.

SS collections : 1 example, IV/ROT/ERS/472, 27.02.2010.

Characters : Body cylindrical. Head with single finger-like palp. Trunk with lateral sulci and longitudinal folds. Tail prominent. Toes long and terminating into acute tips. Corona oblique. Two red, large eyespots presents. Pedal glands small. Stomach with blind sacs. Trophi large and stout. Rami sub-basal chambers terminating in a knob-like expansion. Fulcrum short, triangular. Unci single-toothed. Manubria slightly curved; anterior end with small triangular lamella.

Distribution : India : Assam and Tamil Nadu.

Order FLOSCULARIACEAE

Body loricate or illoricate. Trophi malleoramate. Corona of *Hexarthra*- or *Conochilus*-type. Foot, if present, without toes; in the living forms or in juvenile stages, it terminates into a ciliated cap. Numerous foot glands present. Includes solitary, free-swimming colonies or sessile forms; sessile forms often with a gelatinous sheath or tube made up of detritus.

Five families of this order are documented in present account.

Family FLOSCULARIDAE

Adults usually sessile (solitary or colonial) or pelagic. Corona *Hexarthra*-type; circular or of different shapes, with 2-8 lobes. Foot present.

This family is represented by four genera in our collections from Deepor Beel.

Genus *Floscularia* Cuvier, 1798

Characters : Sessile, inhabiting a tube made of tiny faecal pellets or sand grains. Corona with four lobes. Dorsal antenna only on short papilla.

Only one species of *Floscularia* is observed in the present account.

126. *Floscularia ringens* (Linnaeus, 1758)

Material examined : not observed in 2008-10 collections.

Characters : Sessile on aquatic vegetation. Case formed of small brownish and tightly packed faecal pellets.

Distribution : India : Assam.

Genus *Lacinularia* Schweigger, 1826

Characters : Colonial, pelagic or attached to aquatic vegetation; colonies in a gelatinous matrix. Corona heart shaped to ovoid.

This genus is represented by only one species in the collections from Deepor Beel.

127. *Lacinularia flosculosa* (O. F. Müller, 1773)

Material examined : Not observed in 2008-10 collections.

Characters : Colonies large, spherical, free floating or pelagic. Corona heart-shaped, with deep ventral sinus.

Distribution : India : Assam.

Genus *Limnias* Schrank, 1803

Characters : Sessile. Inhabits an annulated chitinous tube, often covered with debris. Corona consists of two rounded lobes formed by wide dorsal gap and with deep ventral depression.

The samples examined from Deepor Beel include only one species of *Limnias*.

128. *Limnias ceratophylli* Schrank, 1803

Material examined : Not observed in 2008-10 collections.

Characters : Case unstructured. Small horns behind corona lacking.

Distribution : India : Assam and Punjab.

Genus *Sinantherina* Bory de St. Vincent, 1826

Characters : Sessile and form spherical aggregation of individuals radiating from a point; colony not in gelatinous matrix. Corona heart-shaped, with a shallow dorsal notch.

Two species of *Sinantharina* are observed in the samples examined from Deepor Beel.

129. *Sinantharina socialis* (Linne, 1758)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 19.02.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Colonial. Trunk not spinulate. Four tubercles present behind corona. Foot short or medium.

Distribution : India : Assam, Manipur, Meghalaya, Tripura and Tamil Nadu.

130. *Sinantharina spinosa* (Thorpe, 1893)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 19.01.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/438, 28.10.2009; 1 example, IV/ROT/ERS/482, 14.04.2010.

Characters : With up to 30 individuals in colony, attached with their foot. Trunk with distinct hook-like spines on ventral side.

Distribution : India : Assam, Manipur, Tripura and Tamil Nadu.

Family CONOCHILIDAE

Usually in colonies and often with a gelatinous case. Lorica absent; foot stout and without holdfast; toes absent. Corona horse-shoe shaped, with mouth in middle or near dorsal edge. Trophi malleoramate.

This family is represented by one genus in the examined material.

Genus *Conochilus* Ehrenberg, 1834

Characters : Forms colonial but sometimes solitary. Body conical or vase-shaped and with long, contractile and un-segmented foot. Corona as a horse-shoe shaped double band of cilia; mouth near dorsal edge of corona. Digestive tract U-shaped, anus situated dorsally.

Only one species belonging to this genus is presently examined from Deepor Beel.

131. *Conochilus unicornis* Rousselet, 1892

Material examined : BKS collections : 3 examples, 19.01.2009; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Forms colonial, with 5-25 individuals bounded by a gelatinous case. Body vase-shaped; foot contractile. Apical field conically domed and mouth located in its center. Lateral antennae fused and located on apical field.

Distribution : India : Assam, Meghalaya, Manipur, Tripura, West Bengal and Tamil Nadu.

Genus ***Hexarthra*** Schmarda, 1854

Characters : Body conical; six arm-like appendages with pinnate bristles at their tips. Corona wavy, with double band of cilia and with or without ventral lip. Some species with two club-shaped dorsal appendages located at the posterior end of the body. Unci with variable number of teeth.

Only one species of *Hexarthra* is observed in our collections from Deepor Beel.

132. ***Hexarthra mira*** (Hudson, 1871)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 14.11.2008; 2 examples, 24.04.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body conical or bell-shaped, with six arm-like appendages and each ending with pinnate bristles. Ventral arm with three pairs of spines and eight bristles. Two ciliated club-shaped appendages located at posterior end of the body. Each ramus with six teeth.

Distribution : India : Assam, Bihar, Jammu & Kashmir, Meghalaya, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Family TESTUDINELLIDAE

Creeping or semi-pelagic forms. Lorica with a distinct foot-opening. Foot, if present, tubiform and terminally ciliated.

This family is represented by two genera in the present study.

Genus ***Testudinella*** Bory de St.Vincent, 1826

Characters : Body circular, elliptical, oval or vase-shaped. Foot-opening ventral, located near middle or in the posterior half or posterior end of lorica. Foot annulated and terminating with a band of cilia. Corona with a circum-apical band of cilia. Position of lateral antennae diagnostic. Vitellarium horse-shoe shaped.

Testudinella is represented by six species in the examined collections.

133. ***Testudinella brevicaudata*** Yamamoto, 1951

Material examined : BKS collections : not observed in 2008-10 collections.

Characters : Lorica oval, produced posteriorly into a rectangular projection. Anterior dorsal margin with small median spine. Foot-opening semicircular and located ventrally at posterior projection of lorica.

Distribution : India : Assam and Tripura.

134. ***Testudinella emarginula*** (Stenroos, 1898)

Material examined : BKS collections : 3 examples, 12.12.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 26.02.2010; 3 examples, 21.07.2010.

Characters : Lorica vase-shaped and biconcave in cross-section. Anterior dorsal margin with a plate-like process and ventral margin with a shallow notch. Foot-opening slit-shaped and located near posterior end of lorica.

Distribution : India : Assam, Bihar, Meghalaya, Manipur, Orissa, Tamil Nadu, Tripura and West Bengal.

135. ***Testudinella greeni*** Koste, 1981

(Fig. 62)

Material examined : BKS collections : 5 examples, 12.09.2008; 4 examples, 24.07.2009; 3 examples, 31.08.2009; 4 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 30.06.2010; 4 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/405, 25.02.2009.

Characters : Lorica elongate-oval, distinctly arched dorsally; with maximum width in the middle. Anterior end with distinct median dorsal occipital spine and with a U-shaped median ventral sinus. Foot-opening elongated and situated at posterior end of lorica.

Distribution : India : Assam, Meghalaya and Tripura.

136. ***Testudinella parva*** (Ternetz, 1892)

(Fig. 63)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 27.11.2009.

Characters : Lorica pear-shaped and with maximum width in the posterior region. Anterior dorsal margin slightly elevated and with a shallow depression; anterior ventral margin with median notch. Foot-opening elliptical and located at a short distance from posterior margin of lorica.

Distribution : India : Assam, Meghalaya, Tamil Nadu, Tripura and West Bengal.

137. ***Testudinella patina*** (Hermann, 1783)

Material examined : BKS collections : 7 examples, 19.08.2008; 5 examples, 12.09.2008; 6 examples, 14.11.2008; 4 examples, 12.12.2008; 6 examples, 19.01.2009; 5 examples, 19.02.2009; 5 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 7 examples, 27.10.2009; 4 examples, 27.11.2009; 3 examples, 30.12.2009; 5 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 6 examples, 21.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/366, 12.12.2008; 1 example, IV/ROT/ERS/473, 27.02.2010.

Characters : Lorica circular and dorso-ventrally flattened. Dorsum slightly convex. 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 : Andhra Pradesh, Assam, Bihar, Gujarat, Jammu & Kashmir, Meghalaya, Manipur, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

Genus ***Pompholyx*** Gosse, 1851

Characters : Body oval or elliptical or shield-shaped, with thin lorica and without foot. Cloacal opening located at posterior end of lorica; eggs attached to posterior end with retractile threads. Corona consists of a simple circum-apical band of cilia. Trophi malleoramate; unci with numerous teeth.

Pompholyx is represented by only one species in our collections from Deepor Beel.

138. ***Pompholyx sulcata*** Hudson, 1885

(Fig. 64)

Material examined : BKS collections : 3 examples, 12.12.2008; 3 examples, 19.01.2009; 2 examples, 21.03.2009; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 4 examples, 21.05.2010.

Characters : Lorica oval; 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 : Assam, Jammu & Kashmir, Ladak, Meghalaya, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

Family TROCHOSPHAERIDAE

Body spherical or sacciform, without lorica. Corona as a single band of cilia encircling the body (*Trochosphaera*) or borne apically on a short neck (*Horaella*). Trophi malleoramate. Cloaca present; anus terminal or sub terminal. Foot lacking. Vitellarium rounded or elongate; reproduction oviparous, ovoviviparous or viviparous.

This family is represented by two genera in our collections from Deepor Beel.

Genus ***Filinia*** Bory de St.Vincent, 1824

Characters : Body illoricate, cylindrical or sacciform; with two movable antero-lateral spines and one or two terminal or sub-terminal setae. Anus terminal; foot absent. Corona consists of a single circum-apical ring of cilia. Eyes two, situated on apical field.

Five species of *Filinia* are observed in the samples examined from Deepor Beel.

139. ***Filinia brachiata*** (Rousselet, 1901)

Material examined : Not observed in 2008-10 collections.

Characters : Body saccate, with short lateral and caudal setae; all setae nearly equally long and about half of body length. Lateral setae inserted just below corona. Caudal seta inserted ventrally at a distance from the posterior end. Trophi small, with 12-14 unci teeth.

Distribution : India : Assam, Meghalaya and Tamil Nadu.

140. ***Filinia camascela*** Myers, 1938

(Fig. 65)

Material examined : BKS collections : 5 examples, 19.08.2008; 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 31.08.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Body vase-shaped; maximum width nearly in the middle region. Anterior dorsal margin straight, anterior ventral margin slightly elevated and with a shallow median sinus. Lateral setae nearly double the length of body and inserted near the middle. Caudal seta immobile and inserted terminally.

Distribution : India : Assam and Tripura.

141. ***Filinia longiseta*** (Ehrenberg, 1834)

Material examined : BKS collections : 7 examples, 19.08.2008; 5 examples, 12.09.2008; 7 examples, 17.10.2008; 5 examples, 12.12.2008; 7 examples, 26.06.2009; 5 examples, 27.11.2009; 6 examples, 14.04.2010; 8 examples, 30.06.2010.

SS collections : 1 example, IV/ROT/ERS/446, 28.22.2009; 1 example, IV/ROT/ERS/483, 14.04.2010.

Characters : Body cylindrical or saccate and with two long movable antero-lateral setae and one long immobile posterior seta. Posterior seta inserted usually 25µm away from the caudal end of body. Lateral antennae situated in the middle part of the body. Vitellarium with 15-20 nuclei. Trophi with 18-22 unci teeth.

Distribution : India : Assam, Gujarat, Haryana, Madhya Pradesh, Manipur, Meghalaya, Orissa, Punjab, Rajasthan, Tripura and West Bengal.

142. ***Filinia opoliensis*** (Zacharias, 1898)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 27.11.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/ROT/ERS/356, 14.11.2008; 1 example, IV/ROT/ERS/392, 27.02.2010.

Characters : Body spindle-shaped.; with two broad-based lateral and two caudal setae. Lateral setae equal or unequal. Caudal setae unequal; long caudal seta stiff and inserted terminally and an additional small seta or spine located at its base. Vitellarium with 8-14 nuclei. Trophi with 20/ 22 unci teeth.

Distribution : India : Assam, Meghalaya, Tripura, West Bengal, Orissa, Bihar, Madhya Pradesh, Gujarat, Rajasthan, Punjab and Tamil Nadu.

143. *Filinia pejleri* Hutchinson, 1964

Material examined : Not observed in 2008-10 collections.

Characters : Body fusiform, about 3-4 times as long as wide; with minutely spinulate appendages. Lateral setae equal, nearly twice the length of body, inserted behind corona and usually folded laterally. Caudal seta longest, stiff, with broad and oblique base and inserted terminally. Trophi with 16-19 unci teeth.

Distribution : India : Assam, Bihar, Madhya Pradesh, Orissa, Punjab, Tamil Nadu, Tripura and West Bengal.

Genus *Trochosphaera* Semper, 1872

Characters : Body spherical and transparent; apical field well developed. Corona consists of a band of cilia encircling body around middle or towards one end. Vitellarium sickle-shaped, with numerous nuclei. Anus sub-terminal. Mastax relatively small, with malleoramate trophi; unci teeth numerous and un-differentiated. Viviparous.

This genus includes only one species in the present account.

144. *Trochosphaera aequatorialis* Semper, 1872

Material examined : BKS collections : 3 examples, 14.11.2008; 2 examples, 19.09.2009; 3 examples, 27.10.2009.

Characters : Body spherical and transparent. Corona equatorial, a circular band of cilia, with wide dorsal gap near dorsal antenna. Ventral mouth distinct. Cloaca and bladder distinct. Anus almost terminal. Vitellarium band-shaped, with numerous nuclei. Trophi malleoramate, with uniform unci teeth.

Distribution : India : Assam, Tripura and Tamil Nadu.

Subclass DIGONONTA

Ovaries paired, with vitellarium. Reproduction asexual. This sub-class is represented by only one order in the present account.

Order BDELLOIDEA

Ciliated rostrum on head and with a dorsal antenna. Trophi ramate. Corona with two ciliated discs on pedicles (*Philodina*-type) or on a ventral ciliated area (*Adineta*-type).

The bdelloid rotifers are represented by only one family in Deepor Beel.

Family PHILODINIDAE

Corona *Philodina*-type. Rostrum retractile. Stomach lumen tube-shaped and ciliated. Food excrete not formed into pellets.

Our collections from Deepor Beel include only one genus of the Philodinidae.

Genus ***Rotaria*** Scopoli, 1777

Characters : Body fusiform and usually elongated; foot three-segmented. Eyes, if present, located on rostrum. Viviparous.

Two species of this genus are recorded in the samples collected from Deepor Beel.

145. ***Rotaria neptunia*** (Ehrenberg, 1830)

Material examined : BKS collections : 3 examples, 12.12.2008; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 24.07.2009; 2 examples, 19.09.2009; 3 examples, 21.07.2010.

Characters : Body long and fusiform. Rostrum with two eyes and with an arched rostral papilla. Palp-like antennae on first neck segment. Trunk long. Foot long, telescopic and with a pair of pointed spurs; last foot-segment with three slender and equal toes.

Distribution : India : Andhra Pradesh, Assam, Bihar, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

146. ***Rotaria rotatoria*** (Pallas, 1766)

Material examined : BKS collections : 3 examples, 19.01.2009; 2 examples, 24.04.2009; 3 examples, 14.04.2010.

Characters : Body fusiform, trunk without striae, tapering into foot. Dorsal antenna situated on the first neck segment. Foot moderately long; last foot-segment with three equal toes, spurs paired, short and acutely pointed.

Distribution : India : Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Meghalaya, Orissa, Tripura and West Bengal.

c. CLADOCERA

Superclass CRUSTACEA

Class BRANCHIOPODA

Superorder CLADOCERA (s. str.)

Order CTENOPODA

Includes forms with six pairs of similar thoracic legs. This order is represented by only one family in the present account.

Family SIDIDAE

Antennules movable and with nine olfactory setae. Antennae long, massive and biramus, rami flattened; dorsal ramus with both lateral and terminal setae, ventral ramus with terminal setae. Valves oblong. Six pairs of identical and flattened legs present.

Four genera of the Sididae are observed in the collections examined from Deepor Beel.

Genus *Diaphanosoma* Fischer, 1850

Characters : Head large and dorsally demarcated from trunk. Antennules small. Swimming antennae long and powerful. Ventral valve margins curved inwards, forming narrow or wide flap-shaped inflexions. Postabdomen mostly without anal spines; claw with three basal spines.

Diaphanosoma is represented by three species in the present study.

1. *Diaphanosoma excisum* Sars, 1885

(Fig. 66)

Material examined : BKS collections : 5 examples, 26.06.2009; 4 examples, 24.07.2009.

SS collections : 1 example, IV/CLA/ERS/510, 19.02.2009.

Characters : Head large, with well developed dorsal part; eyes relatively large and located in frontal portion of head. Antennae not reaching posterior margin of valves. Postero-ventral corner of valves with variable number of denticles followed by cilia. Shell duplicator joining ventral margin of valves nearly at right angles. Postabdomen narrow and with fine hairs; claw with three basal spines decreasing in size proximally.

Distribution : India : Assam, Bihar, Kerala, Meghalaya, Manipur, Rajasthan, Tripura and West Bengal.

2. *Diaphanosoma sarsi* Richard, 1894

(Fig. 67)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 4 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 4 examples, 21.03.2009; 5 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 5 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 5 examples, 27.10.2009; 7 examples, 27.11.2009; 3 examples, 30.12.2009; 5 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 5 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/582, 28.10.2009; 1 example, IV/CLA/ERS/651, 14.04.2010.

Characters : Head relatively small; eyes exceedingly large. Antennules not reaching the posterior end of carapace. Postero-dorsal corner of valves rounded; postero-ventral corner

with 12-20 small denticles followed by small setae. Shell duplicator broad at distal end. Postabdomen narrow; claw with three basal spines, decreasing in size proximally.

Distribution : India : Andaman & Nicobar islands, Assam, Gujarat, Kerala, Manipur, Meghalaya, Rajasthan, Tripura, Uttar Pradesh and West Bengal.

3. *Diaphanosoma senegal* Gauthier, 1951

Material examined : BKS collections : 4 examples, 14.11.2008; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/564, 18.09.2009.

Characters : Head large, strongly bent dorsally and almost half of total body length. Antennae not reaching posterior end of valves. Posterior ventral part of valves deeply emarginated and with 8-18 rapidly decreasing setae; posterior margin almost straight, with two series of spines, posterior group larger than ventral. Claw short with setae on its concave margin; with three basal spines increasing in length distally.

Distribution : India : Assam, Gujarat, Maharashtra, Manipur and Meghalaya.

Genus *Pseudosida* Herrick, 1884

Characters : Head round, eyes situated frontally; an ocellus and small rostrum present. Antennules with a long flagellum; sensory setae lateral. Dorsal ramus of antenna two-segmented and ventral ramus three-segmented; antennal setae: 3-3/0-3-3. Postabdomen with bundles of spinules. Claws bidentate.

Only one species belonging to *Pseudosida* is recorded in this account.

4. *Pseudosida bidentata* Herrick, 1884

(Fig. 68)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 19.01.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/489, 14.11.2008; 1 example, IV/CLA/ERS/533, 24.07.2009; 1 example, IV/CLA/ERS/583, 28.10.2009; 1 example, IV/CLA/ERS/592, 27.11.2009; 1 example, IV/CLA/ERS/636, 20.03.2010.

Characters : Body elongated and dorsally arched. Head short and depressed. Rostrum present; Antennules attached to the ventral side of rostrum; with a long flexible flagellum and olfactory setae on each side. Postabdomen with 10-11 clusters of spinules. Claw with two large basal spines and a very small spine proximal to them.

Distribution : India : Assam, Kerala, Manipur, Meghalaya, Rajasthan, Tripura, and Tamil Nadu.

Genus *Sarsilatona* Korovchinsky, 1985

Characters : Body massive, head high with eye located close to its dorsal side. Antennules small with one sensory seta and 9 sensory papillae. Lower 3-segmented antennal branch with two largest setae having terminal hooks. Ventral valve margins only with thin setules or small spines. Lower part of posterior margins of each valve with two long naked setae and cluster of spinules. Terminal post-abdominal claw with three long, thin basal spines. Postabdomen with clusters of anal teeth.

Only one species of this genus is observed in our collections from Deepor Beel.

5. *Sarsilatona serricauda* (Sars, 1901)

(Fig. 69)

Material examined : BKS collections : 2 examples, 21.03.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009.

SS collections : 1 example, IV/CLA/ERS/478, 12.12.2008; 1 example, IV/CLA/ERS/520, 26.06.2009; 1 example, IV/CLA/ERS/534, 0507.2009; 1 example, IV/CLA/ERS/623, 27.02.2010.

Characters : Head high, eye small. Antennules relatively long. Antennae with strong basipodite; thin sharp curved spine on dorsal side of basipodite end; thinner terminal spine of first segment of upper 2-segmented antennal branch much longer. Antennal setae: (8-9)-(10-12)/0-1-4. Ventral margin of valves with small sharp denticles, ventro-posterior corner with 11-12 long feathered setae and posterior margin with 4-5 dense clusters of minute spinules. Dorsal margin of post-abdomen with 4-5 characteristic prominences; lateral sides with rows of 10-12 clusters of thin lanceolate anal teeth, with 2-4 teeth in each cluster. Claws with three long basal spines; with thin setules on outer side and row of minute denticles along their dorsal side, inner basal side of claws with row of thin denticles.

Distribution : India : Assam, Madhya Pradesh and Meghalaya.

Genus *Sida* Straus, 1820

Characters : Head with large dorsal gland; rostrum pointed. Antennules of female attached to the side of rostrum. Dorsal ramus of antenna 3-segmented, ventral ramus 2-segmented.

Only one species belonging to this genus is observed in the present study.

6. *Sida crystallina* (O.F. Müller, 1776)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009.

SS collections : 1 example, IV/CLA/ERS/602, 29.12.2009.

Characters : Head large, quadrate and distinctly separable from body by a distinct cervical sinus; with a large dorsal gland. Eye small and located in ventral region of head. Rostrum small and pointed. Antennules short, attached to side of rostrum and with short flagellum. Postabdomen with about 14 lateral anal spines; groups of lateral setae arranged in a row. Claw with four basal spines and with a row of setae distal to basal spines.

Distribution : India : Assam, Jammu & Kashmir, Manipur and Meghalaya.

Order ANOMOPODA

Includes forms with five or six pairs of dissimilar thoracic legs. This order is represented by six families in the samples collected from Deepor beel.

Family DAPHNIIDAE

Antennae long and cylindrical; dorsal ramus 4-segmented and ventral ramus 3-segmented; antennal setae: 0-0-1-3/1-1-3. Antennules small, immobile or rudimentary. Eye large, ocellus small or wanting. Postabdomen usually more or less compressed and always with anal spines. Claws denticulate, sometimes pectinate and with a basal spine. Intestine with two hepatic caeca. Five pairs of different legs present; first two pairs prehensile and without branchial lamellae.

Family Daphniidae is represented by four genera in our collections from Deepor Beel.

Genus *Ceriodaphnia* Dana, 1853

Characters : Body rounded to oval. Head small and depressed; without rostrum. Antennules small and immovable. Vertex with a rounded or angular projection. Valves oval, rounded to sub-quadrate and usually terminating posteriorly into a sharp dorsal angle or short spine. One abdominal process ordinarily developed. Postabdomen large and of variable shape.

Two species belonging to *Ceriodaphnia* are recorded in this account.

7. *Ceriodaphnia cornuta* Sars, 1885

(Fig. 70)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 6 examples, 17.10.2008; 5 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 5 examples, 19.02.2009; 4 examples, 21.03.2009; 5 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 5 examples, 27.10.2009; 3 examples, 27.11.2009; 4 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 5 examples, 14.04.2010; 5 examples, 21.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/521, 26.06.2009; 1 example, IV/CLA/ERS/550, 19.09.2009; 1 example, IV/CLA/ERS/637, 20.03.2010.

Characters : Body oval and produced posteriorly into a short projection. Head with distinct cervical depression; produced anteriorly into a short beak and with a short horn

dorsally. Eyes large; ocellus punctate. Antennules small and fusiform; lateral sensory seta somewhat distal to middle. Valves reticulate with large polygons and hexagons. Postabdomen moderately broad and with 5-6 anal spines. Claws short, stout and smooth.

Distribution : India : Andaman & Nicobar islands, Assam, Bihar, Haryana, Himachal Pradesh, Kerala, Madhya Pradesh, Manipur, Meghalaya, Punjab, Rajasthan, Tripura and West Bengal.

8. *Ceriodaphnia reticulata* (Jurine, 1820)

Material examined : BKS collections : 3 examples, 19.08.2008.

Characters : Head small, rounded, with an obtuse angle in the rostral region. Eyes nearly filling frontal region of head. Fornix distinct. Cervical sinus deep. Carapace rounded oval, valves with reticulate pattern. Postabdomen broadest in middle, with lateral row of up to 8 spines on each side and with several groups of fine setae. Claw with three pectens; the proximal pecten of small and fine spinules, the middle of 4-5 robust teeth and the distal pecten of fine and diminishing setae.

Distribution : India : Assam, Bihar, Gujarat, Meghalaya and Rajasthan.

Genus *Daphnia* O. F. Müller, 1785

Characters : Body oval or elliptical, compressed and modified by development of crest on head (helmet) in some species. Rostrum well marked and pointed. Antennules small or rudimentary, immobile and located behind rostrum. Valves reticulate, with posterior spine and spinules on dorsal and ventral margins of valves. Abdominal processes 3-4; anterior most abdominal process longest and horse-shoe shaped.

Two species of *Daphnia* are observed in the samples collected from Deepor Beel.

9. *Daphnia lumholtzi* Sars, 1885

(Fig. 71)

Material examined : 7 examples, 19.02.2009; 9 examples, 21.03.2009; 5 examples, 20.01.2010; 7 examples, 26.02.2010; 9 examples, 19.03.2010.

SS collections : 1 example, IV/CLA/ERS/511, 19.02.2009; 1 example, IV/CLA/ERS/611, 27.01.2010; 1 example, IV/CLA/ERS/624, 26.02.2010; 1 example, IV/CLA/ERS/638, 20.03.2010.

Characters : *Female* : Body oval and terminating into a long posterior spine; dorsal surface with long and distant spinules extending to the posterior spine and also up to the middle of the ventral valve margin. Head produced anteriorly into a helmet of variable length. Rostrum small. Eyes large and ocellus small. Postabdomen tapering distally, weakly sinuate dorsally, with 10-13 anal spines and groups of lateral setae. Claw stout, curved and with three combs having 10, 18 and 40 teeth respectively.

Male : Smaller in size. Valves oblong; head produced anteriorly as in female. Antennules large and movable, each with a long flagellum. Postabdomen sinuate. First leg with a hook.

Distribution : India : Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Kerala, Meghalaya, Orissa, Punjab, Rajasthan, Tripura, Uttar Pradesh and West Bengal.

10. ***Daphnia pulex*** Leydig, 1860 emend. Scourfield, 1942
(Fig. 72)

Material examined : BKS collections : 10 examples, 19.01.2009; 9 examples, 27.11.2009; 12 examples, 30.12.2009.

Characters : Carapace oval, posterior spine usually short; spinules on dorsal ventral margins less than 25; inner ventral margin with a shallow emarginations bearing a row of setae directed obliquely inwards and posteriorly. Head comparatively small, with rounded dorsal and nearly concave ventral margin; median carina on posterior surface of head continued into a mound between tips of antennules. Rostrum usually short. Antennules arising from central end of short and high mound. Eye moderately large; ocellus small. Abdominal processes setose. Postabdomen tapering distally, dorsal margin convex and with 10-14 curved anal spines gradually decreasing in length. Claw long and curved; proximal and distal pectens with 10-12 and 6-10 teeth respectively.

Distribution : India : Assam, Bihar (?), Jammu & Kashmir, Rajasthan and Sikkim.

Genus ***Scapholeberis*** Schoedler, 1858

Characters : Body quadrate and slightly compressed. Head small; fornix and rostrum well developed. Cervical sinus deep. Antennules small and situated behind rostrum. Valves rectangular, postero-ventral corners of valves produced into a shorter or longer spine; ventral margins with free setae. One abdominal process developed. Postabdomen well marked and with anal spines. Claws denticulate, not pectinate.

The sampled collected from Deepor Beel include only one species of *Scapholeberis*.

11. ***Scapholeberis kingi*** Sars, 1903
(Fig. 73)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 4 examples, 17.10.2008; 4 examples, 12.12.2008; 4 examples, 19.01.2009; 3 examples, 19.02.2009; 5 examples, 21.03.2009; 5 examples, 24.04.2009; 5 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 6 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 5 examples, 30.06.2010; 6 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/584, 28.10.2008; 1 example, IV/CLA/ERS/612, 27.01.2010; 1 example, IV/CLA/ERS/652, 14.04.2010.

Characters : Body oval-quadrangular, transversely truncate posteriorly; postero-ventral corner of each valve with a short backwardly directed spine. Head narrowly rounded

anteriorly; cervical sinus well marked. Rostrum short and blunt. Eyes large and ocellus small. Valves with distinct transverse striae. 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 : Assam, Jammu & Kashmir, Karnataka, Meghalaya, Manipur, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Genus *Simocephalus* Schoedler, 1858

Characters : Body large and heavy; valves large, quadrate, with oblique striae and with rounded angles or sometimes with a short posterior protuberance or a short spine. Head and rostrum small. Eyes of moderate size; ocellus rhomboidal, rounded or elongated. Two abdominal processes present. Postabdomen large, broad and truncate; with emarginated posterior end and bearing anal spines. Claw with setae on its concave margin, sometimes pectinate.

This genus is represented by three subgenera (vide Orlova-Bienkowskaja, 2001) i.e. *Simocephalus* (s. str.), *Simocephalus* (*Echinocaudus*), and *Simocephalus* (*Coronocephalus*) which, in turn include one species each.

12. *Simocephalus* (*Echinocaudus*) *acutirostratus* (King, 1853)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 14.11.2008; 4 examples, 12.12.2008; 5 examples, 19.01.2009; 3 examples, 19.02.2009; 3 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.10.2009; 4 examples, 27.11.2009; 3 examples, 19.03.2010; 5 examples, 14.04.2010; 3 examples, 21.05.2010; 4 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/585, 28.10.2009; 1 example, IV/CLA/ERS/593, 27.11.2009.

Characters : Body oval, dorsal and ventral margins evenly arched; obtuse posterior protuberance situated in the longitudinal axis of body; posterior region of dorsal surface and posterior protuberance with distinct denticles. Head small and produced into an acute projection, its ventral surface nearly straight. Rostrum small and pointed. Eyes moderately large, ocellus punctate. 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 pecten of 10-12 teeth followed by cilia on its concave margin.

Distribution : India : Assam, Maharashtra, Manipur, Meghalaya, Tamil Nadu and Tripura.

13. *Simocephalus* (*Coronocephalus*) *serrulatus* (Koch, 1841)

Material examined : BKS collections : 4 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 19.01.2009; 3 examples, 31.08.2009; 4 examples, 19.09.2009; 4 examples, 27.10.2009; 3 examples, 27.11.2009; 5 examples, 19.03.2010; 3 examples, 14.04.2010.

SS collections : 1 example, IV/CLA/ERS/603, 28.12.2009.

Characters : Body broadly oval, slightly widened posteriorly and its dorsal margin evenly arched; posterior protuberance slightly above the axis of body. Posterior part of dorsal margin and posterior protuberance denticulate. Head small, evenly arched dorsally and its front forming an acute angle marked with a number of minute denticles; rostral projection small. Eyes comparatively large; ocellus small and rhomboidal. Postabdomen less broad; with about eight anal denticles. Claw long, slender and with fine cilia on its concave margin.

Distribution : India : Assam, Manipur, Meghalaya and Tamil Nadu.

14. *Simocephalus (Simocephalus) mixtus* Sars, 1903

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 12.09.2008; 6 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 5 examples, 19.02.2009; 2 examples, 21.03.2009; 4 examples, 24.04.2009; 5 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 6 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 5 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 5 examples, 21.05.2010; 7 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/639, 23.03.2010.

Characters : Carapace rounded, posterior corner with blunt angle or its posterior extremity with a short and obtuse protuberance located at level of axis of dorsal margin. Dorsal margin moderately to strongly arched, posterior part of dorsal margin with distinct denticles. Head small and rounded. Eyes moderately large; ocellus large and elongated. Postabdomen broad, deeply emarginated; with about 10 anal spines decreasing proximally; supra-anal angles prominent. Claw long, curved and ciliated.

Distribution : India : Assam, Bihar, Jammu & Kashmir, Karnataka, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Family BOSMINIDAE

Body usually oval or rounded in its outline. Antennules of female large and immovable. Intestine without loops or any hepatic caeca. Six pairs of legs present.

This family is represented by two genera in our collections from Deepor Beel.

Genus *Bosmina* Baird, 1845

Characters : Forms usually transparent; valves thin and postero-ventral corner of each valve with a spine (mucro). Antennules parallel to each other, curving backwards and fixed to head; olfactory setae lateral and usually near the base of each antennule. Antenna with 3- and 4-segmented rami. Postabdomen quadrate; anus terminal and anal denticles small.

Only one species belonging to *Bosmina* is documented in the present study.

15. ***Bosmina longirostris*** (O. F. Müller, 1785)

Material examined : BKS collections : 9 examples, 19.08.2008; 7 examples, 12.09.2008; 6 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 5 examples, 19.01.2009; 7 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 7 examples, 31.08.2009; 2 examples, 19.09.2009; 9 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 7 examples, 20.01.2010; 5 examples, 26.02.2010; 5 examples, 21.05.2010; 7 examples, 30.06.2010; 10 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/586, 28.10.2009; 1 example, IV/CLA/ERS/604, 29.12.2009.

Characters : Body broadly oval; postero-dorsal corner of valves angular, postero-ventral corner with a backwardly directed spine (mucro). Head large and arched in front of eyes. Small sensory seta situated nearer to eyes than to base of antennule. Antennules parallel and curved; olfactory setae inserted near their bases. Postabdomen quadrate. Claw with proximal pecten of 3-6 spinules and distal pecten of 7-10 spines, continued distally into spinules.

Distribution : India : Assam, Jammu & Kashmir, Madhya Pradesh, Manipur, Meghalaya, Manipur, Tripura and West Bengal.

Genus ***Bosminopsis*** Richard, 1895

Characters : Body oval or oblong. Head large. Ocellus absent. Antennules united at base and diverging at apex, with sensory setae on ventral side of diverging portion. Postabdomen large and tapering at base of claws. Claws large and each with a basal spine.

Bosminopsis is represented by only one species in the examined collections.

16. ***Bosminopsis deitersi*** Richard, 1895
(Fig. 74)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/594, 27.11.2009; 1 example, IV/CLA/ERS/625, 27.02.2010; 1 example, IV/CLA/ERS/653, 14.04.2010.

Characters : Body almost oval; postero-ventral corner of valves with a small mucro-like projection and one or two spinules preceding it. Head broadly rounded dorsally and produced into a robust rostrum; with distinct supra-ocular depression. Antennules long, united at their bases; with about 5-6 sensory setae on ventral side near apex. 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 : Assam, Delhi, Kerala, Madhya Pradesh, Manipur, Meghalaya, Manipur, Tripura and Rajasthan.

Family MOINIDAE

Head prominent; with a pair of thin and long antennules. Postabdomen with a row of lateral teeth and one distal bident tooth. Claws smooth or with pecten. Abdominal processes lacking.

Two genera of the family Moinidae are recorded from Deepor Beel.

Genus *Moina* Baird, 1850

Characters : Body thick and heavy; valves thin, reticulated or striated, without any posterior spine. Antennules large, movable and arising from flat ventral surface of head; spindle-shaped and with a sensory setae on its anterior margin. Ocellus rarely present. Postabdomen with a bident tooth and with 16 lateral feathered teeth. Claw with or without pecten.

The collections examined from Deepor Beel include only one species of *Moina*.

17. *Moina micrura* Kurz, 1874

Material examined : BKS collections : 6 examples, 19.08.2008; 4 examples, 12.09.2008; 5 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 5 examples, 21.03.2009; 5 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 4 examples, 14.04.2010; 4 examples, 21.05.2010; 6 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/491, 25.07.2009; 1 example, IV/CLA/ERS/551, 19.09.2009; 1 example, IV/CLA/ERS/587, 28.10.2009.

Characters : Valves oblong and reticulated; ventral margin of valves with 11-25 long setae followed by groups of short setae on posterior margin. Head large and 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 and curved, its ventral base with 3-7 "basal dorn"; with setae on its concave margin; proximal setae larger and forming a distinct pecten.

Distribution : India : Andaman & Nicobar Islands, Assam, Bihar, Haryana, Manipur, Meghalaya, Punjab, Rajasthan, Tamil Nadu, Tripura and West Bengal.

Genus *Moinodaphnia* Herrick, 1887

Characters : Body compressed; valves quadrate and crested dorsally. Head strongly arched and angled in front; ocellus present. Antennules long and movable. Antennae with long, un-jointed spines on apical segment of 4-segmented ramus. One large abdominal process present. Postabdomen with slender post-anal projection and bearing bident distally.

Only one species of *Moinodaphnia* is documented from Deepor Beel.

18. *Moinodaphnia macleayi* (King, 1853)

(Fig. 75)

Material examined : BKS collections : 5 examples, 17.10.2008; 5 examples, 21.03.2009; 6 examples, 26.06.2009; 3 examples, 24.07.2009; 4 examples, 31.08.2009; 2 examples, 19.09.2009; 5 examples, 27.10.2009; 5 examples, 30.12.2009; 3 examples, 14.04.2010; 7 examples, 21.05.2010; 3 examples, 30.06.2010; 6 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/535, 26.07.2009; 1 example, IV/CLA/ERS/595, 27.11.2009; 1 example, IV/CLA/ERS/614, 27.01.2010.

Characters : Body large and compressed. Head small; eyes large and filling frontal part of head, ocellus present. Antennules thin and movable. Three apical long swimming setae on last exopodite segment of antenna and one rather long spine (modified seta). Carapace with a slight dorsal keel. Abdominal process horse-shoe shaped. Postabdomen elongated distally, with 7-10 feathered teeth and a bident tooth; claw distinct and with setae on concave margin.

Distribution : India : Assam, Bihar, Kerala, Meghalaya and West Bengal.

Family MACROTHRICIDAE

Characters : Head well marked, valves often crested. Antennule one-segmented and attached to ventro-anterior side of the head. Antenna with 4-segmented exopod and 3-segmented endopod; distal segments of antennal branches elongated. Labrum usually with a keel. Eyes and ocellus present. Intestine simple or convoluted. Postabdomen marked off from body; of various forms; no long lateral setae on distal part of postabdomen. Five pairs of thoracic legs.

Four genera of the Macrothricidae are recorded from Deepor Beel.

Genus *Macrothrix* Baird, 1843

Characters : Body compressed and with a dorsal crest. Head large, usually not depressed; rostrum short. Antennules large and located at tip of rostrum. Antennal setae : 0-0-1-3/1-1-3; basal seta of 3-segmented ramus stout and stiff. Ventral margin of valves with long, stout and movable bristles. Postabdomen small and often bilobed; claw small. Intestine without loops and caeca. Five pairs of legs present, exopodite of leg IV with 2-3 setae.

The collections examined from Deepor Beel include three species of *Macrothrix*.

19. *Macrothrix laticornis* (Jurine, 1820)

(Fig. 76)

Material examined : BKS collections : 3 examples, 12.12.2008; 4 examples, 31.08.2009; 3 examples, 19.03.2010.

SS collections : 1 example, IV/CLA/ERS/692, 14.04.2010.

Characters : Body 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 : Assam, Kerala, Ladak, Meghalaya, Manipur, Tamil Nadu and West Bengal.

20. *Macrothrix spinosa* King, 1853

Material examined : BKS collections : 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/615, 27.01.2010.

Characters : Body rounded oval; dorsal margin of head and carapace serrated. Head depressed in rostral region and abruptly widened at level of compound eye; head pore small, transversally oval. Antennules distally dilated, with 7-9 serrated dorsal notches along dorsal margin and two sub-apical rows of setules. Labrum with apical, obtusely pointed protuberance. Valves reticulated and with narrow dorsal keel. Postabdomen with several rows of strong spinules and with groups of setules around anus and near apex. Claws short and finely ciliated along concave margin. Notatory setae with short distal portion carrying long, bristle-like setae.

Distribution : India : Andaman & Nicobar Islands, Assam, Manipur, Meghalaya, Tripura, Rajasthan and Tamil Nadu.

21. *Macrothrix triserialis* (Brady, 1886)

(Fig. 77)

Material examined : BKS collections : 5 examples, 19.08.2008; 9 examples, 12.09.2008; 5 examples, 17.10.2008; 5 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 7 examples, 19.02.2009; 6 examples, 21.03.2009; 4 examples, 24.04.2009; 3 examples, 15.05.2009; 6 examples, 26.06.2009; 3 examples, 24.07.2009; 4 examples, 31.08.2009; 6 examples, 19.09.2009; 6 examples, 27.10.2009; 9 examples, 27.11.2009; 7 examples, 30.12.2009; 5 examples, 20.01.2010; 7 examples, 26.02.2010; 6 examples, 14.04.2010; 6 examples, 21.05.2010; 7 examples, 30.06.2010; 10 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/605, 29.12.2009; 1 example, IV/CLA/ERS/626, 27.02.2010; 1 example, IV/CLA/ERS/643, 14.04.2010.

Characters : Body almost oval; posterior angle distinctly produced. Valves reticulate, dorsal margin of valves with serrations particularly in posterior region; ventral margin with serrations and bristles, bristles arranged in groups of three along postero-ventral margin.

Head large and with a conspicuous ridge over its edges. Antennules cylindrical; anterior margin with notches, a sensory seta located near base and olfactory setae unequal. Postabdomen large, not bilobed and with anal spines on both lobes; lateral setae arranged in transverse rows. Notatory setae with a very short distal segment. Claw short and curved.

Distribution : India : Andaman & Nicobar Islands, Assam, Bihar, Kerala, Manipur, Meghalaya, Rajasthan, Tripura and West Bengal.

Genus ***Grimaldina*** Richard, 1892

Characters : Body broadly oval; head not separated. Antennade rod-like. Antennal seta: 0-0-1-3/1-1-3. Postabdomen wide. Intestine without convolutions. Hepatic caeca very small. Five pairs of thoracic legs present. Exopodite of leg IV with 4 setae.

Only one species of *Grimaldina* is recorded our collections from Deepor Beel.

22. ***Grimaldina brazzai*** Richard, 1892

(Fig. 78)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 4 examples, 12.12.2008; 2 examples, 24.04.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009.

SS collections : 1 example, IV/CLA/ERS/523, 26.06.2009; 1 example, IV/CLA/ERS/538, 25.07.2009; 1 example, IV/CLA/ERS/568, 18.09.2009; 1 example, IV/CLA/ERS/654, 14.04.2010.

Characters : Head and valves slightly squamose. Head not separated from body; its ventral margin with an outgrowth at the base of the antennule. Antennule rod-like. Posterior dorsal and ventral corners of valves rounded. Postabdomen wide; pre-anal part divided by a deep depression; a group of denticles present at the distal side of anal aperture and a large sigmoid tooth present at the posterior side of the anal aperture; pre-anal margin with teeth.. Notatory setae with long distal segment. Claw large and curved.

Distribution : India : Assam, Meghalaya, Rajasthan and West Bengal.

Genus ***Guernella*** Richard, 1892

Characters : Body almost rounded; head not delimited. Antennule thick, with transverse groups of setae. Antennal setae: 0-1-1-3/1-1-3. Postabdomen widely oval. Intestine without convolutions. Five pairs of thoracic legs present. Exopodite of leg IV with 4 setae.

This monotypic genus includes single species; the same is also noticed in Deepor Beel.

23. ***Guernella raphaelis*** Richard, 1892

(Fig. 79)

Material examined : BKS collections : 7 examples, 19.08.2008; 5 examples, 12.09.2008; 7 examples, 15.05.2009; 9 examples, 26.06.2009; 5 examples, 24.07.2009; 4 examples,

31.08.2009; 5 examples, 19.09.2009; 7 examples, 27.10.2009; 6 examples, 27.11.2009; 7 examples, 19.03.2010; 6 examples, 21.05.2010.

SS collections : 1 example, IV/CLA/ERS/522, 26.06.2009; 1 example, IV/CLA/ERS/537, 25.07.2009; 1 example, IV/CLA/ERS/567, 18.09.2009.

Characters : Carapace small and oval; valves with reticulations. Head broad, eye distinct and ocellus small. Head with shallow embayment at apex for insertion of antennules, rostral margin broad. Well developed fornix along head-shield and over antenna. Antennules short and robust, with incisions and serrulations on anterior margin. Antennae with fine and short setae. Postabdomen small, tapering distally and with transverse row of spinules. Claw short.

Distribution : India : Assam, Bihar, Meghalaya, Manipur, Rajasthan and West Bengal, Represents new record from Deepor Beel.

Genus *Streblocerus* Sars, 1862

Characters : Body small, not crested or compressed. Antennules large, bent or twisted at distal end. Antennal setae: 0-0-1-3/1-1-3. Labrum with large, serrate, acute process. Postabdomen with pre-anal spines or hairs. Intestine convoluted, with small hepatic caeca. Five pairs of legs present.

Streblocerus is represented by only species in the present study.

24. *Streblocerus serricaudatus* (Fischer, 1849)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 14.11.2008; 3 examples, 19.02.2009; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/552, 19.09. 2009; 1 example, IV/CLA/ERS/569, 18.09.2009; 1 example, IV/CLA/ERS/596, 28.11.2009; 1 example, IV/CLA/ERS/644, 14.04.2010.

Characters : Body evenly arched dorsally, ventral surface produced in middle region and posterior end with a small protuberance; valves reticulate. Antennules curved distally, each with a lateral seta near its base and several hairs on inner edge; olfactory setae unequal. Postabdomen bilobed; anal part rounded and with spines, pre-anal part serrate and with rows of fine hairs. Claw small, curved and with setae on its concave margin.

Distribution : India : Assam, Meghalaya, Manipur and Rajasthan.

Family ILYOCRYPTIDAE

Head small. Antennules 2-segmented. Antennae with 4-segmented exopod and 3-segmented endopod. Valves with distinct marginal setae. Postabdomen wide and semicircular; distal part with long lateral setae and shorter margin anal teeth, and proximal part with long teeth. Claw long, with two thin basal spines.

This family is represented by single genus in the collections from Deepor Beel.

Genus *Ilyocryptus* Sars, 1862

Characters : Head with a keel; dorsal crest on valves absent or small. Vertex of head forming a sharp angle in front of insertion of antennules. Antennules long and biarticulate. Antennal setae: 0-0-0-3/1-1-3. Abdominal process long and tongue shaped. Intestine without loops and enlarged near rectum; hepatic caeca present. Postabdomen large, broad and compressed; with numerous long spines.

Only one species belonging to *Ilyocryptus* is reported in this account.

25. *Ilyocryptus spinifer* Herrick, 1882

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 14.11.2008; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 21.05.2010.

SS collections : 1 example, IV/CLA/ERS/501, 12.12.2008; 1 example, IV/CLA/ERS/539, 25.07.2009; 1 example, IV/CLA/ERS/579, 18.09.2009; 1 example, IV/CLA/ERS/606, 30.12.2009; 1 example, IV/CLA/ERS/627, 27.02.2010; 1 example, IV/CLA/ERS/655, 14.04.2010.

Characters : Body oval-triangular. Valves dilated; with long, branched and feathered setae along ventral and posterior margins. Head small and triangular, with a keel starting from anterior rim and extending up to its back. Eyes and ocellus small. Antennules attached to ventral side of head behind vertex. Antennal setae very long. Postabdomen large, broad, with 5-7 pre-anal spines and 4-8 post-anal lateral spines situated in a row; anus opening in depression on dorsal margin of postabdomen. Claw long, slightly curved and with two unequal basal spines.

Distribution : India : Andaman & Nicobar Islands, Assam, Kerala, Manipur, Meghalaya, Rajasthan, Tripura and West Bengal.

Family CHYDORIDAE

Forms generally oval or rounded, enclosed by a shell and head shield. Head shield with pores, with rare exceptions. Antennules one-segmented, movable and generally not extending beyond the tip of rostrum. Antennae short, rami three-segmented; antennal setae : 0-0-3/0-1-3 or 0-0-3/1-1-3. Labrum with an expanded plate; differs in shape in different species. Ocellus present. Intestine forming loops. Postabdomen with anal spines; also with lateral seta in some species. Five or six pairs of legs present.

The Chydoridae is represented by two sub-families in the present study.

Subfamily CHYDORINAE

Body height slightly larger than width. Horizontal keels present in some species. Mandibles articulated with head shield at some distance from its margin. Head pores

separated and situated in median line of head shield; two small pores present between main pores, small pores without canals. Anus situated in proximal part of postabdomen. Claw with two basal spines in most species; with only one basal spine in some species. Five or six pairs of legs present. Leg VI, if present, without epipodite.

Eight genera of the Aloninae are represented in the examined collections.

Genus *Alonella* Sars, 1862

Characters : Body oval, reticulations of valves in form of polygons or lines. Setae situated on ventral margin of valves but not on their inner side. Antennules extending behind apex of rostrum or projecting beyond it. Antennal setae: 0-0-3/0-1-3. Head pores situated near posterior margin of head shield; distance of head pores to posterior margin of head shield less than distance between main pores. Five pairs of legs present.

This genus is represented by two species in the present study.

26. *Alonella clathratula* Sars, 1896

(Fig. 80)

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 21.03.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010.

Characters : Body elongated; length : height ratio 1.8. Valves with polygons with longitudinal striations and with blunt indentation at posterior-ventral corner. Antennules not reaching the tip of rostrum. Labral plate cuneiform and with blunt apex. Postabdomen elongated and with small irregular anal teeth. Claw with two basal spines, the proximal spine smallest.

Distribution : India : Assam, Bihar, Manipur and Meghalaya.

27. *Alonella excisa* (Fischer, 1854)

(Fig. 81)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 4 examples, 21.03.2009; 2 examples, 24.04.2009; 4 examples, 26.06.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/513, 19.02.2009; 1 example, IV/CLA/ERS/616, 27.02.2010.

Characters : Body oval, posterior margin of valves straight; postero-ventral corner with one blunt denticle and with a row of setae on inner side. Valves with longitudinal lines formed by polygons; fine longitudinal lines and dots inside each polygon. Rostrum moderately long. Labral plate with convex anterior margin and blunt apex. Postabdomen short, with

about 10 anal spines, anal margin with setae; pre-anal corner blunt. Claw with two basal spines.

Distribution : India : Assam, Bihar, Kerala, Manipur, Meghalaya, Tripura, Uttar Pradesh and West Bengal.

28. *Alonella nana* (Baird, 1850)

Material examined : BKS collections : 2 examples, 19.01.2009; 3 examples, 21.03.2009; 3 examples, 20.01.2010.

SS collections : 1 example, IV/CLA/ERS/656, 14.04.2010.

Characters : Body oval to globose, postero-ventral corner of valves with one or sometimes two posteriorly directed denticles. Lines of valves directed antero-ventrally and postero-dorsally. Rostrum moderately long. Antennules with a sensory seta distal to middle of posterior margin. Labral plate with pointed apex. Postabdomen short, with about six marginal anal spines; pre-anal corner strongly projecting. Claw with two basal spines.

Distribution : India : Assam, Jammu & Kashmir and Meghalaya.

Genus *Chydorus* Leach, 1816

Characters : Body ovate to spherical; posterior part of ventral margin of valves with setae on inner surface. Antennules not reaching apex of rostrum. Antennal setae : 0-0-3/0(1)-1-3. Head shield with two separate main pores and two small pores between them; head pores absent in some species. Ocellus smaller than eye. Intestine with a caecum. Postabdomen usually broad, rarely long and narrow; with anal spines or rarely with fine lateral setae. Claw with two basal spines; proximal basal spine often minute, rarely absent.

The collections examined from Deepor Beel include three species of *Chydorus*.

29. *Chydorus faviformis* Birge, 1893

(Fig. 82)

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 19.09.2009; 3 examples, 21.07.2010.

Characters : Body rounded; valves and head shield with deep polygonal cells. Head shield with rounded posterior margin; head pores typical of the subfamily. Antennules not reaching apex of rostrum, Labral plate with convex anterior margin and pointed apex. Postabdomen wide and with rounded apex; with 9-10 anal spines and groups of lateral setae. Claw with two basal spines and setae on its concave margin.

Distribution : India : Assam, Jammu & Kashmir, Manipur, Meghalaya and Tripura.

30. *Chydorus reticulatus* Daday, 1898

Material examined : BKS collections : 3 examples, 19.01.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010.

SS collections : 1 example, IV/CLA/ERS/502, 12.12.2008; 1 example, IV/CLA/ERS/524, 26.06.2009; 1 example, IV/CLA/ERS/617, 28.01.2010.

Characters : Body broadly oval. Valves reticulated; boundaries of polygons build low vertical walls. Head shield with blunt tip of rostrum. Labral plate oval, with blunt apex. Postabdomen short, with distinct pre-anal corner; with 7-10 anal teeth and lateral setae in crescentic groups. Claw with two basal spines and setae on its concave margin.

Distribution : India : Assam, Manipur, Meghalaya, Tamil Nadu and Tripura.

31. *Chydorus sphaericus* (O.F.Müller, 1776)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/503, 12.12.2008; 1 example, IV/CLA/ERS/571, 27.02.2010; 1 example, IV/CLA/ERS/645, 20.03.2010.

Characters : Body broadly spherical; postero-ventral corner of valves rounded. Valves reticulated with pentagonal or hexagonal cells. Rostrum pointed. Antennules with a sensory seta near middle of anterior margin. Labral plate with convex anterior margin and pointed apex. Postabdomen short, with 7-10 anal spines; lateral setae in several groups and arranged in a single row. Claw with two basal spines and setae on its concave margin.

Distribution : India : Assam, Jammu & Kashmir, Ladak, Manipur, Meghalaya, Tripura, Tamil Nadu, Uttar Pradesh and West Bengal.

Genus *Dadaya* Sars, 1901

Characters : Body oval. Posterior margin of head shield rounded, anterior margin produced into an elongated rostrum. Main head pore single. Ocellus and eye very large. Valves with hexagons. Setae on posterior margin of valves inserted on inner surface. Labrum elongated. Antennules projecting beyond tip of rostrum. Postabdomen without lateral setae. Claw with a single basal spine. Five pairs of legs present; exopodite of III and IV legs with seven setae.

The collections examined from Deepor Beel record only one species of *Dadaya*.

32. *Dadaya macrops* (Daday, 1898)

(Fig. 83)

Material examined : BKS collections : 7 examples, 19.08.2008; 5 examples, 12.09.2008; 5 examples, 19.01.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 5 examples, 19.03.2010; 6 examples, 30.06.2010.

SS collections : 1 example, IV/CLA/ERS/597, 28.11.2009; 1 example, IV/CLA/ERS/628, 27.02.2010.

Characters : Body oval. Valves marked with a pattern of hexagons. Rostrum long and ventrally directed. Ocellus and eye unusually large. Posterior margin of head shield rounded. Antennules distinctly projecting beyond apex of rostrum. Distal segment of antennae not reaching apex of rostrum. Labrum with a long, beak-like process. Postabdomen with 15 anal spines, proximal spines small; pre-anal corner projecting. Claw with a basal spine.

Distribution : India : Assam, Manipur, Rajasthan, Tamil Nadu and Tripura.

Genus *Disperalona* Fryer, 1968

Characters : Body elongated, valves striated or reticulated; broadly rounded posterior ventral corner with one or more denticles. Rostrum elongated. Head shield with two head pores and two closely set small pores between them. Antennae with seven notatory setae. Postabdomen with sharply pointed marginal denticles and minute lateral setules. Five pairs of thoracic legs present. Intestine with caecum.

This genus is represented by only one species in the present account.

33. *Disperalona caudata* Smirnov. 1996

(Figs. 84-85)

Material examined : BKS collections : 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009.

SS collections : 1 example, IV/CLA/ERS/556, 31.09.2009; 1 example, IV/CLA/ERS/575, 18.09.2009.

Characters : Valves longitudinally striated; posterior dorsal angle expressed and posterior ventral angle rounded. Rostrum long, pointed and ventrally directed. Head shield with two main head pores and two small pores between them. Antennule reaching half-way the tip of rostrum. Postabdomen relatively elongated, with distinct dorso-distal corner and pre-anal angle not distinct. Postabdomen with 14 anal teeth, proximal teeth small. Claw with two basal spines; second basal spine smaller than the diameter of the base of claw.

Distribution : India : Assam and Manipur.

Genus *Dunhevedia* King, 1853

Characters : Body oval. Postero-ventral corner of valves with a distinct denticle. Head pores typical for the subfamily; distance from head pores to posterior margin of head shield shorter than distance between head pores. Antennal setae : 0-0-3/0-1-3. Ocellus smaller than eye. Postabdomen wide and with anal spines. Claw with a single basal spine. Five pairs of legs present.

The collections examined from Deepor include two species of this genus.

34. *Dunhevedia crassa* King, 1853

(Fig. 86)

Material examined : BKS collections : 4 examples, 12.09.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/514, 19.02.2009; 1 example, IV/CLA/ERS/553, 19.09.2009; 1 example, IV/CLA/ERS/607, 30.12.2009; 1 example, IV/CLA/ERS/629, 27.02.2010; 1 example, IV/CLA/ERS/646, 20.03.2010.

Characters : Body oval; postero-ventral corner of each valve with a denticle. Antennules terminating before apex of rostrum. Labral plate without denticles and with pointed apex. Postabdomen oval, with 15-18 anal spines and numerous groups of lateral setae. Claw with a basal spine and with setae on its concave margin.

Distribution : India : Andaman & Nicobar Islands, Assam, Gujarat, Kerala, Manipur, Meghalaya, Rajasthan, Tamil Nadu, Tripura and West Bengal.

35. *Dunhevedia serrata* Daday, 1898

(Fig. 87)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 2 examples, 24.04.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 19.03.2010; 3 examples, 30.06.2010.

Characters : Body with maximum height in middle region. Valves with longitudinal lines and dots; postero-ventral corner with two denticles, dorsal denticle smaller than ventral. Labral plate with serrated anterior margin. Postabdomen oval; with 13-15 anal denticles and several groups of lateral setae. Claw with basal spine and setae on concave margin.

Distribution : India : Andhra Pradesh, Assam, Gujarat, Meghalaya, Rajasthan, Tripura, Tripura and West Bengal.

Genus *Ephemeroporus* Frey, 1982

Characters : Body oval; postero-ventral corners of valves with a denticle. Labral plate with denticles on its anterior margin. Postabdomen short and with unequal anal spines. Claw with two unequal basal spines.

This genus is represented by only single species in the present account.

36. *Ephemeroporus barroisi* (Richard, 1894)

(Fig. 88)

Material examined : BKS collections: 3 examples, 19.08.2008; 4 examples, 12.09.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples,

24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/618, 28.01.2010.

Characters : Postero-ventral corner of each valve with a denticle. Rostrum with an apical notch. Antennules not reaching apex of rostrum. Labral plate with 3-5 denticles on anterior margin and pointed apex. Ocellus smaller than eye and situated halfway between eye and apex of rostrum. 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 : Assam, Gujarat, Kerala, Manipur, Meghalaya, Tamil Nadu, Tripura and West Bengal.

Genus *Picripleuroxus* Frey, 1993

Characters : Body distinctly elongated. Postabdomen elongated and slightly bent; post-anal margin slightly concave. Posterior ventral setae of valve slightly sub-marginal. Posterior ventral angle of valve mostly with one or several denticles.

The collections examined Assam indicated two species belonging to this genus.

37. *Picripleuroxus similis* Vavra, 1900 (Fig. 89)

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

SS collections : 1 example, IV/CLA/ERS/598, 28.11.2009; 1 example, IV/CLA/ERS/619, 28.01.2010.

Characters : Valves smooth; postero-ventral corner with 1-3 denticles. Rostrum long and reaching level of ventral margin of valves. Antennules not reaching middle of rostrum. Distance of ocellus to eye about half of its distance to apex of rostrum. Labral plate with convex anterior margin. Postabdomen elongated, tapering distally; distal dorsal corner of postabdomen situated slightly behind base of claws. Anal spines 10-13 and increase in size gradually to distal end. Claw with two basal spines.

Distribution : India : Andaman & Nicobar Islands, Assam, Jammu & Kashmir, Manipur, Meghalaya, Tripura and West Bengal.

Genus *Pseudochydorus* Fryer, 1968

Characters : Body spherical, ventral margin of valves closed; ventral setae situated on inner surface along whole length and those in posterior half located at a distance from the

margin. Rostrum pointed. Postabdomen narrow, with anal spines and groups of lateral setae. Claw with two basal spines; distal basal spine long. Legs II-IV with non-filtering setae.

Only one species belonging to this genus is reported in the present account.

38. *Pseudochydorus globosus* (Baird, 1843)

Material examined : BKS collections : 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 24.07.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 14.04.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/525, 26.06.2009; 1 example, IV/CLA/ERS/630, 27.02.2010.

Characters : Body slightly longer than its height and postero-ventral corner of valves rounded. Valves with a pattern of polygons. Antennules not reaching apex of rostrum. Labrum without plate shaped process. Ocellus smaller than eye and situated nearer to eye than to apex of rostrum. Postabdomen narrow, almost uniformly wide and with produced distal corner. Anal spines about 20 and decreasing in size proximally; groups of lateral setae present. Claw with two basal spines and a row of setae on its concave margin.

Distribution : India : Assam, Manipur, Meghalaya, Rajasthan, Tamil Nadu and West Bengal.

Subfamily ALONINAE

With two or three main head pores situated in median line of head shield and small pores lateral to them; canals extending from lateral pores. Mandibles articulated between head shield and valves. Claw with a single basal spine; sometimes without basal spine. Hepatic processes absent. Anus situated in proximal part of postabdomen. Five or six pairs of legs present; leg VI, if present, with epipodite.

Fourteen genera of the subfamily Aloninae are documented from Deepor Beel.

Genus *Acroperus* Baird, 1843 emend. Smirnov, 1966

Characters : Body oval and strongly compressed laterally. Valves marked with oblique lines. Three connected main head pores, small pores situated at a considerable distance from them. Antennules not reaching apex of rostrum. Ocellus smaller than eye. Postabdomen with anal denticles and with a row of lateral setae arranged in groups. Claw with a tubercle, bearing setae on dorsal side; with one basal spine. Intestine forming loops and with a caecum. Six pairs of legs present; leg VI in form of a small lobe.

Only one species belonging to this genus is documented in the present account.

39. *Acroperus harpae* (Baird, 1834)

(Fig. 90)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 21.05.2010.

SS collections : 1 example, IV/CLA/ERS/588, 28.10.2009.

Characters : Maximum height about 64% of its length; postero-ventral corners of valves with 2-5 denticles. Valves marked with oblique lines. Dorsal keel and head keel present. Antennules not reaching apex of rostrum. Ocellus smaller than eye. Labral plate triangular, with convex anterior margin and blunt apex. Postabdomen with very small anal spines. Lateral setae in groups; distal groups of lateral setae longer than others. Claw with a basal spine and setae on its proximal margin, distal seta longest than others.

Distribution : India : Assam, Jammu & Kashmir, Manipur, Meghalaya, Tamil Nadu, Tripura and West Bengal.

Genus : *Alona* Baird, 1843 emend. Smirnov, 1971

Characters : Body oval to sub-quadrate and compressed. Valves rectangular and marked with lines. Rostrum short and blunt. Antennal setae: 0-0-3/1-1-3. Postabdomen with post-anal spines and lateral setae; anus situated in proximal part of postabdomen. Five to six pairs of legs present. Leg VI, if present, in form of a small lobe and without epipodite.

The collections examined from Assam include five species of the genus *Alona*.

40. *Alona affinis* (Leydig, 1860)

(Fig. 91)

Material examined : BKS collections : 4 examples, 12.09.2008; 4 examples, 12.12.2008; 3 examples, 19.02.2009; 3 examples, 26.02.2010; 3 examples, 19.03.2010.

Characters : Body broadly oblong; postero-ventral corner of valves with a row of setae which continue in a row of spinules on inner side of posterior margin. Valves marked with longitudinal lines. Antennules not reaching apex of rostrum. Labral plate with convex anterior margin. Ocellus smaller, situated nearer to eye than to apex of rostrum. Postabdomen nearly uniformly wide; dorsal margin rounded and with 12-16 anal spines; lateral groups of setae present. Claw with a basal spine and setae on its concave margin.

Distribution : India : Assam, Gujarat, Manipur, Meghalaya and West Bengal.

41. *Alona cheni* Sinev, 1862

(Fig. 92)

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 7 examples, 17.10.2008; 3 examples, 19.02.2009; 5 examples, 21.03.2009; 6 examples, 24.04.2009; 9 examples, 26.06.2009; 5 examples, 27.11.2009; 4 examples, 30.12.2009; 5 examples, 20.01.2010; 7 examples, 26.02.2010; 3 examples, 19.03.2010; 4 examples, 14.04.2010; 7 examples, 21.05.2010; 8 examples, 30.06.2010.

Characters : Body oval; valves marked with longitudinal lines, with interconnections, posterior margin with a row of spinules on inner margin. Head shield with three main connected head pores and lateral pores with chitinous thickening. Antennules not reaching

apex of rostrum. Labral plate with rounded anterior margin. Postabdomen slightly tapering distally and its dorsal margin nearly straight; pre-anal corner slightly projecting beyond base of claws. Anal spines 11-12, decreasing in size proximally; groups of lateral setae present, distal seta longest in each group. Claw with single basal spine.

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

42. *Alona guttata guttata* Sars, 1862

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 14.04.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/620, 28.01.2010; 1 example, IV/CLA/ERS/632, 27.02.2010.

Characters : Body almost oval; postero-dorsal and postero-ventral corners of valves rounded. Valves marked with longitudinal lines. Head shield with three main head pores with a narrow connection between them. Antennules not reaching apex of rostrum. Ocellus smaller than eye. Labral plate with convex anterior margin. Postabdomen short, slightly tapering distally, with nearly straight dorsal and ventral margins and distal dorsal margin projecting beyond base of claws; with 9 anal spines and groups of lateral setae. Claw with one basal spine.

Distribution : India : Assam, Jammu & Kashmir, Ladak, Manipur, Meghalaya, Tamil Nadu and Tripura.

42a. *Alona guttata tuberculata* (Kurz, 1875)

Material examined : SS collections : 1 example, IV/CLA/ERS/526, 26.06.2009.

Characters : Head shield and valves with characteristic rounded pits. Labral plate rounded. Postabdomen with projecting pre-anal corner; distal dorsal end projecting beyond base of claws; with 8-10 anal spines. Claw with a basal spine and setae on its concave margin.

Distribution : India : Assam and Meghalaya.

43. *Alona macronyx* (Daday, 1898)

(Fig. 93)

Material examined : BKS collections : 5 examples, 12.09.2008; 5 examples, 31.08.2009; 6 examples, 21.05.2010; 4 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/493, 26.06.2009.

Characters : Body globulate-oval, with maximum height before its middle. Valves with lines and dots; postero-dorsal and postero-ventral corners rounded; ventral margin slightly

concave. Antennules not reaching apex of rostrum. Ocellus smaller than eye and situated near to it. Labral plate with convex anterior margin and truncate apex. Post-abdomen narrowing distally and with an incision at the base of the claws; with 12-14 large marginal anal denticles, distal margin of post-abdomen with a small denticle. Claw with a basal spine nearly half as long as claw.

Distribution : India : Madhya Pradesh and Meghalaya.

44. *Alona quadrangularis* (O. F. Müller, 1785)
(Fig. 94)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 21.03.2009; 3 examples, 24.07.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/540, 25.07.2009; 1 example, IV/CLA/ERS/ 633, 27.02.2010.

Characters : Body broadly rectangular, postero-dorsal and postero-ventral corners of valves rounded and posterior margin with a row of spinules on its inner margin. 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 slightly smaller than 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 : Assam, Manipur, Meghalaya, Tamil Nadu, Tripura and West Bengal.

45. *Anthalona harti*
(Fig. 95)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 4 examples, 12.12.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 19.03.2010.

SS collections : 1 example, IV/CLA/ERS/555, 19.09.2009.

Characters : Body oval; valves with characteristic tubercles, posterior dorsal and ventral corners rounded. Labral plate with a denticle on its anterior end. Two main connected head pores; lateral pores elevated. Postabdomen short, with curved dorsal and rounded distal margins. Anal spines 6-8; lateral setae in groups, distal seta largest in each group. Claw with a basal spine and setae on the concave margin.

Distribution : India : Assam, Manipur and West Bengal. Represents new record from Deepor Beel.

Genus *Camptocercus* Baird, 1843

Characters : Body oval, greatly compressed and often with a keel on head and back. Valves with longitudinal lines. Distance between head pores and posterior margin of head shield shorter than distance between main pores. Antennules not reaching apex of rostrum. Antennal setae : 0-0-3/0-1-3. Ocellus smaller than eye. Postabdomen long and tapering distally; with anal spines and lateral setae. Claw long, with large basal spine and setae on its concave margin. Intestine forming loops and with a caecum. Five to six pairs of legs present.

Camptocercus is represented by one species in our collections from Deepor Beel.

46. *Camptocercus uncinatus* Smirnov, 1971

(Fig. 96)

Material examined : BKS collections : 7 examples, 14.11.2008; 6 examples, 12.12.2008; 7 examples, 19.01.2009; 5 examples, 19.02.2009; 6 examples, 21.03.2009; 5 examples, 24.04.2009; 7 examples, 26.06.2009; 3 examples, 27.11.2009; 3 examples, 20.01.2010; 6 examples, 26.02.2010; 5 examples, 19.03.2010; 7 examples, 21.05.2010; 7 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/504, 12.12.2008; 1 example, IV/CLA/ERS/541, 25.07.2009; 1 example, IV/CLA/ERS/574, 18.09.2009; 1 example, IV/CLA/ERS/621, 28.01.2010; 1 example, IV/CLA/ERS/648, 20.03.2010.

Characters : Body elongated, postero-ventral corner of valves with 2-5 denticles distinctly separated by margin of valves. Rostrum acute, directed downwards. Valves with longitudinal lines. Postabdomen with 19-20 anal denticles and a row of lateral groups of setae. Claw with setae on concave margin and with a basal spine at some distance from the base of each claw.

Distribution : India : Assam, Madhya Pradesh, Manipur and Meghalaya.

Genus *Euryalona* Sars, 1901

Characters : Body almost quadrangular and valves with indistinct sculpture. Head shield with single head pore. Antennal setae : 1-1-3/0-0-3. Ocellus smaller than eye. Postabdomen long and narrow; with anal spines and lateral setae. Claw with one basal spine. Anus located in proximal part of postabdomen.

Only one species belonging to this genus is included in the present account.

47. *Coronatella anodonta* (Daday, 1905)

(Fig. 97)

Material examined : BKS collections : 9 examples, 17.10.2008.

Characters : Body oval, with maximum height in middle. Head shield and valves with distinct tubercles; postero-dorsal and postero-ventral corners of valves rounded; valves with a row of fine setules along the postero-ventral corner and sub-marginal spinules on posterior margin. Antennules almost reaching apex of rostrum. Ocellus small and situated halfway

between eye and apex of rostrum. Labral plate rounded, without any denticle. Post-abdomen short, dorsal distal corner wide and rounded, with 6-8 anal denticles increasing in size distally and anal margin with 3-4 groups of setules. Pre-anal corner distinct, Lateral surface of post-abdomen with 8-10 groups of setae, the distal seta longest in each group. Claw with a basal spine.

Distribution : India : Meghalaya and Rajasthan (?).

48. ***Coronatella rectangula*** Sars, 1862

(Fig. 98)

Material examined : BKS collections : 5 examples, 12.09.2008; 9 examples, 17.10.2008; 4 examples, 12.12.2008; 5 examples, 19.01.2009; 6 examples, 19.02.2009; 6 examples, 21.03.2009; 7 examples, 24.04.2009; 5 examples, 15.05.2009; 5 examples, 26.06.2009; 5 examples, 24.07.2009; 4 examples, 31.08.2009; 5 examples, 19.09.2009; 3 examples, 27.10.2009; 6 examples, 27.11.2009; 4 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 5 examples, 19.03.2010; 6 examples, 14.04.2010; 4 examples, 21.05.2010; 7 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/658, 21.05.2010.

Characters : Body broadly oval, Valves marked with longitudinal lines; with rounded postero-dorsal and postero-ventral corners. Labral plate with convex anterior margin. Antennules not reaching apex of rostrum. Ocellus smaller than eye. Postabdomen wide, 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 its concave margin.

Distribution : India : Assam, Gujarat, Jammu & Kashmir, Ladak, Manipur, Meghalaya, Tripura and West Bengal.

49. ***Euryalona orientalis*** (Daday, 1898)

Material examined : BKS collections : 4 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 2 examples, 21.03.2009; 5 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 5 examples, 21.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/527, 26.06.2009; 1 example, IV/CLA/ERS/573, 18.09.2009; 1 example, IV/CLA/ERS/609, 30.12.2009.

Characters : Body quadrangular, ventral margin of valves with a blunt process before its middle and margins of valves with several concentric rows of weak dots. Labral plate with convex anterior margin and blunt apex. Postabdomen long, narrow, slightly curved and with produced distal dorsal margin; with 20 anal spines decreasing in size proximally; groups of lateral setae arranged in a row. Claw with a basal spine and with setae on its concave margin.

Distribution : India : Assam, Manipur, Meghalaya, Rajasthan, Tripura and West Bengal.

Genus ***Graptoleberis*** Sars, 1862

Characters : Body semicircular; posterior ventral corner of valves with denticles. Rostrum wide, spatula-shaped. Posterior margin of head-shield pointed. Distance between main head pores larger than distance from pores to posterior margin of head-shield. Valves reticulated with distinct large cells. Antennules not reaching apex of rostrum. Antennal seta: 0-0-3/0-1-3. Plate of labrum rounded. Postabdomen narrowing distally. Claw short. Six pairs of thoracic legs present; leg IV in form of a small process.

Our collections from Deepor Beel indicate only one species of this genus.

50. ***Graptoleberis testudinaria*** (Fischer, 1851)

(Fig. 99)

Material examined : BKS collections : 10 examples, 19.02.2009; 7 examples, 21.03.2009; 8 examples, 24.04.2009; 10 examples, 20.01.2010; 7 examples, 26.02.2010; 9 examples, 19.03.2010; 9 examples, 14.04.2010.

SS collections : 1 example, IV/CLA/ERS/634, 27.02.2010; 1 example, IV/CLA/ERS/649, 20.03.2010.

Characters : Body with maximum height in the middle; dorsal margin of body convex, ventral margin nearly straight and with setae decreasing in size. Postero-ventral corner of valves with variable number of teeth. Head shield and valves with tetragonal, pentagonal or hexagonal cells. Rostrum broad and its ventral margin almost at level of ventral margin of valves. Labral plate with rounded apex. Postabdomen tapering distally and with distinct pre-anal corner. Anal margin with row of anal spines increasing in size distally and groups of lateral setae. Claw with small basal spine and seta on concave margin.

Distribution : India : Andhra Pradesh, Assam, Jammu & Kashmir, Meghalaya and Uttaranchal.

Genus ***Karualona*** Dumont and Silva-Briano, 2000

Characters : Head shield with two connected main pores and two small lateral pores. Valves densely reticulated; posterior ventral corner of each valve with 2-5 denticles. Labrum helmet shaped, with strong keel. Setae on legs I, III and IV characteristic. Postabdomen with sub-marginal group of spines and lateral fascicles of spine-setae.

Karualona is represented by one species in the collections from Deepor Beel.

51. ***Karualona karua*** (King, 1853)

Material examined : BKS collections : 6 examples, 17.10.2008; 4 examples, 12.12.2008; 6 examples, 19.01.2009; 3 examples, 21.03.2009; 5 examples, 24.04.2009; 7 examples, 15.05.2009; 5 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 6 examples, 27.10.2009; 5 examples, 27.11.2009; 5 examples,

20.01.2010; 7 examples, 26.02.2010; 4 examples, 19.03.2010; 5 examples, 14.04.2010; 7 examples, 21.05.2010; 6 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/542, 25.07.2009; 1 example, IV/CLA/ERS/589, 28.10.2009; 1 example, IV/CLA/ERS/600, 28.11.2009; 1 example, IV/CLA/ERS/635, 27.03.2010; 1 example, IV/CLA/ERS/659, 21.05.2010.

Characters : Female : Body broadly oval; with maximum width slightly before its middle. Valves marked with lines interconnected; postero-ventral corner with 3-5 denticles separated from each other by margin of valves. Labral plate with rounded anterior margin. Postabdomen wide and with rounded distal margin; with 7-8 anal spines; lateral setae in groups and first seta of few distal groups projecting beyond margin of postabdomen. Claw with a very small basal spine.

Male : Smaller than female. Postero-ventral corner of valves with denticles. Antennules reaching apex of rostrum. Leg I modified and with a hook. Postabdomen only with a row of lateral setae. Vas deferens opening ventrally near base of claws. Claw with small basal spine.

Distribution : India : Andaman & Nicobar Islands, Assam, Bihar, Gujarat, Jammu & Kashmir, Meghalaya, Tamil Nadu, Tripura and West Bengal.

Genus *Kurzia* Dybowski and Grochowski, 1894

Characters : Body oval. Head shield with three median head pores and small pores lateral to them; distance from small pores to posterior margin of head shield shorter than distance between pores. Rostrum long and ventrally directed. Antennules narrow and elongate. Ocellus smaller than eye. Intestine forming loops and with a caecum. Postabdomen long and narrow; with many anal spines. Claw with one basal spine. Five pairs of legs present.

This genus is divided into two subgenera namely *Kurzia* and *Rostrokurzia*; the latter is represented by two species in our collections from Deepor Beel.

52. *Kurzia (Rostrokurzia) brevilabris* Rajapaksa & Fernando, 1986
(Fig. 100)

Material examined : BKS collections : 5 examples, 26.06.2009; 7 examples, 24.07.2009; 4 examples, 19.09.2009; 6 examples, 19.03.2010; 5 examples, 21.05.2010; 7 examples, 30.06.2010.

Characters : Body oval and compressed; postero-ventral corner of valves rounded. Valves marked with longitudinal lines; marginal setules along postero-lateral corner and sub-marginal setules on posterior margin subequal. Rostrum long. Ocellus about half size of eye and situated close to it. Three connected head pores, medial pore relatively smaller and lateral pores minute. Antennules elongated, only three longest aesthetasces reaching tip of rostrum. Labrum strongly reduced, labral plate with rounded anterior margin. Post-abdomen long, distal corner with a narrow lobe projecting beyond claw, dorsal margin slightly recurved with

10-14 short denticles followed by 3-5 groups of minute spines. Claw long, with setules; basal spine short and with setules at its base.

Distribution : India : New record.

53. *Kurzia (Rostrokurzia) longirostris* (Daday, 1898)

(Fig. 101)

Material examined : BKS collections : 7 examples, 12.09.2008; 5 examples, 17.10.2008; 5 examples, 21.03.2009; 6 examples, 24.04.2009; 5 examples, 15.05.2009; 3 examples, 26.06.2009; 7 examples, 24.07.2009; 6 examples, 19.09.2009; 5 examples, 27.10.2009; 7 examples, 21.05.2010.

SS collections : 1 example, IV/CLA/ERS/543, 25.07.2009; 1 example, IV/CLA/ERS/557, 31.08.2009; 1 example, IV/CLA/ERS/590, 28.11.2009; 1 example, IV/CLA/ERS/610, 30.12.2009; 1 example, IV/CLA/ERS/660, 21.05.2010.

Characters : Body oval and compressed; valves marked with longitudinal lines, with rounded postero-ventral corner. Rostrum long, curved and extending up to median line of body. Three main head pores connected by open channel and expanded at anterior end. Antennules reaching middle of rostrum. Ocellus smaller than eye and its distance from eye half as much as from rostrum. Labral plate with convex anterior margin and pointed apex. Postabdomen long, tapering distally and its distal corner produced, pre-anal corner not projecting; with 18-20 anal denticles. Claw with a basal spine and setae on its concave margin.

Distribution : India : Assam, Andaman & Nicobar Islands, Kerala, Meghalaya, Rajasthan, Tamil Nadu and West Bengal.

Genus *Leydigia* Kurz, 1875

Characters : Postero-dorsal corner of valves near level of highest point of dorsal margin. Rostrum short and blunt. Head shield with three connected main head pores and small pores located very close to main pores; distance from head pores to posterior margin of head-shield longer than distance between main pores. Antennal setae: 0-0-3/1-1-3. Plate of labrum rounded. Postabdomen wide and flattened; anal spines very small; lateral setae well developed and in groups. Claw with or without basal spine. Five pairs of legs present.

Our collections from Deepor Beel indicate only one species of this genus.

54. *Leberis diaphanus* (King, 1853)

(Fig. 102)

Material examined : BKS collections : 5 examples, 19.08.2008; 5 examples, 26.06.2009; 4 examples, 24.07.2009; 4 examples, 31.08.2009; 4 examples, 19.09.2009; 5 examples, 27.10.2009; 5 examples, 14.04.2010; 4 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/572, 26.06.2009; 1 example, IV/CLA/ERS/630, 27.02.2010.

Characters : Body oval. Valves with a pattern of polygons; posterior dorsal and ventral corners rounded; feathered setae on ventral margin continued into a row of short setae on posterior margin. Rostrum blunt. Head-shield with three main connected head pores and two small pores situated laterally. Labral plate rounded. Postabdomen widest in middle and tapering distally, anal spines in 10-11 groups with 2-4 teeth each; with groups of lateral setae, distal seta longer in each group. Claw with a basal spine and setae on its concave margin.

Distribution : India : Assam, Manipur and West Bengal.

55. *Leydigia acanthocercoides* (Fischer, 1854)
(Fig. 103)

Material examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009.

SS collections : 1 example, IV/CLA/ERS/515, 19.02.2009; 1 example, IV/CLA/ERS/544, 25.07.2009; 1 example, IV/CLA/ERS/622, 28.01.2010.

Characters : Body oblong and laterally compressed. Valves and head with longitudinal lines; intervals between lines with fine striations. Rostrum short, blunt and anteriorly directed. Labral plate with cilia on its convex anterior margin. Ocellus larger than eye and situated nearer to eye. Postabdomen large, broadly rounded and with small anal spines; lateral setae in groups, with two setae in each group and with two small terminal groups near base of claws. Claw with a basal spine.

Distribution : India : Assam, Gujarat, Manipur, Meghalaya, Rajasthan, Tripura and West Bengal.

Genus *Leydigiopsis* Sars, 1901

Characters : Body oval. Head shield of female with long rostrum; two main broadly connected head pores and small pores situated near the main pores. Antennules short. Labral plate triangular. Postabdomen large, with convex dorsal margin; with a double row of anal spines and a row of lateral spines on each side. Intestine with a double loop.

This rare genus is represented by only one species in the examined collections.

56. *Leydigiopsis curvirostris* Sars, 1901
(Figs. 104-105)

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 17.10.2008; 2 examples, 21.03.2009; 3 examples, 24.04.2009; 3 examples, 21.07.2010.

Characters : Body with maximum height in the middle. Postero-dorsal and postero-ventral corner of valves rounded. Ventral margin of valves protruding before the middle; entire ventral margin with setae which continue along posterior margin in a row of fine hairs, margin of valves with concentric rows of dots. Rostrum very long and curved. Distance from

apex of rostrum to base of rostrum nearly twice the length of antennule. Head-shield with two broadly connected main head pores and two small pores close to them. Labral plate triangular and with slightly pointed apex. Ocellus about as large as the eye. Endopodite of antenna slightly shorter than exopodite when directed posteriorly; the lowest seta on the apical segment of the exopodite longest than the two others and reaching the posterior margin of the valve. Postabdomen large; its dorsal margin distinctly convex distal to the anus; distal end rounded, pre-anal corner distinct; with double row of 16-20 anal denticles, decreasing in size proximally and a row of lateral spinules on each side. Claw large, with a small basal denticle and with setae on the concave margin.

Distribution : India : Assam.

Genus *Oxyurella* Dybowski and Grochowski, 1894

Characters : Body oval and rostrum blunt. Head shield with two separate main head pores with two small pores in between them and two small lateral pores. Antennules not reaching apex of rostrum. Antennal setae: 0-0-3/1-1-3. Ocellus slightly smaller than eye. Postabdomen slender, slightly tapering distally; with anal spines and lateral setae. Claw with one or more basal spines located at some distance from its base. Five pairs of legs present.

Only one species of this genus is recorded in our collections from Deepor Beel.

57. *Notalona globulosa* (Daday, 1898)

(Fig. 106)

Material examined : BKS collections : 7 examples, 19.08.2008; 6 examples, 12.09.2008; 5 examples, 17.10.2008; 5 examples, 21.03.2009; 5 examples, 24.04.2009; 7 examples, 15.05.2009; 5 examples, 26.06.2009; 3 examples, 24.07.2009; 7 examples, 31.08.2009; 9 examples, 19.09.2009; 8 examples, 27.10.2009; 7 examples, 27.11.2009; 5 examples, 30.12.2009; 3 examples, 19.03.2010; 5 examples, 14.04.2010; 3 examples, 21.05.2010; 10 examples, 30.06.2010; 9 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/554, 19.09.2009; 1 example, IV/CLA/ERS/631, 27.02.2010; 1 example, IV/CLA/ERS/657, 21.05.2010.

Characters : Body with maximum height slightly before its middle. Valves with distinct lines; postero-ventral corners rounded. Rostrum blunt. Head shield with angular posterior margin. Antennules not reaching apex of rostrum. Labral plate denticulate anteriorly and with pointed apex. Ocellus smaller and situated nearer to eye than to apex of rostrum. Postabdomen with rounded dorsal margin; broadest near anus and with distinct pre-anal corner; with about 11-13 groups of lateral setae and anal spines very small. Claw with one basal spine.

Distribution : India : Assam, Kerala, Madhya Pradesh, Manipur, Meghalaya, Orissa, Tamil Nadu, Tripura and West Bengal.

58. *Oxyurella singalensis* (Daday, 1898)

(Fig. 107)

Material examined : BKS collections : 3 examples, 19.08.2008; 5 examples, 12.09.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.02.2009; 5 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 5 examples, 30.12.2009; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 4 examples, 21.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

SS collections : 1 example, IV/CLA/ERS/417, 04.07.2008; 1 example, IV/CLA/ERS/466, 19.08.2008; 1 example, IV/CLA/ERS/650, 30.01.2010.

Characters : Valves marked with dots and with lines parallel to ventral margin; with rounded postero-dorsal and postero-ventral corners. Rostrum blunt. Labral plate with convex anterior margin and blunt apex. Ocellus smaller than eye and situated nearer to eye. Postabdomen long, slightly tapering distally; with 11-13 anal spines decreasing in size proximally, distal longest anal spine preceded by a short denticle at extreme distal end. Lateral setae in groups and arranged in a row. Claw large and with setae on its concave margin; with a large basal spine situated at some distance from its base and with a small additional spine at its base.

Distribution : India : Assam, Manipur, Meghalaya, Rajasthan, Tripura and West Bengal.

d. COPEPODA

Phylum ARTHROPODA

Superclass CRUSTACEA

Class COPEPODA

Order CALANOIDA

Characters : Antennules 20-25-segmented. Antennae, mandibles and maxillulae biramus. In adult males, one antennule geniculate and another always reaching urosome. Caudal part of body often asymmetrical. Leg 5 modified into a copulatory organ in male. Female with a single median genital pore. Abdomen narrow. Egg-sac single.

This order is represented by only one family in the present study.

Family DIAPTOMIDAE

Characters : Antennules 25-segmented. Endopodite of leg I two-segmented, endopodites of legs II-IV three-segmented. Female leg V with endopodite.

It includes sub-family Diaptominae in the samples collected from Deepor Beel.

Subfamily DIAPTOMINAE

Characters : Exopodite of leg I with only one marginal outer spine. Right antenna of male with four segments after geniculation.

Two genera of Diaptominae are represented in the present account.

Genus *Heliodiaptomus* Kiefer, 1932

Characters : Female : Antennules extending slightly beyond or only to base of caudal setae. Endopodite of leg IV without apical setae; end claw with hairy or spinulose margins, rarely denticulate. Exopodite of leg I with only one marginal outer spine.

Male : Right antenna with four segments after geniculation. Right caudal ramus without chitinous tooth on ventral side. Right leg V with endopodite generally cylindrical, lateral spine of exopodite usually proximal; exopodite of left leg V with a short or elongate digitiform process and a well developed seta apically.

Our collections from Deepor Beel include two species of *Heliodiaptomus*.

1. *Heliodiaptomus contortus* (Gurney, 1907)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.02.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : *Female* : Antennules extending caudal setae by last 1 or 2 segments. Second exopodite of left leg V with large tooth-like lateral spine near base; third exopodite vestigial; endopodite 2/3 as long as exopodite and with pointed apex. Lateral wings of 5th pediger small, rounded, symmetrical and with 2 unequal spines; right wing small. Genital somite shorter and asymmetrical; left genital spine longer than anterior in position to right spine. Caudal rami with outer hairy margins.

Male : Right antennule with spine on each of 8 and 10-15 segments; spinous process of penultimate segment straight or curved apically. First exopodite of leg IV with 2 hyaline lobes, second segment of characteristic shape, end claws very strong. Second exopodite of leg V with chela-like shape, endopodite much shorter than its counterpart of right leg. Postero-lateral border of 5th pediger with only few spinules. Genital somite extending beyond succeeding segment. Caudal rami symmetrical, with hairless lateral margins.

Distribution : India : Andhra Pradesh, Assam, Delhi, Bihar, Goa, Maharashtra, Orissa, and West Bengal.

2. *Heliodiaptomus viduus* (Gurney, 1916)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 4 examples, 12.12.2008; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Female : Antennules extending caudal rami by 3-4 segments. Left leg V with shorter left coxal spine, lateral margins of claw denticulate; endopodite about half the length of first exopodite segment. Lateral wings of 5th pediger short, each wing with 2 short, lateral directed hyaline spines. Genital somite slightly asymmetrical, right spine somewhat anterior to left spine, left spine bifid. Caudal rami longer than wide and with hirsute lateral margins. Caudal setae short and stout; outermost 2 setae distinctly arched.

Male : Right antennule with one spine each on 8 and 10-16 segments; spinous process on penultimate segment straight. First exopodite of right leg V produced into spinous process at distal outer corner and armed with conical chitinous process; second exopodite segment elongate, end claw dilated at base and with angular outer margin. Left leg V-basis with 2 small hyaline lobes, endopodite about as long as its counterpart on right leg. Fourth and fifth pedigers separated by transverse row of dorsal spinules. Caudal rami 1.4 times as long as wide and with hirsute inner margins.

Distribution : India : Andhra Pradesh, Assam, Bihar, Kerala, Maharashtra, Madhya Pradesh, Tamil Nadu and West Bengal.

Genus *Neodiaptomus* Kiefer, 1932

Characters : Female : Antennules extending beyond caudal setae. Fifth legs mostly asymmetrical, right leg shorter than left; end claws with coarsely denticulate margins; third exopodite segment reduced or absent; apex of endopodite pointed, without setae.

Male : Right antennule with spine each on 10, 11, 13-15 segments; penultimate segment with spinous process; lateral spine on second exopodite of right leg V inserted medially. Second exopodite of left leg V with small thumb-like process and a short seta apically. Right caudal ramus with tooth-like chitinous structure at inner ventro-distal corner.

This genus is represented by only one species in our collections from Deepor Beel.

3. *Neodiaptomus schmackeri* (Poppe & Richard, 1892)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 14.11.2008; 2 examples, 19.09.2009; 3 examples, 21.07.2010.

Characters : Female : Antennules extending beyond caudal setae by last 2-3 segments. First exopodite of leg V with bulge at proximal inner angle; right claw with 6-8 denticles on inner margin and 0-1 on outer margin; left end claw with 8-11 denticles on inner margin and 0-2 on outer margin. Third exopodite segment distinct. Endopodite shorter than first exopodite segment. Lateral wings asymmetrical, left wing slightly more extensive than right.

Genital somite asymmetrical, sub-proximal part dilated into a lobe on each side. Caudal rami with hirsute inner margins.

Male : Second and third urosomites with ventral hair. Caudal rami symmetrical, right ramus with small dentiform process at distal inner corner on ventral surface. Right antennule with spine each on 8 and 10-15 segments; spinous process on penultimate segment straight. Coxa of leg V with bifid hyaline lobe at distal inner corner; end claw sickle shaped; endopodite flask-shaped. Basis with hyaline lamella on inner margin of left leg V.

Distribution : India : Andhra Pradesh, Assam, West Bengal and Tamil Nadu.

Order CYCLOPOIDA

Characters : Antennules 9-17 segmented; both antennules of male geniculate. Antennae uniramous. Maxilliped simplified, without prehensile claw. Leg V reduced, identical in both sexes. Two genital pores, often sub-dorsally situated on each side of the seminal receptacle. Two egg sacs present.

Only family Cyclopidae is represented in our collections from Deepor Beel.

Family CYCLOPIDAE

Characters : Palp of mandible poorly developed and represented by one process with three setae.

This family is represented by two subfamilies in the present study.

Subfamily EUCYCLOPINAE

Characters : Terminal segment of leg V with 3 setae or spines.

Eucyclopinae is represented by only one genus in the examined collections.

Genus *Tropocyclops* Kiefer, 1929

Characters : Body slender; metastome ob-ovate and epimeral plates well defined and prominent. Antennule 12-segmented. Caudal rami elongate and without spinules on outer margin. Fifth leg small and one-segmented; inner seta very long. Urosome slender. Genital segment swollen anteriorly and narrowed posteriorly.

One species of *Tropocyclops* is noticed in the samples collected from Deepor Beel.

4. *Tropocyclops prasinus* (Fischer, 1860)

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 14.11.2008; 3 examples, 19.01.2009; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 20.01.2010; 3 examples, 19.03.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Female : Metasome about two times longer than wide. Antennule reaching nearly end of third metasomal segment. Caudal rami short, about 3 times longer than wide and without bristles on inner margin or outer margins. Leg V tri-lobed and inner spine shorter than outer. Inner terminal spine of leg IV long. Genital segment little dilated anteriorly.

Male : Body small in size than that of female. Antennules geniculate on both sides. Leg V tri-lobed, inner spine longer. Genital segment as wide as 5th urosomal segment and narrowed posteriorly. Caudal rami symmetrical.

Distribution : India : Assam, Himachal Pradesh, Madhya Pradesh, Rajasthan and West Bengal.

Subfamily CYCLOPINAE

Characters : Terminal segment of leg V with 2 setae or spines.

This sub-family is represented by three genera in Deepor Beel.

Genus *Mesocyclops* Sars, 1914

Characters : Body slender. Medial most terminal seta conspicuously longer than caudal ramus and lateral most terminal seta. Lateral caudal seta inserted at about distal 1/3 of caudal ramus. Female antennule 17-segmented; last two segments bearing serrate hyaline membrane. Male antennule 16-segmented. Apical spines of third endopodite of leg IV usually unequal. Leg V 2-segmented, first segment bearing lateral seta, second segment with slender apical and spiniform medial setae.

Our collections from Deepor beel indicate only one species of *Mesocyclops*.

5. *Mesocyclops leuckarti* (Claus, 1857)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Female : Body with prosome/urosome : 1.4-1.7; cephalothorax width/double genital somite width : 2.9-3.4. Pediger 5 without hairs, dorsal surface with 2 sensilla medially and 2 sensilla laterally. Genital double somite 1.2-1.5 times as long as wide; without hairs. Seminal receptacle : lateral arms relatively short, copulatory pore horse-shoe shaped, copulatory duct broad and strongly sinuously curved. Caudal ramus without medial hairs. Dorsal caudal seta shorter and terminal caudal seta longest. Median expansion of leg I basipodite without spine. Couplers of legs I-IV bare on frontal and caudal surfaces. Leg IV coxopodite seta distinctly longer, mediate expansion of basipodite with distal hairs. Leg V with apical seta slightly longer than spiniform medial seta.

Male : Pediger 5 without hairs. Caudal ramus usually 2.7-4.0 times as long and wide, without medial hairs. Antennule with ventral spinules only on first segment. Leg IV coupler

with large prominences, apical hairs on medial expansion of leg IV basipodite present or absent.

Distribution : India : Andaman & Nicobar Islands, Andhra Pradesh, Assam, Delhi, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal.

Genus ***Microcyclops*** Claus, 1863

Characters : Antennule 12-segmented. Urosome slender, genital segment scarcely dilated anteriorly. Leg V one-segmented. Caudal rami with lateral seta inserted in the last third part of ramus or even more distally. Endopodite of leg IV with two spines distally and inner spine half or less as long as outer spine.

This genus is represented by only one species in the present study.

6. ***Microcyclops varicans*** Sars, 1863

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 17.10.2008; 4 examples, 12.12.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 2 examples, 19.09.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.07.2010.

Characters : *Female* : Cephalic segment large and rounded. Metasome oval and little more than half as wide as long. Antennule smaller in length. Genital segment wider anteriorly and narrow. Caudal rami symmetrical and nearly equal in length of last two segments of urosome combined. Leg V with proximal joint totally confluent with segment and its seta originates from lateral corner; distal joint small and with minute spinules in middle of inner edge.

Male : Body slender than female. Antennules hinged at 5th and 10th segments. Genital segment swollen. Caudal rami longer than wide. Basal segment of leg V fused with body. Leg VI present at posterior corners of genital segment.

Distribution : India : Andhra Pradesh, Assam, Ladak, Punjab and West Bengal.

Genus ***Thermocyclops*** Kiefer, 1937

Characters : Small or medium size cyclopoids. Body slender. Medial most terminal caudal seta longer and sometimes with ventrally curved tips. Lateral caudal seta inserted at 0.5-0.7 of length of caudal ramus. Seminal receptacle usually hammer form. Female antennule 17-segmented, last two segments bearing serrate hyaline membrane; membrane of last segment with notches. Medial margin of basipodite of leg I usually with long spine-like seta. Medial spine of leg IV third endopodite usually longer than lateral spine. Leg V two-segmented, with basal segment bearing one lateral seta, terminal segment bearing one apical and one sub-apical long spine.

Two species belonging to *Thermocyclops* are observed in the present study.

7. *Thermocyclops decipiens* Kiefer, 1929

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 3 examples, 19.01.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 26.02.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Female : Lateral sides of pediger 5 with hair like spinules. Genital double somite longer than wide. Lateral arms of seminal receptacle slightly curved posteriorly. Postero-ventral margin of anal somite with two groups of 4-6 spinules. Caudal rami with smooth medial surface, implantations of lateral and later almost terminal caudal setae without spinules, lateral caudal seta after middle region of caudal ramus. Antennules hardly reaching posterior margin of pediger 2. Medial spine of leg I basipodite reaching third endopodite. Leg IV coupler bearing two rows of hairs on caudal surface. Medial margins of leg I-III basipodites with hairs, those of leg IV basipodite with small spinules. Medial spine of second segment of leg V nearly 1.5 times as long as lateral seta.

Male : Leg VI lateral seta nearly twice as long as medial spine.

Distribution : India : Assam and Ladak.

e. OSTRACODA

Phylum ARTHROPODA

Superclass CRUSTACEA

Class OSTRACODA

Order PODOCOPODA

Podocopoda includes all extant freshwater Ostracoda belonging to suborder Podocopa.

Suborder PODOCOPA

Second antenna with well developed endopodite armed with claws at tip; exopodite either absent or present as a rudimentary scale or simple, seta long.

Podocopa are represented by super-family Cypridacea.

Superfamily CYPRIDACEA

Maxilla and thoracic legs dissimilar. Maxilla not leg-like, a feeding appendage with a well developed masticatory process; modified as asymmetrical prehensile palp in male. Second thoracic leg as a reflexed cleaning limb.

Family CYPRIDIDAE

Abdomen with furca; third leg backwardly and dorsally directed, modified as scratch feet.

Cyprididae is represented by four sub-families in the present study.

Subfamily CYPRIDINAE

Anterior and posterior margins of valves without septa; large taxa; valve surface variable, pitted or pilose; shape sub-ovate to ovate. Endopodite of first thoracic leg 3-segmented, second and third segments of other taxa fused to form second segment. Furcal rami strongly developed.

One genus belonging to Cypridinae is recorded in the present study.

Genus *Cypris* O. F. Müller, 1776

Characters : Shell tumid, width greater than height. Natatory setae of second antenna well developed and reaching to or beyond the tip of the terminal claw. Ultimate podomere of the maxillary palp with a width about 1/3 its length. Furcal rami well developed.

This genus is represented by one species in our collections from Deepor Beel.

1. *Cypris subglobulosa* Sowerby, 1840

Material examined : BKS collections : 5 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 4 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 30.12.2009; 5 examples, 26.02.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 5 examples, 21.07.2010.

Characters : Valves sub-globular; right valve with a flange at the rounded posterior margin, posterior margin narrowly produced. Natatory setae of the second antenna setulate, barely reaching the tip of the pectinate terminal claw. Furcal rami symmetrical, slender; sub terminal claw more than ½ the length of the terminal claw, both claws pectinate; dorsal seta setulate; terminal seta short.

Distribution : India : Assam, Andhra Pradesh, Maharashtra, Madhya Pradesh, Kerala, Punjab, Tamil Nadu and West Bengal.

Subfamily EUCYPRIDINAE

This sub-family is presently represented by genus *Strandesia*, the position of which in Eucypridinae requires re-examination (Hartmann and Puri, 1974). According to Martens (1994), it is closely related to other Cypricerine genera.

Genus *Strandesia* Vavra, 1895

Characters : Valves moderately elongate, sub-elliptical; usually left valve overlaps the right. Sensory club of second antenna long, natatory setae well developed. Furcal rami symmetrical; furcal attachments with a characteristic loop.

Strandesia is represented by one species in the present study.

2. *Strandesia indica* Hartmann, 1964

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 19.01.2009; 3 examples, 19.02.2009; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 26.06.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 26.02.2010; 3 examples, 19.03.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 4 examples, 21.07.2010.

Characters : Valves elongated laterally, dorsum convex; anterior margin more broadly rounded than the posterior; entire margin of valves hairy except dorsally. Natatory setae of second antenna smooth and slightly reaching beyond the tips of pectinate claws. Furcal rami symmetrical; sub-terminal and terminal claws slender and with spines on the dorsal edge; terminal seta hairy, shorter than terminal claw; dorsal margin of both the rami with minute spines along 3/4 the entire length.

Distribution : India : Gujarat, Kerala, Tamil Nadu and West Bengal.

Subfamily CYPRINOTINAE

Shell moderately inflated, with width less than its height; valve smooth, pitted or pilose; anterior and posterior margins of one valve tuberculate.

One genus belonging to this sub-family is recorded in the present study.

Genus *Hemicypris* Sars, 1903

Characters : Right valve of shell overlaps the left; left valve with marginal tubercles. Natatory setae of the second antenna reaching beyond the tips of the terminal claw. Furca well developed, symmetrical and with dorsal and terminal setae.

One species of *Hemicypris* is noticed in the collections from Deepor Beel.

3. *Hemicypris anomala* (Klie, 1838)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 27.11.2009.

Characters : Valves sub-quadrangular; right valve larger, completely overlaps the left; left valve tuberculate. Natatory setae of the second antenna reaching beyond the apex of the terminal claws; sensory club two-segmented. Furca symmetrical, smooth; dorsal seta more than 3/4 the length of the terminal claw; terminal seta less than half the length of sub-terminal claw; dorsal margin of the ramus finely spinose.

Distribution : India : Kerala, Maharashtra, Pondicherry, Tamil Nadu and West Bengal.

Subfamily HERPETOCYPRIDINAE

Carapace length more than 3 times its height. Furcal rami asymmetrical or symmetrical; if asymmetrical, left and right structurally different. Natatory setae of antenna present, short-

ended in some taxa. Furcal attachment forked with a triangular plate above the insertion point of rami.

Herpetocypridinae is represented by one genus in the examined collections.

Genus *Stenocypris* Sars, 1889

Characters : Valves elongate, equal or unequal; anterior and posterior margin of valves with prominent setae. Furcal rami asymmetrical, dorsal setae absent.

Stenocypris is represented by two species in the presently examined collections.

4. *Stenocypris major* (Baird, 1859)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 4 examples, 12.12.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009.

Characters : Valves reniform; left and right valves almost of similar size; radials bands of septa prominent, of uniform width anteriorly and posteriorly. Natatory setae of second antenna barely reaching the tips of terminal claws; claws pectinate; sensory club 2-segmented. Furcal rami asymmetrical; terminal and sub-terminal claws heavily toothed; dorsal seta lacking; left ramus curved; right ramus relatively straight, with few teeth on its distal end.

Distribution : India : Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu and West Bengal.

5. *Stenocypris sewelli* Klie, 1838

Material examined : BKS collections : 3 examples, 19.01.2009; 3 examples, 20.01.2010.

Characters : Valves elongate, unequal, left valve overlaps the right; radial band of septa only in the anterior region. Third leg with a long and curved claw, a small claw-like projection and a seta. Furcal rami asymmetrical; right ramus heavily denticulate and left ramus with weak denticles on its distal end; terminal setae longer than the terminal claws.

Distribution : India : Himachal Pradesh, Meghalaya and West Bengal.

Family CYPRIDOPSIDAE

Anterior margins of both valves with very distinct septa, posterior margin with or without septa. Endopodite of first thoracic leg with four segments and a terminal claw.

This family is represented by subfamily Cypridopsinae in the present study.

Subfamily CYPRIDOPSINAE

Furcal ramus reduced to a long seta or flagellum with a base; base with another small seta or bristle, at times absent.

This sub-family is represented by three genera in the present account.

Genus *Cypridopsis* Brady, 1868

Characters : Anterior and posterior margin of the right valve without septa; surface smooth or punctate, often pilose. Terminal segment of second thoracic leg distinctly divided, pincers present; terminal claw relatively short.

One species belonging to *Cypridopsis* is recorded from Deepor Beel.

6. *Cypridopsis dispar* Hartmann, 1964

Material examined : BKS collections : 4 examples, 12.09.2008; 4 examples, 12.12.2008; 2 examples, 19.09.2009.

Characters : Valves reniform and covered with minute hairs; dorsum strongly arched, maximum height in the middle; right valve overlaps the left. Natatory seta of second antenna smooth, reaching to the tip of the terminal claw; sensory club two-segmented. Furcal ramus reduced to a flagellum.

Distribution : India : Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu and West Bengal.

Genus *Onchocypris* P. E. Müller, 1898

Characters : Carapace sculptured with nodules, tubercles and depressions. Antenna with long slender terminal claw, natatory setae long and reaching beyond the tips of terminal claws. Furca reduced to a flagellum.

Only one species *Onchocypris* of observed in the examined collections.

7. *Onchocypris pustulosa* Gurney, 1926

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 30.12.2009; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Eyes large, united dorsally. Valves tumid, sculptured with fine granulations and tuberculation; valve overlap inconspicuous, anterior extremity with constrictions, dorsum angular. Notatory setae of the second antenna reaching beyond the tips of the terminal claws. Furca reduced to a flagellum.

Distribution : India : Kerala.

Genus *Pseudocypretta* Klie, 1972

Characters : Anterior and posterior margin of the right valve with distinct septa. Terminal segment of second thoracic leg distinctly divided, terminal pincers absent, claw relatively short with a short seta at its base, reflexed seta relatively short.

This genus is represented by one species in the present study.

8. *Pseudocypretta maculata* Klie, 1932

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 24.04.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 20.01.2010.

Characters : Valves tumid, sub-triangular, dorsum boldly arched; right valve overlaps the left; surface punctate and with few short hairs. Notatory setae of the second antenna well developed, reaching to the tips of the terminal claws; claws long and smooth; sensory club 2-segmented. Furca reduced.

Distribution : India : Kerala and Tamil Nadu

Subfamily CYPRETTINAE

Furcal rami peg-like, weakly developed and delicate. This sub-family is represented by one genus in the present study.

Genus *Cypretta* Vavra, 1895

Characters : Size small; carapace tumid, with smooth, punctate or tuberculate surface; right and left valves unequal; anterior margins always with well defined septa. Furcal rami symmetrical, slender and flexible; terminal seta present or absent, dorsal seta present.

One species belonging to the genus *Cypretta* is recorded in the present study.

9. *Cypretta fontinalis* Hartmann, 1965

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 24.04.2009; 3 examples, 30.12.2009.

Characters : Valves tumid, surface hairy, right valve overlapping the left, anterior margin with well developed seta. Furcal rami symmetrical; terminal and sub-terminal claws slender; dorsal seta less than $\frac{1}{4}$ the length of sub-terminal claw and terminal seta rudimentary.

Distribution : India : Maharashtra and Tamil Nadu.

f. GASTROTRICHA

Phylum GASTROTRICHA

Family CHAETONOTIDAE

Body divided into head, neck and trunk. Unbranched caudal furca present at postero-lateral extensions of the body, usually with adhesive glands.

This family is represented by only one genus in the present account.

Genus *Chaetonotus* Ehrenberg, 1830

Characters : Body covered with scales or spines or both. Caudal furca un-segmented, shorter than body.

Three species of this genus are observed in our collections from Deepor Beel.

1. *Chaetonotus anomalus* Brunson, 1950

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 2 examples, 26.02.2010; 3 examples, 14.04.2010; 3 examples, 21.07.2010.

Characters : Head five-lobed; body with 6-8 long rows of spines, increasing in size posteriorly; also with seven long, twice bifurcate spines arising behind the mid region of the trunk and projecting considerably beyond the other spines. Caudal furca long, slightly dilated at base and divergent.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Orissa and West Bengal.

2. *Chaetonotus gastrocyaneus* Brunson, 1950

Material examined : BKS collections : 3 examples, 19.02.2009; 2 examples, 30.06.2010.

Characters : Body elongated. Head irregular, rounded or flattened anteriorly; cephalic shield present, with two pairs of tactile ciliary tufts. Body with 10-16 rows of spines, spines in anterior part of body relatively small; each spine with three pronged base and bifurcate distally. Caudal furca relatively short and divergent.

Distribution : India : Assam and Orissa.

3. *Chaetonotus similis* Zelinka, 1889

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 2 examples, 31.08.2009; 2 examples, 19.09.2009; 2 examples, 30.12.2009; 3 examples, 19.03.2010; 2 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body slender and elongated. Head indistinctly five-lobed. Dorsal surface of body convex and with longitudinal rows of spines; spines increasing in size posteriorly, each spine bifurcated distally and arises on a broad base from a flat cuticular plate. Caudal furca small and divergent.

Distribution : India : Andhra Pradesh, Assam, Meghalaya, Orissa and West Bengal.

g. MOLLUSCA

Phylum MOLLUSCA

Class GASTROPODA

Shell in one piece, coiled or conical. The gastropods are represented by two sub-classes in the present study.

Subclass PROSOBRANCHIA

Mollusca with a gill and an operculum. This subclass is represented by one order in this account.

Order MESOGASTROPODA

This order includes one super-family in the present study.

Superfamily VIVIPAROIDEA

The super-order Viviparoidea is represented by three families in the present study.

Family VIVIPARIDAE

Shell moderately large, dextral, perforate or imperforate with a horny, corneous and concentric operculum. Whorls rounded with or without bands, spire conical and aperture almost circular. The central tooth wide and without denticles. Females generally larger than the males.

Of the three subfamilies of Viviparidae, only two are known to occur in the Indian freshwaters while only Bellamyinae is represented in the collections from Deepor Beel.

Subfamily BELLAMYINAE

Shell medium to large, dextral and varying in shape-convex to angular or carinate, obtusely or strongly keeled at the periphery. Aperture sub-circular ovate; operculum corneous and concentric. Shell banded in adults.

Amongst three genera of this subfamily known from the Indian waters, *Bellamyia* is recorded in the present account.

Genus *Bellamyia* Jousseaume, 1886

Characters : Shell oblong, obtusely keeled at the periphery, flattened whorls. Columellar margin thinner. Head small, mantle margin moderately thick and with short processes.

This genus is represented by three species in the collections from Deepor Beel.

1. *Bellamyia bengalensis* f. *typica* (Lamarck, 1822) (Figs. 108-109)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 2 examples, 21.03.2009; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 30.12.2009; 3 examples, 20.01.2010; 3 examples, 26.02.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell thin, acuminate; spire and body whorls of almost equal height; whorls gradually increasing, less rounded and with almost straight sides, sutures shallow. Aperture sub-circular with a narrow black margin. Bands variable, alternating broad and narrow bands. The examined specimens belong to f. *typica*.

Distribution : India : Throughout.

1a. *Bellamya bengalensis* f. *annandalei* (Kobelt, 1908)

(Figs. 110-111)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 21.03.2009; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Shell thinner, whorls gradually increasing, less rounded and with rather straight sides; sutures shallow.

Distribution : India : Andhra Pradesh, Bihar, Manipur, Meghalaya, Orissa, Rajasthan, Tamil Nadu and West Bengal.

2. *Bellamya crassa* (Benson, 1836)

(Figs. 112-113)

Material examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 15.05.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 3 examples, 26.02.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell olive brown, globulose, without color bands, sculptured with fine spiral lines; spire small and blunt; aperture sub-oval, columella arched, anterior margin nearly straight, outer lip arched; umbilicus rimately perforate.

Distribution : India : Andhra Pradesh, Assam, Karnataka, Meghalaya, Orissa, Uttar Pradesh and West Bengal.

3. *Bellamya dissimilis* (Müller, 1774)

(Figs. 114-115)

Material examined : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell small, high and narrow; spire swollen, sutures deeply impressed, without dark spiral bands; body whorl with one slightly elevated ridge or broad and obscure, pale spiral band. Aperture rim black, operculum thicker, edge of mantle smooth.

Distribution : India : Throughout.

Family AMPULLARIIDAE

Shell medium to large, green or olive brown in color, perforate or imperforate, dextral or sinistral; depressed to ovate, with rounded angular or carinate whorls. Operculum large, concentric, calcareous or corneous with a sub-central nucleus.

Genus *Pila* Roeding, 1798

Characters : Shell medium to large; dextral, globose with convex non-angular whorls; body whorl inflated. Aperture large and expanded, umbilicus open or closed; operculum with

an inner calcareous layer. Radulalateral teeth with 5 cusps, central one largest and innermost reduced.

Two species of the genus *Pila* are noticed in the present study.

4. *Pila globosa* (Swainson, 1822)

(Figs. 116-117)

Material examined : BKS collections : 3 examples, 24.07.2009; 3 examples, 31.08.2009.

Characters : Shell globose and spacious with an inflated body whorl and depressed spire, suture shallow, colored bands inside the aperture, upper surface of whorls obliquely flattened.

Distribution : India : Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan, Uttar Pradesh and West Bengal.

5. *Pila theobaldi* (Hanley, 1875)

(Figs. 118-119)

Material examined : BKS collections : 3 examples, 19.08.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell large, whorls globose, suture more impressed; umbilicus widely open; aperture without color bands.

Distribution : India : Manipur, Meghalaya and Tripura.

Family PLEUROCERIDAE

Shell rounded, oval or tower shaped; sculpture variable, smooth or spirally striated, ribbed or tuberculate; periostracum strong; columellar margin thick, more or less arched. Aperture ovate, relatively large, angular notched or obliquely produced below. Operculum pauci-spiral, spiral up to six whorls, nucleus nearly central.

Out of six-subfamilies of Pleuroceridae, only two are known to occur in India and are also represented in the present study.

Subfamily MELANATRIINAE

Shell tower shaped, smooth or spirally striated, ribbed or tuberculate; columellar margin thick, more or less arched, aperture angular below; operculum spiral with six whorls, nucleus nearly central.

This family is represented by genus *Brotia* in the examined collections.

Genus *Brotia* Adams, 1866

Characters : Shell high coned or turreted, with many whorls; spire longer than body whorl; apex asymmetrical, covered with dark brown or black epidermis; axial ribs heavy; columellar angle of tip of aperture produced slightly forward or round. Operculum multi-spiral, round with central nucleus.

This genus is divided into two subgenera *i.e.*, *Brotia s. str.* and *Antimelania*; the latter is represented in the collections examined from Deepor Beel.

6. ***Brotia (Antimelania) costula*** (Rafinesque, 1833)

(Figs. 120-123)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell elongate with spiral ridges or nodules, proximal axial ribs often with spines; 12-14 regularly increasing whorls; aperture more or less regularly rounded.

Much variable in shape and two variants of this species are noticed in this study.

Distribution : India : Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Tripura, Uttar Pradesh and West Bengal.

Subfamily PALUDOMINAE

Shell oval or rounded, with strong periostracum; sculpture smooth or with spiral markings. Aperture large, ovate or notched or obliquely grooved below; operculum round and with concentric ridges.

Genus ***Paludomus*** Swainson, 1840

Characters : Shell thick, heavy, oblong-globose; aperture larger than spire, columella very thick.

This genus is divided into four sub-genera; of these only *Paludomus s. str.* is recorded in the present study.

7. ***Paludomus (Paludomus) blanfordiana*** Nevill, 1877

(Figs. 124-125)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell ovately globose, dark yellow, often coated with black encrustation; body whorl inflated, with three salient brown broad bands. Aperture oval, margin of columellar callus tinged with brown color.

Distribution : India : Assam, Meghalaya, Manipur, Mizoram and Tripura.

8. ***Paludomus (Paludomus) conica*** (Gray, 1834)

(Figs. 126-127)

Material examined : BKS collections : 3 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell yellow brown to dark brown, globose conical often with dark spiral bands; whorls 5, smooth for the most part except one broad or three to four spiral ridges in the suture region.

Distribution : India : Assam, Meghalaya and Tripura.

9. *Paludomus (Paludomus) reticulata* Blanford, 1856

(Fig. 128-129)

Material examined : BKS collections : 2 examples, 24.04.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Shell globose, with reticulate striations forming regular axial granules or reticulations; suture impressed; whorls 3-4.

Distribution : India : Assam and Meghalaya.

Subclass PULMONATA

Mollusca with a pulmonary sac and without operculum. This sub-class is represented by one order and one super-family in the collections examined from Deepor Beel.

Order BASOMMATOPHORA

This order is represented by two super families in our collections from Deepor Beel.

Superfamily LYMNAEOIDEA

One family belonging to Lymnaeoidae is recorded in the present study.

Family LYMNAEIDAE

Shell small or large, dextral, ovate-oblong, thin, spire pointed. Body whorl inflated and relatively large, columellar axis twisted. Aperture large, lip thin and simple.

This family is represented by only one genus in the present account.

Genus *Lymnea* Lamarck, 1799

Characters : Shell thin, ovate or elongate, rimate or imperforate; spire exerted; body whorl large. Aperture oval, pristome thin and simple; columella spirally twisted; mantle not extending over the shell.

Two species of *Lymnea* are noticed in the collections examined from Deepor Beel.

10. *Lymnea (Pseudosuccinea) acuminata f. typica* Lamarck, 1822

(Figs. 130-131)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell thin and ovate; spire short and acuminate; body whorl much inflated, a little angular above and with a large aperture.

Distribution : India : Throughout.

10a. *Lymnea (Pseudosuccinea) acuminata f. gracilior* Martens, 1881
(Figs. 132-133)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell grey to light pink; shape linear with a long narrow spire.

Distribution : India : Assam, Jharkhand, Kerala, Maharashtra, Orissa, Uttar Pradesh and West Bengal.

10b. *Lymnea (Pseudosuccinea) acuminata f. rufescens* Gray, 1822
(Figs. 134-135)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Shell reddish in color, narrower, spire longer; aperture uniformly less expanded; columellar fold feebly developed.

Distribution : India : Throughout.

11. *Lymnea (Pseudosuccinea) luteola* Lamarck, 1822
(Figs. 136-137)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 15.05.2009; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell thin and glossy; body whorl less inflated and laterally compressed; spire relatively longer, gradually tapering; aperture narrow.

Distribution : India : Throughout.

Superfamily PLANORBOIDEA

Two families belonging to Planorboidea are represented in this study.

Family PLANORBIDAE

Shell small to medium, discoidal or plani-spiral, with a small aperture; apex does not project above the plane. Foot simple, elongated and tapering into faint posterior. Radula with bicuspid central tooth; large bi- or tri-cuspidal teeth long and multi-cuspidal marginal teeth.

It is represented by subfamily Planorbinae in the present account.

Subfamily PLANORBINAE

Shell discoidal or lens shaped with internal septa in some species; whorls distinct, regularly increasing in size, upper and lower side flattened.

Only one genus of this subfamily is observed in presently examined collections.

Genus ***Gyraulus*** Charpentier, 1837

Characters : Shell pale translucent or transparent, small, disc-like, thin and highly depressed; with 3-5 rounded rapidly increasing whorls, angular or carinate, peripheral keel present or absent; aperture slightly deflexed, oblique and lip simple.

This genus is represented by one species in the present study.

12. ***Gyraulus convexiusculus*** (Hutton, 1849)

(Fig. 138-139)

Material examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell small, discoid with 4 rounded body whorls; suture depressed, umbilicus wide and transparent, closely and obliquely striatulate aperture ovate-lunate.

Distribution : India : Andhra Pradesh, Himachal Pradesh, Maharashtra, Mizoram, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Family BULLINIDAE

Shell small to medium, sinistral, either with spire or discoid. Pseudobranch large, deeply folded and highly vascularized. Radula with two cusps on the central tooth, and three cusps on the inner tooth.

It is represented by subfamily Bullininae in the present account.

Subfamily BULLININAE

Shell sinistral, discoid, thick, medium in size; suture deeply impressed; aperture ear-shaped.

This subfamily includes only genus *Indoplanorbis* in the present study.

Genus ***Indoplanorbis*** Annandale and Prashad, 1921

Characters : Shell sinistral, discoid, thick, medium in size; suture deeply impressed; aperture ear-shaped.

This is a monotypic genus and its known species is also reported in this study.

13. ***Indoplanorbis exustus*** (Deshayes, 1834)

(Figs. 140-141)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 15.05.2009; 3 examples, 31.08.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Shell large, thick, discoid, sinistral and rounded at periphery; suture deeply impressed; aperture ear-shaped.

Distribution : India : Widely distributed.

AQUATIC INSECTS : HEMIPTERA

Phylum ARTHROPODA

Class INSECTA

Order HEMIPTERA

Suborder HETEROPTERA

Heteroptera are represented by the members of two infra-orders namely Nepomorpha and Gerromorpha in the collections examined from Deepor Beel.

Infra-order NEPOMORPHA

Antennae shorter than head, usually hidden in cavities beneath eyes and not visible from above.

This infra-order is represented by three families in the present account.

Family NEPIDAE

Abdomen with a pair of long and slender posterior appendages. Hind coxae short, free and rotatory. It is represented by two subfamilies in this account.

Subfamily NEPINAE

Body elongate, sub-oval and flattened. Pronotum about as long as or little shorter than broad. Hind coxae widely separated.

Nepinae is represented by single genus in this account which, in turn, belongs to the tribe Nepini.

Genus *Laccotrephes* Stal, 1866

Characters : Body elongated, sub-oval and flattened. Pronotum almost as long as or little shorter than broad. Hind coxae widely separated. Anterior femora incrassate and longitudinally grooved beneath and with a round tubercle at the base on each. Anterior coxae very short.

Two species of *Laccotrephes* are recorded from Deepor Beel.

1. *Laccotrephes griseus* (Guerin-Meneville, 1844)

(Fig. 142)

Material Examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Adult length less than 20 mm. Abdomen with light bluish tinge. Pronotum with a strong acute spine-like structure. Abdominal appendages shorter than body. Parameres symmetrical and slightly hooked. An obtusely rounded tooth present at the base of anterior femora.

Distribution : India : Assam, Andhra Pradesh, Arunachal Pradesh, Bihar, Chandigarh, Delhi, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Orissa, Pondicherry, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

2. ***Laccotrephes ruber*** (Linnaeus, 1764)

(Fig. 143)

Material Examined : BKS collections : 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Adult length about 30-35 mm. Abdomen yellowish-red in color dorsally. Pronotum with a small indistinct tubercle. Abdominal appendages slightly longer than the body. The male parameres curved and hook shaped.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Orissa, Pondicherry, Punjab, Tamil Nadu, Tripura Uttar Pradesh, Uttar Pradesh and West Bengal.

Subfamily RANATRINAE

Body slender, sub-cylindrical. Pronotum slender and much longer than broad. Hind coxae very close.

This subfamily includes genus *Ranatra* belonging to the tribe Ranatrini.

Genus ***Ranatra*** Fabricius, 1790

Characters : Body slender and sub-cylindrical. Pronotum much longer than broad. Hind coxae very close. Anterior femora little incrassate and without any groove beneath; with one or two pairs of sharp teeth. Anterior coxae very long.

This genus is represented by five species in the present account.

3. ***Ranatra elongata*** Fabricius, 1790

Material Examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Abdominal appendages much longer than the body. Inter-ocular space equal to the diameter of the eye. Anterior femur armed with one spine-like tooth. Metasternal process sub-triangular and mid-longitudinally sulcate.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Bihar, Chandigarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Pondicherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

4. ***Ranatra filiformis*** Fabricius, 1790

(Fig. 144)

Material Examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.11.2008; 31.08.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Abdominal appendages 3-4 mm, shorter than the body length. Metasternal process posteriorly triangular and with a distinct mid-longitudinal ridge.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Pondicherry, Punjab, Manipur, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

5. ***Ranatra gracilius*** Dallas, 1849

(Fig. 145)

Material Examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 14.11.2008; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 21.07.2010.

Characters : Abdominal appendages very short, about 1/4th of the body length. Head with an acute tubercle between the eyes. Anterior femora with six minute teeth arranged below the basal half and two large teeth at the middle.

Distribution : India : Assam, Manipur and Meghalaya.

6. ***Ranatra longipes*** Stal, 1861

Material Examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 14.11.2008; 4 examples, 3 examples, 24.07.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Abdominal appendages a little shorter than the body length. Interocular space a little narrower than the eye. Anterior femur bidentate beneath, a little broad beyond the middle. Pronotum nearly half the length of abdomen.

Distribution : India : Assam, Bihar, Meghalaya, Uttar Pradesh and West Bengal.

7. ***Ranatra varipes*** Stal, 1861

Material Examined : BKS collections : 3 examples, 19.08.2008; 4 examples, 12.09.2008; 3 examples, 24.07.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Abdominal appendages 7-8 mm shorter than the body. Pronotum with a distinct ridge at the posterior angle on each side. Metasternal process blunt posteriorly and slightly rounded with no concavity. Anterior tibia longer and touching the inner tooth on the anterior femur.

Distribution : India : Bihar, Maharashtra, Manipur, Meghalaya, Orissa, Pondicherry, Tamil Nadu, Uttar Pradesh and West Bengal.

Family BELOSTOMATIDAE

Body dorso-ventrally flattened; head nearly triangular at the anterior margin. Membrane of hemelytra with reticulate veins. Abdomen with a pair of short, flat, retractile posterior appendages.

One sub-family belonging to this family is represented in our collections.

Subfamily LETHOCERINAE

This sub-family is represented by one genus in this account.

Genus *Lethocerus* Mayr, 1853

Characters : Body large in size and narrowly elliptical ; length 40-110 mm. Head in front of eyes not conically produced. Scutellum a little broader than long. Hemelytra with distinct membrane provided with longitudinal veins. Tarsal claw one on each.

Only one species belonging to this genus is recorded in the present study.

8. *Lethocerus indicus* (Lepeletier & Serville, 1825)

(Fig. 146)

Material Examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 14.11.2008; 4 examples, 12.12.2008; 2 examples, 24.04.2009; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 19.03.2010; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body large in size (up to 100 mm) of this giant Indian water bug. Head between eyes with parallel sides. Pronotum with a transverse fasciae at the base and with a fine mid-longitudinal carination. Hemelytra with distinct membrane provided with longitudinal veins. Posterior tibiae and tarsi compressed; intermediate and posterior legs with thick set of hairs on the ventral side.

Distribution : India : Andaman & Nicobar islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Mizoram, Orissa, Pondicherry, Punjab, Rajasthan, Tripura, Uttar Pradesh and West Bengal.

Family NOTONECTIDAE

Body elongated, head spherical. Hind legs long, slender and oar-like; without distinct claws. Abdomen without posterior appendages. Hind coxae broadly jointed to the thoracic pleura.

It is represented by two sub-families namely Anisopinae and Notonectinae.

Subfamily ANISOPINAE

This subfamily is represented by only one genus in the present study.

Genus *Anisops* Spinola, 1837

Characters : Hemelytra commissure with a distinct haired-lined pit at the anterior end behind the scutellum. Pronotum more longer than its width. Ventral abdominal keel extending to the last abdominal segment. Anterior tarsus of male one segmented.

Only one species of genus *Anisops* is recorded in the present account.

9. *Anisops sardeus* Herrich-Shaffer, 1850

Material Examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 24.07.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body generally yellow or brownish-yellow, with greatest width in the middle; adult male 7.5-8.4 mm, female up to 7.5 mm. Much prominent cephalic horn with frons excavate of its entire length and bordered laterally by two carinae. Rostral prong shorter than the 3rd rostral segment. Stridulatory comb gradually narrow towards the apex, composed of about 18 teeth.

Distribution : India : Andaman & Nicobar islands, Andhra Pradesh, Assam, Bihar, Chandigarh, Delhi, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Subfamily NOTONECTINAE

This subfamily is represented by genus *Nychia* in the present account.

Genus *Nychia* Stal, 1860

Characters : Hemelytra commissure without any pit at the anterior end. Pronotum wider than its length, with concave anterior angles. Eyes with rounded angles, touching each other at inner basal angle; posterior margin of each eye E-shaped. Elytra without clavus. Antennae 3-segmented.

This genus includes only one species in the samples examined from Deepor Beel.

10. *Nychia marshalli* Scott, 1872
(Fig. 147)

Material Examined : BKS collections : 3 examples, 14.11.2008; 2 examples, 19.09.2009; 3 examples, 21.05.2010.

Characters : Males little longer and more slender than females; female body slightly wider in the middle. Head with slightly raised vortex; eyes with rounded angles, touching each other at the inner basal angle, posterior margin of each eye e-shaped. Antennae 3-segmented. Pronotum short and with concave anterior angles. Hemelytra without any clavus; fully cover the body in the females but three abdominal segments remain uncovered in males. Posterior legs slender and longer than the body.

Distribution : India : Assam and West Bengal.

Infraorder GERROMORPHA

Antennae longer than head, inserted in front of eyes and clearly visible from above.

This suborder is represented by four families in the present study.

Family GERRIDAE

Rostrum 4-segmented. Middle and hind legs elongated; hind femora long, greatly exceeding the apex of abdomen; hind legs with distinct paired claws. Adult with median Metasternal scent gland opening.

Subfamily GERRINAE

Metasternum distinctly present, about 1/10th the length of mesosternum. Seventh abdominal segment modified to form convexival spines.

This sub-family is represented by the tribe Gerrini which, in turn, includes two genera in this study.

Genus *Limnogonus* Stal, 1868

Characters : First tarsal segment much shorter than the second on the front leg. Spiracle located nearly in the middle between the anterior and posterior margins of each segment. 7th segment of male with concave ventral apical margin and without any median emarginations; 8th segment of female always basally telescopic within tubular 7th segment.

Only one species of *Limnogonus* is noticed in the collections from Deepor Beel.

11. *Limnogonus nitidus* (Mayr, 1865)

(Fig. 148)

Material Examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Adult length 8.0-10.0 mm. Pronotum with mid-longitudinal carination moderately prominent; posterior tip of pronotum distinctly angular, anterior lobe with a pair of linear, small and yellow patches. Second and third antennal segments shortest and subequal, fourth segment nearly half the length of the first. Seventh abdominal segment with convexival spines.

Distribution : India : Andaman & Nicobar islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Genus *Aquarius* Schellenberg, 1800

Characters : Body long and slender; distance between front and middle legs much greater than between middle and hind legs. First tarsal segment little short than the second on the first leg. Abdominal spiracles located closer to the anterior margin of each segment; 7th segment of male with a concave ventral margin and with a small median emarginations; 8th segment of female always well exposed.

The samples examined from Deepor Beel indicate only one species of *Aquarius*.

12. *Aquarius adelaidis* Dohrn, 1860

Material Examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Adult with length of about 11.0 mm. Head with a basal semi-lunar pale-yellow spot. First antennal joint longest but slightly shorter than the length of rest three joints together. Rostrum short and slightly surpassing base of head. First tarsal segment of middle length about four times as long as the second tarsal segment. Hind leg with first tarsal segment nearly twice the length of the second tarsal segment.

Distribution : India : Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Family HYDROMETRIDAE

Body very long and remarkably cylindrical. Head very long and slender, nearly 3 times as long as broad across the eyes. All claws inserted at the tip of the tarsi.

Hydrometridae is represented by one subfamily in the present study.

Subfamily HYDROMETRINAE

This sub-family is represented by genus *Hydrometra* in this study.

Genus *Hydrometra* Latreille, 1796

Characters : Very slender and long body (up to 12.0 mm); head greatly elongated. Antennae 4-segmented. Usually wingless, dark brownish or black in color

Only one species of *Hydrometra* is recorded in this account.

13. *Hydrometra greeni* Kirkaldy, 1898

Material Examined : BKS collections: 3 examples, 12.09.2008; 3 examples, 14.11.2008; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body very elongate, linear with thread-like legs. Head very long, much longer than pronotum and dilated at the anterior end; eyes far from anterior margin of pronotum; length of head from eyes to apex about 2/3 times greater than distance from eyes to base. First antennal segment very short, second and fourth almost equal and third segment longest. Pronotum long. Hemelytra shorter than abdomen. Tarsal claws minute and terminal.

Distribution : India : Andaman & Nicobar islands, Arunachal Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Pondicherry, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Family VELLIDAE

Rostrum 3-segmented. Middle and hind legs not elongated; posterior femora short and not extending to the abdominal apex. Adult with lateral meta-thoracic scent gland openings.

Vellidae is represented by one sub-family in the present study.

Subfamily MICROVELIINAE

This sub-family is represented by the tribe Microveliini which, in turn, is represented by genus *Microvelia* in our collections.

Genus *Microvelia* Westwood, 1834

Characters : Body short and sub-ovate; eyes small. Antennae moderately short and stout. Middle tarsus three-segmented. Pronotum sub-angularly posteriorly produced. Hemelytra not divided into corium and membrane.

One species of the genus *Microvelia* is recorded presently from Deepor Beel.

14. *Microvelia annandalei* Distant, 1909

Material Examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 14.11.2008; 3 examples, 27.11.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Legs with long hairs. First and second antennal segments slightly small than third segment, fourth segment either slightly small or equal to third segment. Pronotum with a mid-longitudinal carination on its anterior half; sub-marginal facets on the anterior end of the pronotum not reaching to the anterior angles.

Distribution : India : Assam, Tamil Nadu and West Bengal.

Family MESOVELLIDAE

Antennae longer than head. Coxae contiguous or nearly so; scutellum double, not covered and visible from above in winged forms, absent in wingless forms.

Subfamily MESOVELLIINAE

This sub-family is represented by genus *Mesovelia* in the sampled examined in the present study.

Genus ***Mesovelgia*** Mulsant and Rey, 1852

Characters : Body small; greenish with dark markings. Antennae 4-segmented. The middle and hind legs attached to the body near its ventral mid-line. Tarsal claws apical.

This genus is represented by one species in the material examined from Deepor Beel.

15. ***Mesovelgia vittigera*** Horvath, 1895

(Fig. 149)

Material Examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 14.11.2008; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body elongate, with prominent head; eyes large almost touching anterior margin of pronotum; two celli nearly equally distant from eyes as far from each other. Antennae 4-segmented; second segment shorter, other three segments subequal; pronotum with lateral angles sub-prominent. Scutellum large. Tibiae longly hirsute.

Distribution : India : Andaman & Nicobar islands, Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Orissa, Pondicherry, Tamil Nadu, Uttar Pradesh and West Bengal.

PLECOPTERA

Phylum ARTHROPODA

Class INSECTA

Order PLECOPTERA

Suborder ARCTOPERLARIA

Superfamily NEMOUROIDEA

Family NEMOURIDAE

Labrum with glossae and paraglossae of equal length. Hind wing pads extending outwards from the body. Cerci short, one segmented and modified. Small and robust nymphs.

This family is represented by two subfamilies in the present study.

Subfamily AMPHINEMOURINAE

Three genera of this sub-family are represented in the examined collections.

Genus ***Amphinemoura*** Ris, 1902

Characters : Nymphal gills vestiges on the ventral side of prothorax. Cerci of male simple, not modified as copulatory organ. Eighth sternite of female with a median chitinized plate.

One species of *Amphinemoura* is recorded in the present study.

1. *Amphinemoura luteipes* Kimmins, 1947

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 15.05.2009; 3 examples, 26.06.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Head brown, antennae and palpi pale; thorax fuscous. Wings hyaline. Ninth tergite of male elevated. Sub-genital plate narrow, vesicle slender about $\frac{3}{4}$ as long as sub genital plate. Tenth tergite with rounded depression at centre of basal margin. Cerci short and stout. Sub-anal plate produced apically into two branches; outer branch terminating into upwardly directed hook, inner branch with a finger like process dorsally and carrying a number of spines.

Distribution : India : Assam, Arunachal Pradesh, Manipur and West Bengal.

Genus *Indonemoura* Baumann, 1975

Characters : Epiproct cylindrical, asymmetrical beyond middle and terminating in a short curved tube with spicules at base. Sub-antennal plate divided into three. Cerci of male simple, not modified as copulatory organ.

Two species belonging *Indonemoura* are recorded in the present account.

2. *Indonemoura adunca* Baumann, 1975

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 19.09.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Antennae and pronotum black. Paraproct median lamella rounded apically. Subanal plate at base divided into three lobes. Ninth tergite emarginated centrally, bearing spinules. Tenth tergite excavated anteriorly and prolonged into two short lobed covered with spinules. Epiproct cylindrical, with a short curved lobe terminally and with a group of spinules at its base.

Distribution : India : West Bengal.

3. *Indonemoura assami* (Aubert, 1967)

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 27.10.2009.

Characters : Legs with two deep brown rings in the posterior half of femora. Paraproct median lamella short and chitinized. Sub-anal plate quadrangular and with an elongated sclerotised horn. Sub-anal vesicle long and slender. Epiproct elongated and slender; its interior surface with two parallel ridges each with 9-12 spicules. Cerci 2-3 times longer than wide.

Distribution : India : Assam, Uttar Pradesh and West Bengal.

Genus *Mesonemoura* Baumann, 1975

Characters : Epiproct narrow and flat, asymmetrical distally and prolonged by a whip like process. Sub-anal plate divided into two. Cerci of male simple, not modified as copulatory organ.

This genus is represented by one species in the examined collections.

4. *Mesonemoura filigera* (Kimmins, 1946)

Material examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 31.08.2009.

Characters : Ninth tergite with anal margin produced into a pair of triangular processes each armed with three spines. Subgenital plate tapering to a blunt rounded apex. Vesicle about 2/3 as long as subgenital plate. Supra anal plate with a coiled filament resting in the base of the tenth tergite. Subanal plate broad based; its apex produced in a finger and with a small hairy lobe at the base of the finger.

Distribution : India : West Bengal.

Subfamily AMPHINEMOURINAE

This sub-family is represented genus *Nemoura* in the present account.

Genus *Nemoura* Pictet, 1841

Characters : Cerci of male modified as copulatory organ. Sub-anal lobe pointed and drawn out backwards and slightly upwards.

Only species belonging to *Nemoura* is recorded in the present study.

5. *Nemoura mangicauda* Zwick & Sivee, 1980

Material examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 21.05.2010.

Characters : Ninth tergite simple. Ninth sternite forming an enlarged caudal image. Subgenital plate short, blunt and transversally blanted. Epiproct with sharp outer side. Paraproct triangular with sharp apex; its inner lobe short and external surface sclerotised.

Distribution : India : West Bengal.

Family PERLIDAE

Labrum with glossae much shorter than paraglossae. Hind wing pads extending outwards from the body. Cerci long, many segmented. Thorax with branched pleural gills.

This family is represented by one genus in the present account.

Genus *Perla* Geoffroy, 1764

Characters : Branches of pleural gills present on the thorax.

One species belonging to this genus is noticed in the examined collections.

6. *Perla xenocola* Banks, 1914

Material examined : BKS collections : 3 examples, 17.10.2008; 2 examples, 19.09.2009; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Ocelli about three diameters apart; each ocellus with a dark brown spot. Pronotum width about 1/5 times its length and with nearly square corners. Last tarsal point twice as long as other together.

Distribution : India : West Bengal.

EPHEMEROPTERA

Phylum ARTHROPODA

Class INSECTA

Order EPHEMEROPTERA

Suborder PISCIFORMA

Streamlined, fast swimming nymphs; tail densely fringed with hairs. This suborder is represented by one family in the present study.

Family BAETIDAE

Nymphs not depressed; eyes and/or antennae lateral, antero-dorsal or on front of head. Claws on all legs similar. Gills of single or double lamellae, margins entire. Antennae more than twice the width of head.

Two sub-families of Baetidae are represented in this study.

Subfamily BAETINAE

One genus belonging to Baetinae is recorded in this account.

Genus *Baetis* Lech, 1815

Characters : Gills consisting of single plates rounded at the tip. Distal segment of labial palp rounded apically. Meta-thoracic wing pads present. With three well developed caudal cerci; median cercus shorter and thinner. Claws with or without denticles.

One species belonging to *Baetis* is recorded in this account.

1. *Baetis tigroides* Gillies, 1949

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 27.10.2009; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body medium sized. Fore wing bimaculate; area round wing base and outer ¼ of costal and subcostal space sooty brown; 7-9 cross veins in stigmatic area. Hind wing 1/10 in relation to forewing. Abdominal tergites red yellow, cerci about 3 times the body length; third segment of genital forcep with a sharp bent in its basal 1/3.

Distribution : India : West Bengal.

Subfamily CLOENINAE

Two genera belonging to Cloeninae are recorded in the examined collections.

Genus *Cloeon* Leach, 1815

Characters : Gills consisting of two plates except for the last pair; the smaller lamella present on the dorsal surface of the gills. Meta-thoracic wing pads wanting. Caudal cerci equal and marked with fine, dark rings.

This genus is represented by one species in the examined collections.

2. *Cloeon marginale* (Hagen, 1859)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 3 examples, 24.07.2009; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body small sized. Forewing with diagnostic darker band in costal and subcostal space; prominent white bulla present in darker marginal band. Five cross veins present in the stigmatic area.

Distribution : India : West Bengal and Maharashtra.

Genus *Procloeon* Bengtsson, 1814

Characters : Body olive, often mottled. Gills single with slightly pointed tips. Caudal cerci with a distal dark patch.

One species belonging to *Procloeon* is recorded in this study.

3. *Procloeon harveyi* Kimmins, 1947

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 3 examples, 24.07.2009; 3 examples, 27.11.2009; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Body small. Head luteous, eyes in male with brown pigments of upper lobe and green in lower lobe but black in female. Thorax brown dorsally and with pale patch on each side. Wings hyaline, smaller than body length; with red spot at junction of radius and humeral cross veins, stigmatic area with 3-4 simple slanting cross veins. A pointed chitinous process present between two genital forceps.

Distribution : India : West Bengal and Madhya Pradesh and Maharashtra.

Suborder RECTRACHAETA

Nymphs with slightly flattened or cylindrical bodies; gills plate-like or filamentous. Caudal cerci with short sparse hairs.

One family belonging to this suborder is recorded in the present account.

Family CAENIDAE

Gills on segment 2 quadrate, gills on succeeding segments with fringed margins; operculate gills not fused at median line. Mesonotum without an antero-lateral lobe. Meta thoracic wing pads wanting.

This family is represented by one subfamily in the present account.

Subfamily CAENINAE

Only one genus belonging to Caeninae is noticed in the examined collections.

Genus *Caenis* Stephens, 1835

Characters : Nymphs small; body and wings fairly short and stout. First pairs of gills small and inconspicuous, second pair enlarged to form a flap covering the remaining gills.

One species belonging to this genus is noticed in the examined collections.

4. *Caenis perpusilla* Walker, 1853

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 14.11.2008; 3 examples, 21.05.2010; 3 examples, 30.06.2010.

Characters : Body small. Head with black stripe dorsally between two eyes. Mesonotum marked with pale narrow mid-dorsal line. Sooty black lateral lines on side of prothorax, dorso-lateral side of meso-thorax and apically on metanotum. Wings hyaline with purple costal band and purple patch at subcostal space. Cerci 3-4 time body length.

Distribution : India : West Bengal and Orissa.

Suborder SETISURA

Nymphs with broad flattened bodies; gills plate-like with a tuft of filaments at the base.

One family belonging to Setisura is reported in this account.

Family HEPTAGENIIDAE

Gills consist of a single lamella and usually with a fibrilliform tuft at or near the base. Mandibles not visible dorsally. Labial palp 2-segmented.

Heptageniidae is represented by one subfamily in the present study.

Subfamily HEPTAGENIINAE

Gill lamellae without a finger-like projection. Claws not much elongated. Maxillary palp 2-segmented.

One genus belonging to this sub-family is noticed in the examined collections.

Genus *Ecdyonurus* Eaton, 1868

Characters : Nymphs characterized by the distinct shape of the pronotum.

One species belonging to this genus is recorded in the examined collections.

5. *Ecdyonurus indicus* Hubbard, 1937

Material examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 27.11.2009.

Characters : Body small. Thorax light brown dorsally. All femora with basal, apical and medial dark brown rings. Stigmatic area with simple cross veins. Basal segment of genital forcep broader than long; second segment six time the length of basal and incurved. Genital humule strong, downwardly curved; penes lobes separate.

Distribution : India : Meghalaya.

COLEOPTERA

Phylum ARTHROPODA

Class INSECTA

Order COLEOPTERA

Family DYTISCIDAE

Body sleek and streamlined, the head fits snugly into thorax. Legs are fringed with strong swimming hairs and move together like oars. Meso-scutellum is large and exposed.

One subfamily of Dytiscidae is recorded in this study.

Subfamily DYTISCINAE

Scutellum visible. Anterior end of the eyes not incised. Three basal segments of the pro-tarsi enlarged into rounded, oval or sub-triangular pallet.

Dytiscinae includes members of three tribes in the present account.

Tribe CYBISTERINI

This tribe is represented by genus *Cybister* in the material examined from Deepor Beel.

Genus *Cybister* Curtis, 1827

Characters : Body sleek and streamlined, the head fits snugly into thorax. Legs are fringed with strong swimming hairs and move together like oars

One species of *Cybister* and belonging to sub-genus *Meganectes* is recorded in this study.

1. *Cybister (Meganectes) posticus* Aube, 1832

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 17.10.2008; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Head black with yellow labrum. Pronotum black. Elytra black with red spot just above the apex. Tibial spurs of the hind leg not reaching the two basal tarsal segments combined.

Distribution : India : Assam, Delhi, Maharashtra, Manipur, Meghalaya, Orissa, Uttar Pradesh and West Bengal.

2. *Cybister (Meganectes) sugillatus* Erichson, 1934

Material examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010.

Characters : Head black, labrum brown. Pronotum black and with indistinct red lateral borders. Elytra black with an apical red spot.

Distribution : India : Assam, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttaranchal and West Bengal.

Tribe HYDATICINI

This tribe is represented by *Hydaticus* in the material examined from Deepor Beel.

Genus *Hydaticus* Leach, 1817

Characters : Apex of pro-sternal process rounded. Outer margin of meta-sternal wings straight. Outer spur at apex of hind tibiae acute.

This genus is represented by two species which, in turn, belong to sub-genus *Guignotites*.

3. *Hydaticus (Guignotites) fabricii* Macleoy, 1833

Material examined : BKS collections : 3 examples, 14.11.2008; 3 examples, 27.10.2009; 3 examples, 27.11.2009; 3 examples, 14.04.2010.

Characters : Head with transverse band on the posterior border of vertex. Pronotum with a transverse, median band along the posterior corner. Elytra reddish yellow, densely speckled with black irrorations more or less condensed near the suture.

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

4. *Hydaticus (Guignotites) vittatus* (Fabricius, 1775)

Material examined : BKS collections : 3 examples, 17.10.2008; 3 examples, 27.11.2009; 3 examples, 30.12.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 30.06.2010; 3 examples, 21.07.2010.

Characters : Head black anteriorly. Pronotum black with sides blending into yellow. Elytra with two bright golden yellow longitudinal lateral stripes in the basal half.

Distribution : India : Andhra Pradesh, Assam, Bihar, Jammu & Kashmir, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh.

Subfamily COLYMBETINAE

Anterior boarder of eyes excised. Three basal segments of the pro-tarsi enlarged but not forming a large pallet.

This sub-family is represented by tribe Colybetini in the present account.

Tribe COLYBETINI

This tribe is represented by the genus *Rhantus* in the material examined from Deepor Beel.

Genus ***Rhantus*** Stephens, 1835

Characters : Anterior point of metasternum triangularly split to receive tip of pleurosternal process. Pronotum margined laterally. Protosternal process convex or cariniform. Two unequal claws on the hind tarsi.

One species of the genus *Rhantus* is recorded in the present study.

5. ***Rhantus taprobanicus*** Sharp, 1890

Material examined : BKS collections : 3 examples, 12.09.2008; 3 examples, 27.10.2009; 3 examples, 14.04.2010; 3 examples, 21.05.2010; 3 examples, 21.07.2010.

Characters : Reticulations on ventral side not distinct. Normal striae of punctures more spaced. Anterior claws thin.

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

Family GYRINIDAE

Eyes divided into dorsal and ventral portions. Forelegs long and raptorial, mid and hind legs short and paddle-like. Antennae stout and club-shaped.

This family is represented by one sub-family in the present study.

Subfamily ENHYDRINAE

Posterior legs broader on the inner side than outer side; maxilla without galea.

One genus belonging to Enhydrinae is recorded in the examined collections.

Genus ***Dineatus*** Macleay, 1925

Characters : Dorsal glabrous; last abdominal segment rounded, its sternite without a median longitudinal line of hairs; scutellum not visible; elytral striate not punctate.

This genus is represented by one species which, in turn, is now assigned to subgenus *Spinosodineatus*.

6. ***Dineatus (Spinosodineatus) spinosus*** (Fabricius, 1781)

Material examined : BKS collections : 3 examples, 19.08.2008; 3 examples, 17.10.2008; 2 examples, 19.09.2009; 3 examples, 27.10.2009; 3 examples, 21.07.2010.

Characters : Episternum not extending up to elytral epipleurae. Pronotum and elytra without any pubescence. Scutellum concealed or invisible. Apex of elytra with two spines.

Distribution : India : Assam, Bihar, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

Family HYDROPHILIDAE

Antennal club made up of three segments with five segments before the 'club'; abdomen with five segments visible on the underside; fore tarsi with five segments. Pronotum broadens posteriorly; eyes prominent or not.

This is represented by subfamily Hydrophilinae in the present account.

Subfamily HYDROPHILINAE

Antennae as long as or often shorter than maxillary palpi. Maxillary palpi long, last glabrous more or less asymmetrical, cup-like, embracing the first joint of tri-articulate club. Abdomen sometimes with six ventral segments.

One genus belong to Hydrophilinae is recorded in this study.

Genus *Sternolophus* Solier, 1834

Characters : All femora clothed at base with a silky procumbent and dense pubescence. Antennae with normal club.

Our collections indicate one species of *Sternolophus*.

7. *Sternolophus rufipes* (Fabricius, 1792)

Material examined : BKS collections : 3 examples, 14.11.2008; 3 examples, 27.10.2009; 3 examples, 21.05.2010.

Characters : Antennae with normal club. Abdominal ventral segments pubescent, without shining spot on the middle of the posterior margin of fifth segment.

Distribution : India : Assam, Meghalaya and West Bengal.

4. ZOOPLANKTON RICHNESS

The different zooplankton species recorded from Deepor Beel and their occurrence at the selected sampling stations 1-6 are presented in Tables 2-3. Further, their monthly richness at various stations along with ranges and mean $\pm$ SD as well as total monthly richness at each station during the study period are included in Table 4. Percentage similarities (vide Sørensen index) between monthly zooplankton communities during 2008-09 and 2009-10 are indicated in Tables 5-6. In addition, notable features of spatial and temporal variations of zooplankton richness are indicated hereunder :

Net Plankton samples collected (during August 2008-July 2010) from six sampling stations of Deepor Beel reveal a total of 232 species of zooplankton belonging to 101 genera and 38 families. Our results indicate cumulative monthly richness during the study period ranging between 55-139 (90 ± 25) species with the record of 59-135 (89 ± 22) species during 2008-09 and between 55-139 (93 ± 26) species during 2009-10 (Tables 2 and 3). Total richness does not follow any definite pattern of monthly variations. Minimum and maximum numbers of species are recorded in the months of February, 09 and September, 08 during first

year of our observations. On the other hand, minima and maxima are noticed during December, 09 and July, 10 in the succeeding year. In general, higher total zooplankton richness is noticed between August-October (101-134 species), June-November, 09 (100-121 species) and again between May-July, 20 (101-139 species). On the other hand, low richness is observed from December, 09 through April, 10 (55-67 species) during 2009-10 (second year) while low richness is noticed from November, 08-May, 09 (79-78 species) during the first year (2008-09) except for the record of 98 species in March, 08.

Rotifera (25-74, 47 ± 15 species) contribute notably to total monthly richness of zooplankton of Deepor Beel during 2008-09 while their richness varies between 24-79 (51 ± 19) species during 2009-10. Cladocera, another important qualitative component, exhibit variations ranging between 16-38 (27 ± 6) species and between 16-32 (26 ± 4) species during two years of the study period respectively. Rhizopoda record richness varying between 4-14 (8 ± 3) species during 2008-09 and between 5-17 (9 ± 4) species during 2009-10. Of the other group, Copepoda (4 ± 1 and 4 ± 1 species), Ostracoda (3 ± 1 and 3 ± 1 species) and Gastrotricha (1 ± 1 and 1 ± 1 species) show low richness during two years respectively.

Referring to individual sampling stations (Table 4), zooplankton richness at station 1 varies between 12-66 (34 ± 19) species and 10-56 (35 ± 12) species respectively during two years of the study period with minima and maxima in April, 09 and June, 09 during 2008-09, and in March, 10 and May, 10 respectively during 2009-10. Station 2 indicates annual richness variations between 12-62 (28 ± 15) species and 16-51 (30 ± 10) species respectively with minima and maximum in November, 08 and August, 08 during 2008-09 and in December, 09 & February, 10 and September, 09 during 2009-10 respectively. Station 3 records richness between 13-53 (27 ± 12) species during 2008-09 with minima and maxima in the months of December, 08 and August, 2008 respectively. On the other hand, zooplankton richness at station III, during 2009-10 ranges between 12-65 (28 ± 14) species and registers annual minima and maxima during April, 10 and June, 10 respectively.

Table 2 : Monthly variations in Zooplankton richness of Deepor Beel (2008-09)

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
ROTIFERA													
Brachionidae													
Anuraeopsis fissa	+	+	+	+	+					+		+	
A. navicula											+		
Brachionus angularis				+						+			
B. bidentatus													
B. budapestinensis			+										
B. calyciflorus	+	+	+		+					+			
B. caudatus	+			+	+								

Table 2 : (Contd.)

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>Brachionus dichotomus reductus</i>	+	+	+							+			
<i>B. diversicornis</i>				+	+								
<i>B. donneri*</i>													
<i>B. durgae</i>	+												
<i>B. falcatus</i>	+	+	+	+	+			+		+	+	+	
<i>B. forficula</i>				+	+	+			+				
<i>B. mirabilis</i>									+	+			
<i>B. quadridentatus</i>	+	+	+	+	+	+			+	+	+	+	
<i>B. rubens*</i>													
<i>Keratella cochlearis</i>				+	+								
<i>K. edmondsoni</i>				+		+							
<i>K. lenzi</i>									+	+			
<i>K. procurva</i>													
<i>K. quadrata</i>		+											
<i>K. tecta</i>					+								
<i>K. tropica</i>	+	+	+	+	+	+		+	+	+	+	+	
<i>Platyias leloupi</i>	+												
<i>P. quadricornis</i>		+	+				+	+	+		+	+	
<i>Plationus patulus</i>	+	+	+	+	+			+	+		+	+	
Epiphanidae													
<i>Epiphanes brachionus</i>		+	+										
Euchlanidae													
<i>Beauchampiella eudactylota</i>										+	+		
<i>Euchlanis dilatata</i>	+	+	+	+	+	+	+	+	+	+	+	+	
<i>E. incisa</i>			+	+									
<i>E. triquetra</i>	+	+	+					+	+	+	+	+	
<i>Dipleuchlanis propatula</i>		+							+	+	+	+	
<i>Tripleuchlanis plicata</i>	+	+							+			+	
Mytilinidae													
<i>Lophocharis salpina</i>												+	
<i>Mytilina acanthophora</i>								+			+		
<i>M. bisulcata</i>		+								+	+	+	
<i>M. ventralis</i>	+	+	+		+	+	+	+	+	+	+	+	
Trichotriidae													
<i>Macrochaetus collinsi</i>		+				+				+			

Table 2 : (Contd.)

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Lecanidae													
Lecane inermis			+					+					
L. lateralis		+							+	+		+	
L. leontina	+	+	+	+	+	+	+		+	+	+	+	
L. ludwigii	+	+	+	+	+			+		+	+	+	
L. luna	+	+			+	+	+	+	+	+			
L. nana	+							+					
L. nitida	+										+	+	
L. ohioensis			+									+	
L. papuana	+	+	+	+	+	+	+	+			+	+	
L. paxiana		+										+	
L. pertica		+											
L. ploenensis	+	+									+		
L. pusilla		+										+	
L. signifera	+	+	+	+	+		+	+	+	+	+	+	
L. sola*													
L. tenuiseta			+		+								
L. unguolata	+	+	+	+							+	+	
L. (Hm.) blachei	+	+										+	
L. (Hm.) inopinata	+	+	+		+			+			+		
L. (Hm.) sympoda	+									+			
L. (Monostyla) bulla	+	+	+	+	+	+	+	+	+	+	+	+	
L. (M.) closterocerca	+	+	+	+	+	+	+	+		+	+	+	
L. (M.). decipiens*													
L. (M.) furcata	+	+	+	+	+	+	+	+		+	+	+	
L. (M.) hamata	+	+	+	+	+	+	+	+		+	+	+	
L. (M.) lunaris	+	+		+	+	+		+		+		+	
L. (M.) monostyla													
L. (M.) obtusa		+	+								+		
L. (M.) pyriformis					+								
L. (M.) quadridentata	+	+	+	+		+		+	+		+		
L. (M.) stenroosi	+							+	+				
L. (M.) thienemanni*													
L. (M.) unguitata	+	+	+			+	+	+	+	+	+	+	

Table 2 : (Contd.)

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Notommatidae													
Cephalodella forficula											+		
C. gibba		+											
C.mucronata	+												
Monommata longiseta	+							+			+		
Notommata spinata	+												
Scaridiidae													
Scaridium longicaudum					+			+			+		
Trichocercidae													
Trichocerca bicristata		+		+	+					+	+	+	
T. capucina		+											
T. cylindrica								+					
T. elongata		+											
T. iernis	+	+	+		+					+		+	
T. flagellata												+	
T. longiseta								+					
T. porcellus		+											
T. pusilla			+	+							+		
T. rattus					+	+	+	+	+		+	+	
T. similis	+		+		+					+	+		
T. sulcata						+							
Asplanchnidae													
Asplanchna priodonta		+	+	+						+		+	
Synchaetidae													
Polyarthra vulgaris	+			+	+	+	+	+		+	+		
Dicranophoridae													
Dicranophoroides caudatus											+		
Floscularidae													
Floscularia ringens*													
Lacinularia flosculosa*													
Limnias ceratophylli*													
Sinantherina socialis	+	+	+				+						
S. spinosa	+	+	+			+		+	+	+	+	+	
Conochilidae													
Conochilus unicornis						+							

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Hexarthridae													
<i>Hexarthra mira</i>	+			+					+				
Testudinellidae													
<i>Testudinella brevicaudata</i>		+										+	
<i>T. emarginula</i>					+					+	+		
<i>T. greeni</i>		+										+	
<i>T. parva</i>		+											
<i>T. patina</i>	+	+		+	+	+	+	+	+	+	+	+	
<i>Pompholyx sulcata</i>					+	+		+					
Trochosphaeridae													
<i>Filinia brachiata</i> *													
<i>F. camascela</i>	+	+	+										
<i>F. longiseta</i>	+	+	+		+							+	
<i>F. opoliensis</i>	+	+	+	+	+								
<i>F. pejleri</i> *													
<i>Trochosphaera aequatorialis</i>				+									
Philodinidae													
<i>Rotaria neptunia</i>					+			+	+			+	
<i>R. rotatoria</i>						+			+				

Table 2 : Monthly variations in Zooplankton richness of Deepor Beel (2008-09) (Contd.)

[illegible]

Table 2 : (Contd.)

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Daphniidae													
Ceriodaphnia cornuta	+	+	+	+	+	+	+	+	+	+	+		
C. reticulata	+												
Daphnia lumholtzi							+	+					
D. pulex						+							
Scapholeberis kingi	+	+	+		+	+	+	+		+	+	+	
Simocephalus acutirostratus	+			+			+	+	+		+	+	
S. serrulatus	+	+	+			+	+						
S. mixtus	+	+	+	+	+	+	+	+	+			+	
Bosminidae													
Bosmina longirostris	+	+	+	+	+	+	+	+	+	+		+	
Bosminopsis deitersi	+	+	+	+						+			
Moinidae													
Moina micrura	+	+	+	+	+			+	+	+		+	
Moinodaphnia macleayi			+					+			+	+	
Macrothricidae													
Macrothrix laticornis					+								
M. spinosa						+	+	+	+		+		
M. triserialis	+	+	+	+	+	+	+	+	+	+	+	+	
Guernella raphaelis	+	+								+	+	+	
Grimaldina brazzai	+	+			+				+		+	+	
Streblocerus serricaudatus	+	+											
Ilyocryptidae													
Ilyocryptus spinifer		+		+				+	+	+		+	
Chydoridae													
Chydorinae													
Alonella clathratula			+					+					
A. excisa		+	+			+	+	+	+		+		
A. nana						+		+					
Chydorus faviformis		+					+	+					
C. reticulatus						+							
C. sphaericus	+	+	+			+	+	+	+	+	+		
Dadaya macrops	+	+				+					+		
Disperalona caudata										+	+	+	
Dunhevedia crassa		+			+	+	+	+	+		+	+	

Table 2 : (Contd.)

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>Dunhevedia serrata</i>	+	+	+						+			+	
<i>Ephemeroporus barroisi</i>	+	+	+					+	+	+	+	+	
<i>Picripleuroxus similis</i>		+				+	+	+	+		+		
<i>Pseudochydorus globosus</i>				+	+	+	+	+				+	
Aloninae													
<i>Acroperus harpae</i>		+											
<i>Alona affinis</i>		+			+		+						
<i>A. cheni</i>	+	+	+				+	+	+		+		
<i>Leberis diaphanus</i>	+										+	+	
<i>Notalona globulosa</i>	+	+	+					+	+	+	+	+	
<i>A. guttata</i>	+	+	+				+	+	+			+	
<i>A. macronyx</i>		+											
<i>Coronatella anodonta</i>			+										
<i>A. quadrangularis</i>	+				+	+		+				+	
<i>A. rectangula</i>		+	+		+	+	+	+	+	+	+	+	
<i>Antholona harti</i>	+		+		+		+	+	+		+	+	
<i>Camptocercus uncinatus</i>				+	+	+	+	+	+		+		
<i>Euryalona orientalis</i>	+	+	+	+	+			+		+	+	+	
<i>Graptoleberis testudinaria</i>						+	+	+	+				
<i>Karualona karua</i>			+		+	+		+	+	+	+	+	
<i>Kurzia brevilabris</i>		+		+				+		+	+		
<i>K. longirostris</i>		+	+					+	+	+	+	+	
<i>Leydigia acanthocercoides</i>			+	+			+	+		+	+		
<i>Leydigiopsis curvirostris</i>		+	+				+	+					
<i>Oxyurella singalensis</i>	+	+		+	+		+	+	+	+	+	+	
COPEPODA													
Diaptomidae													
<i>Heliodiaptomus contortus</i>	+	+		+	+		+		+	+	+	+	
<i>H. viduus</i>	+	+			+					+			
<i>Neodiaptomus schmackeri</i>	+			+									
Cyclopidae													
<i>Tropocyclops prasinus</i>		+		+		+		+		+			
<i>Mesocyclops leuckarti</i>	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Microcyclops varicans</i>		+	+		+		+	+	+		+	+	

	2008					2009							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Euglephidae													
<i>Assulina muscorum</i>	+	+								+		+	
<i>A. seminulum</i>		+											
<i>Euglypha acanthophora</i>	+	+	+			+		+	+		+	+	
<i>E. laevis</i>	+			+						+		+	
<i>E. tuberculata</i>		+	+		+			+					
<i>Trinema lineare</i>			+								+		
Actinophryidae													
<i>Actinophrys sol</i>	+		+						+			+	
GASTROTRICHA													
Chaetonotidae													
<i>Chaetonotus anomalus</i>		+				+				+		+	
<i>C. gastrocyaneus</i>						+							
<i>C. similis</i>	+	+	+					+	+		+	+	
Rotifera	62	74	58	39	48	29	25	43	25	50	53	54	
Cladocera	28	34	27	16	19	22	25	38	27	20	32	30	
Copepoda	5	5	3	4	4	3	3	3	4	5	3	4	
Rhizopoda	12	14	9	7	5	5	4	9	6	9	8	12	
Ostracoda	5	5	3	2	2	2	2	4	3	3	3	3	
Gastrottricha	1	2	1	0	0	2	0	1	1	1	1	1	
Total No. of Species	113	134	101	68	78	63	59	98	66	88	100	105	

[illegible]

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>Brachionas diversicornis</i>					+								
<i>B. donneri</i> *													
<i>B. durgae</i>										+		+	
<i>B. falcatus</i>	+	+		+						+	+	+	
<i>B. forficula</i>			+	+					+		+	+	
<i>B. mirabilis</i>		+							+	+		+	
<i>B. quadridentatus</i>		+	+	+	+	+	+	+	+	+	+	+	
<i>B. rubens</i> *													
<i>Keratella cochlearis</i>			+	+	+					+	+	+	
<i>K. edmondsoni</i>				+									
<i>K. lenzi</i>				+	+				+	+			
<i>K. procurva</i>										+			
<i>K. quadrata</i>													
<i>K. tecta</i>										+			
<i>K. tropica</i>	+	+	+	+							+	+	
<i>Platytas leloupi</i>			+										
<i>P. quadricornis</i>	+	+		+		+			+	+	+	+	
<i>Platyonus patulus</i>	+	+		+	+	+	+	+	+	+	+	+	
Epiphanidae											+		
<i>Epiphanes brachionus</i>	+									+			
Euchlanidae													
<i>Beauchampiella eudactylota</i>	+			+			+		+			+	
<i>Euchlanis dilatata</i>	+	+	+	+	+	+	+	+	+	+	+	+	
<i>E. incisa</i>		+									+	+	
<i>E. triquetra</i>		+	+	+		+				+	+	+	
<i>Dipleuchlanis propatula</i>	+	+	+	+					+	+	+		
<i>Tripleuchlanis plicata</i>	+		+									+	
Mytilinidae													
<i>Lophocharis salpina</i>							+			+			
<i>Mytilina acanthophora</i>		+											
<i>M. bisulcata</i>											+		
<i>M. ventralis</i>	+	+	+	+		+	+	+		+	+	+	
Trichotriidae													
<i>Macrochaetus collinsi</i>		+											
<i>M. longipes</i>	+	+	+	+								+	

Table 3 : Monthly variations in Zooplankton richness of Deepor Beel (2009-10)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>M. sericus</i>	+	+	+	+			+				+	+	
<i>Trichotria tetractis</i>		+	+	+	+	+	+	+				+	
Lepadellidae													
<i>Colurella obtusa</i>		+	+							+		+	
<i>C. sulcata</i>													
<i>C. uncinata</i>	+	+	+	+	+	+	+	+		+	+	+	
<i>Lepadella acuminata</i>				+									
<i>L. apsida</i>	+	+											
<i>L. benjamini</i>										+	+		
<i>L. biloba</i>			+				+			+		+	
<i>L. costatoides</i>										+		+	
<i>L. dactyliseta</i>			+	+		+							
<i>L. discoidea</i>							+						
<i>L. eurysterna</i>			+			+							
<i>L. minuta</i>											+		
<i>L. ovalis</i>				+	+	+						+	
<i>L. patella</i>	+	+	+	+		+	+	+			+	+	
<i>L. rhomboides</i>	+	+						+		+	+	+	
<i>L. rhomboidula*</i>													
<i>L. triptera</i>	+									+			
<i>L. (H.) apsicora</i>												+	
<i>L. (H.) ehrenbergi</i>	+	+	+	+			+	+				+	
<i>L. (H.) heterostyla</i>	+	+										+	
<i>Squatinella mutica*</i>													
Lecanidae													
<i>Lecane aculeata</i>		+	+	+	+						+		
<i>L. arcula</i>		+	+										
<i>L. crepida</i>		+	+	+			+					+	
<i>L. curvicornis</i>	+	+	+	+	+	+	+		+	+	+	+	
<i>L. doryssa</i>	+	+	+	+	+					+			
<i>L. flexilis</i>	+	+	+										
<i>L. haliclysta</i>			+	+							+		
<i>L. hastata*</i>													
<i>L. hornemanni</i>	+	+	+	+								+	
<i>L. inermis</i>	+	+	+	+		+					+		

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Lecanidae													
L. lateralis	+		+			+				+	+	+	
L. leontina		+	+	+		+		+	+		+	+	
L. ludwigii	+	+	+			+				+	+	+	
L. luna	+	+	+	+	+	+	+	+		+	+	+	
L. nana		+	+	+								+	
L. nitida	+		+									+	
L. ohioensis	+	+	+									+	
L. papuana	+	+	+	+	+		+	+	+	+		+	
L. paxiana		+											
L. pertica	+												
L. ploenensis	+	+	+									+	
L. pusilla													
L. signifera	+	+	+	+			+			+	+	+	
L. sola*													
L. tenuiseta		+											
L. unguolata	+	+	+	+		+	+			+	+	+	
L. (Hm.) blachei									+	+	+	+	
L. (Hm.) inopinata	+	+	+	+							+	+	
L. (Hm.) sympoda			+										
L. (Monostyla) bulla	+	+	+	+	+	+	+	+	+	+	+	+	
L. (M.) closterocerca	+	+	+	+	+	+	+	+	+	+	+	+	
L. (M.). decipiens*													
L. (M.) furcata	+	+	+	+		+	+			+	+	+	
L. (M.) hamata	+	+	+	+		+	+	+	+	+	+	+	
L. (M.) lunaris	+	+	+			+	+	+	+	+	+	+	
L. (M.) monostyla			+										
L. (M.) obtusa	+	+		+								+	
L. (M.) pyriformis					+								
L. (M.) quadridentata	+	+	+			+	+			+	+	+	
L. (M.) stenroosi	+	+	+	+			+			+			
L. (M.) thienemanni*													
L. (M.) unguitata		+	+	+	+	+	+	+	+	+	+	+	
Notommatidae													
Cephalodella forficula						+							

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>Cephalodella gibba</i>													
<i>C.mucronata</i>													
<i>Monommata longiseta</i>	+	+	+	+		+							
<i>Notommata spinata</i>		+	+									+	
Scaridiidae													
<i>Scaridium longicaudum</i>	+			+	+	+		+				+	
Trichocercidae													
<i>Trichocerca bicristata</i>	+		+		+		+	+				+	
<i>T. capucina</i>										+			
<i>T. cylindrica</i>								+				+	
<i>T. elongata</i>							+						
<i>T. iernis</i>	+	+	+	+						+	+	+	
<i>T. flagellata</i>											+		
<i>T. longiseta</i>		+											
<i>T. porcellus</i>											+		
<i>T. pusilla</i>		+		+						+		+	
<i>T. rattus</i>	+	+	+	+	+	+			+	+	+	+	
<i>T. similis</i>				+			+			+	+	+	
<i>T. sulcata</i>			+				+						
Asplanchnidae													
<i>Asplanchna priodonta</i>	+		+	+							+	+	
Synchaetidae													
<i>Polyarthra vulgaris</i>	+	+	+	+	+	+			+	+	+		
Dicranophoridae													
<i>Dicranophoroides caudatus</i>		+				+	+						
Floscularidae													
<i>Floscularia ringens</i> *													
<i>Lacinularia flosculosa</i> *													
<i>Limnias ceratophylli</i> *													
<i>Sinantherina socialis</i>		+	+	+							+	+	
<i>S. spinosa</i>	+	+	+	+	+				+	+	+	+	
Conochilidae													
<i>Conochilus unicornis</i>									+		+	+	
Hexarthridae													
<i>Hexarthra mira</i>		+	+	+	+				+	+	+	+	

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Testudinellidae													
<i>Testudinella brevicaudata</i>													
<i>T. emarginula</i>		+	+				+					+	
<i>T. greeni</i>	+	+	+								+	+	
<i>T. parva</i>				+									
<i>T. patina</i>	+	+	+	+	+		+	+	+	+	+	+	
<i>Pompholyx sulcata</i>								+	+	+			
Trochosphaeridae													
<i>Filinia brachiata*</i>													
<i>F. camascela</i>	+			+					+		+	+	
<i>F. longiseta</i>					+					+		+	
<i>F. opoliensis</i>				+						+	+	+	
<i>F. pejleri*</i>													
<i>Trochosphaera aequatorialis</i>		+	+										
Philodinidae													
<i>Rotaria neptunia</i>			+									+	
<i>R. rotatoria</i>								+			+		

Note : Of the total **146 species** of Rotifera recorded from Deepor beel, 133 **species noticed in our 2008-10 samples** exclude **three sessile species of Flosculariidae** as well as **10 species of planktonic Rotifera** present in our **2002-03 collections (marked as *)**.

Table 3: Monthly variations in Zooplankton richness during 2009-10 **(Contd.)**

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Sididae													
Diaphanosoma excisum													
D. sarsi	+	+	+	+	+	+	+	+	+	+	+	+	
D. senegal	+											+	
Pseudosida bidentata	+	+	+	+	+			+	+	+	+	+	
Sarsilatona serricaudata	+	+	+										
Sida crystallina	+												
Daphniidae													
Ceriodaphnia cornuta	+	+	+	+	+	+	+	+	+	+	+	+	
C. reticulata													
Daphnia lumholtzi						+	+	+					

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>D. pulex</i>				+	+								
<i>Scapholeberis kingi</i>				+	+	+	+	+	+	+	+	+	
<i>Simocephalus acutirostratus</i>	+	+	+	+				+			+	+	
<i>S. serrulatus</i>	+	+	+	+				+	+				
<i>S. mixtus</i>	+	+	+	+	+	+	+	+	+	+	+	+	
Bosminidae													
<i>Bosmina longirostris</i>	+	+	+	+	+	+	+			+	+	+	
<i>Bosminopsis deitersi</i>	+	+		+					+	+	+	+	
Moinidae													
<i>Moina micrura</i>	+	+				+	+		+	+	+	+	
<i>Moinodaphnia macleayi</i>	+	+	+		+				+		+	+	
Macrothricidae													
<i>Macrothrix laticornis</i>	+							+					
<i>M. spinosa</i>	+	+	+	+				+	+		+		
<i>M. triserialis</i>	+	+	+	+	+	+	+		+	+	+	+	
<i>Guernella raphaelis</i>	+	+	+					+		+			
<i>Grimaldina brazzai</i>		+	+	+									
<i>Streblocerus serricaudatus</i>				+			+			+		+	
Ilyocryptidae													
<i>Ilyocryptus spinifer</i>	+	+	+	+		+	+			+			
Chydoridae													
Chydorinae													
<i>Alonella clathratula</i>			+				+	+	+	+			
<i>A. excisa</i>	+	+		+			+						
<i>A. nana</i>						+							
<i>Chydorus faviformis</i>		+										+	
<i>C. reticulatus</i>									+	+			
<i>C. sphaericus</i>				+	+	+		+	+	+	+	+	
<i>Dadaya macrops</i>	+		+					+					
<i>Disperalona caudata</i>													
<i>Dunhevedia crassa</i>	+						+	+		+	+	+	
<i>D. serrata</i>	+	+	+					+			+		
<i>Ephemeroporus barroisi</i>	+	+			+	+	+		+	+	+	+	
<i>Picripleuroxus similis</i>	+			+		+				+	+		
<i>Pseudochydorus globosus</i>				+	+	+	+		+		+	+	

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
Aloninae													
Acroperus harpae								+					
Alona affinis							+	+					
A. cheni				+	+	+	+	+	+	+			
Deberis diaphanus	+	+	+						+		+		
Notalona globulosa	+	+	+	+	+			+			+	+	
A. guttata	+					+	+		+			+	
A. macronyx										+	+	+	
Coronatella anodonta													
A. quadrangularis					+	+	+	+				+	
A. rectangula	+	+	+	+	+	+	+	+	+	+	+	+	
Anthalona verrucosa	+	+		+	+	+		+					
Camptocercus uncinatus				+		+	+	+		+	+	+	
Euryalona orientalis	+	+	+	+						+	+	+	
Graptoleberis testudinaria							+	+					
Karualona karua	+	+	+	+		+	+	+	+	+	+	+	
Kurzia brevilabris											+	+	
K. longirostris		+	+							+			
Leydigia acanthocercoides													
Leydigiopsis curvirostris													
Oxyurella singalensis	+	+	+		+		+	+	+	+	+	+	
COPEPODA													
Diaptomidae													
Heliodiaptomus contortus	+	+		+			+	+		+	+	+	
H. viduus	+								+	+	+		
Neodiaptomus schmackeri		+										+	
Cyclopidae													
Tropocyclops prasinus	+		+			+		+		+	+		
Mesocyclops leuckarti	+	+	+	+	+	+	+	+	+	+	+	+	
Microcyclops varicans		+		+	+				+			+	
Thermocyclops decipiens	+	+	+				+				+	+	
OSTRACODA													
Cyprinidae													
Cypris subglobulosa	+	+	+		+		+		+	+	+	+	

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>Strandesia indica</i>	+		+	+			+	+		+		+	
<i>Hemicypris anomala</i>				+									
<i>Stenocypris major</i>	+		+		+				+	+	+	+	
<i>S. sewelli</i>						+							
Cypridopsidae													
<i>Cypridopsis dispar</i>		+											
<i>Onchocypris pustulosa</i>	+				+			+	+		+	+	
<i>Pseudocyprretta maculata</i>		+				+							
<i>Cyprretta fontinalis</i>	+												
Rhizopoda													
Arcellidae													
<i>Arcella discoides</i>	+	+	+		+		+	+	+	+	+	+	
<i>A. hemispherica</i>	+			+							+	+	
<i>A. vulgaris</i>		+				+				+		+	
Centropyxidae													
<i>Centropyxis aculeata</i>	+		+	+		+		+		+	+	+	
<i>C. ecornis</i>		+		+			+		+		+	+	
<i>C. oblonga</i>	+		+			+						+	
<i>C. orbicularis</i>		+							+				
<i>Cyclopyxis eurysterna</i>												+	
Difflogidae													
<i>Difflogia acuminata</i>	+	+		+	+		+		+		+	+	
<i>D. corona</i>		+	+			+		+		+	+		
<i>D. oblonga</i>	+	+		+			+					+	
<i>D. tuberculata</i>	+		+		+		+				+	+	
<i>D. urceolata</i>	+				+			+		+			
Nebelidae													
<i>Lesquereusia spiralis</i>	+	+	+			+		+	+		+	+	
Cyphoderiidae													
<i>Cyphoderia ampulla</i>		+											
Euglephidae													
<i>Assulina muscorum</i>	+			+							+	+	
<i>A. seminulum</i>	+	+										+	
<i>Euglypha acanthophora</i>	+		+		+		+		+		+	+	
<i>E. laevis</i>		+				+					+	+	

Table 3 : (Contd.)

	2009					2010							
Taxa↓ Months→	A	S	O	N	D	J	F	M	A	M	J	J	
<i>Euglgpha tuberculata</i>		+				+				+			
<i>Trinema lineare</i>	+										+	+	
Actinophryidae													
<i>Actinophrys sol</i>	+	+		+			+		+			+	
GASTROTRICHA													
Chaetonotidae													
<i>Chaetonotus anomalus</i>	+			+			+		+			+	
<i>C. gastrocyaneus</i>											+		
<i>C. similis</i>	+	+			+			+			+	+	
Rotifera	57	71	69	62	26	32	32	24	31	62	61	79	
Cladocera	32	28	24	26	16	21	24	27	22	26	30	31	
Copepoda	5	5	3	3	2	2	3	3	3	4	5	5	
Rhizopoda	14	13	7	7	5	7	7	5	7	6	12	17	
Ostracoda	5	3	3	2	3	2	2	2	3	3	3	5	
Gastrotricha	2	1	0	1	1	0	1	1	1	0	2	2	
Total No. of Species	115	121	106	101	55	67	69	62	67	101	113	139	

Table 4 : Species richness of zooplankton of Deepor Beel (2008-10)

Stations →	1	2	3	4	5	6	Range	Mean±SD	Total
August, 2008	59	62	53	56	52	58	52-62	57±3	113
September	57	42	40	67	55	73	40-73	56±12	134
October	30	29	30	59	58	33	29-59	40±13	101
November	17	12	19	16	25	32	12-30	20±7	68
December	23	13	13	40	34	47	13-47	28±13	78
January, 2009	16	19	14	16	24	30	14-30	20±6	63
February	18	20	19	36	19	19	18-36	22±6	59
March	15	16	32	58	41	32	15-58	32±15	98
April	12	15	22	41	26	29	12-41	24±10	66
May	47	35	20	55	42	28	20-55	38±12	66
June	66	44	28	60	58	31	28-66	48±15	100
July	51	33	39	45	52	39	33-52	43±7	105
August, 2009	39	34	36	68	68	50	34-72	49±14	115
September	43	51	24	68	57	63	24-68	51±15	121
October	38	30	23	69	54	58	23-60	45±16	106
November	27	22	24	61	23	48	22-61	34±15	101

Table 4 : (Contd.)

Stations →	1	2	3	4	5	6	Range	Mean±SD	Total
December	19	16	19	37	35	24	16-37	25±8	55
January, 2010	31	29	18	28	30	41	18-41	30±7	67
February	26	16	18	41	29	49	16-49	30±12	69
March	10	21	30	25	33	42	10-42	27±10	62
April	37	35	12	33	32	40	12-40	32±9	67
May	56	43	24	62	62	55	24-62	50±13	101
June	47	34	65	58	47	49	34-65	50±10	113
July	45	32	47	79	58	62	32-79	54±15	139
Mean ± SD	35±16	29±13	28±13	49±17	42±14	43±14			90±25

Monthly zooplankton richness at station 4 varies between 16-67 (46±16) species and between 28-79 (52±18) species during 2008-09 and 2009-10 respectively. Further, minima and maxima of richness are noticed in November, 08 & January, 09 and September, 08 during the first year of the study period while minima and maxima are observed in January, 10 and July, 10 respectively in the following year (2009-10). Station 5 indicates richness ranging between 19-58 (41±14) species during 2008-09 with minima and maxima during February, 09 and October, 08 & June, 09 respectively. The monthly zooplankton richness at this station ranges between 29-88 (44±15) species during 2009-10 and show lowest and maximum richness February, 10 and August, 09 respectively. Finally, richness at station 6 varies between 19-73 (38±14) species during 2008-09 with lowest and peak number of species in February, 09 and September, 09 respectively. Further, station 6 records richness between 24-62 (48±10) species during 2009-10 with minima and maxima in the months of December, 09 and September, 09 respectively.

Zooplankton richness shows wider monthly variations during the study period at various sampling stations. It varies between 10-66, 12-62 and 12-65 species at stations 1-3 respectively while it varies between 16-79, 19-68 and 19-73 species at stations 1-4 respectively. Peak monthly richness is observed during June, 09 (station 1); August, 08 (station 2); June, 10 (station 3); July, 10 (station 4); August, 09 (station 5); and September, 08 (stations). The lowest monthly richness is recorded in the months of March, 10; November, 08; April, 10; and January, 09 at stations 1-4 respectively while it is observed; February, 09 at both station 5 and station 6. Further, mean monthly richness at different sampling stations during the study period (2008-10) follows the stated pattern : 49±17 species (station 4) > 43±14 species (station 6) > 42±14 species (station 5) > 35±17 species (station 1) > 29±13 species (station 2) ≈ 28±13 species (station 3).

Table 5 : Percentage similarities (vide Sørensen index) of zooplankton (2008-09)

	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
Aug	-	64.0	55.1	55.2	44.6	42.0	41.9	53.1	51.4	56.7	59.1	66.0
Sep		-	62.1	43.6	43.4	45.7	44.6	50.9	56.0	60.4	59.8	57.7
Oct			-	42.6	48.0	43.9	43.7	55.3	55.1	52.9	55.7	57.3
Nov				-	58.9	42.7	44.1	53.0	35.8	52.6	42.9	45.1
Dec					-	52.5	46.7	53.4	38.9	54.2	51.7	51.4
Jan						-	62.3	55.9	48.1	57.0	49.1	42.9
Feb							-	65.0	52.8	43.1	51.6	41.5
Mar								-	61.0	50.5	64.6	60.1
Apr									-	46.7	50.6	44.5
May										-	59.6	62.2
June											-	61.5
July												-

Table 6 : Percentage similarities (vide Sørensen index) of zooplankton (2009-10)

	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
Aug	-	65.2	65.1	57.1	43.5	45.1	50.8	46.3	50.0	54.6	65.8	66.9
Sep		-	86.3	64.0	42.0	42.6	48.4	39.3	46.8	54.9	63.0	68.6
Oct			-	58.9	43.5	46.2	49.1	45.2	46.2	48.3	66.7	60.4
Nov				-	50.0	46.4	52.9	44.2	53.6	58.4	65.4	63.3
Dec					-	45.9	48.4	44.4	57.4	47.4	52.4	47.4
Jan						-	48.5	43.1	44.8	48.8	54.4	42.7
Feb							-	51.9	45.6	51.8	48.3	50.0
Mar								-	48.1	46.6	48.0	43.8
Apr									-	54.8	61.1	51.5
May										-	64.4	59.2
June											-	71.4
July												-

The monthly zooplankton communities record percentage similarities ranging between 35.8-66.0% during 2008-09 (Table 5); the lowest similarity is noticed between November, 08 and April, 09 collections while peak similarity is observed between July and August, 09 communities. The percentage similarity ranged between 39.3-86.3% (Table 6) during the succeeding year (2009-10) with the lowest value between September, 09 and March, 10 collections while peak similarity is recorded between September and October, 10 zooplankton species. The hierarchical cluster analysis (Figs. 150-151), based on zooplankton community similarities, shows notable variations in monthly groupings during 2008-09 as well as 2009-10.

5. DISCUSSION

A total of 315 species of freshwater invertebrates (zooplankton and hydrophyte associated fauna) belonging to 11 groups and spread over 150 genera and 73 families are documented from Deepor Beel. These include 269 species of zooplankton and 13 species of freshwater Mollusca, while aquatic insects are represented by 15 species of Hemiptera, and 7, 6 and 5 species of Coleoptera, Plecoptera and Ephemeroptera respectively. The recorded faunal diversity in general and zooplankton diversity in particular is the highest known till date from any individual freshwater ecosystem of South and South East Asia. This salient feature highlights biodiversity significance of the sampled Ramsar site as well as reflects greater environmental heterogeneity and micro-habitat diversity of this important floodplain lake of Northeast India. This generalization supports our concurrent remarks based on analysis of diversity of certain groups of zooplankton of various floodplain lakes of this region (Sharma, 2005, 2009a, 2011; Sharma and Sharma, 2005a, 2008, 2009a, 2011a). The present study reveals 49 new records including two new records from India while 18 species are new records from northeast India and 29 species represent new records from the state of Assam.

Lack of detailed information on general invertebrate diversity in the floodplain lakes or Ramsar sites of India does not allow any meaningful comparison of the present results with other related works. However, highly speciose and diverse zooplankton biocoenosis (269 species) of Deepor beel observed by us distinctly outnumbers our earlier record of total 171 species (Sharma, 2011c) during 2002-03 limnological survey of this wetland. This salient difference affirms the biodiversity value of this Ramsar site vis-a-vis the importance of extensive sampling. In addition, this report is higher than that of 189 species observed from Loktak Lake (Sharma, 2009)-another Ramsar site and an important floodplain lake of India. Our results also present a distinct contrast to the report of total 209 zooplankton species from 15 floodplain lakes of the Brahmaputra river basin of Assam (Sharma and Sharma, 2008) with individual richness ranging between 102-156 (125 ± 13) species. Interestingly, zooplankton diversity of Deepor Beel even broadly concurs with 273 species recorded from 84 floodplain lakes of Assam (Sharma and Sharma, 2008). The greater higher diversity *i.e.*, 118 genera and 51 families of zooplankton, yet another salient feature of the present study, is distinctly more than our earlier highest Indian report of 95 genera and 37 families from 84 beels of Assam (Sharma and Sharma, loc cit.). In general, zooplankton biocoenosis is characterized by occurrence of cosmopolitan > cosmotropical and pantropical species and depicts broadly 'tropical character' following the generalizations of Fernando (1980, 2002), Dussart *et al.*, (1984) and Sharma and Sharma (2008).

Zooplankton diversity of Deepor Beel is contrastingly higher than that reported from several other floodplain lakes of India *i.e.*, 51 species from two floodplain lakes (Khan, 1987), and 26 species from Mirgund Wetland (Yousuf *et al.*, 1986) of Kashmir; 19 species

(Baruah *et al.*, 1993) and 31 species (Sanjer and Sharma, 1995) from Kawar Lake, Bihar; 49 species from Samuajan Beel, Upper Assam (Sharma and Hussain, 2001); and 71 species from Beri Gopalpur and Sosadanga, West Bengal (Khan, 2003). Though Deepor Beel is in fact more species rich, the differences between this study and other authors' studies also result from incomplete species inventories, inadequate sampling, and overlooking identification of smaller species.

The nature and composition of the different groups of micro- and macro-invertebrates documented from Deepor Beel and various elements of biogeographically interesting as well as of regional or local distributional interest thereof, are discussed group-wise. In addition, comments are made on the distribution of important taxa and other notable features of the examined faunal diversity.

PROTOZOA

Protozoa are represented by 46 species belonging to 26 genera and 21 families and include the members of two phyla namely Sarcomastigophora and Ciliophora. Of these, the former (31 species) form the main qualitative component while the ciliates include 15 species. In general, this study shows rich Protozoa diversity of this Ramsar site as compared with those of certain state faunas studied by Das *et al.*, (1993, 1995, 2000, 2003, 2004) as well as Rhizopoda documented from fifteen floodplain lakes of the Brahmaputra river basin of Assam (Sharma and Sharma, 2008). However lack of detailed analysis of the protozoan species inventories from various freshwater ecosystems of India does not allow meaningful comparison of the present results for their ecosystem diversity.

Eighteen species *i.e.*, *Assulina muscorum*, *A. seminulum*, *Actinophrys sol*, *Gymnodinium aeruginosum*, *Trachelomonas hispida*, *T. urceolata*, *Coleps hirtus*, *Dileptus anser*, *Lacrymaria olor*, *Trachelius ovum*, *Frontonia acuminata*, *F. depressea*, *Vorticella aequilata*, *Spirostomum ambiguum*, *Stichotricha socialis*, *Oxytricha fallax*, *Euplotes muscicola* and *E. plumpipes* are new records from Assam. A number of species indicate examples of regional distributional interest. The notable members of this category are those restricted to this region and these include *Gymnodinium aeruginosum* and *Frontonia acuminata* which are known to occur so far from India only in Manipur; *Vorticella aequilata* is recorded from Tripura while *Actinophrys sol*, *Peridinium tabulatum*, *Phacus pleuronectes* and *Trachelomonas hispida* are documented from Manipur and West Bengal. In addition, *Dileptus anser* and *Trachelius ovum* are recorded from Manipur, West Bengal and Rajasthan; *Euglena oxyuris* is recorded from Manipur, West Bengal and Andhra Pradesh, and *Frontonia depressea* is reported from Manipur, West Bengal and Sikkim.

Rhizopoda, the most diverse group of Protozoa, are represented by 22 species belonging to 10 genera, 7 families and three classes. The examined collections indicate 14 species of Lobosea and 7 species of Filosea, and register L/F quotient = 2.0 which is apparently lower

than the value (3.0) reported by Sharma and Sharma (2008) from various floodplain lakes of Assam but the same differs from its values ranging between 0.5-1.4 reported for moss-dwelling Rhizopoda (Chattopadhyay and Das, 2003). Euglephidae > Centropyxidae = Diffflugidae, three speciose families, comprise dominant fraction (76.2%) of the rhizopods. Cyphoderiidae and Nebelidae, the least speciose families, include one species each. *Diffflugia* > *Centropyxis* are relatively speciose genera (42.9%) while *Arcella* = *Euglypha* also form a notable fraction (28.6%) of the rhizopod diversity.

Our results reflect the richest faunal diversity of the Rhizopoda known till date from fresh water ecosystems of India. Total richness is even higher than 16, 12, 7 and 19 species examined from the freshwater biotopes of Meghalaya (Das *et al.*, 1995), Tripura (Das *et al.*, 2000), Sikkim (Das *et al.*, 2003) and Manipur (Das *et al.*, 2004) respectively. Further, the richness is higher than the reports of 16 species from Loktak Lake-a Ramsar site (refer Das *et al.*, 2004); 10 species from Melghat Wildlife Sanctuary (Bindu, 2010), Maharashtra; 13 species from Pench National Park, Maharashtra (Bindu and Das, 2010) and also 7-16 species listed from 15 floodplain lakes of the Brahmaputra river basin of Assam (Sharma and Sharma, 2008).

Centropyxis orbicularis and *Cyphoderia ampulla* exhibit restricted occurrence in India. The moss-dwelling *Cyphoderia ampulla* is recently observed from the Indian freshwaters from Assam (Sharma and Sharma, 2008) and Maharashtra (Bindu 2010). The present report, re-affirming its occurrence in freshwater environs, merits ecological interest. Our study also endorses an identical report (Sharma and Sharma, 2008) of *Cyclopyxis eurysterna* which was known from soil and mosses in India (Chattopadhyay and Das, 2003). *Arcella hemispherica*, *Centropyxis cassis*, *Diffflugia corona*, *D. tuberculata*, *D. urceolata*, *Cyclopyxis eurysterna*, and *Euglypha laevis* comprise examples of local or regional distributional interest. Further, these species exhibit rare occurrence in our collections. On the other hand, *Arcella discoides*, *A. vulgaris*, *Centropyxis aculeata*, *C. ecornis*, *Diffflugia acuminata*, *D. oblonga*, *Euglypha acanthophora* and *E. tuberculata* exhibit relatively common occurrence.

Amongst other documented Protozoa, the Mastigophora include nine species of Phytomastigophora (plant flagellates) belonging to two orders and spread over five genera and three families. Various members of this group are known for their routine occurrence in our plankton samples. Ciliophora, another member of Protozoa, indicate 15 species with relatively rich higher diversity *i.e.*, three classes, five orders, 11 families and 12 genera. Further, the ciliates are characterized by occurrence in shallow habitats or in the littoral region during periods of low water levels.

To sum up, the rich and diverse Protozoa biocoenosis is characterized by the highest richness of Rhizopoda known so far from any individual freshwater ecosystem of India. The testaceans show L/F quotient = 2.0, qualitative importance of Euglephidae > Centropyxidae

= Diffflugidae as well as relatively speciose nature of *Diffflugia* > *Centropyxis*. The flagellates, represented by Phytomastigophora, are notable for their routine occurrence in plankton collections while Ciliophora are characterized by their relatively rich higher diversity (11 families and 12 genera).

ROTIFERA

A total of 146 species of Rotifera belonging to 37 genera and 19 families, observed from Deepor Beel is the richest biodiversity of this Phylum known from any freshwater ecosystem of South Asia. The rotifer richness of this biodiversity hot-spot is higher than the reports of 111 species from floodplains of Argentina (Jose de Paggi, 1993); 124 species (Oguta lake) and 136 species (Iyi-Efi lake) in the Niger delta (Segers *et al.*, 1993); 130 species from Lake Guarana, Brazil (Bonecker *et al.*, 1994); 106 taxa from Thale-Noi Lake, a Ramsar site in Thailand (Segers and Pholpunthin, 1997); 104 species from Laguna Bufeos, Bolivia (Segers *et al.*, 1998) as well as 114 taxa examined from the Rio Pilcomayo National park (a Ramsar site), Formosa, Argentina (Jose de Paggi, 2001). The rotifer richness even exceeds the earlier highest Indian report of 120 species from Loktak Lake (a Ramsar site), Manipur (Sharma, 2009a) and presents a significant departure from the report of 110 species (Sharma and Sharma, 2005a) collected from Deepor Beel between 2002-2003 as well as the record of 103 species (Sharma, 2005) from the Dighali Beel, Assam (Northeast India). Thirty-five species are added as new records from Deepor Beel; of these 21 new records are dealt with by Sharma and Sharma (2011a) include new report of *Brachionus durgae* from northeast India. In addition, Sharma and Sharma (2012) provide a recent update on Deepor Rotifera.

The rich and speciose rotifer taxocoenosis reflects greater environmental heterogeneity and micro-habitat diversity of Deepor Beel and thus concurs with generalizations of Jose de Paggi (1993), Bonecker *et al.* (1998) and Shiel *et al.* (1998) on the floodplain lakes of Argentina, Brazil and Australia respectively. Besides, this salient feature lends significant support to hypothesis of Segers *et al.* (1993) indicating (sub) tropical floodplains to be the world's richest habitats for rotifers as well as supports earlier concurrent remarks of Sharma (2005) and Sharma and Sharma (2008).

The species known from this Ramsar site comprise a notable fraction of the rotifer fauna of Northeastern India (65.8%) and of the Indian Rotifera (38.7%). Amongst 43 genera and 22 families as well as 65 genera and 25 families of Phylum Rotifera recorded from Northeast India and from this country respectively (BKS, unpublished), 35 genera and 19 families are represented in our collections re-affirm rich higher diversity of the rotifer taxocoenosis of Deepor Beel.

Rotifera of Deepor Beel are characterized by various biogeographically interesting elements (7.5%); these include two Australasian elements namely *Brachionus dichotomus*

reductus and *Notommata spinata*; four Oriental endemics *Brachionus donneri*, *Keratella edmondsoni*, *Lecane blachei* and *Filinia camascela* and the paleotropical *Lepadella discoidea*, *Lecane lateralis*, *L. unguitata*, *Testudinella greeni* and *T. brevicaudata*. The members of these categories form a notable feature of the rotifer diversity of Northeast India (Sharma and Sharma, 2005b) and of the state of Assam (Sharma and Sharma, 2008, 2012). Of these, *Brachionus dichotomus reductus*, *Notommata spinata*, *Keratella edmondsoni*, *Lecane blachei* and *L. lateralis* are interestingly observed in our 2008-2010 collections only (Sharma and Sharma, 2011a).

The occurrence of Australasian elements in this Ramsar site (Sharma and Sharma, 2011a) is noteworthy and supports earlier generalization of Sharma (2005) and Sharma and Sharma (2008) reflecting the salient feature of the affinity of Assam Rotifera with those of Southeast Asia and Australia. Referring to the former brachionid, Segers (2001) commented on the occurrence of the *reductus* vicariant of *B. dichotomus* outside Australia, hypothesizing the recent expansion of these populations to Southeast Asia with Australia as possible origin of this taxon. The record of disjunct populations of the *reductus* vicariant from Deepor Beel further support Segers's hypothesis and affirms earlier remarks of Sharma and Sharma (2008). *Notommata spinata* is so far observed from Northeast India only with reports from Assam (Sharma, 2005; Sharma and Sharma, 2008).

Amongst the Oriental endemics, *Brachionus donneri* was noticed earlier (Sharma and Sharma, 2005a) from Deepor Beel but it is interestingly not observed in our recent collections. *Lecane blachei*, originally described from Cambodia (Berzins, 1973), is known from Thailand (Sanoamuang, 1998b); its Indian reports refer to disjunct populations from Assam (Sharma, 2004, 2005; Sharma and Sharma, 2008) and Meghalaya (Sharma and Sharma, 2011b), West Bengal and Delhi. *Keratella edmondsoni*, a close relative of cosmopolitan *K. procurva*, was described from Tamil Nadu (Ahlstrom, 1943) as *K. quadrata* var. *edmondsoni* while Nayar (1965) proposed it to be raised to the status of a distinct species. This brachionid is reported Northeast Thailand only. Its disjunct occurrence within this country refers to the reports from South India, Orissa, Rajasthan and Northeast India (Assam). *Filinia camascela* is now known for its single Neotropical report from Panama; the latter is, however, believed to be an example of its possible introduction (Segers, 2007).

The palaeotropical elements *Lepadella discoidea*, *Testudinella brevicaudata* and *T. greeni* are so far known only from the floodplain lakes of Assam in Northeast India. *Lecane lateralis* was described from West Bengal (Sharma, 1978) and believed to be an Indian endemic (Sharma, 1998b). This lecanid was categorized as an Eastern Hemispheric rotifer (Segers, 2001; Savatnalinton and Segers, 2005) while is now considered as palaeotropical element (Segers 2007; Sharma and Sharma 2008). This species is known for its disjunct occurrence in the Indian inland waters with reports from Assam, Meghalaya, Tripura, West Bengal, Orissa and Tamil Nadu. *Lepadella discoidea* is known from Indonesia, Australia, Zaire,

Nigeria and Papua New Guinea while its Indian reports are from Delhi and the northeastern state of Assam.

The cosmopolitan *Keratella tecta* is a new record from India. *Lecane paxiana* is a new record from Northeast India; its only Indian report is from the backwaters of the river Yamuna at Delhi (Arora and Mehra, 2003). Besides, *Brachionus durgae*, *B. mirabilis*, *Keratella procurva*, *K. lenzi*, *Lecane dorsyssa*, *L. haliclysta*, *L. nana*, *L. pusilla*, *L. tensuiseta*, *L. thienemanni*, *Lepadella benjamini*, *L. dactyliseta*, *L. costatoides*, *Lophocharia salpina*, *Mytilina acanthophora*, *M. bisulcata*, *Macrochaetus longipes*, *Platyias leloupi*, *Testudinella parva*, *T. emarginula*, *Trichocerca bicristata*, *T. iernis*, *T. flagellata*, *Tripleuchlanis plicata* and *Trochosphaera aequatorialis* are examples of regional distributional importance in the Indian sub-continent. Of these, the cosmo (sub) tropical *B. durgae* was described as a new species from Andhra Pradesh (Dhanapathi, 1976a) while its current distribution extends to African, Neotropical, Oriental and Palearctic regions (Segers, 2007). Besides the type-locality, the Indian reports of this brachionid are from Orissa while Sharma and Sharma (2009b) recently recorded it from Tamil Nadu. *Lepadella benjamini*, a cosmopolitan species, is examined from Manipur (Sharma, 2007) and now from Assam in this country. Besides, it is reported elsewhere from China and Thailand among the Asian countries. *Lecane haliclysta*, *L. dorsyssa*, *L. pusilla*, *L. tensuiseta*, *Lepadella dactyliseta*, *L. costatoides*, *Platyias leloupi*, *Macrochaetus longipes* and *Trichocerca iernis* are so far known from northeast India while *Mytilina acanthophora*, *M. bisulcata*, *Lophocharia salpina*, *Trichocerca bicristata*, *T. flagellata*, *Tripleuchlanis plicata* and *Trochosphaera aequatorialis* show disjunct distributions in India.

Lecanidae (42 species) > Brachionidae (26 species) > Lepadellidae (21 species) > Trichocercidae (12 species) form an important component (69.2%) of Deepor Rotifera. Their qualitative importance broadly concurs with the reports from the floodplains of South America (Jose de Paggi, 1993, 2001; Bonecker *et al.*, 1994, 1998; Lansac-Toha *et al.*, 1997; Segers *et al.*, 1998), Africa (Segers *et al.*, 1993), Thailand (Sanoamuang, 1998b) and India (Sharma and Sharma, 2001a, 2008; Sharma, 1998b, 2005, 2006, 2009a). Euchlanidae > Flosculariidae = Testudinellidae > Mytilinidae = Trichotriidae = Trochosphaeridae together (19.2%) deserve mention.

Latitudinal variations in the distribution, directly or indirectly induced by climatological factors are well known in Rotifera (Green, 1972; De Ridder, 1981; Dumont, 1983; Segers, 1996). Segers (2001) stressed the role of thermopiles in the rotifer fauna of Southeast Asia and indicated the qualitative significance of *Lecane*. This fact is affirmed by speciose nature of *Lecane* (42 species, 28.8%) in Deepor Beel. In general, the lecanid dominance concurs with the reports from the floodplain rotifer faunas studied by Segers *et al.* (1993, 1998), Sanoamuang (1998b), and Jose de Paggi (2001). The qualitative importance of *Lecane* also concurs with the rotifer faunas of Northeastern India (Sharma, 1998b, 2005, 2009a, 2009b; Sharma and Sharma, 2005a, 2005b, 2006, 2008). *Lepadella* (17 species) > *Brachionus* (14

species) and *Trichocerca* (12 species) are important (20.4%) in Deepor Rotifera. Interestingly, temperate-centred' *Keratella* includes 7 species while *Filinia* and *Testudinella* are other notable genera (5 species each). Cosmopolitan species (69.3%) show higher richness while Cosmotropical (16.4%) > Pantropical (14.4%) form an important component. The stated features along with qualitative significance of, tropic-centred' genera *Lecane* and *Brachionus* impart a general 'tropical character' to the rotifer fauna of Deepor Beel; this generalization concurs with the composition of the tropical faunas from different parts of the globe (Green, 1972; Pejler, 1977; Fernando, 1980; Dussart *et al.*, 1984; Segers, 1996, 2001) as well as with the results of Sharma (1991a, 1996, 1998b, 2005) and Sharma and Sharma (2001, 2005a, 2005b, 2008).

Interestingly, our samples collected during 2008-10 indicate only 64.8% (vide Sorenson index) with the rotifer species recorded in 2002-03 collections (Sharma and Sharma, 2005a) and thus indicate significant variations in their species composition. This is endorsed by the fact that 34 species are new records from Deepor Beel based on our recent samples; of these 21 species are reported in a recent communication by Sharma and Sharma (2011a). These include *Anuraeopsis navicula*, *Brachionus budapestinensis*, *B. dichotomus reductus*, *B. durgae*, *Keratella edmondsoni*, *K. procurva*, *K. tecta*, *Platyias leloupi*, *Mytilina acanthophora*, *Macrochaetus collinsi*, *M. longipes*, *Colurella sulcata*, *Lepadella benjamini*, *L. costatoides*, *L. dactyliseta*, *L. eurysterna*, *Lecane arcua*, *L. blachei*, *L. doryssa*, *L. haliclysta*, *L. lateralis*, *L. nana*, *L. paxiana*, *L. pusilla*, *L. sympoda*, *L. tensuiseta*, *Notommata spinata*, *Trichocerca bicristata*, *T. flagellata*, *T. iernis*, *T. pusilla*, *T. sulcata*, *Dicranophoroides caudatus* and *Testudinella parva*. On the other hand, 16 species reported earlier (Sharma and Sharma, 2005a) are not observed in 2008-2010 collections; these include *Anuraeopsis navicula*, *Brachionus bidentatus*, *B. donneri*, *B. rubens*, *Keratella quadrata*, *Lepadella rhomboidula*, *Squatinella mutica*, *Lecane hastata*, *L. decipiens*, *L. thienemanni*, *Cephalodella mucronata*, *Trichocerca elongata*, *T. porcellus*, *Testudinella brevicaudata*, *Filinia brachiata* and *F. pejeri*. The rotifer fauna of Deepor Beel registers 80.0% community similarity (vide Sorenson index) with that of Loktak Lake (vide Sharma, 2009a). The common occurrence of various cosmopolitan, cosmotropical and pantropical species explains higher similarity between the rotifer communities in the two Ramsar sites of India. The differences, however, are mainly attributed to less number of species of *Lecane* (34 species) as well as distinct paucity of *Brachionus* spp. (5 species) in the latter.

Referring to the Indian floodplain lakes, the rotifer diversity of Deepor Beel is in significant contrast 67-103 species (Sharma, 2005) and 69-93 species (Sharma and Sharma, 2008) reported from different beels of Assam; 62-73 species reported from 14 floodplain lakes (pats) of Manipur (Sharma, 2009b). Our results are, however, significantly higher than the records of 24-35 species from five floodplain lakes of upper Assam (Sharma, 2000) and 54-65 species from seven beels of upper and lower Assam (Sharma and Sharma, 2001). The

richness is also distinctly higher than the reports of only 29 species from four beels (Goswami, 1997), 48 species from 33 beels (Sarma, 2000) and 9 species from Mori beel (Goswami and Goswami, 2001) and 64 species from the beels of the Pobitora Wild Life Sanctuary of Assam state; 11 species from two floodplain lakes of Kashmir (Khan, 1987) as well as of 37 species from two Ox-bow lakes (Khan, 2002) and 38 species from 9 floodplain lakes (Khan, 2003) of South-eastern West Bengal. In addition, the rotifer richness of this floodplain lake of the Brahmaputra river basin is notably higher than the report of 110 species from the backwaters of the river Yamuna at Delhi (Arora and Mehra, 2003).

A distinct dominance of the periphytic rotifers and occurrence of fewer planktonic species in our 2008-2010 as well 2002-2003 collections from Deepor Beel exhibits lack of definite pelagic habitats (De Manuel, 1994); this is attributed due to excessive growth of aquatic macrophytes and shallow nature of this floodplain lake. Furthermore, frequent occurrence of both planktonic and non-planktonic species in the littoral zone of the sampled wetland with marginal vegetation affirms occupation of different niches as hypothesized by Bonecker *et al.*, (1998). Deepor Rotifera is characterized by occurrence of large number of small-sized species (Sharma and Sharma, 2005a); an identical trend is again affirmed in our recent collections. This interesting feature may be attributed to conditions of low concentrations of food (Papinski, 1990) and predation by juvenile fish and invertebrates (Baumgartner *et al.*, 1997).

Various acidophilus rotifers (*vide* Koste, 1978) recorded from Deepor Beel include *Plationus patulus macracanthus*, *Dipleuchlanis propatula*, *Euchlanis triquetra*, *Mytilina bisulcata*, *Lepadella acuminata*, *Lecane pertica*, *Monommata longiseta* and *Testudinella emarginula*. These are represented in both 2002-03 and 2008-2010 collections and are further corroborated by slightly acidic-circum neutral nature of waters of this Ramsar site (BKS, unpublished). The relative paucity of *Brachionus* spp. (11 species) and restricted occurrence of majority of them in the recent samples is noteworthy as compared to our earlier report of 14 species (Sharma and Sharma, 2005a).

Only sixteen rotifers (14.5%) namely *Brachionus caudatus*, *B. falcatus*, *B. patulus*, *B. patulus macracanthus*, *Platylas quadricornis*, *Keratella cochlearis*, *K. tropica*, *Euchlanis dilatata*, *Lecane bulla*, *L. leontina*, *L. unguitata*, *Asplanchna priodonta*, *Polyarthra vulgaris*, *Sinantherina socialis*, *Conochilus unicornis* and *Testudinella patina* represent perennial elements. *Brachionus falcatus*, *B. quadridentatus*, *Keratella cochlearis*, *K. tropica*, *Plationus patulus*, *Euchlanis dilatata*, *Mytilina ventralis*, *Trichotria tetractis*, *Lepadella rhomboides*, *Lecane bulla*, *L. curvicornis*, *L. luna*, *L. leontina*, *L. papuana*, *L. unguata*, *L. lunaris*, *Polyarthra vulgaris*, *Testudinella patina*, *Trichocerca similis*, *T. rattus*. *Filinia longiseta*, exhibit common occurrence in Deepor Beel. On the other hand, *Brachionus mirabilis*, *B. donneri*, *B. durgae*, *Keratella edmondsoni*, *Platylas leloupi*, *Tripleuchlanis plicata*, *Mytilina acanthophora*, *M. bisulcata*, *Lepadella apsidea*, *L. minuta*, *L. discoidea*, *Lecane hastata*, *L.*

monostyla, *L. nana*, *L. paxiana*, *L. pusilla*, *L. tensuiseta*, *L. furcata*, *L. sola*, *L. pyriformis*, *L. thienemanni*, *Notommata spinata*, *Filinia brachiata*, *Testudinella brevicaudata* and *T. greeni* are rare elements.

To conclude, this study presents an exhaustive inventory of Phylum Rotifera of Deepor Beel and shows its speciose and highly diverse taxocoenosis. Our results affirm this Ramsar site to be the richest freshwater ecosystem of South and South East Asia for its rotifer diversity. This study is characterized by occurrence of various species of global biogeographical interest, general tropical character, qualitative significance of Lecanidae > Brachionidae > Lepadellidae > Trichocercidae, distinct richness of tropic-centred genera *Lecane* and *Brachionus*, predominance of the monogonont and the littoral-periphytonic species, and occurrence of large number of small-sized species.

CLADOCERA

Fifty-eight species of Cladocera recorded from Deepor Beel exhibit highly speciose and diverse taxocoenosis and indicate the highest richness of this group known till date from any freshwater ecosystems of Asia. This salient feature reiterates greater environmental heterogeneity of the sampled Ramsar site. One species is a new record from India; two species are new records from Assam state while 15 species are added as new records to our earlier list of Cladocera (Sharma and Sharma, 2008) from this wetland. The present report excels our earlier highest Indian record of 51 species (Sharma and Sharma, 2009a) from Loktak Lake-another Ramsar site.

The Cladocera richness of Deepor Beel merits special biodiversity significance in light of a conservative estimate (Fernando and Kanduru, 1984; Sharma and Michael, 1987) of occurrence of up to 60-65 species of Cladocera from tropical and subtropical parts of India. Further, the cladoceran communities reflect greater higher diversity (39 genera) as compared with 36 genera so far known from India (Sharma, 1991b). The generic richness is also higher than the reports of 29 genera each in the cladoceran faunas of the states of Meghalaya (Sharma and Sharma, 1999b) and Tripura (Venkataraman and Das, 2000) of Northeast India as well as 28 genera recorded from Loktak Lake (Sharma and Sharma, 2009a). Besides, all the seven families of freshwater Cladocera known to occur in the Indian waters are represented in Deepor Beel.

Our collections show several examples of global biogeographical interest; these include the Australasian *Disperalona caudata*, the Oriental *Kurzia* (*Rostrokurzia*) *brevilabris*, the Indo-Malayan *Alona macronyx* and *Leydigiopsis curvirostris* which is known elsewhere only from Brazil and Nicaragua. *Kurzia* (*Rostrokurzia*) *brevilabris* is an interesting addition to the Indian Cladocera; originally described from Thailand (Rajapaksa and Fernando, 1986), it is also known to occur in Ceylon and Philippines. Hudec (2000) dealt with five *Kurzia* spp. and proposed their sub-generic differentiation into *Kurzia* s. str. and *Rostrokurzia*. K. (*Rostrokurzia*)

brevilabris is a member of the later and can be distinctly differentiated from other members of this genus by its diagnostic reduced labrum.

Disperalona caudata, another globally interesting species, was described (Smirnov, 1996a) from Mudginberri Lagoon, Kakadu National Park, Australia and was believed to be an Australian endemic (Smirnov, 1996b). Sanoamuang (1998a) reported this species from north-east Thailand by Sanoamuang (1998a) incidentally as first record from Asia. Sharma and Sharma (2007) reported *D. caudata* from two floodplain lakes (Deepor and Raidong Beels) of the Brahmaputra river basin, Assam extending its distributional range to the Indian subcontinent and also designated this chydorid as an Australasian element. This interesting species, hence, depicts an important link between the Cladocera faunas of northeast India, South-East Asia and Australia.

Leydigiopsis, a rare genus of Cladocera, was described from Brazil by Sars (1901) and until the end of 20th century; it was presumed to be distributed in South and Central America only (Sinev, 2004). Incidentally, its single specimen collected (Sanoamuang, 1998a) from a swamp (Bung Bung) in Kalasin province of north-east Thailand was insufficient to certain the status of the Thai taxon. Sinev (2004) categorized *Leydigiopsis* to be insufficiently studied and a morphologically unusual genus of the subfamily Aloninae and re-described its two species, and remarked on unclear status of Asian *Leydigiopsis*. The authors (Sharma and Sharma, 2007) provided first report of *L. curvirostris* based on specimens examined from Deepor Beel extending its distributional range to the Indian subcontinent. This study reaffirms its restricted Indian occurrence in Assam state only.

The Indo-Malayan *Alona macronyx* is a new record from Assam state. The first Indian report of this species referred to *Indialona jabalpurensis*, a new species described by Rane (1983b) from Madhya Pradesh which was considered as a synonym of *A. macronyx* (refer Rajapaksa and Fernando, 1987; Sharma and Sharma, 1990). This chydorid was recently recorded for the first time from Northeast India from Meghalaya (Sharma, 2008). The present study further extends its distribution to the adjoining state of Assam.

Daday (1905) described *Alona anodonta* from Lake Gregory but his description and illustrations were not satisfactory (refer : Rajapaksa & Fernando 1982) who, in turn, recorded it from Sri Lanka with proper figures. Subsequently, Brehm (1933) examined specimens without characteristic tubercles and described them as *A. pseudoanodonta*. Smirnov (1974) designated the former was designated as *A. pseudoanodonta anodonta* and the later as *A. pseudoanodonta pseudoanodonta* by in his global revision of the Chydoridae. Our specimens are identical with those from Sri Lanka and are, hence, assigned to genus *Coronatella* following Van Damme *et al.* (2010).

Alonella clathratula, *A. nana*, *Alona guttata tuberculata*, *Daphnia pulex*, *Diaphanosoma senegal*, *Grimaldina Lrazzai*, *deberis diaphaness*, *Sarsilatona serricauda*, *Simocephalus serrulatus* and *Streblocerus serricaudata* are examples of regional distributional interest in

India. Of these, *Sarsilatona* is reported to occur in the tropics and subtropics (Korovchinsky, 1992; Negrea *et al.*, 1999). The sole earlier report of this genus from Asia refers to *Latonopsis fernandoi*-a new species described by Rane (1983a) from Madhya Pradesh which was treated it as a synonym of *Sarsilatona serricauda* by Sharma and Sharma (1990).

Alonella clathratula was formerly treated as a subspecies of *A. excisa* by Smirnov (1971) while Smirnov (1996a) subsequently resurrected its specific status based on morphological differences as well as their different distributional ranges. *A. clathratula* is so far represented by its disjunct populations from India examined from Bihar (Sharma and Sharma, 2001) and Meghalaya (Sharma, 2008). The present report further extends its distributional range to the adjoining state of Assam. *Alona tuberculata* was treated as a subspecies of *A. guttata* by Smirnov (1971). It is recently documented from India from Meghalaya state (Sharma, 2008). The present second Indian report of this taxon further extends its distributional range within Northeastern India. Van Damme *et al.* (2011) is followed for recent revision of status of *A. verrucosa*-group and the specimens from Deepor Beel are assigned to new species *Anthalona harti* Van Damme, Sinev & Dumont, 2011. The earlier specimens of this taxon from Meghalaya (Sharma, 2008) as well as its previous records from Gujarat and West Bengal need re-examination in view of restricted global distribution of members of erstwhile *A. verrucosa*-group.

Daphnia pulex is recorded from Northeast India from Assam (Refer : Michael and Sharma, 1988). Its present report from Deepor Beel is noteworthy particularly in view of the fact that *Daphnia* spp. are known for their remarkably limited occurrence in this region (Sharma, 1991b). Amongst other species, *Alonella nana* is reported from Meghalaya and Kashmir; *Alona davidi* from Assam, Meghalaya and West Bengal; *Diaphanosoma senegal* from Assam, Meghalaya, Gujarat and Maharashtra; *Ceriodaphnia reticulata* from Meghalaya, Rajasthan, Bihar and Gujarat; *Grimaldina brazzai* from Assam, Meghalaya, West Bengal and Rajasthan; *Sida crystallina* from Meghalaya, Assam and Kashmir; *Simocephalus serrulatus* from South India, Assam and Meghalaya and *Streblocerus serricaudata* is recorded from Assam, Meghalaya, Manipur and Rajasthan.

The Cladocera richness currently recorded from Deepor Beel compares well with 58 species reported from Meghalaya (Sharma and Sharma, 1999b; Sharma, 2008). Further, it corresponds broadly with 56 species known from West Bengal (Venkataraman, 1999) while it is higher than 49 species examined from Tripura state (Venkataraman and Das, 2000) from N. E. India. Further, the richness registers 76.4% and 73.3% similarities with the cladoceran faunas of the states of Meghalaya and Tripura respectively; while higher similarity values apparently result from common occurrence of several species, the extent of dissimilarity indicates some taxa restricted to this floodplain lake.

The recorded richness is distinctly higher than the record of 14 species from 37 floodplain lakes (Sarma, 2000) of Assam, 9 species from 65 wetlands of 24-Parganas district (Nandi *et al.*, 1993) of West Bengal as well as 36 species from 20 wetlands, including 25 species from

four ox-bow lakes South eastern West Bengal (Khan, 2003); 39 species from 30 wetlands of the Keoladeo National Park, Rajasthan (Venkataraman, 1992) and 29 species from 25 water bodies of Melghat Tiger reserve, Maharashtra (Rane, 2005). Interestingly, the richness presents a distinct contrast to the reports of five species from a wetland (Yousuf *et al.*, 1986) and eleven species from two floodplain lakes (Khan, 1987) of Kashmir; one (Baruah *et al.* 1993), four (Sinha *et al.*, 1994) and 12 species (Sanjer and Sharma, 1995) from a floodplain lake of Bihar, three species reported from Mori beel (Goswami and Goswami, 2001) of Assam.

The Cladocera are invariably considered as a group showing cosmopolitan distribution; this generalization is also observed presently. This salient feature coupled with the occurrence of several cosmotropical and pantropical species along with typical cosmotropical and pantropical genera imparts a general 'tropical character' to the cladoceran fauna of Deepor Beel. These remarks are in conformity with the general composition of cladoceran communities from other tropical regions (Fernando, 1980; Fernando and Kanduru, 1984; Dussart *et al.*, 1984; Sharma and Michael, 1987; Michael and Sharma, 1988; Sharma, 1991b; Sharma and Sharma, 1999b, 2008).

Chydoridae, the largest family of Cladocera, form a dominant component (56.9%); these include 13 species of Chydorinae and 20 species of Aloninae. These two sub-families, are represented by 8 and 14 genera, respectively in this account. The chydorid dominance broadly concurs with the results of Khan (2003). Daphniidae (8 species) > Sididae (6 species) = Macrothricidae (6 species), together, comprise another important component (34.5%) of the cladoceran diversity. *Alona* (5 species) is most speciose genus while *Diaphanosoma*, *Simocephalus*, *Macrothrix*, *Alonella* and *Chydorus*, with three species, together contribute 25.9% of total richness. Our collections are characterized by prominence of the littoral or periphytic species particularly the Chydoridae and littoral taxa of Macrothricidae, Ilyocryptidae, *Pseudosida*, *Sida* and *Simocephalus*.

Alona Bosmina longirostris, *Camptocercus uncinatus*, *Ceriodaphnia cornuta*, *Chydorus sphaericus*, *Coronatella rectangula*, *Diaphanosoma excisum*, *D. sasri*, *Ephemeroporus barroisi*, *Karualona karua*, *Kurzia longirostris*, *Macrothrix triserialis*, *Moina micrura*, *Notoalenga globulosa* and *Simocephalus mixtus* show common occurrence. *Acroperus harpae*, *Alona macronyx*, *Alonella nana*, *Ceriodaphnia reticulata*, *Coronatella anodonta* *Diaphanosoma senegal*, *Guernella raphaelis* and *Leydigiopsis curvirostris* are rare elements.

To sum up, Deepor Beel is the richest habitat of Asia for its Cladocera diversity. It shows several examples of global biogeographical importance namely the Australasian *Disperalona caudata*, the Oriental *Kurzia (Rostrokurzia) brevibris*, the Indo-Malayan *Alona macronyx* and *Leydigiopsis curvirostris* which is known elsewhere only from Brazil and Nicaragua. The faunal diversity exhibits general tropical characters, distinct richness of the Chydoridae, common occurrence of littoral taxa and paucity of limnetic species.

COPEPODA

Plankton samples collected from Deepor beel indicate seven species of Copepoda belonging to six genera and two families. Of these, *Heliodiaptomus contortus* is an interesting Indian endemic, *Mesocyclops leuckarti* is a Palearctic species, *Microcyclops varicans* is a old world species while *Thermocyclops decipiens* is a pantropical species. This report assumes taxonomic importance because of fewer investigations on faunal diversity of copepods in northeast India.

Our collections show three and four species of Calanoida and Cyclopoida respectively. The richness compares well with eight species reported by Khan (2002) from two ox-bow lakes of West Bengal. Copepoda of Deepor Beel appear to be speciose as compared with the report 10 species (7 genera, 2 families) from the floodplain lakes and wetlands of Southeastern West Bengal (Khan, 2003) and 11 species (7 genera and 2 families) reported from fifteen floodplain lakes of Assam (Sharma and Sharma, 2008).

Of the most common diaptomid genera namely *Heliodiaptomus*, *Neodiaptomus* and *Phyllodiaptomus* in the plankton of tropical India (Ranga Reddy, 2001), the first two members of Diaptominae are observed in the collections from Deepor Beel. Among species of the first genus, *Heliodiaptomus contortus* is an Indian endemic (refer Sharma and Sharma, 2008). This diaptomid was described from the Indian Museum tank, Calcutta (Gurney, 1907) and is believed to be a eurytopic species which though not common is yet widely distributed in India (Ranga Reddy, 1994). *H. viduus* is reported to be most abundant in Southern India that decreases gradually in North (Hossain, 1985). Besides, it is known to occur in South and Southeast Asia. *Neodiaptomus schmackeri* is distributed in South, Southeast Asia and east Siberia.

Cyclopoida belong exclusively to the family Cyclopidae which, in turn, includes more than 40 genera in surface freshwaters, about half occurring in tropics while only four of three comprise truly planktonic species (Alekseev, 2002). Further, out of its four subfamilies, two namely Eucyclopinae and Cyclopinae include truly freshwater species and these are represented by one and three species respectively in our collections. Among seven genera of Eucyclopinae known from the tropics, only *Tropocyclops* has planktonic species. This genus includes *T. prasinus* which is recently reported from Assam (Sharma and Sharma, 2008) from northeast India; it so far exhibits disjunct distribution in India. Cyclopinae, another sub-family of Cyclopidae, includes 16 genera in tropics. Of these, *Mesocyclops* and *Thermocyclops* contain typical planktonic species widely represented in the tropics while *Microcyclops* occurs mainly in shallow water (Alekseev, 2002). These three genera are represented by one species each in this study. The genus *Mesocyclops* has been under intensive taxonomic revision following the seminal paper of Kiefer (1981). The formerly cosmopolitan *M. leuckarti* is now a Palearctic species and all its records from other zoogeographical regions are considered as

invalid (Van der Velde, 1984). *Thermocyclops* includes the pantropical *T. decipiens* which is recently reported from Assam state (Sharma and Sharma, 2008) from northeast India while it is known to occur elsewhere in this country from Ladak.

OSTRACODA

Nine species belonging to eight genera and two families belonging to super-family Cypridacea recorded in this study show fairly diverse character of Ostracoda. Six species are new records from northeast India while two species are new records from Assam. Victor (2002) indicated likely occurrence of 17 tropical genera of this group in freshwater zooplankton; of these, eight genera are noticed in our plankton samples from Deepor Beel.

Family Cyprididae is represented by three subfamilies namely Cyprininae, Eucypridinae, Cyprinotinae and Herpetocypridinae; the first includes *Cypris subglobulosa* which is a widely distributed species in the Oriental region. *Strandesia* (Eucypridinae), a widely distributed genus in tropics, includes *S. indica* which is known by its disjunct occurrence in Gujarat, Kerala, Tamil Nadu and West Bengal while the present report extends its distribution to northeast India. However, allocation of this genus to the Eucypridinae still requires re-examination (Hartmann and Puri, 1994; Victor, 2002).

Among all tropical Cyprinotinae, *Hemicypris* is probably the most widespread genus likely to occur as plankton (Victor, 2002); *H. anomala* is the sole species of this genus in our collections and its distribution is presently extended to Northeast India. Of the two species of *Stenocypris*, *S. sewelli* merits attention as yet another example of regional distribution interest because of its earlier Indian reports from Himachal Pradesh, Sikkim and Darjeeling (West Bengal). Cypridopsidae includes two sub-families and shows one species each of *Cypridopsis*, *Onchocypris*, *Pseudocyprretta* and *Cyprretta*; the recorded species of last three genera deserve special mention because of their erstwhile restricted and disjunct occurrence in central and southern India while the present report considerably extends their distribution to N. E. region of this country. In general, this pioneering report on Ostracoda from Deepor beel shows biodiversity as well as ecosystem value.

GASTROTRICHA

The gastrotriches invariably occur in plankton samples but are often over-looked because of difficulty of identification from the preserved specimens (Fernando, 2002). The limited information on the Indian freshwater Gastrotricha is attributed to the works of Vanamala Naidu (1962), Visvesvara (1963, 1964), Dhanapathi (1976), Rao and Mohan (1977) and Sharma (1980, 1987c) while contributions from northeast India are by Sharma and Sharma (1991, 2008). Three species of Gastrotricha belonging to the genus *Chaetonotus* (Family: Chaetonotidae) are reported from Deepor Beel. All these species are cosmopolitan elements and are recently reported from Assam by Sharma and Sharma (2008).

MOLLUSCA

Freshwater Mollusca examined from Deepor Beel reveal 13 species (16 taxa including forms) belonging to seven genera and six families. *Bellamya bengalensis* f. *annandalei* and *Pila theobaldi* are new records from Assam state. The recorded species comprise about 6.4 % of the Indian freshwater Mollusca. Further, they comprise 18.8% of the freshwater species known from northeastern India and 26.5 % of species known from water bodies of Assam and, hence, appear to be fairly rich and speciose. The stated comparisons are based on the lists compiled from Ramakrishna and Dey (2007) due to lack of separate information on faunal diversity of this group from the two areas. The sub-class Prosobranchia shows relatively more richness (9 species) while four species of sub-class Pulmonata are noticed in our collections.

Amongst order Mesogastropoda, the family Viviparidae is known to be limited to freshwater habitats; its members are found in freshwater throughout the world but are notably absent from South America. Vaught (1989) divided it into five subfamilies; of these, only three are known to be represented in India (Ramakrishna and Dey, 2007) while only one of them *i.e.*, Bellamyinae is observed in Deepor Beel. Further, out of three genera of the latter known from this country, only genus *Bellamya* is recorded in the present study. Of the recorded members, *Bellamya bengalensis* f. *typica* and *B. dissimilis* are known to occur throughout India and are also commonly noticed in Deepor Beel. *B. bengalensis* f. *annandalei* and *B. crassa* are also relatively widely distributed in this country; these two are, however, reported elsewhere from Myanmar and Bangladesh respectively (refer : Ramakrishna and Dey, 2007).

The Ampullariidae, commonly known as 'apple snail', are represented by only genus *Pila* throughout India; its amphibious inhabitant, notably the common Indian apple snail *P. globosa* is known to make long excursions on land. The later generalization is also observed in our study though *P. globosa* is not a common species in Deepor Beel. On the other hand, *P. theobaldi* is an interesting addition to the Mollusca fauna of Assam; it is characterized by its occurrence restricted to Meghalaya, Manipur and Tripura in Northeast India besides its record from the adjoining Myanmar.

Family Pleuroceridae is divided into six subfamilies by Vaught (1989); only two are represented in India as well as in Deepor Beel. Melanatriinae presently includes only genus *Brotia* (*Antimelania*) which, in turn, is represented by *Brotia* (*Antimelania*) *costula*. Annandale (1921) described three varieties of this species; these are listed by Subba Rao (1989) and Ramakrishna and Dey (2007) but yet not characterized individually. This species is apparently represented in our collections by its *typical* specimens as well as those belonging to var. *episcopalis*.

Paludominae as well as *Paludomus* merit distributional interest because of their restricted occurrence in India. Amongst three *Paludomus* spp. recorded from Deepor beel, *P. reticulata*

was described from North Cachar (Assam) by Blanford (1870) and is recorded from Assam and Meghalaya and thus can be categorized as a species endemic to northeast India. Besides, other two species namely *P. blanfordiana* and *P. conica* are noteworthy for such a distribution as these are known to occur in India in its north eastern region only. Of these, the former is known elsewhere from Myanmar, Peru and Arkan while the latter shows distribution restricted to Bangladesh and Bhutan.

Order Basommatophora includes super families Lymnaeoidea and Planorboidea. The former is represented by Lymnaeidae which is a large family of freshwater gastropods distributed throughout the world. The systematic of this family as well as the genus *Lymnea* is yet highly confused because of extreme variability but its recorded members are identified following Ramakrishna and Dey (2007). *Lymnea (Pseudosuccinea) acuminata* is represented by f. *typica*, f. *gracilior* and f. *rufescens* in Deepor Beel while *L. (P.) luteola* includes specimens belonging to f. *typica*; all these taxa are distributed throughout India and are also common in our collections. Of these, *L. (P.) acuminata* f. *rufescens* is known elsewhere from Myanmar while *L. (P.) luteola* f. *typica* is recorded elsewhere from Bangladesh, Nepal, Pakistan and Myanmar.

Planorboidea, another super family of Basommatophora, is represented by two families in our collections from Deepor Beel. Of these, Planorbidae, a cosmopolitan family is reported to be commonly found in shallow waters and littoral regions. It is represented by genus *Gyraulus* which shows worldwide distribution and is usually found attached to leaves and roots of aquatic vegetation. This generalization also holds valid for *G. convexiusculus*; it is noticed commonly in association with *Eichhornia crassipes* in Deepor Beel. The family Bullinidae includes its monotypic genus *Indoplanorbis* found in southern Asia, south east Arabia and Socotra island; it includes *I. exustus* which is observed presently from Deepor Beel.

To sum up, our study shows fairly rich and speciose character of Mollusca fauna of Deepor Beel. Three taxa are new records from the state of Assam while a number of taxa show their distribution in northeast India only.

AQUATIC INSECTS : HEMIPTERA

Aquatic Hemiptera form an integral component of invertebrate communities of freshwater ecosystems. The investigations on faunal diversity of water bugs from northeastern India are yet limited; the related studies are those of Distant (1902, 1906, 1910), Palva (1919), Hutchinson (1940) and Bal and Basu (1998) while Thirumalai (2002, 2007) commented on distribution of species of Gerromorpha and Nepomorpha known from the region while dealing with their check lists and synoptic lists from India respectively. There is, however, distinct paucity of information on distribution of water bugs in different freshwater environments of India in general and that of Northeast India in particular. The studies on ecosystem

diversity from the later region are confined to an unpublished work (Kalita, 2008) as well as a recent report by Hazarika and Goswami (2010). The present account on aquatic Hemiptera, therefore, merits faunal and ecosystem diversity interest.

Our collections from Deepor Beel reveal 15 species of water bugs belonging to 12 genera and seven families and thus affirm speciose nature of the group indicating environmental heterogeneity and habitat diversity of the sampled Ramsar site. Further, Nepomorpha include 10 species and Gerromorpha are represented by five species while three species i.e., *Ranatra varipes*, *Aquarius adalaidis* and *Microvelia annandalei* are new records from Assam state. The occurrence of five *Ranatra* spp. in this floodplain lake is noteworthy and again reflects micro-habitat diversity of this wetland.

Aquatic Hemiptera richness of Deepor Beel is higher than 8 species recorded from this wetland in earlier unpublished report of Kalita (2008) and is marginally higher than 14 species recorded from two fish-ponds located in Guwahati University campus (Hazarika and Goswami, 2010). We, however, caution against over-emphasis of these comparisons as the stated two reports show certain nomenclatural anomalies and require confirmations of certain species. Further, our reports shows higher richness than 8 species each reported from wetlands of West Bengal (Bhattacharya, 1998), two man-made lakes of Calcutta (Khan, 2002) and Pocharam lake of Andhra Pradesh (Deepa and Rao, 2007).

Laccotrephes griseus, *L. ruber*, *Ranatra elongata*, *R. filiformis*, *Lethocerus indicus*, *Anisops sardeus*, *Limnogonus nitidus*, *Hydrometra greeni* and *Mesovelia vittigera* are relatively common in our collections; these species are also known to be widely distributed in India. On the other hand, *Ranatra gracilius*, *R. longipes*, *R. varipes*, *Nychia marshalli*, *Gerris adalaidis*, *Hydrometra vittata* and *Microvelia annandalei* show limited occurrence in this study and also exhibit limited distribution in this country. Of these, *R. gracilius* interestingly shows its current distribution restricted to Northeastern India. A majority of the species, except those of Notonectidae, are known elsewhere from various countries of South and Southeast Asia; *Ranatra gracilius* is recorded elsewhere from Bhutan only; *Microvelia annandalei* is known from Bali, Java and Sumatra in Indonesia while *Mesovelia vittigera* is distributed in Bangladesh, Myanmar, Sri Lanka and Sumatra.

PLECOPTERA

The stone-flies are represented by six species belonging to two families and five genera. Nemouridae includes four and one species of sub-families Amphinemourinae and Nemourinae respectively while family Perlidae is represented by one species. Four species namely *Indonemoura adunca*, *Mesonemoura filigera*, *Nemoura mangicauda* and *Perla xenocola* are new records from northeast India. These species are so far known from West Bengal and are reported elsewhere from Nepal. *Indonemoura assami*, described from Assam is also examined from Uttar Pradesh besides its record from Nepal.

EPHEMEROPTERA

Five species belonging to three sub-orders and spread over three families and five genera are reported from this pioneering report of Ephemeroptera of Deepor Beel. Of these, four species namely *Baetis tigroides*, *Cloeon marginale*, *Procloeon harveyi* and *Caenis perpusilla* are new records from northeast India while *Ecdyonurus indicus* is a new record from Assam state; the last species is known earlier from Meghalaya from this region. The sub-order Pisciforma includes one and two species of the Baetinae and Cloeninae respectively; Rectrachaeta is represented by one species of the Caenidae which, in turn, belongs to Caeninae; and sub-order Setisura indicates one species of the Heptageniidae.

COLEOPTERA

Seven species of Coleoptera belonging to five genera and three families are documented in the present pioneering report on aquatic beetles from Deepor Beel. All the species are known from Assam State and are relatively widely distributed in India except *Sternolophus rufipes* which shows restricted occurrence in Assam, Meghalaya and West Bengal. Further, this species is known elsewhere from East Asia and Sunda Island. The diving beetles (Dytiscidae) show more diversity in our collections and, in turn, include four species of the Dytiscinae belonging to two tribes namely Cybisterini and Hydraticini while subfamily Colymbetinae is represented by one species of *Rhantus* and belonging to the tribe Colybetini. Gyrinidae (Whirling beetles) include one species of the subfamily Enhydrinae. Hydrophilidae (Scavenger beetles) indicate one species of *Sternolophus* belonging to Hydrophilinae.

ZOOPLANKTON RICHNESS

Of the total 269 species of zooplankton recorded from Deepor Beel, 232 species (excluding Protozoa other than Rhizopoda) belonging to 101 genera and 38 families collected (during August 2008-July 2010) are analysed for temporal and spatial variations. Interestingly, zooplankton exhibit more richness than that of phytoplankton (BKS, personal communication) in our net plankton collections. The salient feature of their qualitative dominance corresponds with the findings of Sharma and Sharma (2008) and Sharma (2010b). This feature also concurs with our earlier report from Deepor Beel based on 2002-03 survey (Sharma, 2011) as well as the results from Loktak Lake (Sharma and Sharma 2011c). Our results, however, differ from zooplankton sub-dominance recorded by Baruah *et al.*, (1993), Sinha *et al.*, (1994) and Sharma and Hussain (2001).

The zooplankton species show wider monthly variations at six sampling stations (10-73 species) during the study period; the richness ranges between 10-66, 12-62, 12-65, 16-79, 19-68 and 19-73 species at stations 1-6 respectively. ANOVA registers significant variations of richness between different stations ($F_{5, 143} = 18.986$, $P = 9.94E-14$) as well as between months ($F_{23, 143} = 9.852$, $P = 6.5E-11$). Further, mean monthly richness at different stations during the study period (2008-10) follow the stated pattern: 49 ± 17 species (station 4) > 43 ± 14 species

(station 6) > 42±14 species (station 5) > 35±17 species (station 1) > 29±13 species (station 2) > 28±13 species (station 3).

Temporal variations in richness at individual sampling stations do not follow any definite general pattern during the study period nor do they show any definite periodicity of peak and lowest number of species. Peak number of species is observed in June 09; September 08, June 10, July, 10, August, 09 and September, 08. while lowest richness is recorded in March 10, November 08, April 10, February 08, March 09 and again March 09 during the study period at stations 1-6 respectively. The relatively more richness (> 40 species) is noticed in 17, 12, and 14 monthly collections at sampling stations 4-6 respectively but it occurs only in 9, 5 and 4 months at stations 1-3 respectively. The stated variations are attributed to general spatial and temporal heterogeneity between the sampled sites which, in turn, may be attributed to their varied hydrophyte associations particularly at sampling stations 4-6.

Total monthly richness in Deepor Beel ranges between 59-135 (89±22) species during 2008-09 and between 55-139 (93±26) species during 2009-10. Our results, hence, reflect notable temporal variations of zooplankton richness. This generalization is supported by significant (vide ANOVA) monthly variations ($F_{11, 23} = 5.257$, $P = 0.0053$) but the results shows insignificant annual variations during the study period. The last feature is again reflected in temporal variations of total monthly richness which does not confirm to any definite periodicity annually or during the study period. Maximum and lowest richness is observed in the months of September, 08 and February, 09, and during July, 10 and December, 09 during 2008-09 and 2009-10, respectively. In general, lower richness is recorded from December, 09 through April, 10 during second year of the study period while no such trend is noticed during the preceding year and lower richness is observed during November, 08-February, 09 and again during April-May, 09. The present results, however, differ from winter richness maxima reported earlier from Deepor Beel (Sharma, 2011) as well as from Loktak Lake (Sharma and Sharma, 2011c). Mean total richness recorded during the study period (89±22 species), however, broadly concurs with the report (85 ± 13 species) from Loktak Lake (Sharma and Sharma, 2011c).

The percentage similarities (vide Sørensen index) of zooplankton reflect considerable differences in their monthly composition. The similarity ranges between 35.8-66.0% during 2008-09 but follows a relatively wider range (39.3-86.3%) during 2009-10, thereby, indicating certain annual differences. Its lowest value is noticed between November, 08 and April, 09 collections while peak similarity is observed between July and August, 09 communities during first year of the study period. On the other hand, the lowest value is observed between September, 09 and March, 10 collections while peak similarity is recorded between September and October, 10 in the succeeding year. Our results differ from higher similarities as well as period of high and low values observed in Loktak Lake (Sharma and Sharma, 2011c) and also

differ from higher community similarities recorded in Deepor beel during 2002-03 survey (Sharma, 2011).

A careful analysis of community similarities during 2008-09 indicates that in majority of instances (80.3%) included in the matrix, the similarity ranges between 40-60%. On the other hand, only 2 instances show similarity below 40% while 11 instances exhibit similarity above 60%. Again during 2009-10, in spite of wider observed range, the similarity ranges between 40-60% in majority of instances (75.7%) while only one instance records below 40% similarity, 17 instances showed similarity ranging between 61-70% while 71-80% and above 80% similarity values are noticed in one instance each. Hence, these generalizations indicate 40-60% zooplankton similarity in majority of the cases during the study period and, thus, reflect more differences in their monthly species composition as well as annual differences. These variations are supported by notable variations in monthly groupings during 2008-09 and 2009-10 as observed in the hierarchical cluster analysis which, in turn, shows greater heterogeneity in zooplankton particularly during the second year. The species composition reflects higher similarity between July vs. August and again between September vs. October and March vs. June while November > January > April differ greatly in their community structure during 2008-09. On the other hand, September and October zooplankton show higher similarity during 2009-10 while they reflect more differences in their composition in general and during December, February and January in particular.

Rotifera (25-74, 47 ± 15 species) contribute notably to total monthly richness of zooplankton of Deepor Beel during 2008-09 while their richness varies between 24-79 (51 ± 19) species during 2009-10. Besides, they also form main component of zooplankton at individual sampling stations. The qualitative importance of Rotifera agrees with the reports from several other floodplain lakes (Sharma, 2000, 2005, 2009a, 2009b; Sharma and Sharma, 2001a, 2008; Khan 2002, 2003). Cladocera, another important component, concur with their qualitative importance with the reports of Sharma and Sharma (2008, 2009a, 2010a, 2010c) from floodplain lakes of northeast India. They exhibit richness ranging between 16-38 (27 ± 6) species and between 16-32 (26 ± 4) species during two years of the study period respectively. Rhizopoda show richness varying between 4-14 (8 ± 3) species during 2008-09 and between 5-17 (9 ± 4) species during 2009-10. Copepoda (4 ± 1 and 4 ± 1 species), Ostracoda (3 ± 1 and 3 ± 1 species) and Gastrotricha (1 ± 1 and 1 ± 1 species) show very low monthly richness during two years respectively.

To sum up, 315 species of freshwater invertebrates belonging to 11 groups and spread over 150 genera and 73 families recorded from Deepor Beel indicate rich and speciose fauna diversity of this Ramsar site. Zooplankton (269 species) assign this wetland the status of the richest freshwater ecosystem of India. Deepor Beel is the richest freshwater ecosystem of South and South East Asia for Rotifera (146 species) and Cladocera (58) biodiversity. It is also one of the richest ecosystems of India known till date for aquatic Mollusca and

Hemiptera. The stated features reflect greater environmental heterogeneity and micro-habitat diversity of this Ramsar site and highlights biodiversity value of this important floodplain lake of Northeast India. This study records several species of global and regional or local distributional interest. Though certain groups of zooplankton are apparently well documented, certain other groups may still require up-dating. Nevertheless, our results provide valuable information on aquatic micro- and macro-faunal diversity of this interesting hot-spot of India.

6. SUMMARY

The collections examined from Deepor Beel record 315 species of freshwater invertebrates (zooplankton and hydrophyte associated fauna) belonging to 11 groups, 150 genera and 73 families. These include 269 species of zooplankton and 13 species of freshwater Mollusca. Aquatic insects include 15 species of Hemiptera, 7 species of Coleoptera, 6 species of Plecoptera and 5 species of Ephemeroptera.

The faunal diversity in general and zooplankton diversity in particular is the highest known till date from any individual freshwater ecosystem of South and South East Asia. These salient features highlight biodiversity significance of the sampled Ramsar site and reflect its greater environmental heterogeneity and micro-habitat diversity.

In all 49 species are new records; these include two new records from India, 18 records from Northeast India while 29 species are new records from the state of Assam.

The nature and composition of various groups and notable features of their faunal diversity are indicated below :

PROTOZOA

1. This study reveals 46 species of Protozoa belonging to 26 genera and 21 families, and including 31 and 15 species of Sarcostomastigophora and Ciliophora.
2. Eighteen species *i.e.*, *Assulina muscorum*, *A. seminulum*, *Actinophrys sol*, *Gymnodinium aeruginosum*, *Trachelomonas hispida*, *T. urceolata*, *Coleps hirtus*, *Dileptus anser*, *Lacrymaria olor*, *Trachelius ovum*, *Frontonia acuminata*, *F. depressa*, *Vorticella aequilata*, *Spirostomum ambiguum*, *Stichotricha socialis*, *Oxytricha fallax*, *Euplotes muscicola* and *E. plumpipes* are new records from Assam.
3. *Actinophrys sol*, *Dileptus anser*, *Euglena oxyuris*, *Frontonia acuminata*, *F. depressa*, *Gymnodinium aeruginosum*, *Phacus pleuronectes*, *Peridinium tabulatum*, *Trachelius ovum*, *Trachelomonas hispida* and *Vorticella aequilata* show regional distributional interest.
4. Rhizopoda, the most diverse group of Protozoa, are represented by 22 species of belonging to 10 genera, 7 families and three classes.
5. This study reflects the richest faunal diversity of the testacean amoebae known till date from any aquatic ecosystem of India.

6. Our collections record 14 species of Lobosea and 7 species of Filosea, and register L/F quotient = 2.0.
7. Euglephidae > Centropyxidae = Diffflugidae are speciose more families (76.2%). *Diffflugia* > *Centropyxis* are relatively diverse genera (42.9%). *Arcella* = *Euglypha* also form a notable fraction (28.6%) of the rhizopod diversity.
8. The occurrence of *Centropyxis orbicularis*, *Cyphoderia ampulla* and *Cyclopyxis eurysterna* in freshwater environs merits ecological interest.
9. *Arcella hemispherica*, *Centropyxis cassis*, *Diffflugia corona*, *D. tuberculata*, *D. urceolata*, *Cyclopyxis eurysterna*, and *Euglypha laevis* are examples of local or regional distributional interest and exhibit rare occurrence in our collections.
10. *Arcella discoides*, *A. vulgaris*, *Centropyxis aculeata*, *C. ecornis*, *Diffflugia acuminata*, *D. oblonga*, *Euglypha acanthophora* and *E. tuberculata* exhibit relatively common occurrence.
11. The Mastigophora include nine species of Phytomastigophora (plant flagellates) belonging to two orders and spread over five genera and three families.
12. Ciliophora indicate 15 species with relatively rich higher diversity i.e., three classes, five orders 11 families and 12 genera.

ROTIFERA

1. One hundred and forty-six species of Rotifera belonging to 37 genera and 19 families, recorded from Deepor Beel is the richest biodiversity of this Phylum known from any freshwater ecosystem of South Asia.
2. This salient feature affirms environmental heterogeneity and micro-habitat diversity of this Ramsar site.
3. The recorded species comprise an important component of the rotifer fauna of Northeastern India (65.8 %) and of the Indian Rotifera (38.7%).
4. *Keratella tecta* as a new record from India while *Lecane paxiana* is a new record from Northeast India and 35 species are added as new records from Deepor Beel.
5. The biogeographically interesting elements (7.5%) include two Australasian elements namely *Brachionus dichotomus reductus* and *Notommata spinata*; four Oriental endemics *Brachionus donneri*, *Keratella edmondsoni*, *Lecane blachei* and *Filinia camascela* and the paleotropical *Lepadella discoidea*, *Lecane lateralis*, *L. unguitata*, *Testudinella greeni* and *T. brevicaudata*.
6. The occurrence of Australasian elements in this Ramsar site reflects affinity of Assam Rotifera with those of Southeast Asia and Australia.
7. *Brachionus durgae*, *B. mirabilis*, *Keratella procurva*, *K. lenzi*, *Lecane dorsyssa*, *L. haliclysta*, *L. nana*, *L. pusilla*, *L. tensuiseta*, *L. thienemanni* *Lepadella benjamini*, *L.*

dactyliseta, *L. costatoides*, *Lophocharia salpina*, *Mytilina acanthophora*, *M. bisulcata*, *Macrochaetus longipes*, *Platylas leloupi*, *Testudinella parva*, *T. emarginula*, *Trichocerca bicristata*, *T. iernis*, *T. flagellata*, *Tripleuchlanis plicata* and *Trochosphaera aequatorialis* are examples of regional distributional importance in the Indian sub-continent.

8. *Lecane haliclysta*, *L. dorsyssa*, *L. haliclysta*, *L. pusilla*, *L. tensuisseta*, *Lepadella dactyliseta*, *L. costatoides*, *Platylas leloupi*, *Macrochaetus longipes* and *Trichocerca iernis* are so far known from northeast India while *Mytilina acanthophora*, *M. bisulcata*, *Lophocharia salpina*, *Trichocerca bicristata*, *T. flagellata*, *Tripleuchlanis plicata* and *Trochosphaera aequatorialis* show disjunct distributions in India.

9. Lecanidae (42 species) > Brachionidae (26 species) > Lepadellidae (21 species) > Trichocercidae (12 species) show qualitative importance. Euchlanidae > Flosculariidae = Testudinellidae > Mytilinidae = Trichotriidae = Trochosphaeridae also deserve mention.

10. *Lecane* (42 species) is the most speciose genus. *Lepadella* (17 species) > *Brachionus* (14 species) > *Trichocerca* (12 species) show importance. *Keratella* includes 7 species while *Filinia* and *Testudinella* are other notable genera (5 species each).

11. Cosmopolitan species (69.3%) show higher richness while Cosmotropical (16.4%) > Pantropical (14.4%) form an important component.

12. The stated features along with qualitative significance of 'tropic-centred' genera *Lecane* and *Brachionus* impart a general 'tropical character' to the rotifer fauna of Deepor Beel.

13. Deepor Rotifera are characterized by dominance of the periphytic rotifers, fewer planktonic species, frequent record of both planktonic and non-planktonic species in the littoral zone of this wetland and occurrence of large number of small-sized species.

14. The acidophilus rotifers are *Platyonus patulus macracanthus*, *Dipleuchlanis propatula*, *Euchlanis triquetra*, *Mytilina bisulcata*, *Lepadella acuminata*, *Lecane pertica*, *Monommata longiseta* and *Testudinella emarginula*. The relative paucity of *Brachionus* spp. (11 species) and their restricted occurrence in the recent samples is noteworthy.

15. Only 16 species show common occurrence and 25 species are rare in our collections.

16. This study presents an exhaustive inventory of Rotifera of Deepor Beel and shows its speciose and highly diverse taxocoenosis.

17. Our results affirm this Ramsar site to be the richest freshwater ecosystem of South and South East Asia for its rotifer diversity.

CLADOCERA

1. Fifty-eight species of Cladocera recorded from Deepor Beel indicate the highest richness of this group known till date from any freshwater ecosystems of Asia.

2. This salient feature reiterates greater environmental heterogeneity and micro-habitat diversity of this floodplain lake.

3. The richness merits special biodiversity significance in light of a conservative estimate of occurrence of up to 60-65 species of Cladocera from tropical and subtropical India.
4. One species is a new record from India; two species are new records from Assam state while 15 species are added as new records from this wetland.
5. The Cladocera reflect greater higher diversity (39 genera) as compared with 39 genera so far known from different states of India.
6. The examples of global biogeographical importance include the Australasian *Disperalona caudata*, the Oriental *Kurzia* (*Rostrokurzia*) *brevilabris*, the Indo-Malayan *Alona macronyx* and *Leydigiopsis curvirostris* which is known only from Brazil and Nicaragua.
7. *Kurzia* (*Rostrokurzia*) *brevilabris* is an interesting addition to the Indian Cladocera.
8. *Disperalona caudata* depicts an important link between the Cladocera faunas of northeast India, South-East Asia and Australia.
9. *Alona macronyx* and *Coronatella anodonta* are new records from Assam state.
10. *Alonella clathratula*, *A. nana*, *Alona guttata tuberculata*, *Daphnia pulex*, *Diaphanosoma senegal*, *Grimaldina brazzai*, *Labaris diaphanus*, *Sarsilatona serricauda*, *Simocephalus serrulatus* and *Streblocerus serricaudata* show regional distributional interest in India.
11. Cladocera of Deepor Beel shows several cosmotropical and pantropical species, typical cosmotropical and pantropical genera and general 'tropical character'.
12. Chydoridae form a dominant component (33 species, 56.9%). Daphniidae (8 species) > Sididae = Macrothricidae, together, comprise another important component (34.5%).
13. *Alona* (5 species) is most speciose genus. *Diaphanosoma*, *Simocephalus*, *Macrothrix*, *Alonella* and *Chydorus*, together contribute 25.9% of total richness.
14. Our collections show prominence of littoral or periphytic species of the Chydoridae and littoral taxa of Macrothricidae, Ilyocryptidae, *Pseudosida*, *Sida* and *Simocephalus*.
15. *Alona cheni*, *Bosmina longirostris*, *Camptocercus uncinatus*, *Ceriodaphnia cornuta*, *Chydorus sphaericus*, *Coronatella rectangla*, *Diaphanosoma excisum*, *D. sarsi*, *Ephemeroporus barroisi*, *Karualona karua*, *Kurzia longirostris*, *Macrothrix triserialis*, *Moina micrura*, *Notoalona globosa* and *Simocephalus mixtus* show common occurrence.
16. *Acroperus harpae*, *A. macronyx*, *Alonella nana*, *Ceriodaphnia reticulata*, *Coronatella anodonta*, *Diaphanosoma senegal*, *Guernella raphaelis* and *Leydigiopsis curvirostris* are rare elements.

COPEPODA

1. The samples collected from Deepor beel indicate seven species of Copepoda belonging to six genera and two families.
2. *Heliodyptomus contortus* is an interesting Indian endemic. *Mesocyclops leuckarti* is a Palearctic species, *Microcyclops varicans* is a old world species while *Thermocyclops decipiens* is a pantropical species.

3. Copepoda of Deepor Beel appears to be speciose as compared with the reports from the floodplain lakes and wetlands of South eastern West Bengal and Assam.
4. The Cyclopidae, represented by Eucyclopinae and Cyclopinae, one and three species respectively.
5. Among seven genera of Eucyclopinae known from the tropics, only *Tropocyclops* has planktonic species. This genus includes *T. prasinus* is the present study.
6. Cyclopinae includes *Mesocyclops*, *Thermocyclops* and *Microcyclops* ; these genera are represented by one species each in our collections.

OSTRACODA

1. Nine species belonging to eight genera and two families belonging to super-family Cypridacea recorded in this study show fairly diverse character of Ostracoda.
2. Six species are new to northeast India while two species are new records from Assam.
3. The Cyprininae includes *Cypris subglobulosa* which is a widely distributed species in the Oriental region.
4. *Strandesia* (Eucypridinae) includes *S. indica* which is known by its disjunct occurrence in India; the present report extends its distribution to northeast India.
5. Among all tropical Cyprinotinae, *Hemicypris* includes *H. anomala*; its distribution is presently extended to Northeast India.
6. Of the two species of *Stenocypris*, *S. sewelli* merits attention as yet another example of regional distribution interest.
7. Cypridopsidae shows one species each of *Cypridopsis*, *Onchocypris*, *Pseudocypretta* and *Cypretta*; the species of last three genera deserve special mention because of their erstwhile restricted and disjunct occurrence in central and southern India. The present report considerably extends their distribution to north eastern region of this country.

GASTROTRICHA

1. Three species of Gastrotricha belonging to *Chaetonotus* (Family : Chaetonotidae) are reported from Deepor Beel.
2. All these species are cosmopolitan elements and are recently reported from Assam.

MOLLUSCA

1. Freshwater Mollusca of Deepor Beel reveal 13 species belonging to seven genera and six families.
2. *Bellamya bengalensis* f. *annandalei* and *Pila theobaldi* are new records from Assam.
3. The recorded species comprise about 6.4% of the Indian freshwater Mollusca. They comprise 18.8% of the freshwater species known from north eastern India and 26.5% of aquatic Mollusca species known from Assam.

4. The sub-class Prosobranchia shows relatively more richness (9 species) while four species of sub-class Pulmonata are noticed in our collections.
5. Amongst order Mesogastropoda, and the family Viviparidae, only genus *Bellamya* is recorded in the present study. Of these, *Bellamya bengalensis* f. *typica* and *B. dissimilis* are known to occur throughout India and are also commonly noticed in Deepor Beel. *B. bengalensis* f. *annandalei* and *B. crassa* are also relatively widely distributed in this country.
6. The Ampullariidae are represented by two species of genus *Pila*. Of these, *P. theobaldi* is an interesting addition to the Mollusca fauna of Assam.
7. Family Pleuroceridae, represented by Melanatriinae, presently includes only genus *Brotia* (*Antimelania*) which, in turn, is represented by *Brotia* (*Antimelania*) *costula*.
8. Two species of Paludominae namely *P. blanfordiana* and *P. conica* are noteworthy for this distribution; these are known to occur in India in its north eastern region only.
9. Lymnaeoidea is represented by Lymnaeidae. *Lymnea* (*Pseudosuccinea*) *acuminata* is represented by f. *typica*, f. *gracilior* and f. *rufescens* while *L. (P.) luteola* includes specimens belonging to f. *typica*.
10. The Bullinidae includes its monotypic genus *Indoplanorbis*; it includes *I. exustus* which is observed presently from Deepor Beel.
11. Mollusca fauna of Deepor Beel shows fairly rich and speciose character.

AQUATIC INSECTS : HEMIPTERA

1. The collections from Deepor Beel reveal 15 species of water bugs belonging to 12 genera and seven families and thus affirm speciose nature of the group.
2. Nepomorpha include 10 species and Gerromorpha are represented by five species.
3. *Ranatra varipes*, *Aquarius adelaidis* and *Microvelia annandalei* are new records from Assam state.
4. Aquatic Hemiptera richness of Deepor Beel is higher than reports from certain other freshwater ecosystems of India.
5. *Laccotrephes griseus*, *L. ruber*, *Ranatra elongata*, *R. filiformis*, *Lethocerus indicus*, *Anisops sardeus*, *Limnogonus nitidus*, *Hydrometra greeni* and *Mesovelie vittigera* are relatively common in our collections.
6. *Ranatra gracilius*, *R. longipes*, *R. varipes*, *Nychia marshalli*, *Gerris adelaidis*, *Hydrometra vittata* and *Microvelia annandalei* show limited occurrence in this study.

PLECOPTERA

1. This group includes six species belonging to two families and five genera.
2. Nemouridae includes four and one species of sub-families Amphinemourinae and Nemourinae respectively while family Perlidae is represented by one species.

3. Four species namely *Indonemoura adunca*, *Mesonemoura filigera*, *Nemoura mangicauda* and *Perla xenocola* are new records from northeast India.

EPHEMEROPTERA

1. Five species belonging to three sub-orders, three families and five genera are reported in this pioneering report of Ephemeroptera of Deepor Beel.

2. *Baetis tigroides*, *Cloeon marginale*, *Procloeon harveyi* and *Caenis perpusilla* are new records from northeast India while *Ecdyonurus indicus* is a new record from Assam state.

COLEOPTERA

1. Seven species of Coleoptera belonging to five genera and three families are documented in this pioneering report on aquatic beetles from Deepor Beel.

2. All the species are known from Assam State and are relatively widely distributed in India except *Sternolophus rufipes* which shows restricted occurrence in Assam, Meghalaya and West Bengal.

3. The diving beetles (Dytiscidae) include four species of the Dytiscinae belonging to two tribes namely Cybisterini and Hydaticini while subfamily Colymbetinae is represented by one species of *Rhantus* and belonging to the tribe Colybetini.

4. Gyrinidae (Whirling beetles) include one species of the subfamily Enhydrinae.

5. Hydrophilidae indicate one species of *Sternolophus* belonging to Hydrophilinae.

ZOOPLANKTON RICHNESS

1. Of the total 269 species of zooplankton documented in this study, 232 species (excluding Protozoa other than Rhizopoda) belonging to 101 genera and 38 families collected are analysed for temporal and spatial variations.

2. The number of species shows wider monthly variations at six sampling stations (10-73 species); the richness ranges between 10-66, 12-62, 12-65, 16-79, 19-68 and 19-73 species at stations 1-6 respectively.

3. ANOVA registers significant variations of zooplankton richness between different stations ($F_{5, 143} = 18.986$, $P = 9.94E-14$) as well as between months ($F_{23, 143} = 9.852$, $P = 6.5E-11$).

4. Mean monthly richness at different stations during the study period follows the stated pattern: 49 ± 17 species (station 4) > 43 ± 14 species (station 6) > 42 ± 14 species (station 5) > 35 ± 17 species (station 1) > 29 ± 13 species (station 2) > 28 ± 13 species (station 3).

5. Temporal variations in richness at individual sampling stations do not follow any definite general pattern during the study period nor do they show any definite periodicity of peak and lowest number of species.

6. Peak number of species is observed in June 09; September 08, June 10, July, 10, August, 09 and September, 08. while lowest richness is recorded in March 10, November 08, April

10, February 08, March 09 and again March 09 during the study period at stations 1-6 respectively.

7. Total monthly richness in Deepor Beel ranges between 59-135 (89 ± 22) species during 2008-09 and between 55-139 (93 ± 26) species during 2009-10. It shows significant monthly variations ($F_{11, 23} = 5.257$, $P = 0.0053$) but shows insignificant annual variations during the study period.

8. The similarity ranges between 35.8-66.0% during 2008-09 but follows a relatively wider range (39.3-86.3%) during 2009-10.

9. A careful analysis of community similarities noticed during 2008-09 indicates that in majority of instances (80.3%) included in the matrix, the similarity ranged between 40-60%. On the other hand, only 2 instances show similarity below 40% while 11 instances exhibit similarity above 60%.

10. During 2009-10, the similarity ranges between 40-60% in majority of instances (75.7%) while only one instance records below 40% similarity, 17 instances show similarity ranging between 61-70% while 71-80% and above 80% similarity values are noticed in one instance each.

11. These generalizations affirm 40-60% zooplankton similarity in majority of the cases.

12. The hierarchical cluster analysis shows greater heterogeneity in zooplankton particularly during the second year.

13. Rotifera (25-74, 47 ± 15 species) contribute notably to total monthly richness of zooplankton during 2008-09 and their richness varies between 24-79 (51 ± 19) species during 2009-10.

14. Cladocera, another important component, exhibit richness variations ranging between 16-38 (27 ± 6) species and between 16-32 (26 ± 4) species during two years respectively.

15. Rhizopoda record richness varying between 4-14 (8 ± 3) species during 2008-09 and between 5-17 (9 ± 4) species during 2009-10. The other groups namely Copepoda (4 ± 1 and 4 ± 1 species), Ostracoda (3 ± 1 and 3 ± 1 species) and Gastrotricha (1 ± 1 and 1 ± 1 species) show very low monthly richness during two years respectively.

To sum up, the report of 315 species of freshwater invertebrates belonging to 11 groups and spread over 150 genera and 73 families from Deepor Beel indicate rich and speciose fauna diversity of this Ramsar site. Zooplankton (269 species) assigns this wetland the status of the richest freshwater ecosystem of India. Deepor Beel is the richest freshwater ecosystem of Asia for Rotifera (146 species) and Cladocera (58) biodiversity. This floodplain lake is also one of the richest ecosystems of India in terms the recorded species of aquatic Mollusca and Hemiptera. The stated features reflect greater environmental heterogeneity and micro-habitat diversity of this Ramsar site and highlights biodiversity value of these important floodplain lakes of Northeast India. This study indicates several species of global and regional or local distributional interest.

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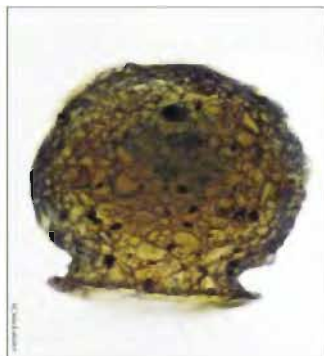
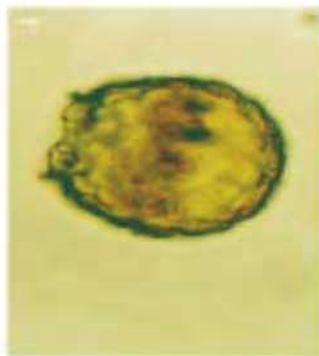
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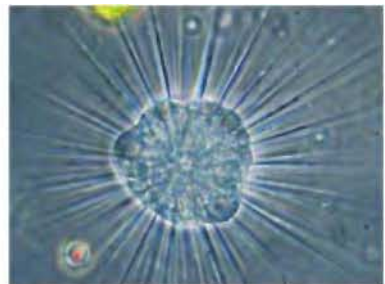
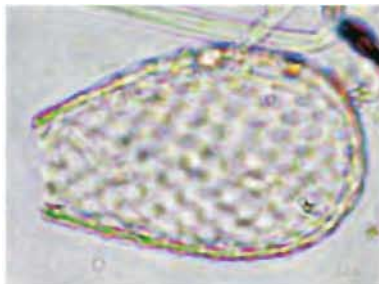
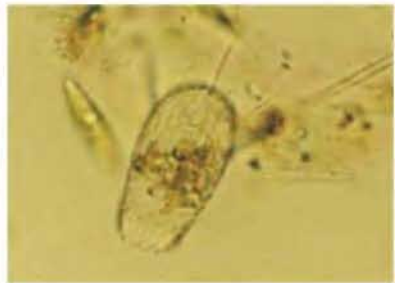
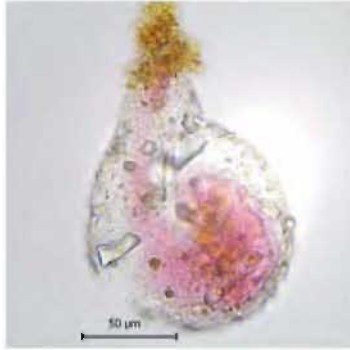
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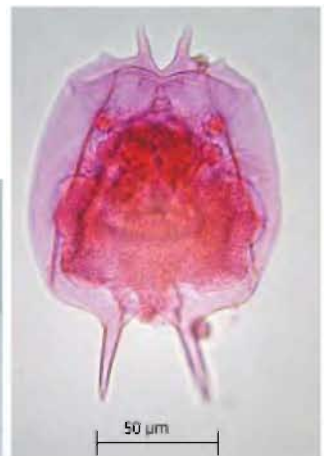
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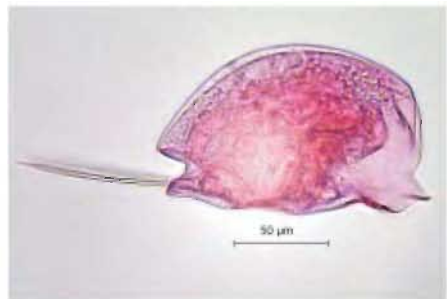
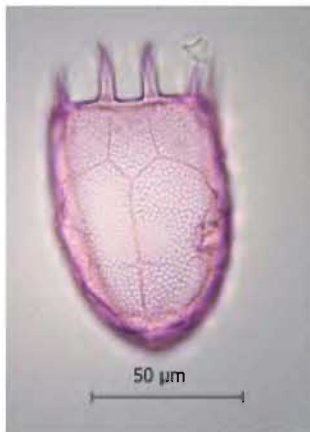
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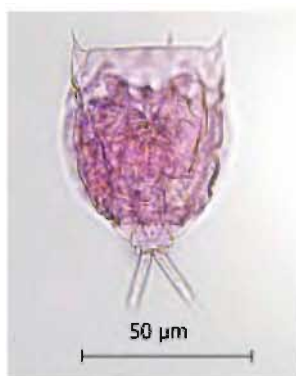
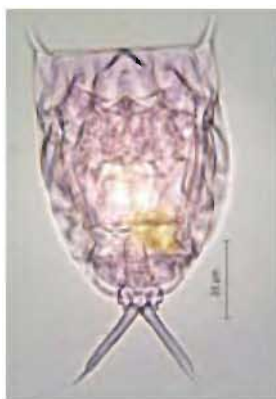
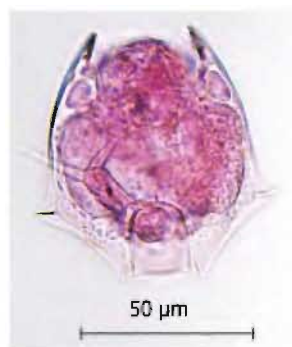
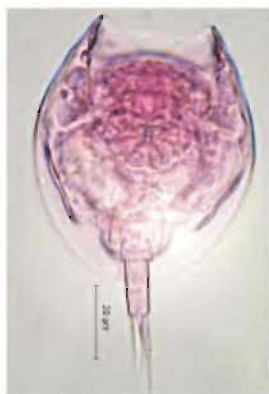
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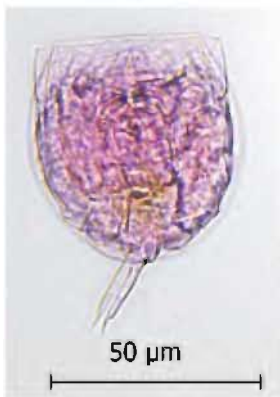
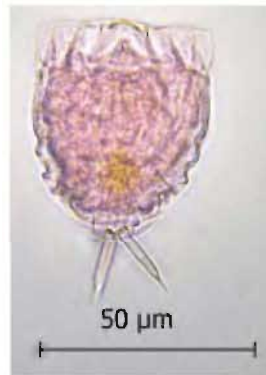
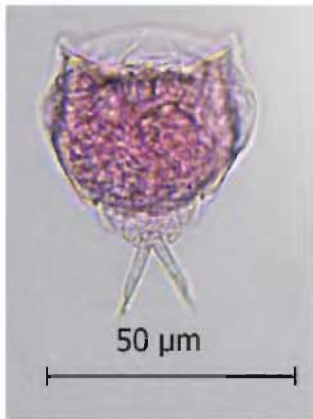
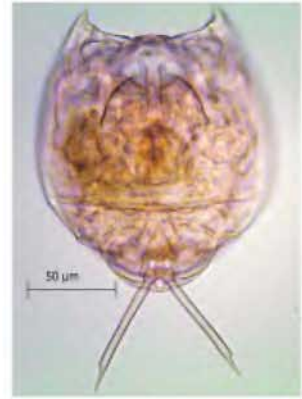
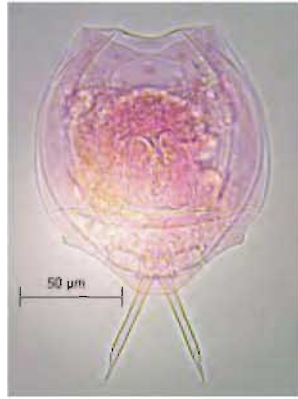
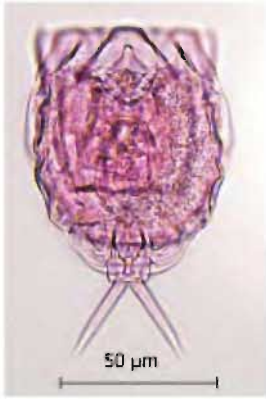


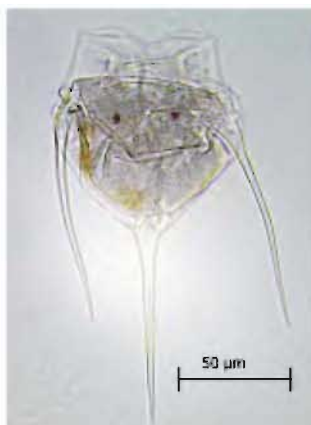
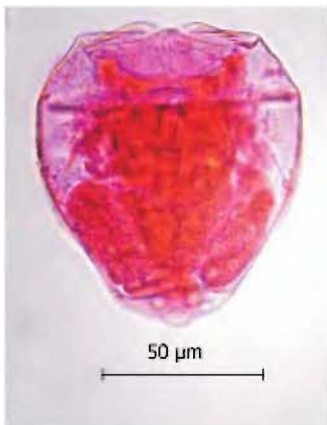
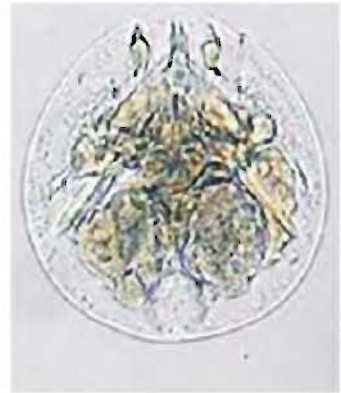
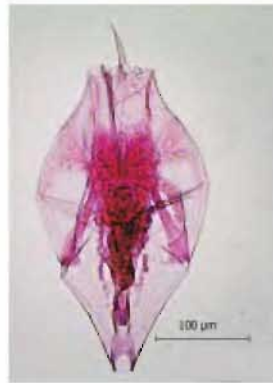
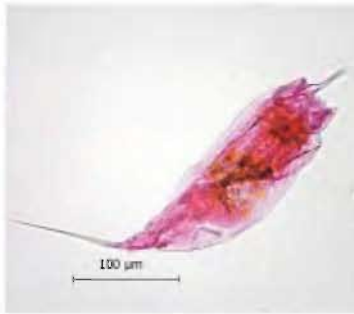
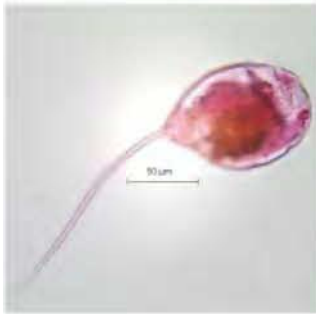


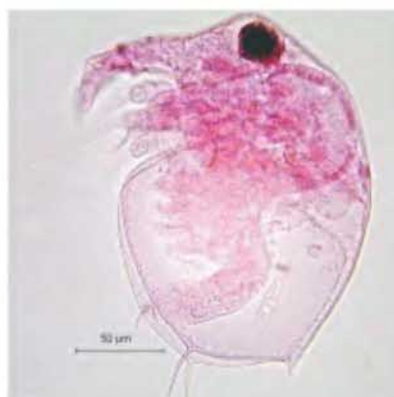


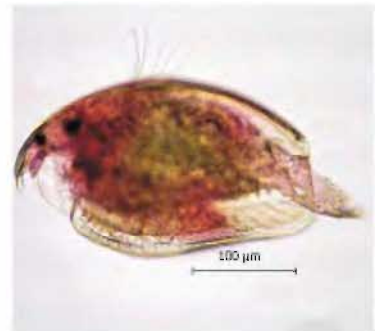
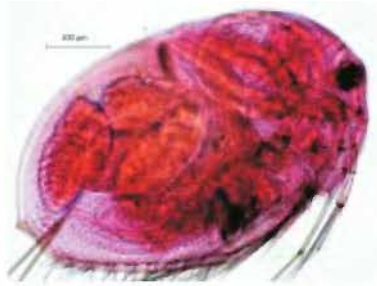
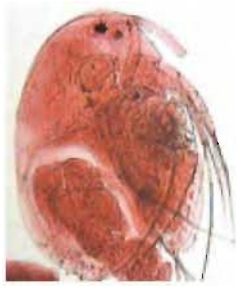


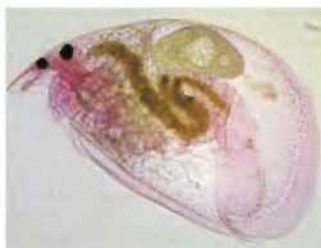
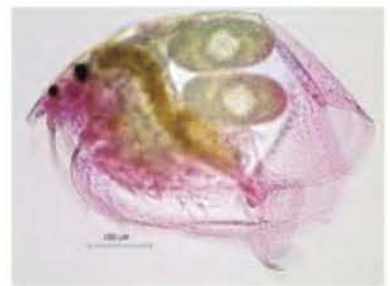
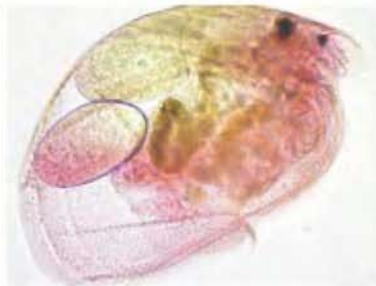


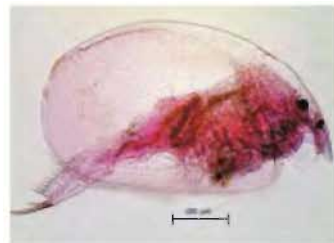
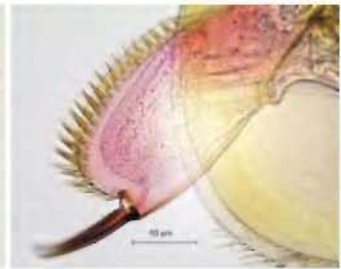
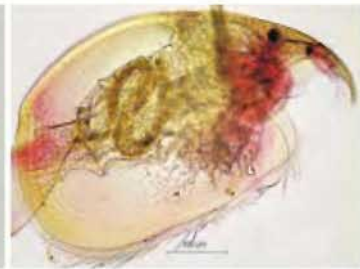
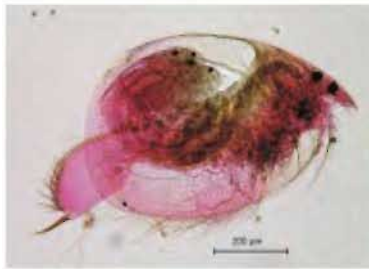
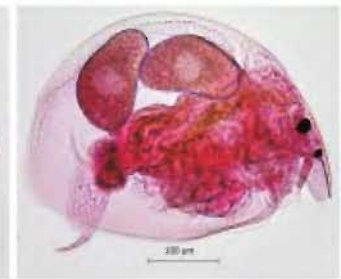
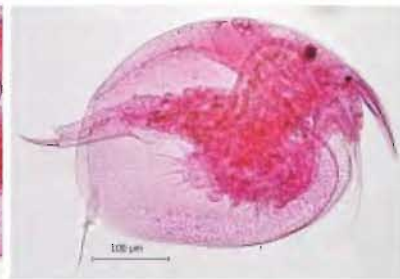
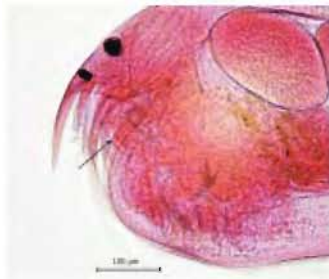
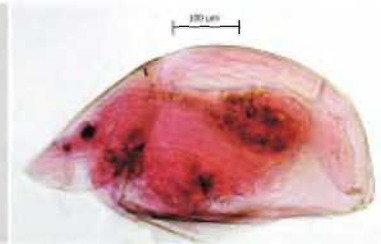
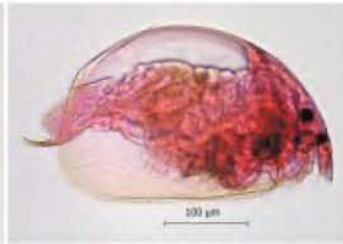


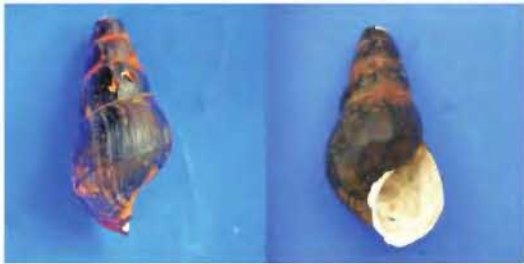


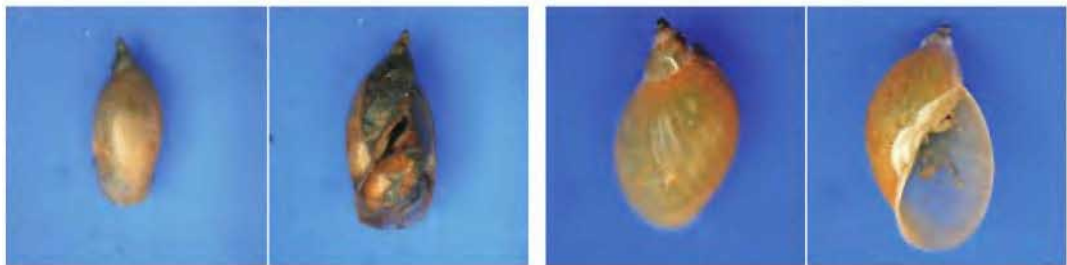
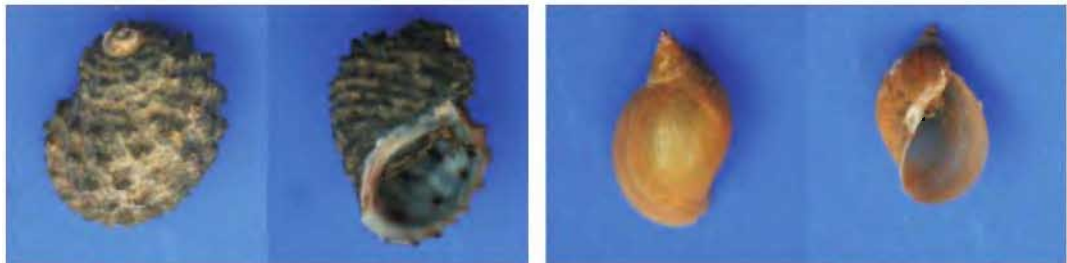














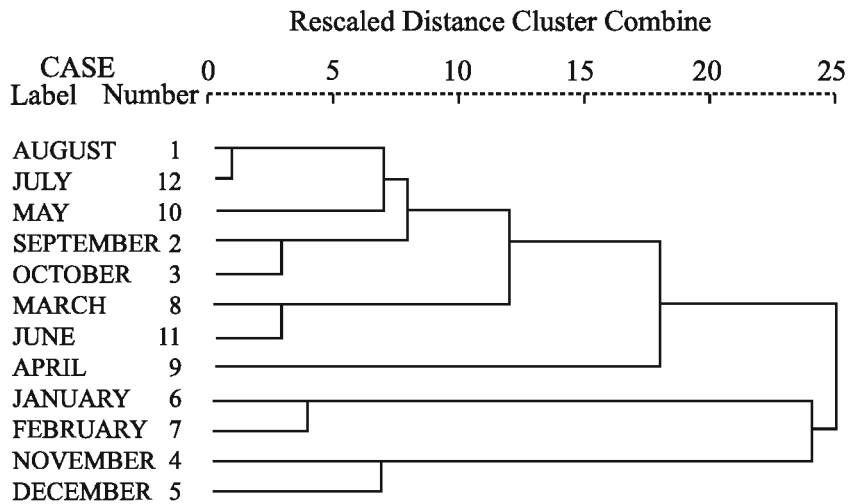


Fig. 150: Hierarchical cluster analysis of zooplankton of Deepor Beel (2008-09)

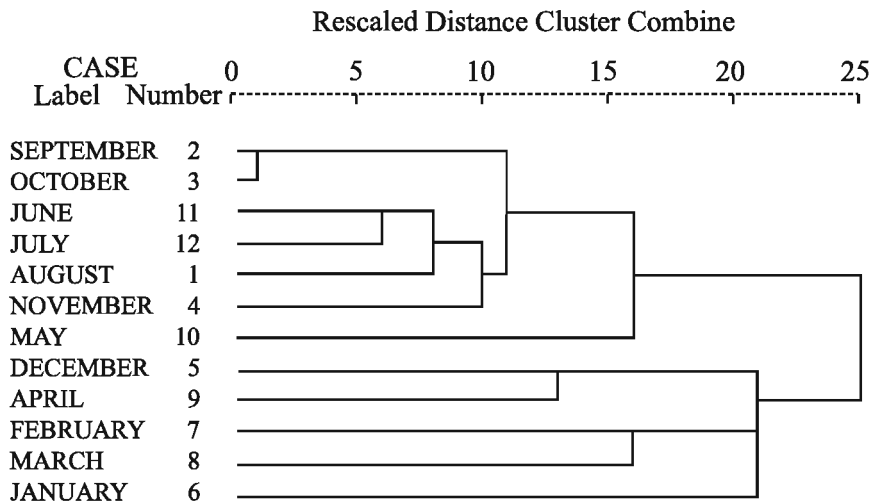


Fig. 151: Hierarchical cluster analysis of zooplankton of Deepor Beel (2009-10)

