PART A

QUALITATIVE AND QUANTITATIVE STUDIES
CHAPTER I

SYSTEMATIC ACCOUNT

OF

FRESHWATER ROTIFERA
INTRODUCTION

The Rotifers, also known as 'Rotatoria' or Wheel animalcules is a group of small pseudocoelomate animals, usually microscopic in nature. This has variously been regarded either as a class of phylum Aschelminthes or as a separate phylum. They are perhaps the commonest animals found in standing waters. In terms of density they, at times, constitute the dominant component of the zooplankton in many cases.

The rotifers occur wherever there is water, in the smallest puddles as well as in the largest lakes from the arctic to the antarctic region through the tropics. Though, a majority of them are found in freshwater, their original habitat, during the course of evolution to their present multiplicity they have also invaded and become adapted to other habitats. While some species are ubiquitous and have suited themselves to all kinds of habitats, some others are restricted to specialised niches because of their specific food requirements (Donner, 1966). Thus it is seen that every biotope has its own rotatorian community consisting of generalised and specialised forms.

The rotifers have attracted the attention from microscopists because of their widespread distribution in different kinds of waters, the great abundance of their occurrence and their intricate structure. The importance of these organisms in the aquatic food-chain is also well known.

Till now very little work has been done on freshwater rotifers from the Indian subcontinent. Most of the earlier papers from
this country represent only occasional reports or contain the
descriptions of new species or register only new records, but
efforts to present a detailed account of the rotifer fauna of any
particular region are lacking. The present study, based on the
collections made from Calcutta and its environs (some localities
in 24-Parganas district), is an effort to work out the rotifer
fauna of this region. This study though restricted to a particular
area only, may also be useful for other parts of this country
because of the possibilities of occurrence of some species in
those areas. Moreover, the systematic study of this poorly known
group of freshwater animals is essential as a primary step in
order to carry out further studies on their ecology, population
dynamics, and life history, which may be of value to hydrobiologists.

GENERAL MORPHOLOGY

The rotifers are mostly free-living microscopic animals but
some of them can also be perceived by the unaided eyes as minute
cots, rods or sacs. Very commonly, the descriptions of the Rotifers
in the literature always refer to the females which are larger and
have complex structure. The males, on the other hand, are of a
much simpler organisation and are more diminutive. While studying
the living rotifers one may be struck up by their endless profusion
and variety of forms and also by their interesting, varied habits.
Many rotifers can alter their general appearance by drawing in
certain parts of their body. In still other soft-bodied forms,
the appearance may be changed due to their various types of
movements. The appearance of these animals may also be altered
beyond recognition by their death, more particularly when they are treated with chemicals for ultimate preservation. The ability of soft forms to contract greatly, and change shape, makes the definition of their shapes rather difficult.

The rotifer body is generally of an elongated form and can be divided into a head, bearing the wheel organs, the trunk, and the foot with two toes. Variations from typical elongated forms are short and stout shapes, leading to sacciform or even spherical shapes through reduction or loss of foot. Broad types with wide flattened trunk, and long slender forms through lengthening of the foot are even markedly asymmetrical forms are also often found. Broadly speaking, body forms of the various rotifers can be plainly related to their living habits.

The body is covered with yellowish cuticle which may be thickened either in particular areas, chiefly on the trunk, or over the whole surface to form an encasement called the "lorica". Depending upon the degree of firmness of loria, the forms are termed as "loricate" or "semi-loricate" while others without loria are designated as "illloricate".

The detailed structure of a rotifer (loricate and bdelloid form) is illustrated (Plate 1) to give an idea of the generalised morphological plan. The most characteristic feature of the rotifers is the wheel organ, at the anterior end of the body, in which the metachronous beating of the cilia produces the illusion of a rotating wheel, whence the name "Rotatoria", "Rotifera" or "Wheel bearers" for these organisms. The basic type and variations in the wheel organ are illustrated in Plate 2. The wheel organ varies
from a simple ring of cilia to a complex structure. It serves both as an organ for propulsion as well as for drawing up food particles through rhythmic action of the fine cilia moving in rapid forward strokes, with a slower recovery, results in rotating whirlpool-like movements which generate centrifugal currents drawing floating food particles to the mouth, and propelling the animal forward. Ingested food material is acted upon mechanically by an apparatus called the mastax. This is a unique and very characteristic apparatus of very varied and complicated structure. The hard jaw like parts of the mastax constitute the trophi (Plate 3).

The internal structure of a rotifer is very simple and consists of an alimentary canal, a pair of excretory organs (flame bulbs) and the reproductive organ (ovo-vitellarium). The muscles are few in number and form narrow bands. Many rotifers have a posterior projection called the foot at the base of which glands are situated. Foot usually terminates in a pair of toes.

Most of these characters referred to and illustrated here are useful for the determination of various taxa at the levels, families, genera and species. The detailed study of the trophi, at times, is necessary for the correct identification of different species.
REVIEW OF LITERATURE

Following the discovery of the microscope, the rotifers were seen, described and figured by various early microscopists. A review of the literature indicates that a great deal of work regarding the systematic account of freshwater rotifers has been done in different regions of the world. Some of the references from tropical and subtropical countries, which may have some relevance to Indian studies have been included here. These include the contributions by Laday (1897b, 1907, 1910); Weber (1906); Rousselet (1910); Murray (1913), Harring (1914); Cunningham (1920); Slonimsky (1925); Bryce (1931); Ahlstrom (1932, 34); Beauchamp (1932, 39); Carlin-Nilsson (1935); Hauer (1938, 53, 56, 65), Ueno (1939); Tafall (1942); Russell (1956, 57, 58a, 58b); Herzins (1957, 59); Gillard (1957a, 57b, 59, 67); Green (1960, 67, 72a); Magis (1962, 67); Ridder (1966, 71, 77); Pourriot (1968) and Koste (1972, 74a, 74b).

From the areas adjoining Indian subcontinent, the papers relating to the rotifer fauna of Sri Lanka (Ceylon) are those of Laday (1898); Apstein (1907, 1910); Mendis & Fernando (1962), Mendis (1964, 65); Costa & De Silva (1969); Fernando (1969); Fernando & Ellepoda (1969); Chenagalath & Fernando (1973); Chenagalath et al., (1973, 1974). Murray (1906) studied the rotifers from Sikkim.

Moreover the rotifers from Tibet were worked out by Stewart (1908).

Furthermore, some other valuable contributions from different parts of the world as well as the important monographic or revisionary works are those of Jennings (1900, 1903); Harring (1913, 1916);
Herring & Myers (1922, 26); Hauer (1924, 29); Myers (1930); Ahlstrom (1940, 43); Bermins (1955, 62); Sudzuki (1964); Wulfert (1964, 65a). In addition, comprehensive works of Voigt (1957); Bartos (1959); Rudescu (1960); Kutikova (1970); Kuttner-Kolisko (1972) enable accurate diagnosis of the species. The useful general works on the rotifers are by Pennak (1953), Edmondson (1959); Lonner (1966) and Chengalath et al., (1971).

Though the studies on Indian Rotifers were initiated by Anderson in 1889, a perusal of literature indicates that earlier contributions from this subcontinent are far from sufficient to draw a clear picture of the Rotifer fauna of India. The earliest work of Anderson (1889), based on the study of the material from Calcutta and its environs (West Bengal), dealt with 47 species (including 10 new species and two uncertain species). After a period of more than four decades, Edmondson & Hutchinson (1934) examined the extensive collections made by the Yale University North India Expedition containing material from Ladakh, Kashmir valley, Punjab and also including some samples from Nilgiri Hills in south India and reported 99 species, (excluding a few doubtful species). They also gave a list of 37 valid species from the account earlier given by Anderson (loc. cit.). Since then there has been further reports from different regions of this country ranging from high altitudes to the scattered localities in plains and peninsula.

As the earlier contributions on Indian rotifers are scattered, it will be better to take regional faunistie studies into account separately. The papers of Hauer (1936b, 1937a, 1937b) dealt with
the rotifers from Madras and described some new taxa belonging to the genera Lecane, Trichocerca and Brachionus. The monographic works of Ahlstrom (1940, 1943) also included a species of genus Brachionus from Sholavaram Lake (Madras) and a new variety of Keratella from Coitacamaunc (Tamil Nadu). Further, Brehm (1951) described a new species (Brachionus donneri) from Madras. In addition, a collection of lecanic rotifers from Madras Presidency was worked out by Pasha (1961), who reported six species belonging to the genera Lecane and Monostyla.

Further additions to the rotifer fauna of this region were made as a result of paper by Naidu (1967) dealing with the material collected from two freshwater wells at Chuddapah & Chittor and also from temporary rainwater pools at Vijayawada in Andhra Pradesh. In more recent years studies on the rotifers from Andhra Pradesh carried out by Ihanapathi (1973, 1974a, 1974b, 1975a, 1975b, 1976a, 1976b) have enriched considerably our knowledge of these animals from this region. Adding to further information from the above mentioned state, Mohan & Rao (1976a, 1976b) worked on morphometric studies of the rotifer, Brachionus angularis and also observed epizoic rotifers on Odonata nymphs from Visakhapatnam. Rao & Mohan (1976) also recorded the occurrence of Asplanchna sieboldi urwensis (Sudzuki) in Indian waters based on the plankton collections from Visakhapatnam.

Other contribution from Southern region of this subcontinent is by Nayar & Nair (1969) who gave an account of brachionic rotifers from Kerala State and recorded 15 taxa (including the description of one new subspecies). Later, Nair & Nayar (1971) made a survey
of rotifer fauna of the freshwater bodies in and around Irinjalakuda (Kerala). Wycliffe & Michael (1968) described a new genus and a new species of an epizoic rotifer on Caridina sp. from Madurai (Tamil Nadu). Michael (1973) also gave a preliminary account of the various rotifers collected from Madurai and its environs.

Important contributions from central India are that of Arora (1962, 1963a, 1963b, 1965, 1966a, 1966b) which dealt with the study of plankton samples from various clean and polluted waters from Nagpur city. As a result of these investigations, he described 7 new species and 2 new varieties. Arora (1966c) also studied cyclomorphosis in three species of Brachionid rotifers.

From the neighbouring Gujarat state in western India, the only contribution is by Wullert (1966) who worked on the material collected from some reservoirs in Baroda and sent to him for identification. He recorded 87 rotifer taxa including the descriptions of 5 new species, one new variety, 3 new forms and also proposed one new combination.

Further information relating to Indian rotifers was added from the adjoining state of Rajasthan by Nayar (1964) who studied morphometric variations in the rotifer, Brachionus calyciflorus and later on (Nayar, 1965a) also studied cyclomorphosis in the above mentioned rotifer species. An account of the Indian species of the genus Keratella was given by Nayar (1965b) who also gave a key to the species recorded. In another paper, Nayar (1968) gave an account of the rotifer fauna of Rajasthan based on the material collected from 32 water bodies located in eight districts of the
state and recorded 36 species (including one new species).

From North-Western region of this country, George (1966) studied the cyclomorphosis of the rotifer, *Keratella tropica* at Delhi. The only record of male rotifer from India is that of *Cupelopogia vorax* by Vasisht & Iqbal (1967). Contributions to the rotifer fauna of this region have been made by Vasisht & Gupta (1967) from Chandigarh and Vasisht & Battish (1969, 1970, 1971a, 1971b, 1971c, 1971d) who dealt with the rotifers from Chandigarh and Patiala (Punjab). Recently Sharma (1976) gave a list of rotifers collected from some localities in Punjab, Haryana & Himachal Pradesh. In addition, Ras and Akhtar (1976) surveyed rotifers of low and high altitude Lakes of Kashmir, between 1600m - 4500m altitude and recorded new palaeoarctic genera and species from this region.

On the other hand, the information about these animals from North-Eastern India is still very meagre. Lonner (1949) described a new genus and new species from Bihar. Besides the pioneering work of Anderson (1899) from West Bengal, after a time lag of about four decades, Sewell (1935) gave an account of rotifers present in the Indian Museum tank, Calcutta during the investigations conducted between 1929-32. Brebm (1950) in his contributions to the freshwater fauna of India, also reported two species of rotifers from this state. Recently Tiwari & Sharma (1977) again surveyed the Indian Museum Tank, Calcutta and remarked on the changes in the specific composition of the rotifers after a period of four decades since this tank was last surveyed by Sewell (loc. cit.). While conducting the present investigations, based on the material
collected from Calcutta and environs, further information relating to the rotifer fauna of this region has been furnished by Sharma (1978).

**MATERIAL AND METHODS**

The material for the present study has been collected from various freshwater ponds, tanks and lakes of Calcutta and its environs (some localities in 24-Parganas district), West Bengal, for a period from 1974-1976. The collections were made by towing a conical plankton net of bolting silk (mesh no. 20) through the surface layers of different water bodies from both limnetic and littoral regions. The water weeds were also disturbed to detach the various rotifers that might be attached to them or taking shelter in them. In addition, regular fortnightly collections made from three freshwater tanks in central Calcutta were also used for this study. Most of the plankton collections were fixed in the field in 4% formalin. However, some living samples were also examined in the laboratory. The preserved plankton samples were passed through Baird and Tatlock sieve no. 50 (mesh no. 48) to isolate the copepods and cladocerans which invariably formed a source of interference in the isolation of rotifers even after fixation.

Loricate forms were best studied in the contracted state as the structure and ornamentation of lorica in these comprised an important taxonomic character. On the other hand, illoricate rotifers gave good results when killed by boiling water, followed by preservation in 4% formalin. Many illoricate forms were found
to be fully extended by employing the above method.

The lorica of different rotifers were cleared by treating the animals with a boiling solution of 10% Potassium hydroxide. The diagnosis of some species was based upon the studies of the trophi, using the method given by Myers (1937). Specimens mounted in Polyvinyl-lectophenol alcohol also proved good material for the study of the trophi. For making permanent whole mounts of the soft-bodied rotifers, the method suggested by Ir. Walter Koste (personal communication) has been used. In this, the specimens were left in distilled water and glycerine, and water was allowed to evaporate slowly and then they were mounted in glycerine-jelly and properly sealed. The other rotifers were washed in distilled water and then in 70% alcohol and afterwards mounted in Polyvinyl alcohol-lectophenol mixture. Mixing a few drops of Indian ink in the mounting medium gave good results. Permanent slides have also been made by staining the specimens in Borax carmine and then mounting them in Canada balsam or IPX.

The various rotifers described and illustrated in the present study have been identified by studying the female animals only. No males are recorded in the present study. All the diagrams, except for cross-sections, are drawn with the help of a camera lucida and the measurements are given in microns (μ).

The classification followed in this work is as proposed by Koste (in press) and is a combination of earlier systems adopted by Remane (1933), Bartos (1959) and De Beauchamp (1965). A provisional key to the recorded genera has also been incorporated. The degree of similarity between the rotifer fauna of
this region and that of other regions is compared by means of the Sorensen Index. This has been calculated according to the following equation (Sorensen, 1948).

\[ S = \frac{2c}{a+b} \times 100 \]

where \( a \) = number of species recorded in the study area; \( b \) = number of species in the other mentioned region; and \( c \) = number of species common to both regions.

Green (1972a) used the above method to compare the degree of similarity between rotifer fauna of Suia Missú Lakes, Central Brazil.

**LIST OF LOCALITIES**

(Plate 4)

Collections were made from the following localities:

1. Indian Museum Tank, Calcutta (IMT)
2. Tank opposite Lindsay Street, Calcutta (TOL)
3. Tank in maidan opposite Birla Planetarium, Calcutta (TIM)
4. Tank opposite Park Street, Calcutta (TOP)
5. Victoria Memorial Lake, Calcutta (VML)
6. Lhakuria Lake, Calcutta (IL)

* Regular fortnightly plankton collections made from January, 1975 to December, 1975.

** Regular fortnightly plankton collections made from January, 1975 to December, 1976.
7. Baranagar, Calcutta (BN)
8. Behala, Calcutta (BL)
9. Ban-Hooghly, 24-Parganas (BH)
10. Barrackpore, 24-Parganas (BRP)
11. Barisha, 24-Parganas (BR)
12. Thakurpukur, 24-Parganas (THK)
13. Amtala, 24-Parganas (AMT)
14. Shirakole, 24-Parganas (SRK)
15. Sarisha, 24-Parganas (SR)
16. Memanpur, 24-Parganas (MNP)
17. Maheshtala, 24-Parganas (MST)
18. Budge Budge, 24-Parganas (BB)
19. Achipur, 24-Parganas (APR)
20. Garia, 24-Parganas (GR)
21. Manikpur, 24-Parganas (MNK)
22. Baruipur, 24-Parganas (BPR)
SYSTEMATIC LIST
OF
ROTIFER TAXA PRESENTLY RECORDED

CLASS : ROTIFERA
Superorder : MONGONONTA Wesenberg-Lund, 1889.
Order : PLOIMILIA Ielaga, 1897.
Family : BRACHIONIDAE Hudson & Gosse, 1888.
Genus : Anuraeopsis Lauterborn, 1900.
   Anuraeopsis coelata (Le Beauchamp, 1932).
   Anuraeopsis fissa (Gosse, 1851).
Genus : Brachionus Pallas, 1776.
   Brachionus angustus Gosse, 1851.
   Brachionus bidens Anderson, 1889.
   Brachionus bidens forma adorna Wulfert, 1966.
   Brachionus budapestinensis Daday, 1885.
   Brachionus calyciflorus Pallas, 1776.
      B. calyciflorus var. dorcas (Gosse, 1851)
         (including forma spinosus Wierzejski, 1891).
      B. calyciflorus f. anuraeiformis (Brehm, 1909).
      B. calyciflorus cf. borgeri (Apstein, 1907).
   Brachionus caudatus Boris & Daday, 1894.
      B. caudatus var. perforatus Ahlstrom, 1940.
      B. caudatus var. aculeatus (Hauer, 1937).
      B. caudatus var. aculeatus forma lateralis (Hauer, 1937).
      B. caudatus forma vulgaris Ahlstrom, 1940.
   Brachionus diversicorne (Daday, 1883).
   Brachionus forficula Wierzejski, 1891.
   Brachionus forficula forma minor (Voronkov, 1913).
   Brachionus fulcatus Zacharias, 1898.
   Brachionus patulus O.F. Muller, 1786.
   Brachionus plicatilis O.F. Muller, 1786.
   Brachionus pterodinoides Rousselet, 1913.
**Brachionus quadridentatus** Hermann, 1783.

**Brachionus quadridentatus mirabilis** (Lacay, 1897).

**Brachionus quadridentatus var. cluniornbiculatis** (Skorikov, 1894).

**Brachionus rubens** Ehrenberg, 1838.

**Brachionus urceolaris** O.F. Müller, 1773.

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

- **Keratella cochlearis** Gosse, 1851.
- **Keratella leoni** Hauer, 1933.
- **Keratella procura** (Thorpe, 1891).
- **Keratella quadrata** (O.F. Müller, 1786).
- **Keratella tropica** (Apostin, 1907).

Genus: **Platyias** Harring, 1913.

- **Platyias quadrirornis** (Ehrenberg, 1832).

Family: **EUCHLANILAE** Bartos, 1959.

Genus: **Euchlania** Ehrenberg, 1832.

- **Euchlania dilatata** Ehrenberg, 1832.
- **Euchlania propha** Gosse, 1887.

Genus: **Tripleuchlania** Le Beuchamp, 1910.

- **Tripleuchlania propatula** (Gosse, 1887).

Genus: **Tripleuchlania** (Myers, 1930).

- **Tripleuchlania plicate** (Levander, 1894).

Family: **MYTILINIDAE** Bartos, 1959.

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

- **Mytilina scathophora** Hauer, 1938.
- **Mytilina ventralia** (Ehrenberg, 1832).
- **Mytilina ventralia forma longidactyla** Wulfert, 1965.

Family: **TRICHTOTRITAE** Bartos, 1959.

Genus: **Macrocheastus** Perty, 1850.

- **Macrocheastus sericus** (Thorpe, 1853).

Genus: **Trichotria** Bory de St. Vincent, 1827.

- **Trichotria retracta** (Ehrenberg, 1830).

Genus: Colurella Bory de St. Vincent, 1824.
   Colurella bicuspicata Ehrenberg, 1832.

Genus: Lepadella Bory de St. Vincent, 1826.
   Lepadella acuminata (Ehrenberg, 1834).
   Lepadella aspicora Myers, 1934.
   Lepadella aspida Harring, 1916.
   Lepadella ehrenbergii (Perty, 1850).
   Lepadella heterostyla (Murray, 1913).
   Lepadella imbricata Harring, 1916.
   Lepadella ovalis (O.F. Müller, 1786).
   Lepadella ovalis forma larga, new form.
   Lepadella patella (O.F. Müller, 1773).
   Lepadella quadrigratata (Stenroos, 1898).
   Lepadella rhomboidea (Cosse, 1886).
   Lepadella rhomboidea (Bryce, 1890).
   Lepadella triproiectus, new species.
   Lepadella triptera Ehrenberg, 1830.

Family: LECARILLIDAE Remane, 1933.

Genus: Lacana Kuntsch. 1827.

Subgenus: Lacana (Lacana) Kuntsch, 1827.
   Lacana (Lacana) aculeata (Jakubski, 1912).
   Lacana (L.) arculea Harring, 1914.
   Lacana (L.) cricida Harring, 1914.
   Lacana cricida forma bengalensis, new form.
   Lacana (L.) curvicornis (Murray, 1913).
   Lacana (L.) curvicornis var. miamensis Myers, 1941.
   Lacana (L.) flexia (Cosse, 1886).
   Lacana (L.) lateralis, new species.
   Lacana (L.) leontina (Turner, 1892).
   Lacana (L.) ludwigii (Eckstein, 1893).
   Lacana (L.) ludwigii forma brevicaudata Hauer, 1938.
   Lacana (L.) ludwigii forma lacinulata Hauer, 1938.
   Lacana (L.) ludwigii forma laticaudata Hauer, 1938.
   Lacana (L.) luna (O.F. Müller, 1776).
   Lacana (L.) luna forma dorsicalis Sharma, 1978.
Lacane (L.) nana (Murray, 1913).
Lacane (L.) ohicenesis (Herrick, 1885).
Lacane (L.) papuana (Murray, 1913).
Lacane (L.) pleoensis (Voigt, 1902).
Lacane (L.) pusilla Harring, 1914.
Lacane (L.) ungulae (Crosse, 1887).
Lacane (L.) verecunda Harring & Myers, 1926.

Subgenus: Lacane (Hemimonostra) (Bartos, 1959).
Lacane (Hm.) anopinata Harring & Myers, 1926.
Lacane (Hm.) sympoda Hauer, 1929.

Subgenus: Lacane (Monostyla) Ehrenberg, 1830.
Lacane (M.) bulla (Crosse, 1851).
Lacane (M.) closterocerca (Schmarda, 1859).
Lacane (M.) crenata (Harring, 1913).
Lacane (M.) decipiens (Murray, 1913).
Lacane (M.) furcata (Murray, 1913).
Lacane (M.) hemata (Stokes, 1896).
Lacane (M.) lunaris (Ehrenberg, 1832).
Lacane (M.) pawlowski Wulfert, 1966.
Lacane (M.) pyriformis (Laday, 1905).
Lacane (M.) sinuata (Hauer, 1938).
Lacane (M.) stenroogi (Meissner, 1908).
Lacane (M.) thalera (Harring & Myers, 1926).
Lacane (M.) quadridentata (Ehrenberg, 1832).
Lacane (M.) unguiculata (Jadeev, 1925).

Family: NOTOMMATIDAE Wesenberg-Lund, 1899.

Genus: Scaridium Ehrenberg, 1830.
Scaridium longicaudum (O.F. Müller, 1786).

Family: TRICHOCERCIDAE Harring & Myers, 1926.

Genus: Trichocerca Lamarck, 1801.
Trichocerca brasiliensis Murray, 1913.
Trichocerca ratti (C.F. Müller, 1776).
Trichocerca similis (Wierzejski, 1893).
Trichocerca tigris (Müller, 1786).
Trichocerca weberti (Jennings, 1903).
Family: Asplanchinidae Harring & Myers, 1926.

Genus: Asplanchna Gosse, 1850.
  Asplanchna brightwelli Gosse, 1850.
  Asplanchna priodonta Gosse, 1850.


Suborder: Flosculariacea Remane, 1933.

Family: Testudinellidae Harring & Myers, 1926.

Genus: Pompholyx Gosse, 1851.
  Pompholyx sulcata Hudson, 1885.

Genus: Testudinella Bory de St. Vincent, 1826.
  Testudinella patina (Hermann, 1783).


Genus: Filinia Bory de St. Vincent, 1824.
  Filinia longiseta (Ehrenberg, 1834).
  Filinia ocelliensia (Zacharias, 1898).
  Filinia pelleri Hutchinson, 1964.


  Horaella brahmi Lonner, 1949.


Order: Belloidea Remane, 1933.

Family: Philodinidae Bryce, 1910.

Genus: Rotaria Scopoli, 1777.
  Rotaria neptunia (Ehrenberg, 1832).
SYSTEMATIC ACCOUNT

CLASS: ROTIFERA


Ovary with vitellarian. Freshwater or brackish water forms. Parthenogenetic, bisexual or asexual (Edelloidea).

This subclass is comprised by two suborders in this account i.e., Monogononta and Dignonta.

Superorder: MONOGONONTA Weesenberg-Lund, 1889.

Ovary unpaired, with vitellarian. Reproduction by parthenogenesis, at times bisexual. Animals usually free swimming.

In the present collections, the bulk of rotifers is represented by monogonont forms which belong to two orders, viz., Ploimida and Gnesiastrocha.

Order: PLOIMIDA Delage, 1897.

Form variable; body loricate or illoricate. Corona of diverse types, never of Hexarthra- or Conochilus- or Collotheca-type. Foot, when present with one or two toes; mostly two, often four, foot glands present. Trophi of malleate, cudate, forcipate or incudate types. Animals creeping, free-swimming, free-living, epibionts or ectoparasites; not forming colonies.

This order is represented by nine families in the present account.

Family: Brachionidae Hudson & Gose, 1888.

Trophi malleate. Funnel shaped mouth in buccal area. Corona of Euchlanis- Brachionus- type, with lateral lamellae; head without hood. Only trunk covered with loric. Dorsal and ventral plates
of lorica closely fused at the sides, without any lateral sulcus. Foot present or absent. Eyes on the brain, brow or lacking.

In the present material this family is represented by twenty two species belonging to four genera.

Genus: *Anuraeopsis* Lauterborn, 1900.
Lorica thin and flexible, more or less cylindrical, rounded or obtusely truncated posteriorly; composed of a dorsal and a ventral plate, bounded laterally by flexible membrane.

Only two species of this genus have been recorded in the present material.

*Anuraeopsis coelata* (De Beauchamp, 1932).

(Pl. V, figs. 1 & 2)

*Anuraeopsis navicula* var. *coelata* De Beauchamp, 1932, p. 238, fig. 2.
*Anuraeopsis navicula* Green, 1960, p. 494, fig. 3a.
*Anuraeopsis navicula coelata* Wulfert, 1965b, p. 349.
*Anuraeopsis coelata* Wulfert, 1966, p. 57, fig. 1, a-d; Chengalath et al., 1973, p. 34, fig. 9.

Material: AMT, BB, BN, BPR, IMT, MNK, SR.

Characters: Lorica granulated, long and boat shaped. Anterior margin with a shallow sinus in its middle. Mental margin divided into two lobes with a depression. Dorsal plate sculptured with two longitudinal ridges, running almost parallel to one another and united at the hinder end to form a single ridge which is in turn attached with a pentagonal area at the posterior extremity of lorica. From the sides of the pentagonal area arise
small, long facets ending from the later offshoot lateral ribs, each running toward the anterior end. Closal aperture not much elongated.

This species has been recorded earlier from India by Wulfert (1966) from Baroda and by Sharma (1976) from North West India.

Measurements: Lorica length 90; maximum width 42.

Distribution: Tropics and subtropics.

*Anuracoeoptis fissia* (Gosse, 1851).

(Pl. V, figs. 3 & 4)


*Anuracoeoptis hypelasma* Gosse, 1886 (in Hudson & Gosse, Rotifera, vol. 2), p. 123, pl. 29, fig. 6.

*Anuracoeoptis hypelasma* Lauterborn, 1900, p. 441; Brauer, 1912, p. 228, fig. 458.

*Anuracoeoptis fissia* Harring, 1913, p. 12; 1914, p. 532; Hauer, 1938, p. 363-364; Lonner, 1943a, p. 29, fig. 7, a-e; Hauer, 1953, p. 162; Wulfert, 1956, p. 462, fig. 2; 1966, p. 58; Pourriot, 1968, p. 474; Vasiath & Battish, 1971c, p. 335, figs. 11-13; Chengalath et al., 1973, p. 34, fig. 10.

*Anuracoeoptis fissia fissia* Bermins, 1962, p. 35-37, figs. 1-10.

Material: APR, BH, BL, BN, BRP, MNK, MST, SR.

Characters: Lorica more or less cylindrical, obtusely pointed posteriorly; finely stippled and without any surface markings or crests. Dorsal plate arched, without any sculpture; anterior ends of dorsal plate pulled together forming a shallow sinus, with elevated sides. Ventral plate projecting a little laterally beyond the dorsal plate in the anterior region but in the middle region, the dorsal plate broader than the ventral
plate. Mental margin almost straight and with a slight depression in its middle.

Earlier recorded from India by Edmondson & Hutchinson (1934) from Punjab; Nayar (1968) from Rajasthan; Wulfert (1966) from Baroda; Nayar & Nair (1969) from Kerala; Vasishat & Gupta (1967). Vasishat & Battish (1971c) from North West India.

Measurements: Lorica length 78; maximum width 46.

Distribution: Cosmopolitan.

Genus Brachionus Pallas, 1766.

Head illoricate and retractile. Body loricate, compressed dorsoventrally. Lorica usually separated in a dorsal and a ventral plate, basal plate developed in some species. Anterior dorsal margin with four or six spines; mental margin usually rigid, with a median sinus. Posterolateral spines developed in some species, posteromedian spines also present in a few. Foot opening at the posterior end of the lorica between base of the posterior spines, if present. Foot long, wrinkled, retractile; toes two. Species very variable.

Fourteen species belonging to this genus are recorded in the material studied.

Brachionus angularis Gosse, 1851.

(Pl. V, figs. 5 & 6)

Brachionus angularis Gosse, 1851, p. 203; Harring, 1913, p. 18; Hada, 1938, p. 174; Ahlstrom, 1940, p. 154-155, pl. 5, figs. 1-13; Donner, 1954, p. 63, fig. 4, h; Koste & Wulfert, 1964, p. 485, fig. 1, a; Nayar, 1966, p. 173, figs. 4-8; Pourriot, 1968, p. 476; Vasishat & Battish, 1971a, p. 184, fig. 19; Chengalath et al., 1973, p. 35, fig. 11; Dhanapathy, 1974b, p. 366.
Material: AMT, APR, BB, BH, BN, BPR, LL, IMT, MNK, MSt, SR, SRK.

Characters: Lorica firm, moderately compressed dorsoventrally; stippled and dorsal plate with a distinct pattern of cuticular ridges. Anterior dorsal margin with two median spines, divided by a U-shaped sinus. Mental margin slightly raised and with a shallow median sinus. Foot opening large, flanked laterally by cuticular protuberances. Posterior spines wanting.

This species is widely distributed in Indian waters. So far it has been recorded by Edmondson & Hutchinson (1934) from Punjab and Kashmir; Arora (1963a) from Nagpur; Nayar (1968) from Rajasthan; Nayar & Nair (1969) from Kerala; Vasisht & Gupta (1967), Vasisht & Battish (1971a) and Sharma (1976) from North West India and Lhanapathi (1974a) from Andhra Pradesh. Also very common in the present collections.

Measurements: Total length 95–105; maximum width 75–80; anterior width 50–52.

Remarks: It is a variable species (Ahlstrom, 1940). Mohan & Rao (1976a) studied the morphometric variations in this rotifer and stated that the Indian specimens are relatively smaller in size.

Distribution: Cosmopolitan in alkaline waters.

Brachionus bidentata Anderson, 1889.

(Pl. V, figs. 7-9)

Brachionus bidentata, Anderson, 1889, p. 352, pl. 21, fig. 13; Ahlstrom, 1940, p. 167-168, pl. 13, figs. 1, 2 & 4-9; Wulfert, 1966, p. 59-60, fig. 4, a-b; Vasisht & Battish, 1971a, p. 184, figs. 20 & 21; Lhanapathi, 1974b, p. 360-361, pl. 1, fig. 1.
Brachionus furcatus Thorpe, 1891, p. 302, pl. 6, fig. 3; Rousselet, 1906, p. 393, pl. 14, figs. 1-3; De Beauchamps, 1928, p. 96, fig. 2; Edmondson & Hutchinson, 1934, p. 158.

Material: APR, BPR, MNK, SR, SRK, THK.

Characters: Lorica firm, very slightly stippled; dorsal pattern of cuticular ridges indistinct in the present specimens. Dorsal and ventral plates soldered together for about 3/4 of the length of the lorica, where they diverge and unite to third, basal plate. Anterior dorsal margin with six spines; laterals and medians longer than intermediates. Mental margin flexible, nearly straight. Posterolateral spines variable in length and position of origin. Foot opening with a symmetrically projecting sheath.

Recorded earlier from India by Anderson (1889) from Calcutta and its environs; Edmondson & Hutchinson (1934) from Kashmir; Wulfert (1966) from Baroda; Vasisht & Gupta (1967), Vasisht & Battish (1971a) and Sharma (1976) from North West India and Dhanapathi (1974b) from Andhra Pradesh.

Measurements: Total length 172-180; maximum width 100-110; anterior width 80-90.

Distribution: Cosmopolitan.

Brachionus bidentata forma adorna Wulfert, 1966.

(Pl. V, fig. 10)

Brachionus bidentata f. adorna Wulfert, 1966, p. 59-60, fig. 4, c-d.

Material: BN, SR.

Characters: A few specimens almost identical with f. adorna Wulfert 1966, are noticed but the same are much smaller than the specimens described by Wulfert (1966). Dr. W. Koste
(personal communication) also agrees with me in assigning it to the mentioned form.

**Measurements:** Total length 150; maximum width 122; anterior width 100.

**Distribution:** India.

*Brachionus budapestinensis* Daday, 1885.

(Pl. V, fig. 11)

*Brachionus budapestinensis* Daday, 1885, p. 131, 211, pl. 11, figs. 1-4, 8, 10; Harring, 1914, p. 529; Ahlstrom, 1940, p. 152-53.

pl. 4, figs. 6-9; Vasishth & Battish, 1971a, p. 187-188, figs. 28 & 29; Changelath et al., 1973, p. 35-36, figs. 12-15;

Pejler, 1974, p. 391, fig. 9; Koste, 1976, p. 204, pl. 2, fig. 2, a-c.

**Material:** BH, BH, GR, MNK, TOL.

**Characters:** Lorica firm, oval; with an ornamentation of cuticular ridges on dorsal and ventral plates and a dense covering of minute tubercles. Anterior dorsal margin with four spines; medians longer than laterals, their distal ends curving ventrally and outer pair of spines not quite lateral. Mental margin almost straight, with a small median notch. Foot opening small, V-shaped dorsally and a longer oval aperture ventrally.

Reported earlier from India only by Vasishth & Battish (1971a) and Sharma (1976) from North West India. However, Arora (1963a) reported var. punctatus from Nagpur.

**Measurements:** Total length 122; maximum width 82; anterolateral spines 18, median spines 30.

**Distribution:** Sub-tropicopolitan, in alkaline waters.
Brachionus calyciflorus Pallas, 1766.

Brachionus calyciflorus Pallas, 1966, p. 93.

Lorica oval, flexible, slightly compressed dorsoventrally, not separable into a dorsal and a ventral plate. Anterior dorsal margin with four broad based spines of variable length, medians longer than laterals. Mental margin with a shallow U-shaped unflanked notch. Posterior spines present or absent. Posterolateral spines commonly absent, spines flanking foot present though may be slightly developed. Lorica smooth or slightly stippled.

This species is cosmopolitan in alkaline waters and is extremely variable in its size, length of occipital spines and the presence and length of posterior spines. In the material this species is represented by the following forms and varieties.

Brachionus calyciflorus var. dorcas (Gosse, 1851).

(Pl. V, fig. 12)

Brachionus dorcas Gosse, 1851, p. 202; 1859, p. 318, pl. 15, figs. 17-19; Hudson & Gosse, 1889, p. 118, pl. 28, fig. 4.

Brachionus dorcas var. spinosus Wierzejski, 1891, p. 52, fig. 4.

Brachionus calyciflorus f. dorcas Ahlstrom, 1940, p. 179, pl. 3, fig. 5.

Brachionus calyciflorus var. dorcas Arora, 1966a, p. 3-4; text fig. 1 a, text fig. 1 b; Thanapathi, 1974b, p. 365-366, pl. 2, fig. 5.

Material: AMT, BB, BN, BL, BN, BPR, IMT, SR, SRK, TOL.

Characters: Characterised by long anterior median spines, about twice the length of anterolateral spines. Posterolateral spines usually absent, also present in some specimens.
This variety is commonly present in the material studied. It has been recorded earlier from India by Arora (1966a) from Nagpur; Ihanapathi (1974b) from Andhra Pradesh; Sewell (1935) and Tiwari & Sharma (1977) from West Bengal.

**Measurements:** Total length 400-460; maximum width 250-280; anterolateral spines 52-60; anteromedian spines 95-120.


*(Pl. V, fig. 13)*

Brachionus *pale* anuraeiformis* Brehm, 1909*, p. 210, fig. 200.

Brachionus *calyciflorus* Ahlstrom, 1940, p. 150-152, pl. 3, fig. 3.

Brachionus *calyciflorus* f. *anuraeiformis* Arora, 1966a, p. 4 & 5, text fig. 10.

**Material:** APR, DMT, MNK.

**Characters:** Anterior spines of almost equal length. Median spines broader at their bases. Posterolateral spines present. This form has been reported early from this country only by Arora (1966a) from Nagpur.

**Measurements:** Total length 290; maximum width 155; anterior spines 50-60; posterolateral spines 40.


*(Pl. V, figs. 14 & 15)*

Brachionus *calyciflorus* *borgei* Aposteen, 1907, p. 211, figs. 14, 15.

Brachionus *calyciflorus* f. *borgei* Ahlstrom, 1940, p. 170, pl. 20, figs. 7 & 8.

**Material:** AMT, APR, TOL.

**Characters:** Anterior median spines having saw like tooth base. Posterolateral spines present or absent.

This form represents a new record from this country.
Measurements: Total length 300; maximum width 175; anterior spines 50-70; posterolateral spines 26.

Remarks: Dhanapathi (1974b) described var. hymani from Andhra Pradesh. The same is very much identical with f. borgerti. In the present material also, some similar specimens are present but I prefer to assign the same to f. borgerti (Apostel, 1907) rather than to var. hymani Dhanapathi (1974b).

Brachionus caudatus Boris & Leday, 1894.

Brachionus caudatus Boris and Daday, 1894, p. 232, pl. VII, figs. 9, 10, 13.

Lorica usually stippled and with a dorsal pattern of cuticular ridges. Anterior dorsal margin with two median spines separated by a U-shaped sinus, lateral spines developed in some forms and intermediates rarely developed. Mental margin rigid, sometimes undulating and with a shallow median sinus. Foot opening between two posterior spines, dorsal plate overhanging foot opening with a V-shaped extension of lorica.

Apparently cosmopolitan species. This species is represented by two varieties and two forms in the present material.

Brachionus caudatus var. personatus Ahlstrom, 1940.

(Pl. V, fig. 16)

Brachionus hayensis var. ahlstromi Lindeman, 1939, p. 213, pl. I, fig. 9.

Brachionus caudatus var. personatus Ahlstrom, 1940, p. 158, pl. 7, figs. 1, 2 & 5-7.

Material: BK, BN, BRP, GF.

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

This variety has been recorded earlier from India by Vasisht & Battish (1971a) from North West India.

Measurements: Total length 190; maximum width 102; anterior width 65; anterior spines 18-2-13; posterior spines 62.

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

*(Pl. V, fig. 17)*

*Brachionus angularis* var. *aculeatus* Hauer, 1937b, p. 18, fig. 1a.
*Brachionus caudatus* var. *aculeatus* Ahlstrom, 1940, p. 159, pl. 7, figs. 9 & 11; Nayyar, 1968, p. 172, figs. 2 & 3.
*Brachionus aculeatus* Arora, 1963a, p. 114-115, text fig. 1.

Material: AMT, BB, IMT, TIM, THK, TOL.

Characters: Lorica heavily stippled, compressed moderately. Anterior dorsal margin with six spines of which the laterals and medians about equally developed, intermediates rudimentary. Posterior spines bent ventrally, each bearing a dorsally extended spur-like process on its inner side.

Recorded earlier from India by Arora (1963a) from Nagpur; Nayyar (1968) from Rajasthan; Vasisht & Battish (1971a) from North West India.

Measurements: Total length 128; maximum width 78; anterior width 64; anterior spines 10-2-8; posterior spines 20.
Brachionus caudatus var. aculeatus f. lateralis
(Hauer, 1937).
(Pl. V, fig. 18)

Brachionus angulare var. aculeatus f. lateralis Hauer, 1937b, p. 19, fig. 19.
Brachionus caudatus var. aculeatus Ahlstrom, 1940, p. 159, pl. figs. 10 & 12; Nayar, 1968, p. 172, figs. 2 & 3.
Brachionus aculeatus f. lateralis Arora, 1963, p. 116, text fig. 2.

Material: APR, IMT, MNK, MNP, MST, TOL.
Characters: Identical with var. aculeatus except that the lorida is having two lateral prominences on its postero-lateral margins.

It has been reported earlier only by Arora (1963a) from Nagpur.

Measurements: Total length 143; maximum width 100; anterior width 75; anterior spines 12-2-10; posterior spines 32.

Remarks: As noted by Ahlstrom (1940), in the present collections also the specimens are larger than specimens of var. aculeatus.

Brachionus caudatus f. vulgatus Ahlstrom, 1940.
(Pl. V, fig. 19)

Brachionus caudatus f. vulgatus Ahlstrom, 1940, p. 156-157, pl. 6, figs. 6, 8-11.

Material: APR, BPR, GR, SR.
Characters: Occipital margin with only two median spines. Posterior spines relatively short and arising at an angle ventrally. Pattern of lorida somewhat distinct.
Reported earlier from India only by Vasisht & Battish (1971a) from North West India.

**Measurements:** Total length 170; maximum width 100; anterior width 74; posterior spines 50.

*Brachionus diversicornis* (Daday, 1883) (Pl. VI, fig. 1)

*Schisocerca diversicornis* Day, 1883, p. 291; 1885, p. 132, pl. 11, figs. 5-7; Ueno, 1936, p. 522; Hada, 1938, p. 175, pl. 3, fig. 3, a-b; Hauer, 1938, fig. 9.

*Brachionus diversicornis* Ahlstrom, 1940, p. 161, pl. 9, fig. 7; Pourriot, 1968, p. 479; Vasisht & Battish, 1971a, p. 184-185, fig. 22; Ihanapathi, 1974b, p. 366, pl. 3, fig. 2.

**Material:** AMT, BB, BL, BN, BPR, BRP, SR.

**Characters:** Lorica firm, almost smooth; compressed dorsoventrally. Dorsoal margin with four spines; medians short and laterals much longer. Mental margin rigid, with a shallow median sinus. Lorica narrowed posteriorly into two unequal diverging spines, the right spine usually long. Foot opening situated between the bases of posterior spines; a rounded tongue-like projection of dorsal plate hanging over the foot opening. Toes elongated, each terminating into two soft fleshy points.

Earlier reports from India are by Vasisht & Battish (1971a) and Sharma (1976) from North West India and Ihanapathi (1974b) from Andhra Pradesh.

**Measurements:** Total length 350-365; maximum width 120-130; anterolateral spines 80-85; right posterior spine 75-86; left posterior spine 25-40.
Distribution: Asia, Africa, Europe.

**Brachionus forficula** Wierzejski, 1891.

**Brachionus forficula** Wierzejski, 1891, p. 51, fig. 3; Laday 1903, p. 150, pl. 1, figs. 8, 10, 11; Ahlstrom, 1940, p. 162-163, pl. 7, fig. 5, pl. 20, figs. 6 & 8; Wulfert, 1966, p. 61-62, fig. 6, e-by Chengalath et al., 1973, p. 37, pl. 5, fig. 27; Thanapathi, 1974b, p. 364, pl. 3, fig. 3.

**Brachionus forficula** f. **typica** Fadeev, 1925b, p. 286, fig. 1, 2.

**Brachionus forficula** f. **laticornis** Pourriot, 1968, p. 479-480, fig. 4.

**Material:** AMT, BB, BL, BRP, MTS, SR, SRK.

**Characters:** Lorica finely stippled and moderately compressed dorsoventrally. Anterior dorsal margin with four occipital spines, laterals longer than medians. Posterior spines stout, unequal, widely separated at their bases, bending inwards and tapering to blunt points. Knee like swellings present on the inner sides of the posterior spines near their bases.

This species has been recorded from this country by Wulfert (1966) from Baroda; Vasisht & Battish (1971 a) from North West India; and Thanapathi (1974 b) from Andhra Pradesh.

**Measurements:** Total length 260; maximum width 128; anterolateral spines 90-120.

**Remarks:** This is a quite variable species (Ahlstrom, 1940). The present specimens are identical with f. **typica** described by Fadeev (1925 b) and the length of the anterolateral spines also seems to be variable. Pourriot (1968) described an identical form **laticornis**. But I agree with Dr. Walter Koste (Personal
Brachionus forficula f. minor (Voronkov, 1913)
(Pl. VI, fig. 3)

Brachionus forficula var. minor Voronkov, 1913, p. 103.
Brachionus forficula f. minor Fadeev, 1925 b, p. 288, fig. A, 8-9; Hada, 1938, p. 174, fig. 2, b.

Material: MNK, SR.

Characters: Specimens very small. Lorica finely stippled. Posterior spines of almost equal length, strongly shortened, with comparatively less distance between their bases. No knob like swelling on the inner sides of the posterior spines. Ratio of length of posterior spines to total body length less than half.

This form is being reported for the first time from this country.

Measurements: Total length 150; maximum width 78; posterior spines 49.

Brachionus fulcatus Zacharias, 1898.
(Pl. VI, fig. 4)

Brachionus fulcatus Zacharias, 1898, p. 133, pl. 4, fig. 4; Harring, 1913, p. 21; 1914, p. 530; Hauer, 1938, p. 368, fig. 14; Ahlstrom, 1940, p. 164, pl. 10, figs. 1-3; Hauer, 1963, p. 174; Hulbert, 1966, p. 61; Vasishth & Battish, 1971 a, p. 185-186, figs. 23 & 24; Chengalath et al., 1973, p. 37, figs. 24-26; Ehanapathi, 1974 b, p. 360-361, pl. 1, fig. 3.

Material: AMT, APR, BL, BN, BPR, BRP, DL, VML, TOL.
Characters: Lorica firm, compressed dorso-ventrally. Anterior margin with six spines; intermediates curving ventrally, much longer than others, laterals and medians short and of almost equal length. Mental margin rigid, at times with a slight median sinus. Posterior spines long, incurved and widely separated at their bases. Foot opening situated between the bases of posterior spines.

This rotifer has been so far reported from this country by Arora (1963a) from Nagpur; Wuliert (1966) from Baroda; Nayar (1968) from Rajasthan; Nayar & Hair (1969) from Kerala; Vasisht & Battish (1971a) and Sharma (1976) from North West India and Dhanapathi (1974b) from Andhra Pradesh.

Measurements: Total length 356; maximum width 140; anterior width 100; anterior spines 19-80-20; posterior spines 170.

Distribution: Cosmopolitan.

Brachionus patulus O.F. Müller, 1786.

(Pl. VI, fig. 5)

Brachionus patulus Müller, 1786, p. 361, pl. 47, figs. 14 & 15; Wuliert, 1965a, p. 50-58, figs. 7-12; Chengalath et al., 1973, p. 41, figs. 42 & 43; Pajler, 1974, p. 391.

Brachionus militaris Ehrenberg, 1834, p. 199; Cohn, 1856, p. 473, pl. 24, figs. 13-16.

Platypus patulus Ahlstrom, 1940, p. 175-176, pl. 19, figs. 1-4.

Material: BH, BL, BN, DMT, MNP, MNK, TCL, TOP, VML.

Characters: Lorica subrectangular, compressed ventrolaterally. Both anterior dorsal and ventral margins with
spines. Ten anterior spines; occipital medians longest and curving ventrally; pectoral medians shortest and straight; intermediates and laterals of almost equal length. Median sinus between pectoral medians broad. Two short, stout posterior spines present. Foot opening bounded by two short spines. Lorica with simple pattern of cuticular plates on the dorsal plate. Lateral antennae on the inner edge of the posterolateral spines at their bases.

This species is widely distributed in India and recorded so far by Edmondson & Hutchinson (1934) from Kashmir and Nilgiri Hills; Arora (1963a) from Nagpur; Wulfert (1966) from Baroda; Nayar (1968) from Rajasthan; Nayar & Nair (1969) from Kerala; Vasisht & Gupta (1967); Vasisht & Battish (1971 a) and Sharma (1976) from North West India; Ihanapathi (1974 b) from Andhra Pradesh; Sewell (1935) and Tiwari & Sharma (1977) from West Bengal.

Measurements: Total length 240-260; maximum width 160-175.

Distribution: Cosmopolitan.

Brachionus plicatilis O.F. Müller, 1786.

(Pl. VI, figs. 6 & 7)

Brachionus plicatilis Müller, 1786, p. 344, pl. 50, figs. 1-8; Hada, 1938, p. 174; Ahlstrom, 1940, p. 149-150, pl. 2, figs. 1-9; Yamamoto, 1960, p. 389, fig. 5; Hauer, 1963, p. 174-175; Nayar, 1968, p. 174; Vasisht & Battish, 1971 a, p. 188; figs. 30 & 31.

Material: APR, BH, THK.

Characters: Lorica smooth, flexible, oval in
outline and dorsoventrally compressed; not separated into a dorsal and a ventral plate. Anterior dorsal margin with six, broad-based, acutely pointed and saw toothed spines almost equal in length. Mental margin rigid and separated into four lobes. Posterior spines lacking. Foot opening — a small subsquare aperture on the dorsal side and longer V-shaped aperture ventrally.

This species has been recorded from India by Edmondson & Hutchinson (1934) from Ladakh; Newar (1968) from Rajasthan; Vasiht & Battish (1971 a) and Sharma (1976) from North West India.

Measurements: Total length 178; maximum width 135; anterior width 75.

Distribution: Cosmopolitan in brackish waters.

Brachionus pterodinoides Rousselot, 1913.
(Pl. VI, figs. 8 & 9)

Character: Lorica fine, finely stippled, oval, much compressed dorsoventrally. Anterior dorsal margin with six spines of almost equal length, laterals usually shorter. Mental margin almost straight and having a lateral sinus on each side. Foot opening pear shaped, situated just below the centre of ventral plate. Foot sheath weakly developed.

This species is being reported for the first time from India.

Measurements: Total length 266; maximum width
Remarks: The anterior end of the present specimens is wider than those described by Ahlstrom (1940).

Distribution: America, Argentina.

Brachionus quadridentatus Hermann, 1783.

(Pl. VI, figs. 10 & 11)

Brachionus quadridentatus Hermann, 1783, p. 47, pl. 2, fig. 9; Ahlstrom, 1940; p. 165, pl. 11, fig. 9, pl. 12, figs. 1-3; Wulfert, 1956, p. 463, fig. 3f; 1965 b, p. 350; Pourriot, 1968, p. 480; Chellalath et al., 1973, p. 40, figs. 33 & 34; Fejiler, 1974, p. 391, fig. 2.

Material: APR, AMT, BN, IL, TOL, VML.

Characters: Lorica stippled, compressed dorso-ventrally. Anterior dorsal margin with six spines; medians longest, curving ventrally outward and laterals longer than intermediates. Mental margin rigid, with a shallow notch flanked on either side by a tooth-like papilla. Posterolateral spines well developed. Ventroposterior spines of lorica prolonged to form a foot sheath around the base of retractile foot.

Widely distributed in this country and reported earlier by Anderson (1889) and Sewell (1935) from Calcutta; Arora (1963a) from Nagpur; Nayar (1968) from Rajasthan; Nayar & Nair (1969) from Kerala; Vasisht & Gupta (1967), Vasisht & Battish (1971 a) and Sharma (1976) from North West India; Naidu (1969) and Dhanapathi (1974 b) from Andhra Pradesh.

Measurements: Total length 240; maximum width 172; anterior spines 18–20–22; posterior spines 60.
**Distribution:** Cosmopolitan.

**Brachionus quadridentatus mirabilis** (Ladey, 1897)

(Pl. VI, figs. 12 & 13)

**Brachionus mirabilis** Ladey, 1897 a, p. 140, fig. 8; 1901, p. 24, fig. 7; Harring, 1914, p. 531; Ahlstrom, 1940, p. 167, pl. 11, figs. 5-8; Gillard, 1948, p. 210.

**Brachionus quadridentatus mirabilis** Koste, 1972, p. 370, pl. 8, figs. a-d; 1974 b, p. 51; pl. 2, fig. 1, a-e.

**Material:** APR, BB.

**Characters:** Lorica firm, stippled, somewhat compressed dorsoventrally. Anterior dorsal margin with six spines; medians longest and curving outward, laterals also curving outwards and longer than intermediates. Dorsal plate terminating posteriorly into two long, thin lateral spines. Ventral plate narrowing posteriorly and terminating into two long spines extending backwards from lorica at an angle of 45°. Foot opening situated between the base of the ventral spines and surrounded by a sheath.

This rotifer represents a new record from this subcontinent.

**Measurements:** Total length 250; width of lorica 120; anterior spines 25-18-30; posterodorsal spines 120; posteroventral spines 70.

**Remarks:** Differs from *B. quadridentatus* Hermann, 1783, chiefly in the long posterior ventral spines.

**Distribution:** Tropics.
**Brachionus quadridentatus** var. *cluniorbicularis*  
(Skorikov, 1894)  
(Pl. VI, fig. 14)

**Brachionus cluniorbicularis** Skorikov, 1894, pl. 8, fig. 24.  
**Brachionus quadridentatus** f. *cluniorbicularis* Ahlstrom, 1940, p. 179, pl. 12, fig. 24.  
**Brachionus quadridentatus** var. *cluniorbicularis* Hauer, 1963, p. 176-177, fig. 8; Koste, 1976, p. 236, pl. 3, fig. 1, d.

**Material:** MNK, SR, THK, VML.  
**Characters:** Characterised by the absence of posterolateral spines, posterior corners rounded.  
This variety has been recorded earlier from India only by Edmondson & Hutchinson (1934) from Ladakh.  
**Measurements:** Total length 204; maximum width 184; anterior width 135; anterior spines 20-14-28.

**Brachionus rubens** Ehrenberg, 1838.  
(Pl. VII, figs. 1 & 2)

**Brachionus rubens** Ehrenberg, 1838, p. 513, pl. 63, fig. 4;  
Rousselot, 1907, p. 151, pl. 12, figs. 9 & 10; Ahlstrom, 1940, p. 170-171, pl. 15, figs. 1-9; Donner, 1954, p. 63-64, fig. 4, d-g; Hauer, 1963, p. 177, fig. 9; Nayar, 1968, p. 170, fig. 1; Vasisht & Battish, 1971 a, p. 102, figs. 12 & 13; Chengalath et al., 1973, p. 40, fig. 35.  
**Material:** AMT, BH, BL, BN, INT, MNK, SRK, THK, TOL.  
**Characters:** Lorica firm, oval and slightly compressed dorsoventrally. Anterior dorsal margin with six
spines; medians and intermediates having a peculiar shape, each showing a narrow anterior part then rounded outwards and forming a broad base; medians somewhat longer than other spines. Four inner spines of dorsal margin with a short strengthening ridge. Foot opening subsquare; rather small dorsally and truncate-ovate to V-shaped ventrally.

Recorded earlier from India by Nayar (1968) from Rajasthan; Vasisht & Battish (1971 a) and Sharma (1976) from North West India; Sewell (1935) and Tiwari & Sharma (1977) from West Bengal. Common in the present collections.

Measurements: Total length 185; maximum width 130; anterior spines 15-14-21.

Distribution: Cosmopolitan

*Brachionus urceolaris* O.F. Müller, 1773.

*Brachionus urceolaris* Müller, 1773, p. 131; Cohn, 1856, p. 459, pl. 14, figs. 1-12; Weber, 1898, p. 674, pl. 23, figs. 18-20; Ahlstrom, 1940, p. 171, pl. 16, figs. 1-11; Arora, 1963 a, p. 119, fig. 8; Hauer, 1963, p. 177, fig. 10; Wulfert, 1966, p. 486, fig. 6; Chengalath et al., 1973, p. 41, fig. 41.

Material: APR, BB, GR.

Characters: Lorica firm, almost oval and moderately compressed dorsoventrally. Anterior dorsal margin with six spines; medians longest, laterals and intermediates about equal in length. Mental margin rigid, undulating, slightly elevated towards the centre and with a central sinus. Foot
opening rectangular to subsquare in the dorsal plate and a oval aperture ventrally. Lorica nearly smooth and four inner spines of the dorsal margin having short strengthening ridges and two strengthening ridges arising from papilla like processes on either side of central sinus on mental margin.

It has been recorded earlier from this country by Arora (1963 a) from Nagpur and by Sharma (1976) from North West India.

**Measurements:** Total length 152; maximum width 128; anterior width 100; anterior spines 10-11-22.

**Distribution:** Cosmopolitan.

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

Brachionid rotifer with loricate body, divided into a dorsal and a ventral plate and more or less compressed dorso-ventrally. Anterior dorsal margin with four or six spines. Mental margin rigid, with a median sinus. Posterior spines often present, one or two; single posterior spine being usually median. Dorsal plate with a sculptured pattern. Head retractile and illoricate.

Only four species belonging to this genus are present in my material.

*Keratella cochlearis* (Gosse, 1851).

(Pl. VII, figs. 5 & 6)

*Anuraea cochlearis* Gosse, 1851, p. 202; Lauterborn, 1898, p. 598, fig. 2; 1900, p. 421, pl. 10, figs. 2-4, text figs. 1 & 2; Weber, 1898, p. 709, pl. 25, fig. 8.

*Keratella cochlearis* Edmondson & Hutchinson, 1934, p. 159;

Material: TJM.

Characters: Lorica oval in outline, with greatest width slightly behind the middle; terminating in a short stout median spine of variable length. Anterior dorsal margin with six spines; medians longest and curving ventrally, intermediates usually slightly divergent and somewhat shorter than lateral spines. Ventral plate postulated on the upper third only, dorsal plate often pulsulate. Pattern of dorsum characterised by a median line extending longitudinally from behind the median frontal area to the base of the posterior spine; two enclosed median plaques arranged on either side of median line with two pairs of enclosed lateral polygons to the sides of the anterolateral polygons; a third pair present to the sides of the posterolateral plaques.

Recorded earlier from this subcontinent by Edmondson & Hutchinson (1934) from Kashmir and Ladakh; Brehm (1950) from West Bengal; Arora (1966c) from Nagpur and Ehanapethi (1974b) from Andhra Pradesh.

Measurement: Total length 130; maximum width 46; anterior width 46; anterior spines 15-10-20; posterior spine 30.

Distribution: Cosmopolitan.

Keratella lensi Hauer, 1953.

(Pt. VII, fig.7)

Keratella valga f. aspina Edmondson & Hutchinson, 1934, p. 171, fig. 4 A.
Keratella valga f. brehmi Ahlstrom, 1943, p. 452, pl. 39,
figs. 9-11.
Karatella lens Hauer, 1953, p. 167-168, fig. 9; Bierzins, 1955, p. 555-556, fics. 7-10; Pourriot, 1968, p. 483-484, fig. 5; Chengalath et al., 1973, p. 42, figs. 49-51.

**Material:** SRK.

**Characters:** Lorica slender, rounded at the posterior end; without any posterior spine. Dorsal occipital margin with six spines; middle spines longest, sickle shaped. Dorsal plate moderately arched, slightly sloping and finely granulated. Dorsum of lorica with strongly marked pattern; with three median plaques, the ultimate plaque much elongated and its arms running towards hinder end into a divergent crest. Mental margin with a median sinus.

This species comprises a new record from this country.

**Measurements:** Length of lorica 145; maximum width 62; anterior width 54; anterior spines 22-30.

**Distribution:** Tropics and Subtropics.

**Karatella procura** (Thorpe, 1891).

(Pl. VII, fig. 8)

Anurea procura Thorpe, 1891, p. 305, pl. 17, fig. 7.

Karatella valga f. valga Edmondson & Hutchinson, 1934, fig. 4 B.

Karatella valga var. procura Ahlstrom, 1943, p. 452, pl. 39, fig. 8; Russell, 1949, p. 353.

Karatella procura Bierzins, 1953, p. 7, fig. 6; 1955, p. 555, fig. 6; Hauer, 1963, p. 185, fig. 18; Nayar, 1965 b, p. 459, fig. 2; Vasisht & Battish, 1971 c, p. 231, figs. 9 & 10.

**Material:** BH, BN, MNK, SR.

**Characters:** Anterior dorsal margin with six...
spines; medians longest and curved ventrally. Dorsal plate of loria with three median plaques; posteromedian plaque pentagonal and terminating in a short median line extending up to posterior margin of loria. Posterior margin of loria slightly narrow than the occipital margin. Posterior spines small and subequal, right spine slightly longer than the left.

It has been recorded so far from India by Edmondson & Hutchinson (1934) from Punjab; Nayar (1965 b) from Rajasthan; Nayar & Nair (1969) from Kerala; Vasisht & Battish (1971 c) and Sharma (1976) from North West India.

Measurements: Total length 135; length of loria 62; maximum width 60; anterior width 53; anterior spines 15-12-25; right posterior spine 22; left posterior spine 18.

Distribution: Tropics and Subtropics.

*Keratella quadrata*(D.F. Müller, 1786).

(Pl. VII, fig. 9)

*Bacchionus quadrata* Müller, 1786, p. 354, pl. XLIX, figs. 12-17.

*Anurea quadrata* Ehrenberg, 1832, p. 145; 1838, p. 508, pl. LXII, fig. 14; Hudson & Cosse, 1886, p. 123, pl. 29; Hartmann, 1918, p. 220-225, figs. 16-64.


Material: SR, GR.

Characters: Dorsal plate of loria postulated; three median plaques behind anterior median area, anterior median plaque hexagonal, posterior plaques usually not closed posteriorly.
Anterior occipital margin with six spines; medians longer, stout and curved ventrally, laterals usually longer than intermediates and slightly divergent. Posterior spines long, subequal, widely separated at their bases, usually divergent or bowed.

Earlier this species has been reported only from Kashmir, Ladakh and Nilgiri Hills (Edmondson & Hutchinson, 1934).

Measurements: Total length 198; maximum width 82; anterior width 78; anterior spines 22-17-35; posterior spines 62.

Distribution: Cosmopolitan, in alkaline waters.

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

*(Pl. VII, fig.10)*

*Anurea valga* f. *tropic*a Apstein, 1907, p. 210, fig. F.

*Anurea aculeata* var. *tropica* Tschugunoff, 1921, figs. 13 & 14.

*Keratella quadrata* Spandl, 1926, fig. 4.

*Keratella valga* f. *tropica* Edmondson & Hutchinson, 1934, p. 170, fig. 4, C-E; Hauer, 1938, p. 382, fig. 30 a; Ahlstrom, 1943, p. 451-452; Wulffert, 1966, p. 67, fig. 12, a-f.

*Keratella quadrata* f. *brehmi* Ahlstrom, 1943, p. 39, fig. 11.

*Keratella tropica* Hersins, 1955, p. 554-555, figs. 2 & 3; Nayar, 1965 b, p. 457-458, fig. 1; 1966, p. 175; Arora, 1966 c, p. 484-486, fig. 2; Chengalath et al., 1973, p. 43, figs. 53-55; Dhanapathi, 1974 b, p. 366-367, pl. 3, figs. 4 & 5; Pejler, 1974, p. 394, fig. 19.

Material: AMT, APR, BL, BFR, DMT, MST, SR, SRK, TOL.

Characters: Lorica heavily postulated. Lorical plate with three median hexagonal plaques and a plaque between the posterior margin of lorica and the last median hexagonal plaque.
Anterior dorsal margin with six spines, medians curving ventrally and longer than the others. Mental margin with a shallow notch. Posterior spines unequal, divergent and of variable length; right spine generally longer than the left spine which may be wanting sometimes.

The rotifer is widely distributed in India and has been recorded earlier by Edmondson & Hutchinson (1934) from Kashmir, Punjab and Nilgiris; Arora (1966 c) from Nagpur; Wulfert (1966) from Baroda; Nayar & Nair (1969) from Kerala; Vasisht & Gupta (1967), Vasisht & Battish (1971 c) and Sharma (1976) from North West India; Ihanapathi (1974 b) from Andhra Pradesh; Sewell (1935) and Tiwari & Sharma (1977) from Calcutta (West Bengal).

Measurements: Total length 106-115; maximum width 70-78; anterior width 64-73; right posterior spine 30-44; left posterior spine 104-126.

Distribution: Tropics & Subtropics.

Genus: Platyste Harring, 1913.

Head illoricate, retractile. Body loricate, somewhat compressed dorsoventrally, lorica separable in a dorsal and a ventral plate. Anterior margin with several spines, medians always developed and longest. Mental margin variable. Posterior spines well developed. Foot opening in ventral plate. Foot jointed, retractile; toes two.

Only one species belonging to this genus is present in my material.
Platvias quadricornis (Shrenberg, 1832).

(Pl. VII, fig. 11)

*Noteus quadricornis* Ehrenberg, 1832, p. 143, pl. 4, fig. 5.
*Platvias quadricornis* Harring, 1913, p. 84; Ahlstrom, 1940, p. 174-175, pl. 8, figs. 6-9; Hauer, 1963, p. 189-190; Changalath et al., 1973, p. 43, fig. 56; Ihanapathi, 1974 b, p. 368, pl. 4, fig. 1.

**Material:** APR, BB, BN, IMT, MNP, SR.

**Characters:** Lorica almost circular in outline, moderately compressed dorsoventrally. Anterior dorsal margin with two stout median spines, bluntly rounded to nearly truncate at tips and bending somewhat ventrally. Mental margin serrate, rigid and depressed towards the centre. Lorica terminating posteriorly into two short and parallel spines. Foot opening in the ventral plate about 1/4 the length of lorica from the posterior margin. Lorica tuberculate, with a pattern of three central polygons surrounded by marginal areas.

Recorded previously from India by Edmondson & Hutchinson (1934) from Kashmir and Ladakh; Nayar & Nair (1969) from Kerala; Vasishth & Battish (1971 c) and Sharma (1976) from North West India and Ihanapathi (1974 b) from Andhra Pradesh; Tiwari & Sharma (1977) from Calcutta (West Bengal).

**Measurements:** Total length 235; maximum width 165; median spines 40; posterior spines 50.

**Distribution:** Cosmopolitan.

**Family:** Euchlanidae Bartos, 1959.

Trophi malleate. Lorsal and ventral plates of lorica
bounded with a thin membrane. Lateral sulci deep, often connected with a stiff flange of cuticle laterally.

In this material, this family is represented by three genera i.e., Euchlanis, Tripleuchlanis and Tripleuchlanis.

Genus: Euchlanis Shrenberg, 1832.

Loricate rotifer, head retractile; lorica composed of a dorsal and a ventral plate, bounded laterally by a thin membrane. Dorsal plate large, ventral plate small. No spine present. Foot with two strong toes, carrying setae. Mastax modified malleate.

In this material, the genus Euchlanis is represented by two species only.

Euchlanis dilatata Shrenberg, 1832.

(Pl. VII, figs. 12-14)

Euchlanis dilatata Shrenberg, 1832, p. 131, pl. 4, fig. 3; Haring, & Myers, 1922, p. 556; Myers, 1930, p. 360-365, pl. 10, figs. 1-3, pl. 11, figs. 1-8; Haas, 1930, p. 177; Hauer, 1938, p. 381; Wulff, 1956, p. 469, fig. 13; 1966, p. 66; Vasisht & Battish, 1971, c, p. 336-337, fig. 17; Chengalath et al., 1973, p. 43, figs. 57-60.

Material: BH, BN, LL, DM, MHN, MNP, SR.

Characters: Lorica almost oval in outline, truncate anteriorly and rounded posteriorly. Dorsal plate variable, high or low. Posterior end of the dorsal plate divided by an elevated notch, shaped like an inverted "U". Foot slender, 2-jointed and a pair of long setae protruding from the distal margin of the first foot joint. Toes short, stout, about 1/3 the length of the dorsal plate; blade-like and fusiform in shape.
This species has been reported earlier from India by Edmondson & Hutchinson (1934) from Punjab, Kashmir and Ladakh; Sewell (1935) from Calcutta; Wulfert (1966) from Baroda; Vasishth & Bettish (1971 c), Tae & Akhtar (1976) and Sharma (1976) from North West India.

Measurements: Length dorsal plate 170-185; length ventral plate 162-178; width dorsal plate 132-140; width ventral plate 108-116; toes 54-62.

Distribution: Cosmopolitan.

Euchlanis oropho Gosse, 1887.

(Pl. VII, figs. 15 & 16)

Euchlanis oropho, Gosse, 1887a, p. 5, pl. 2, fig. 16; Haring, 1914, p. 532; Myers, 1930, p. 366-367, pl. 12, figs. 7-10; Hauer, 1963, p. 182-183, fig. 16; Wulfert, 1966, p. 66; Chengalath et al., 1974, p. 44, fig. 63; Dhanapathi, 1974 b, p. 368-370, pl. 4, fig. 6.

Material: SR, THK.

Characters: Body ovoid, truncate anteriorly and rounded posteriorly. Dorsal plate arched and without a dorsal keel, posterior portion of the dorsal plate with an inverted U-shaped notch. Ventral plate flat. Foot stout and two-jointed. A pair of small setae projecting from the distal margin of the first foot joint. Toes short, stout, increasing in width for about two-thirds their length and then tapering to acute points.

Recorded earlier from India only by Dhanapathi (1974 b) from Andhra Pradesh.

Measurements: Length dorsal plate 190; length
ventral plate 178; width dorsal plate 125; width ventral plate 110; toes 60.

Distribution: England, America, Egypt, India, South Africa, New Zealand.


Body ovoid, strongly compressed. Dorsal plate wider than the ventral plate. Lateral sulci forming a deep groove. Root without setae.

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

*Dipleuchlanis propatula* (Gosse, 1886).

(Pl. VII, figs. 17 & 18)

*Dipleuchlanis propatula* Gosse, 1886 (in Hudson & Gosse, Rotifera, Vol. 2), p. 87, pl. 24, fig. 2.


*Dupleuchlanis propatula* De Beauchamp, 1910, p. 37; Harring, 1914, p. 535; Myers, 1930, p. 380-381, pl. 22, figs. 5 & 7; Wulfert, 1965 b, p. 350, fig. 1, a-c; Pourriot, 1968, p. 481; Chengalath et al., 1973, p. 45, fig. 65.

Material: APR, BR.

Characters: Body oval in outline, truncate anteriorly and rounded posteriorly. Dorsal plate concave and smaller than the ventral plate, obtusely pointed at its posterior end. Ventral plate convex. Root short, slender and three-jointed. Toes very long, parallel sided, cylindrical and very slightly swollen at their bases.
Recorded so far from India only by Nayar & Nair (1969) from Kerala.

**Measurements:** Length dorsal plate 150; length ventral plate 160; width dorsal plate 68; width ventral plate 140; toes 90.

**Distribution:** Cosmopolitan.

**Genus:** *Tripleuchlanis* (Myers, 1930).

Body ovoid, truncate anteriorly and rounded posteriorly. Dorsal and ventral plates of nearly same size and connected by a pair of lateral longitudinal sulci.

Only one species of this genus is present in the material examined.

**Tripleuchlanis plicata** (Levander, 1894).

(L. VII, figs. 19-21)

*Euchlanis plicata* Levander, 1894, p. 48, pl. 2, fig. 27; Harring, 1914, p. 538; Hauer, 1925, p. 165, fig. 6.

*Tripleuchlanis plicata* Myers, 1930, p. 379, pl. 22, figs. 1-4; Hauer, 1938, p. 562, fig. 87, a-c; 1963, p. 191; Chengalath et al., 1973, p. 45, fig. 66; Dhanapathil, 1975b, p. 130-131, fig. 1.

**Material:** DMT.

**Characters:** Body ovoid in shape. Dorsal plate with a shallow emargination posteriorly. Ventral plate nearly as long as the dorsal plate. Lateral longitudinal sulci separated by a flange of stiffened cuticle. Dorsal and ventral plates seem to be connected by bellow-like folds in cross-section. Foot stout, with three robust joints projecting considerably beyond lorica in the extended specimens. Toes short, parallel sided.
This species has been recorded from India only by Lhanapathi (1975 b) from Andhra Pradesh.

**Measurements**: Length dorsal plate 80; length ventral plate 88; width dorsal plate 62; width ventral plate 57; toes 28.

**Distribution**: America, Africa, India, Ceylon.

**Family**: MYTILINIIAE Bartos, 1959.

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

In the present material, this family is represented by only one genus.

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

Heavily loricated; lorica of one piece, dorsolateral and ventral plates fused. Foot with two well developed toes, without any spur or spines.

My collections contain only two species and one form of this genus.

*Mytilina acanthophora* Hauer, 1938.

(Pl. VIII, figs. 1 & 2)

*Mytilina acanthophora* Hauer, 1938, p. 550, fig. 73, a-c; Chengalath et al., 1974, p. 89-90, fig. 28.

**Material**: MT.

**Characters**: Lorica granulated, width of lorica less than its length. Anterior end with two triangular projections.
Posterior and with a deep sinus. Lorsum highly arched. Lateral antennae opening through the lorica behind the middle on a swollen elevation. Upon the two segmented foot lies an additional shield shaped plate. Toes long, slender and ending into points.

This species is a new record from this country.

Measurements: Total length 240; length of lorica 150; width of lorica 60; height of lorica 95; length of toes 80.

Distribution: Indonesia, Ceylon.

*Mytilina ventralis* (Schröder, 1832).

(Pl. VIII, fig. 3)

Salpina ventralis Schröder, 1832, p. 133, pl. 4, fig. 7.
Salpina macracantha Cosse, 1886 (in Hudson & Cosse, Rotifera vol. 2), p. 84, pl. 22, fig. 6.

Mytilina macracantha Brauer, 1912, p. 157, fig. 307.

Mytilina ventralis Harrington, 1913, p. 75; Hauer, 1938, p. 551;
Wulfert, 1965 b, p. 354, fig. 2b; Pourriot, 1968, p. 485;
Chengalath et al., 1973, p. 45, fig. 60; Dhanapathi, 1974 b, p. 368.

Material: AMT, IL, DJM, MNP, VML.

Characters: Lorica heavily stippled in the anterior region. Dorsolateral plate projecting dorsomedially in the form of a longitudinal ridge and continued posteriorly into dorsomedian spines. Foot with two well developed toes.

Reported so far from India by Anderson (1889) from Calcutta; Edmonson & Hutchinson (1934) from Punjab, Kashmir and Ladakh; Wulfert (1966) from Baroda; Nayar (1968) from Rajasthan; Nayar and Nair (1969) and Nair & Nayar (1971) from Kerala; Vasisht & Battish (1971 b) from North West India and Dhanapathi (1974 b) from Andhra Pradesh.
Measurements: Total length 210; maximum width 100; toes 68.

Distribution: Cosmopolitan.


(Pl. VIII, fig. 4)


Material: AMT, APR, MST.

Characters: Lorica smaller, stippled. Dorso-median and posterior spines much elongated. Toes much longer.

This form is being reported for the first time from this country.

Measurements: Lorica length 260; maximum height 90; median posterior spine 86; median ventral spine 82; toes 82.

Distribution: Tanganyika Lake (Africa).

Family: *TRICHTRIDAE* Bartos, 1959.

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

In this material, this family is represented by two genera.

Genus: *Macrochaeetus* Perty, 1850.

Head, almost rectangular trunk and foot clearly defined. Lorica granulated, with two long spines. Foot with two toes. Eye single.
Only one species belonging to this genus is present in the material examined.

**Macrochaetua sericus** (Thorpe, 1893).

(Pl. VIII, figs. 5 & 6)

_Linocharis serica_ Thorpe, 1893, p. 152, fig. 4.

_Polychaetcea serica_ Jennings, 1900, p. 89.

_Haematochaetua sericus_ Harring, 1913, p. 67; Russell, 1956, p. 412; Borsins, 1959, p. 930, fig. 15; Wulfert, 1964, p. 288-290, figs. 7-9; Hauer, 1965, p. 371, fig. 27; Kutikova, 1970, p. 516; Kosta, 1972, p. 409, pl. 41, fig. 1; Chengalath et al., 1973, p. 47-48, fig. 77.

_Haematochaetua sericus sericus_ Gillard, 1957 b, p. 17, pl. 3, fig. 14; Wulfert, 1965 b, p. 354-356, fig. 2, 1-n.

_Haematochaetua serica_ Arora, 1965, p. 455; Dhanapathi, 1974 b, p. 368, pl. 4, fig. 2.

**Material:** APR, MST, MNP.

**Characters:** Lorica pulsulated, broad, almost rectangular, with small spines at the external edges. Dorsum with eight spines placed symmetrically with respect to the midline of lorica, median caudal spines deeply inserted. Posterior end of lorica pushed inward between posterior outer and inner spines. First foot segment with flattened cuticle and two separated spines. Foot with two toes.

This species has been reported earlier from this subcontinent by Arora (1965) from Nagpur and by Dhanapathi (1974 b) from Andhra Pradesh.

**Measurements:** Total length 116; length of lorica 94; maximum width 88; second foot segment 20; length of toes 16.
Distributions Tropics and subtropics.

Genus: *Trichotria* Bory de St. Vincent, 1827.

Head, trunk and foot clearly defined. Head retractile, eye single. Lorica sturdy, vase-shaped, not compressed dorso-ventrally; usually bearing larger facets on the dorsal surface. Foot and toes long. Foot usually with two spines at its base. Toes about as long as foot.

Only one species of this genus is noticed in the present material.

*Trichotria tetractis* (Hagenberg, 1830).

(Pl. VIII, fig. 7)

*Dinocharas tetractis* Ehrenberg, 1830, p. 47; Brauer, 1912, p. 146, fig. 287.

*Trichotria tetractis* Harring, 1913, p. 106; 1914, p. 356; Hauer, 1938, p. 562; Wulfert, 1956, p. 491, fig. 50, a-d; 1965 b, p. 356, fig. 4; 1966, p. 90, fig. 47, a-d; Arora, 1966 b, p. 491-492, fig. 6, a-b; Chengalath et al., 1973, p. 48, fig. 79; Dhanapathi, 1974 b, p. 370.

Material: APR, GR, WNP, SR, THK.

Characters: Lorica longer than its width, antero-lateral margins of lorica pointed. Dorsum heavily stippled and with usual pattern of carinal plates and ridges. Foot long, three-segmented, first foot segment with two triangular spines and second foot segment longer than others. Toes long, slender and each terminating in an acute point.

This species has been recorded so far from this country by Edmondson & Hutchinson (1934) from Punjab, Kashmir and Nilgiri.
Hilla; Arora (1966 b) from Nagpur; Wulfert (1966) from Baroda; Nayar & Nair (1969) and Nair & Nayar (1971) from Kerala; Dhanapathi (1974 b) from Andhra Pradesh; Sharma (1976) and Ras & Akhtar (1976) from North West India.

Measurements: Length of lorica 112; maximum width 75; length of foot 68; toes 90.

Distribution: Cosmopolitan.


Family Colurellidae is represented by only two genera.

Genus: Colurella Bory de St. Vincent, 1824.

Lorica oval, smooth, laterally compressed, continued across dorsum but ventrally with a median longitudinal cleft. Two eyes present. Toes slender, often longer than foot.

Only one species of the mentioned genus is found on the present collections.

Colurella bicuspilata Ehrenberg, 1832.

(Pl. VIII, figs. 8 & 9)


Material: BB, BH, DMT, MNK, MNP.
Characters: Lorica bulky, swollen, laterally compressed, wider anteriorly and pointed posteriorly; with a deep ventral head opening and a similar foot opening; abdominal joint situated between them. Foot small and stout. Toes small, nearly straight and pointed.

This species has been recorded earlier from this country by Edmondson & Hutchinson (1934) from Punjab, Kashmir, Ladakh and Nilgiri Hills and Wulfert (1966) from Baroda.

Measurements: Lorica length 75; width of lorica 40; height of lorica 50; toes 18.

Distribution: Apparently cosmopolitan.

Genus: Lepadella Bory de St. Vincent, 1826.

Lorica usually smooth, oval, compressed dorsoventrally and closed laterally. Foot with 3-4 segments; foot aperture large. Two slender, moderately long toes. Eyes two.

The lepadellid rotifers are represented by 13 species and one form (including the descriptions of one new species and one new form).

Lepadella acuminata (Ehrenberg, 1834).

(Pl. VIII, figs. 10-12)

Metopicia acuminata Ehrenberg, 1834, p. 210; 1838, p. 477, pl. 59, fig. 10; Hudson & Gosse, 1886, p. 107, pl. 25, fig. 9; Levander, 1894, p. 55.

Lepadella acuminata Lujardin, 1841, p. 633; Harring, 1916, p. 546-547, pl. 92, figs. 4-8; Wulfert, 1956, p. 474, fig. 22; Chengelath, 1976, p. 901-902; fig. 1-3.

Material: APR.
Characters: Lorica usually oval in outline and produced posteriorly in a long pointed spine of variable length. Dorsal plate convex and evenly rounded, ventral plate nearly flat. Dorsal sinus broadly U-shaped, not very deep and with a granulated collar. Ventral sinus deep and pointed posteriorly. Foot groove of elongate-ovate form. Foot stout, last foot joint longer than the rest. Toes long, slender and nearly straight.

This species has been previously reported from India by Edmundson & Hutchinson (1934) from Hilgiri Hills.

Measurements: Length of lorica 88; width of lorica 58; anterior width 30; length of foot groove 30; length of foot 20; toes 20.

Remarks: Variability in this species has been studied by earlier workers like Wulfert (1960), Lonner (1964) and Chengalath (1976). The material at my disposal is too insufficient to notice any variations but the present specimens differ from the description given by Herring (1916) in having the smaller size as well as in the shape of the anterior dorsal sinus.

Distribution: Cosmopolitan.

Lepadella aspicora Myers, 1934.
(Pl. VIII, figs. 13 & 14)

Lepadella aspicora Myers, 1934, p. 5, figs. 16-18; Hauer, 1938, p. 527, fig. 50, a-c.

Material: MNP, MGT.

Characters: Lorica almost oval in outline, shallow and evenly arched. Anterior dorsal margin nearly straight and with a prominent stippled collar. Ventral sinus deep,
broadly V-shaped and marked with a stippled collar. Posterior margin of loria with a very slight notch. Foot groove wide and slightly flaring posteriorly. Foot stout, terminal foot joint longest and so twisted that the left toe directly lies under the right. Toes asymmetrical, the right toe longer than the left.

This species represents a new record from this subcontinent.

Measurements: Length of loria 63; width of loria 58; anterior width 28; length of foot groove 18; length of foot 32; right toe 23; left toe 18.

Distribution: Mount desert Island (U.S.A.), Indonesia.

*Lepadella aspida* Harring, 1916.

(Pl. VIII, figs. 15 & 16)

*Lepadella aspida* Harring, 1916, p. 536, pl. 89, figs. 1-3; Ahlstrom, 1934, p. 253; Hauer, 1938, p. 528, fig. 51, a-b.

Material: SR, SRK.

Characters: Lorica almost circular in outline. Dorsal plate moderately convex and its edges projecting slightly beyond the flat ventral plate. Anterior dorsal margin convex and dorsal sinus lacking, ventral sinus circular and without any stippled collar. Foot groove U-shaped, rounded anteriorly. Foot fairly short and stout, its edges slightly increasing in length from its basal to the posterior. Toes short, about 1/6 the length of lorica and tapering to acute points.

The only record of this species is from North West India by Sharma (1976).

Measurements: Length of loria 60; width of
lorica 48; length of anterior sinus 20; width of anterior sinus 18; length of foot groove 17; toes 12.

D i s t r i b u t i o n: China, America, Indonesia, India.

Lepadella ehrenbergii (Perty, 1850).

(Pl. VIII, figs. 17-19)

Notogonia ehrenbergii Perty, 1850, p. 20; Hudson & Gosse, 1889, p. 60, pl. 33, fig. 36.
Metopidia angulata Anderson, 1889, p. 356, pl. 21, fig. 10.
Murray, 1913 a, p. 459, pl. 18, fig. 8.
Lepadella ehrenbergii Harring, 1916, p. 533, pl. 94, figs. 1-4;
Hauer, 1930, p. 529, fig. 52, a & b; Koste, 1974 b, p. 34, fig. 18; Chengalath, 1976, p. 902, figs. 7-11.

M a t e r i a l: APR, BB.

C h a r a c t e r s: Lorica broadly ovate in outline, produced posterolaterally into two broad triangular spurs curving outwards and forwards, two similar and smaller curved spines at the sides of the foot groove. Dorsal plate strongly convex and evenly arched, ventral plate almost flat. Anterior margin wide; dorsal sinus shallow and ventral sinus fairly deep. Broad stippled collars on both dorsal and ventral plates. Foot groove rounded posteriorly, with slightly divergent and curved sides, the curvature increasing towards the posterior end of lorica. Posterior emargination evenly rounded. Foot moderately stout, last foot segment longer than the rest. Toes long, asymmetrical, tapering to fine points; right toe straight, left toe curved and bent outwards.

Reported so far from Indian subcontinent only by Anderson (1889) from Calcutta and its environs.
Measurements: Length of lorica 68; width of lorica 72; anterior width 28; length of foot groove 20; length of foot 30; right toe 20; left toe 14.

Distribution: Cosmopolitan.

_Lepadella heterostyla_ (Murray, 1913).

(Pl. VIII, figs. 20-22)

**Metopoidia heterostyla** Murray, 1913 b, p. 459, pl. 9, fig. 6, a-e.

**Metopoidia rhomboides** Hofstein, 1909, p. 70, fig. 16; Brauer, 1912, p. 190, fig. 376.

**Lepadella heterostyla** Harring, 1916, p. 94, fig. 9-13; Hauer, 1938, p. 530, fig. 53, a & b; Chengalath, 1976, p. 902, figs. 12-14.

Material: MNK.

Characters: Lorica broadly rhomboid in outline and with a well-marked emargination; the edges of lorica curving upward from the blunt lateral angles towards the anterior margin. Width of lorica almost equal to its length. Dorsal plate strongly convex in its median part and gradually recurved toward the lateral angles and the ventral plate moderately convex. Anterior ends of both dorsal and ventral plates with stippled collars. Lorical broadly U-shaped and very shallow and ventral sinus semi-elliptical foot groove U-shaped. Semi-circular emargination between two rounded lobes at the posterior angles of lorica. Foot long, its terminal joint longest. Toes long, asymmetrical.

Recorded for the first time from India.

Measurements: Length of lorica 68-72; width of lorica 70-75; anterior width 28; length of foot groove 20; length of foot 30; right toe 22; left toe 19.
Distribution: America, Australia, Indonesia, Canada, Europe.

(Pl. VIII, figs. 23 & 24)

*Lepadella imbricata* Harring, 1916, p. 556, pl. 95, figs. 9-11;
Ridder, 1977, p. 125, fig. 42.

Material: BR.

Characters: Lorica broadly ovate in outline and very slightly constricted at the anterior margin. Dorsal plate tectiform, with a shallow groove on each side and an inconspicuous median ridge. Ventral plate nearly flat. Frontal edge of dorsal plate straight, without any sinus. Ventral sinus broadly V-shaped, and pointed posteriorly. Stippled collar or bead like thickening of the anterior margin lacking. Foot groove U-shaped, parallel sided. Lorica rounded posteriorly and without any emargination. Foot slender, last foot segment more than half its entire length. Toes slender, straight and tapering to very fine points.

This species is being reported for the first time from this country.

Measurements: Length of lorica 78; width of lorica 50; anterior width 24; length of foot groove 20; length of foot 30; toes 20.

Distribution: U.S.S.R., America, Malaya and Neotropics.
**Lepadella ovalis** (O. & M. Müller, 1786).

(Pl. IX, figs. 1-3)

*Brachionus ovalis* Müller, 1786, pl. 345, pl. 49, figs. 1-3.

*Metopidea lepadella* Ehrenberg, 1832, p. 136.

*Lepadella ovalis* Ehrenberg, 1830, p. 85, pl. 7, fig. 4; Haring, 1916, p. 537, p. 84, figs. 4-10; Hauer, 1938, p. 531; Wulfert, 1939, p. 611, fig. 42; 1956, p. 475; Chengalath et al., 1973, p. 51, fig. 7; Chengalath, 1976, p. 904, figs. 21-25.

**Material**: APR, BB, BN, MNT, THK.

**Characters**: Lorica outline variable from sub-circular to broadly ovate; its width sometimes a little less than its length. Dorsal plate slightly convex, ventral plate nearly flat. Dorsal sinus U-shaped, with convergent sides; ventral sinus large, deep and sub-rhomboidal in outline. Stippled collars present on dorsal and ventral anterior margins. Foot groove widely varied, nearly parallel sided and the edges of the groove projecting posteriorly below the surface of the ventral plate, occasionally forming obtuse points on each side of the posterior emargination. Foot stout, projecting beyond the lorica. Toes short and pointed.

Reported earlier from India by Anderson (1889) from Calcutta and its suburbs; Edmondson & Hutchinson (1934) from Kashmir, Ladakh; Vasisht & Battieh (1971 b) and Sharma (1976) from North West India.

**Measurements**: Length of lorica 130-158; width of lorica 110-128; anterior width 30-42; length of foot groove 42-48; length of foot 32-40; toes 24-30.

**Distribution**: Cosmopolitan.
Lepadella ovalis f. larga, new form
(Pl. IX, figs. 4-6)

Material: 2 oo (one on each slide), Regd. Nos. ++
P. 3021/1 & P. 3022/1, Zoological Survey of India; loc. Maheshrbala,

These specimens differ from L. ovalis, nominate form in
(i) lorica broader than its length, (ii) dorsal plate more arched,
(iii) shape of posterior margin of lorica, (iv) shape of the foot
groove.

These specimens were referred to Dr. Walter Kosta, West
Germany for conformation and he agrees with me in assigning these
to a new form of L. ovalis.

Measurements: Length of lorica 94; width of
lorica 100; anterior width 32; length of foot groove 26; length
of foot 32; toes 25.

Lepadella patella (O.F. Muller, 1773)
(Pl. IX, figs. 7-9)

Brachionus patella Muller, 1773, p. 130, pl. 1.
Lepadella patella Bory de St. Vincent, 1826, p. 96; Haring, 1916,
p. 539, pl. 90, figs. 1-12, Hauer, 1939, p. 531, fig. 54;
Wuliert, 1939, p. 611, fig. 23, a-c; 1956, p. 475; Donner,
1954, p. 89, fig. 21; g-j; 1964, p. 289; Chengalath et al.,
1973, p. 52, fig. 98; Chengalath, 1976, p. 904, figs. 26-32;
Kosta, 1976, p. 208, pl. 17, fig. 2, a-b.

Material: AMT, APR, IB, IMT, GR, M KK, SR, TG.

Character: Outline of lorica variable from
circular to oval. Dorsal plate strongly convex and ventral
plate nearly flat. Dorsal sinus varying from a shallow U-shaped
ventral sinus deep. Loral and ventral anterior margins having stippled collars. Foot groove parallel sided and the edges of the foot groove invariably slightly below the surface of the ventral plate. Foot fairly stout; last foot joint longer than the rest. Toes straight and pointed.

Very common in Indian waters and reported so far by Edmondson & Hutchinson (1934) from Punjab, Kashmir and Ladakh; Wulfert (1966) from Baroda; Nayar (1968) from Rajasthan; Vasisht & Battish (1971b) and Sharma (1976) from North West India.

Measurements: Length of lorica 75-80; width of lorica 58-62; anterior width 25-27; length of foot groove 24-25; length of foot 28-32; toes 20-22.

Remarks: It can be distinguished from L. ovalis by its smaller size and strongly arched, convex lorica. This species is another common rotifer and is highly variable (Lonne, 1964; Kutikova, 1970).

Distribution: Cosmopolitan.

Lepadella quadriraminata (Stenroos, 1898).

(Pl. IX, figs. 10-12)

Metopoidia quadrirarinata Stenroos, 1898, p. 165, pl. 3, fig. 2.
Lepadella quadrirarinata Haring, 1913, p. 64; Olofsson, 1918, p. 599, fig. 58; Hauer, 1936 C, p. 143, pl. 1, fig. 6, a-c; Ahlstrom, 1938, p. 99, pl. 6; Wulfert, 1939, p. 612, fig. 25; Lonne, 1943 b, p. 176, fig. 4; Voigt, 1957, p. 197, pl. 30, fig. 14, pl. 35, fig. 10, a-c; Ridder, 1972, p. 30-31, pl. 5, fig. 4; Chengelath, 1976, p. 904, 906, figs. 33-35.

Material: APR, MNK, MST.

Characters: Lorica broadly ovate in outline.
Dorsal plate convex and ventral plate flat. Dorsal sinus fairly deep and ventral sinus V-shaped. Edges of the anterior ventral margin acutely pointed. Foot groove almost parallel sided and dorsal plate projecting over the foot opening. Foot fairly stout; last foot joint longer than preceding ones. Toes straight and pointed.

This species is being reported for the first time from India.

Measurements: Length of lorica 80-95; width of lorica 60-65; anterior width 20-24; length of foot groove 22-25; length of foot 25; toes 22.

Remarks: Haring (1916) considered this species as a synonym of *L. patella* but I accept it as a distinct species, following the works of Hauer (1936 c), Ahlstrom (1938), Donner (1943 b), and Chengalath (1976).

Distribution: Central Europe, America, Canada, New Zealand.

*Lepadella rhomboidea* (Gosse, 1886).

(Pl. IX, figs. 13-15)


*Lepadella rhomboidea* Haring, 1913, p. 65; 1916, p. 557, pl. 95, figs. 12-15; Ahlstrom, 1938, p. 609; Hauer, 1938, p. 532; Donner, 1943b, p. 174-175, fig. 3, a-f; Chengalath *et al.*, 1973, p. 52, fig. 99; Chengalath, 1976, p. 906, figs. 36-39.

Material: APR, BB, BH, BN, CR, DMT, THK.

Characters: Lorica rhomboid-ovate in outline. Dorsal plate moderately convex, with a wide and moderately high

This rotifer has been listed earlier from India by Edmondson & Hutchinson (1934) from Punjab and Nilgiri Hills and by Wulfert (1966) from Baroda.

**Measurements:** Length of lorica 80; width of lorica 52; anterior width 29; length of foot groove 22; length of foot 30; toes 24.

**Remarks:** This is a highly variable species and is commonly found in weedy margins of lakes, ponds and pools.

**Distribution:** America, Canada, Ceylon, Germany, India, South Africa.

*Ispadella rhomboidula* (Bryce, 1890)
(Pl. IX, figs. 16-18)

*Metopidea rhomboidula* Bryce, 1890, p. 76, text figs.; Murray, 1913 b, p. 459, pl. 19, fig. 7.

*Lepadella rhomboidalula* Harring, 1913, p. 65; 1916, p. 559, pl. 96, figs. 1-4; Hauer, 1938, p. 532; Voigt, 1957, p. 202, pl. 35, fig. 4 a-d; Kidder, 1972, p. 25, pl. 7, fig. 1.

**Material:** AMT.
Characters: Loricula broadly rhomboidal in outline; its width being slightly more than its height. Dorsal plate slightly convex and with a median keel extending the entire length of loricula, sides of the keel slightly concave and meeting the median region at an acute angle thus forming a dorsal ridge. Ventral plate almost flat. No dorsal sinus present. Ventral sinus semicircular. No stippled collar present. Foot groove U-shaped, almost parallel sided but rounded anteriorly. Posterior end of loricula bluntly pointed beyond the point where the sides of the foot groove meet the edges of the ventral plate. Foot slender; foot joints nearly of equal length. Toes slender and tapering to points.

This species represents a new record from this subcontinent.

Measurements: Length of loricula 72; width of loricula 78; anterior width 23; length of foot groove 18; length of foot 20; toes 21.

Distribution: America, England, France, Germany, Indonesia, New Zealand.

Lepadella triprojectus, new species
(Pl. IX, figs. 19 & 20)


Description: Loricula almost oval in outline, compressed dorsoventrally, anterior body opening relatively wide. Dorsal plate slightly raised in the middle, ventral plate almost
flat. Anterior dorsal sinus slightly concave and marked with a stippled collar. Ventral sinus V-shaped, sides of sinus curving outward. Posterior end of lorica rounded. Three tube-like projections present, one anterior and two posterolateral; anterior projection longest and arising from the right arm of ventral sinus; posterolateral projections almost equal, the right a little higher placed than the left. Foot groove almost U-shaped. Foot fairly long, terminal foot joint longer than the rest. Toes equal, fairly long and tapering to acute points.

Measurements (Holotype): Length of lorica 75; width of lorica 55; anterior width 38; anterior projection 15; posterolateral projections 9-9; length of foot groove 20; length of foot 26; toes 20.

Remarks: This species differs from all the known species in the presence of three tube-like projections. Though I have only one specimen at my disposal, it is sufficiently different from all other species of the genus to warrant inclusion in a new taxon of species rank.

Lepadella triptera Ehrenberg, 1830.
(Pl. IX, figs. 21-23)

Lepadella triptera Ehrenberg, 1830, p. 71; Haring, 1916, p. 561, pl. 95, figs. 1-4; Myers, 1934, p. 10, figs. 28-32; Lonner, 1954, p. 90, fig. 21, a-b; Wulfert, 1956, p. 475; Chengalath, 1976, p. 906, figs. 43-45.

Material: BN, DM.

Characters: Lorica almost circular in outline. Dorsal plate with a high and very thin median keel extending its

Earlier record of this species from India is only by Edmondson & Hutchinson (1934) from Punjab, Kashmir and Nilgiri Hills.

Measurements: Length of lorica 48; width of lorica 40; anterior width 23; length of foot groove 15; length of foot 13; toes 14.

Distribution: America, Canada, Europe, France, Java, India.

Family: LECANIDAE Remane, 1933.

Loricate or illoricate rotifers. Hastax malleate modified for suction. Mouth not funnel like. Buccal area very simple. Foot one or two jointed. Toes one or two.

This family is represented by only one genus.

Genus: Lecane Hitzsch, 1827.

Lecanids with dorsoventrally flattened lorica; consisting of two laterally separated plates, the ventral plate usually smaller. Foot aperture small. Foot with two segments. Corona weak. Toes single or two; in the later case may be completely free or partially fused.
In this study, genus *Lucane* Kießling, 1827 has been divided into three subgenera i.e., *Lucane* (Lucane), *Lucane* (Hemimonostyla), *Lucane* (Monostyla). The criterion of subgeneric differentiation is based on the character of toes. Presently, this genus is represented by 35 species and various varieties and forms.

**Lucane (Lucane) aculeata** (Jakubski, 1912)

(Pl. X, figs. 1 & 2)

*Distyla aculeata* Jakubski, 1912, p. 543, figs. 3 & 4.  
*Lucane aculeata* Hauer, 1938, p. 508, fig. 32, a & b; Wulfert, 1965b, p. 358, fig. 5, c-e.

**Material:** APR, DMT, TOL.

**Characters:** Lorica broadly ovate and longer than its width. Dorsal and ventral margins almost straight and coincident; external angles with large and outcurving spines. Dorsal plate almost oval, truncate posteriorly and its surface markings distinct. Ventral plate almost oval, slightly narrower than the dorsal plate and with a few surface markings. Posterior segment large, projecting beyond the dorsal plate. Coxal plates indistinct. First foot joint large, pyriform; second foot joint large. Toes long, straight, parallel sided and terminating into slender, acutely pointed claws.

This lecanid is being reported for the first time from India.

**Measurements:** Length dorsal plate 54; length ventral plate 60; width dorsal plate 47; width ventral plate 44; toes 20; Claw 6.

**Distribution:** Apparently cosmopolitan.
Lecane (Lecane) arcula Harring, 1914.

(Pl. X, figs. 3 & 4)

*Cathypna aculeata* Murray, 1913, p. 350, pl. 14, fig. 28 (not *Listyia aculeata* Jakubski).

*Lecane arcula* Harring, 1914, p. 539, pl. 19, figs. 4-6; Harring & Myers, 1926, p. 355, pl. 24, figs. 1 & 2; Hauer, 1953, p. 168; 1963, p. 187; Wulfert, 1965 b, p. 357, fig. 5, a & b; Chengalath & Mulemoottil, 1974, p. 948.

**Material:** APR, BB, BPR.

**Characters:** Lorica broadly ovate in outline and a little longer than broad. Dorsal and ventral margins straight and nearly coincident; external angles produced into two small, broad based spines directed slightly upward. Dorsal plate oval and almost rounded posteriorly; with rather faint markings in the present specimens. Ventral plate ovate, slightly narrower than the dorsal plate and its surface markings not distinct. Posterior segment prominent, rounded in shape and projecting beyond the dorsal plate. First foot joint large, elongated and pyriform; second foot joint large at its base and narrowed immediately behind the lorica. Toes fairly long, slender straight and parallel sided, terminating into slender and acutely pointed claws.

The only report of this species from India is by Wulfert (1966) from Baroda.

**Measurements:** Length dorsal plate 49; length ventral plate 54; width dorsal plate 44; width ventral plate 40; toes 18; claw 5.

**Distribution:** Cosmopolitan.
**Lecane** (Lecane) **crepida** Harring, 1914.

(Pl. X, figs. 5 & 6)

*Distyta gigasensis* Jennings, 1900, p. 91, pl. 20, figs. 33 & 34.

(not *Distyla gigasensis* Ekstein).

*Lecane crepida* Harring, 1914, p. 533, pl. 22, figs. 4-7; Harring & Myers, 1926, p. 366, pl. 28, figs. 1 & 2; Hauer, 1938, p. 512, fig. 36, a-b; Wulfert, 1966, p. 70, fig. 16, a-e; Chongoloth & Fernando, 1973, p. 15, figs. 3 & 4; Koste, 1974b, p. 32, fig. 10.

**Material:** BPR, DMT.

**Characters:** Lorica flexible, parallel sided for one-half of its length and then tapering rapidly to the foot, strongly gibbous posteriorly. Anterior dorsal margin slightly convex, ventral margin concave and with two stout anterior spines at the external angles. Dorsal plate strongly convex, smaller than the ventral plate and its surface markings limited to three pairs of divergent ridges, beginning near the anterior margin. Ventral plate moderately convex and marked with a transverse fold in front of the foot. Posterior segment large and projecting out. First foot joint large and bulbous; second subsquare and projecting more than 1/2 its length beyond the lorica. Toes long, slender terminating into long, slender and pointed claws.

This rotifer has been recorded earlier by Pasha (1961) from Madras; Wulfert (1966) from Baroda and Tiwari & Sharma (1977) from Calcutta.

**Measurements:** Length dorsal plate 75; length ventral plate 66; width dorsal plate 46; width ventral plate 50; anterior width 52; toe 28; claw 9.
Distribution: America, Brasil, Canada, Ceylon, Indonesia, India.

Lecane (Lecane) crepida forma bengalensis new form
(Pl. X, figs. 7 & 8)

Material: 2 oo (2 slides) Regd. Nos. P. 3017/1 + +
and P. 3018/1, Zoological Survey of India; loc. Indian Museum

Description: These specimens differ from Lecane crepida nominate form in (i) having truncate dorsal plate
(ii) absence of markings on the dorsal plate.

The present specimens were referred to Dr. Walter Koste,
West Germany for confirmation and he also agrees with me in
assigning these to a new form of Lecane crepida Harring, 1914

Measurements: Length dorsal plate 75; length
ventral plate 86; width ventral plate 42; width dorsal plate 46;
anterior width 42; toes 26; claw 6.

Lecane (Lecane) curvicornis (Murray, 1913)
(Pl. X, figs. 9 & 10)

Cathypna curvicornis Murray, 1913 a, p. 346, pl. 14, fig. 22.
Cathypna nitidis Murray, 1913 a, p. 347, pl. 14, fig. 24.
Cathypna lofuana Murray, 1913 c, p. 551, pl. 22, fig. 1.
Lecane curvicornis Harring, 1914, p. 535, pl. 17, fig. 3; Harring
& Myers, 1926, p. 321-322, pl. 8, figs. 1 & 2; Hauer, 1953,
p. 168; Arora, 1965, p. 447; Chengalath & Fernando, 1973,
p. 16, figs. 5 & 6; Chengalath & Mulamoottil, 1974, p. 948,
figs. 5 & 6; Dhanapathi, 1976 a, p. 10-11.

Material: BB, BR, IMT, MNK, MST, SR.
Characters: Lorica broadly pyriform in outline. Anterior margins coincident, with a broad, V-shaped sinus; external angles with two prominent spines. Dorsal plate oval, truncate posteriorly and narrower than the ventral plate. Ventral plate pyriform and marked by a transverse fold in its posterior region. Posterior segment small and rounded posteriorly. Coxal plates large and obtusely pointed. First foot joint large, indistinct; second fairly large and subsquare. Toes long, slender, parallel sided, ending in a small claw with basal spicule.

Recorded earlier from this country by Arora (1965) from Nagpur and by Thanapathil (1976 a) from Andhra Pradesh.

Measurements: Length dorsal plate 120; length ventral plate 128; width dorsal plate 100; width ventral plate 105; toes 42; claw 9.

Distribution: Africa, America, Australia, Brazil, Canada, Ceylon, France, India.

Lecane (Lecane) curvicornis var. miamiensis
Myers, 1941.

(Pl. X, figs. 11 & 12)

Lecane curvicornis var. miamiensis Myers, 1941, p. 2; figs. 1-2; Changalath & Fernando, 1973, p. 16, figs. 7 & 8.

Material: SR.

Characters: Anterior margins coincident, prominent anterolateral spines and shape of the posterior segment are characteristic features for the diagnosis of this variety.

This variety represents a new record from India.
Measurements: Length dorsal plate 150; length ventral plate 165; width dorsal plate 115; width ventral plate 100 toes 50; claw 15.

Distribution: Florida, Ceylon.

* * *

**Lecane** (Lecane) *flexis* (Gosse, 1886).

(Pl. X, figs. 13 & 14)

**Listyle flexis** Gosse, 1886. (In Hudson & Gosse, Rotifera, vol. 2), p. 97, pl. 24, fig. 7.

**Cathypna flexis** Stenroos, 1898, p. 159, pl. 12, fig. 19; Murray, 1913 a, p. 351, pl. 14, fig. 27.

**Lecane flexis** Herring, 1913, p. 61; 1914, p. 538, pl. 19, figs. 1-3; Herring & Myers, 1926, p. 355, pl. 24, figs. 3 & 4; Pax & Wulfert, 1941, p. 187, fig. 4; Wulfert, 1956, p. 473; 1966, p. 72; Hauer, 1963, p. 187; Chengalath & Mulamoottil, 1974, p. 948, figs. 9-12.

Material: APR, BPR.

Characters: Lorica subcircular in outline, body strongly gibbous. Anterior dorsal and ventral margins almost straight and not coincident; with two short, stout, slightly incurving spines at external angles. Dorsal plate subcircular, rounded posteriorly and its surface markings not distinct in the present specimens. Ventral plate flexible, narrower than the dorsal plate, with only a few markings. Posterior segment rounded, projecting beyond the dorsal plate. Coxal plates semicircular. First foot joint elongate, oval; second foot joint large and rhomboid. Toes short, tapering slightly to small acute and recurved claws, each having a dorsal and a small basal spicule.

Reported earlier from India by Edmondson & Hutchinson (1934) from Nilgiri Hills and by Wulfert (1966) from Baroda.
Measurements: Length dorsal plate 58; length ventral plate 74; width dorsal plate 52; width ventral plate 44; anterior width 47; toes 12; claw 4.

Distribution: America, Egypt, Brasil, Canada, Ceylon, France, Germany, India.

Lecon (Lecon) lateralis, new species.

(Pl. X, figs. 15 & 16)


Description: Lorica broadly ovate in outline, compressed dorsoventrally. Anterior dorsal margin concave; anterior ventral margin undulating and with a shallow median sinus. Dorsal plate almost circular, its maximum width being in the middle and rounded posterior margin; without any surface markings. Ventral plate with distinct external angles, marked by a distinct transverse fold in its posterior region and produced into two lateral extensions at its venterolateral angles. Posterior segment large, distinct, semicircular, projecting well beyond the dorsal plate. Coxal plates large. First foot joint large, indistinct, second foot joint large, subsquare. Toes long, parallel sided along 3/4 of its length, then narrowing down and produced into long, stout claws. Each claw with one basal spicule.

Measurements: Length dorsal plate 110; length ventral plate 120; width dorsal plate 112; width ventral plate 115; anterior width 60; toe 42; claw 10.
Remarks: This species resembles *Lecane luna* (Müller, 1776), but differs from it in having (i) dorsal plate smaller than the ventral plate; (ii) undulating anterior ventral margin; (iii) having ventrolateral extensions of the ventral plate; (iv) posterior segment much larger and distinct; (v) toes not swollen at their bases.

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

(Pl. X, figs. 17 & 18)

*Cathypna leontina* Turner, 1892, p. 61, pl. 1, fig. 12; Jennings, 1894, p. 24; Kellicott, 1897, p. 53; Laday, 1905 b, p. 109, pl. 6, fig. 12; Rousselet, 1906, p. 405, pl. 14, fig. 6; Murray, 1913 a, p. 345, pl. 13, fig. 21.


Material: AMT, APR, BB, BL, BR, IMT, MST.

Characters: Lorica broadly pyriform in outline. Anterior dorsal margin slightly concave, ventral margin with a broad U-shaped sinus and with two triangular spines at external angles. Dorsal plate slightly narrower than the ventral plate, rounded posteriorly and without any surface markings. Ventral plate with an indistinct fold in front of the foot. Posterior segment extending over the foot as tail-like projection, widest posteriorly, with two divergent spines. Coxal plates large and
obtusely pointed. First foot joint parallel sided, indistinct; 
second foot joint subsquare. Toes very long, slender, parallel 
sided, each terminating in a fairly long claw with basal spicule.

The earlier records of this rotifer from India are by Arora 
(1965) from Nagpur and by Lhanapathi (1976a) from Andhra Pradesh.

Measurements: Length dorsal plate 170; length 
ventral plate 200; width dorsal plate 142; width ventral plate 148; 
toe 88, claw 12.

Distribution: Tropics and subtropics.

Lecane (Lecane) ludwigii (Eckstein, 1883).

(Pt. X, figs. 19 & 20)

Listula ludwigii Eckstein, 1883, p. 383, pl. 26, fig. 37; Hudson 
& Gosse, 1889, suppl., p. 43, pl. 33, fig. 36; Jennings, 
1900, p. 92, pl. 20, fig. 32; lacey, 1905b, p. 108, pl. 6, 
fig. 11; 1910, p. 82.

Cathypna ludwigii Murray, 1913a, p. 352, pl. 14, fig. 23.

Lecane ludwigii Haring, 1913, p. 61; 1914, p. 357; Harring & 
Myers, 1926, p. 350, pl. 22, figs. 5 & 6; Wulfert, 1956, 
p. 473, fig. 25; Chengalath & Fernando, 1973, p. 17, figs. 13 
& 14; Chengalath & Mulamoottil, 1974, p. 950, figs. 19 & 20; 
Lhanapathi, 1976a, p. 13, pl. 2, figs. 3 & 4.

Material: APR, BB, MST, MNP.

Characteristics: Loricca oval in outline and moderately 
broad. Anterior margins coincident and slightly concave; with 
two fairly long, stout spines at external angles. Dorsal plate 
oval, truncate posteriorly, its surface markings not distinct in 
the present specimens. Ventral plate slightly pyriform, narrower 
than the dorsal plate and marked with a few longitudinal ridges. 
Posterior segment produced into a long, triangular pointed spine. 
Coxal plate large and rounded posteriorly. First foot joint
narrow, overlapping the trapezoidal second joint as a lobate projection. Toes long, slender, parallel sided, ending into acute conical points.

Reported earlier from India only from Andhra Pradesh (Thanapathi, 1976a).

Measurements: Length dorsal plate 120; length ventral plate 166; width dorsal plate 78; width ventral 68; toe 44.

Distribution: America, Canada, Ceylon, France, India.


(Material: BPR.

Characters: Posterior segment remarkably smaller than the typical form. Almost parallel sided for 2/3 of its length and the suddenly ending in a small point.

New record from Indian subcontinent.

Distribution: Indonesia.


(Material: MST.

Characters: Posterior segment broad at its free end and with a very small spine displaced slightly to the right
side of the body axis in the specimens examined.

Recorded for the first time from India.

**Distribution:** Indonesia.

**Lecane (L.) ludwigii f. laticaudata** Hauer, 1938.

(Pl. X, fig. 23)

**Lecane ludwigii f. laticaudata** Hauer, 1938, p. 518, fig. 41, g.

**Material:** MST.

**Characters:** Posterior segment small, rounded at its free angles.

Represents a new record from this country.

**Distribution:** Indonesia.

**Lecane (Lecane) luna** (O.F. Müller, 1976)

(Pl. XI, figs. 1 & 2)

**Cercaria luna** Müller, 1776, p. 139, pl. 20, figs. 8 & 9.

**Cathypna luna** Cosse, 1886, (in Hudson & Gosse, Rotifera, Vol. 2), p. 94, pl. 24, fig. 4; Weber, 1898, p. 593, pl. 22, figs. 4 & 5; Jennings, 1900, p. 91, figs. 28 & 29; Murray, 1913a, p. 345, pl. 17, fig. 19; Bryce, 1924, p. 97.


**Material:** APR, BB, BN, BPR, DMT, MNK, MST, SR.

**Characters:** Loria broadly subcircular in outline. Dorsal and ventral plates having lunate anterior sinus. Lorsal
and ventral plates having lunate anterior sinus. Dorsal plate circular and without any surface marking, the angles of sinus blunt and without any spines. Sometimes a broad median hump formed by the excessive contraction of the anterior margin. Ventral plate slightly ovate, narrower than the dorsal plate and marked by one or two transverse folds; its lunate anterior sinus being cuspidate at external angles. Posterior segment small, rounded and projecting a little beyond the dorsal plate. Coxa plates bluntly pointed. First foot joint small; second foot joint large and subsquare. Toes parallel sided, swollen at their bases and each ending into a distinct claw with a small basal spicule.

Widely distributed in India and recorded earlier by Anderson (1889) from Calcutta; Edmondson & Hutchinson (1934) from Punjab, Kashmir and Ladakh; Wulfert (1966) from Baroda; Nayar (1968) from Rajasthan; Vasiht & Battish (1971b) and Sharma (1976) from North West India and Ihanapathi (1976a) from Andhra Pradesh; Das & Akhtar (1976) from Kashmir. Also very common in the present collections.

Measurements: Length dorsal plate 125; length ventral plate 135; width dorsal plate 117; width ventral plate 107; anterior width 75; toe 35; claw 9.

Distribution: Cosmopolitan.


(Pl. XI, figs. 3 & 4)

*Lecane dorsicalis* Arora, 1965, p. 449, fig. 2, a & b.
*Lecane luna* Nayar, 1968, p. 176-177, figs. 13-17.
Material: IMT.

My material agrees with the description of *Lecane dorsicalis* from Nagpur by Arora (1965). Nayar (1968) considered *L. dorsicalis* Arora as a form of *Lecane luna* Müller, 1776, but did not give a separate name. In fact *L. dorsicalis* does bear a close resemblance to *L. luna* in general appearance, the only differences being a straight anterior dorsal margin and narrower lorica. Dr. Walter Koste (Personal communication) also agrees with Nayar's view and hence the present combination is proposed for Arora's species.

Measurements: Length dorsal plate 120; length ventral plate 124; width dorsal plate 98; width ventral plate 90; anterior width 60; toe 34; claw 6.

Distribution: India.

*Lecane* (Lecane) *nana* (Murray, 1913).

(Pl. XI, figs. 5 & 6)

*Cathyopa nana* Murray, 1913a, p. 353, pl. 14, fig. 29.

*Lecane nana* Harring, 1914, p. 536; Hauer, 1924, p. 149; 1925, p. 168, fig. 8; Harring & Myers, 1926, p. 375-376, pl. 34, figs. 1 & 2; Ionner, 1954, p. 85, fig. 19; Wulfert, 1966, p. 74-75, fig. 25; Nayar, 1968, p. 179; Chengalath & Moomoottil, 1974, p. 950, figs. 29 & 30.

Material: APR, IMT, SR.

Characters: Lorica nearly subcircular in outline. Anterior dorsal and ventral margins very slightly convex, coincident. Dorsal plate subcircular without any surface markings. Ventral plate narrower than the dorsal plate, almost parallel.
anteriorly and slightly obtuse posteriorly; surface markings limited to a few longitudinal lines. Posterior segment distinct, projecting beyond the dorsal plate. Coxal plates small and rounded posteriorly. First foot joint obtusely conical and widest in front; second foot joint irregularly subsquare. Toes long, fairly slender and pointed at distal ends.

This rotifer has been recorded earlier from India by Wulfert (1966) from Baroda and by Nayyar (1969) from Rajasthan.

Measurements: Length dorsal plate 49; length ventral plate 53; width dorsal plate 48; width ventral plate 40; toe 20.

Distribution: America, Canada, Ceylon, India, Japan, Indonesia.

*Lecane (Lecane) ohloensis* (Herrick, 1885).

(Pl. XI, figs. 7 & 8)

*Listyla ohloensis* Herrick, 1885, p. 54, fig. 1; Jennings, 1900, p. 19, fig. 30.

*Cathypna ohloensis* Turner, 1892, p. 61; Murray, 1913a, p. 352, fig. 14.

*Lecane ohloensis* Harring, 1913, p. 62; Harring & Myers, 1926, p. 354, pl. 23, figs. 4 & 5; Chengalath & Fernando, 1973, p. 18, figs. 17 & 18; Chengalath & Mulamoottil, 1974, p. 950, figs. 31 & 32.

Material: M8T.

Characters: Lorica moderately broad oval in outline. Anterior dorsal and ventral margins concave; external angles with two fairly prominent and stout spines. Dorsal plate
broadly oval and truncate posteriorly, its surface marked with four transverse rows of prominent tessellations. Ventral plate ovate, slightly narrower than the dorsal plate and marked with a few folds or ridges. Coxal plates large and obtusely pointed posteriorly. First foot joint indistinct, overlapping the sub-square second foot joint as a lobate projection. Toes long, slender, parallel sided ending into acute points; without claws.

The only report of this species from India is by Edmondson & Hutchinson (1934) from Punjab.

Measurements: Length dorsal plate 100; length ventral plate 128; width dorsal plate 75; width ventral plate 68; anterior width 52; toe 34.

Distribution: America, Brazil, Canada, Ceylon, India.

Lecane (Lecane) papuana (Murray, 1913) 
(Fl. XI, figs. 9 & 10)

Cathypna papuana Murray, 1913c, p. 551, p. 122, fig. 2.

Material: APR, BR, MNP, MST, MNK, THK.

Characters: Lorica nearly subcircular in outline. Anterior dorsal margin straight, anterior ventral margin with a V-shaped sinus and undulating sides. Dorsal plate subcircular and almost rounded posteriorly. Ventral plate narrower than the dorsal
plate and marked by a transverse fold in front of the foot. Posterior segment small, rounded and projecting a little beyond the dorsal plate. First foot joint pyriform and second joint robust. Toes parallel sided, slender, each terminating in a distinct claw with minute basal spicule.

Reported earlier from India by Edmondson & Hutchinson (1934) from Punjab, Kashmir and Ladakh; Pasha (1961) from Madras; Naidu (1967) and Dhanapathi (1976a) from Andhra Pradesh.

**Measurements**: Length dorsal plate 110; length ventral plate 114; width dorsal plate 94; width ventral plate 90; toe 35; claw 9.

**Remarks**: Russell (1957) suggested that *L. papuana* can be a variety of *L. junu*. However, Nayar (1969) and Dhanapathi (1976a) pointed out these as distinct species. I also support their views as there is no trace of intermediate stages in my collections. Moreover, the anterior margin is too characteristic to be confused with other forms.

The present specimens are identical with those described from Ceylon (Chengalath & Mulamottil, 1974) in as much as that the dorsal plate is broader than the ventral plate.

**Distribution**: Tropics and subtropics.

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

*(Pl. XI, figs. 11 & 12)*

*Listyle ploenensis* Voigt, 1902, p. 679.
*Cathypna ploenensis* Murray, 1913c, p. 552, pl. 22, fig. 4.
*Lecane ploenensis* Harrington, 1913, p. 62; 1914, p. 536; Harrington & Myers, 1926, p. 332-333, pl. 13, figs. 5 & 6; Hauer, 1938, p. 521, fig. 44; Wulfert, 1940, p. 576, fig. 17; 1966, p. 78.
Characters: Lorica elongate oval in outline. Anterior dorsal and ventral margins straight and coincident, with two small cusp-like spines at external angles. Dorsal plate ovate, truncate posteriorly, its surface markings not very distinct. Ventral plate narrower than the dorsal plate and with a few markings on it. Posterior segment small, projecting beyond the dorsal plate. Coxal plates large and rounded posteriorly. First foot joint narrow; second foot joint large. Toes very long, slender, parallel sided, ending into acute points.

Reported so far from India by Wulfert (1966) from Baroda and by Vasisht & Battish (1971d) from North West India.

Measurements: Length dorsal plate 104; length ventral plate 110; width dorsal plate 85; width ventral plate 74; toes 48.

Distribution: America, Canada, Central Brasil, Ceylon, Indonesia, India.

*Leucane* (*Leucane*) *pusilla* Harring, 1914.

(Pl. XI, figs. 13 & 14)

*Leucane pusilla* Harring, 1914, p. 541, pl. 20, figs. 4-6; Harring & Myers, 1926, p. 369, pl. 30, figs. 1 & 2; Chengalath & Fernando, 1973, p. 20, figs. 25 & 26.

Material: APR, MST.

Characters: Lorica broadly ovate in outline. Anterior dorsal and ventral margins almost straight; no anterior
spine present. Dorsal plate subcircular, very slightly truncate posteriorly, projecting somewhat beyond the ventral plate, its surface markings not distinct. Ventral plate almost parallel in the anterior half and slightly obtuse posteriorly, with a few surface markings only. Posterior segment rounded and projecting beyond the dorsal plate. Coxal plates small and rounded posteriorly. Toes long, slender, each terminating into very slender, recurved and acute claw.

Represents new record from this country.

Measurements: Length dorsal plate 47; length ventral plate 51; width dorsal plate 46; width ventral plate 42; anterior width 44; toe 12; claw 5.

Distribution: America, Ceylon, Russia.

Lecane (Lecane) unguilata (Cosse, 1887).

(Pl. XI, figs. 15 & 16)

Cathypna unguilata Cosse, 1887 b, p. 361, pl. 9, fig. 1; Hudson Cosse, 1889, suppl., p. 42, pl. 11, fig. 36; Jennings, 1900, p. 91, pl. 19, figs. 26 & 27; Rousselet, 1906, p. 406, pl. 15, fig. 1.

Lecane unguilata Harring, 1913, p. 62; 1914, p. 535; Harring & Myers, 1926, p. 323-325, pl. 10, figs. 3 & 4; Hauer, 1930, p. 526-527; 1963, p. 188; Wulfert, 1966, p. 83, fig. 30, a-d; Chengalath & Fernando, 1973, p. 21, figs. 27 & 28; Chengalath & Mulemoottil, 1974, p. 952, figs. 41-43; Dhanapathi, 1976a, p. 11, pl. 1, figs. 1 & 2.

Material: APR, BB, BH, BR, MST.

Characters: Lorica broadly ovate in outline.

Anterior dorsal margin nearly straight, ventral margin very slightly concave and with two triangular cusps at external angles. Dorsal
plate oval, narrower than the ventral plate and without any surface markings. Ventral plate oval, broad and marked with an indistinct fold in front of the foot joint. Posterior segment broad, truncate and projecting beyond the dorsal plate. Coxal plates large and obtusely pointed. First foot joint indistinct and second foot joint fairly broad. Toes straight, very slightly enlarged posteriorly and each ending in a long, stout claw with a prominent basal spicule.

Reported earlier from India by Wulfert (1966) from Baroda and by Ihanapathi (1976a) from Andhra Pradesh.

**Measurements:** Length dorsal plate 320; length ventral plate 290; width dorsal plate 184; width ventral plate 210; toes 80; claw 45.

**Remarks:** The present specimens differ from those described by Wulfert (1966) in having dorsal plate less broad than the ventral plate.

**Distribution:** Cosmopolitan.

**Lecane (Lecane) verscunda** Harring & Myers, 1926.

(Pl. XI, figs. 17 & 18)

**Lecane verscunda** Harring & Myers, 1926, p. 358-359, pl. 25, figs. 3 & 4; Chengalath & Fernando, 1973, p. 21, figs. 29 & 30; Chengalath & Mulamottil, 1974, p. 952, figs. 44 & 45.

**Materials:** IMT, MNK, SR.

**Characters:** Lorica broadly ovate in outline. Anterior dorsal and ventral margins nearly straight, coincident but in some specimens dorsal plate very slightly convex with
two small, acutely pointed, incurved spines at external angles. Dorsal plate broadly ovate, very slightly truncate posteriorly and its surface markings not distinct. Ventral plate somewhat elongate oval, with a few surface markings. Posterior segment fairly large and semicircular. Coxal plates small and very obtusely pointed posteriorly. First foot joint long, parallel and pointed posteriorly; second joint robust, pyriform and projecting beyond the lorica. Toes fairly long, parallel sided. Claw long, conical and indented at the base.

This lecanid is reported for the first time from India.

Measurements: Length dorsal plate 56; length ventral plate 60; width dorsal plate 50; width ventral plate 45; toe 19; claw 6.

Distribution: America, Canada, Ceylon.

Lecane (Hemimonostyla) inopinata Harring & Myers, 1926. (Pl. XI, figs. 19 & 20)

Lecane inopinata Harring & Myers, 1926, p. 374-375, pl. 32, figs. 5 & 6; Ihanapathi, 1976a, p. 14, pl. 2, fig. 5.

Material: DM, MSK, SR.

Characters: Lecane broadly ovate in outline, its width almost 2/3 of the length. Anterior dorsal and ventral margins not coincident, nearly straight and very slightly convex in some specimens; no anterior spine present. Dorsal plate oval and slightly truncate posteriorly. Ventral plate broadly ovate, narrower than the dorsal plate, marked with two transverse and several longitudinal ridges. Posterior segment small, rounded and projecting a little beyond the dorsal plate. Coxal plates
rounded posteriorly. First foot joint large, pyriform and lobate posteriorly; second joint subsquare and robust. Toes long, slender, parallel sided, each terminating into fairly long, acute claws; toes fused for about 1/3 of their length.

Earlier record from India is only by Dhanapathi (1976a) from Andhra Pradesh.

Measurements: Length dorsal plate 75; length ventral plate 80; width dorsal plate 60; width ventral plate 57; toes 25; claw 5.


Distribution: America, Ceylon, Germany, India.

*Lacera (Lacera) sympoda* Hauer, 1929.

(Pl. XI, figs. 21 & 22)

*Lacera sympoda* Hauer, 1929, p. 512-513, fig. 10, a-b; 1938, p. 524-525, fig. 48, a-b; Koch-Althaus, 1963, p. 418, fig. 27; Wulfert, 1966, p. 80, fig. 30, a-f; Chengelath & Fernando, 1973, p. 21, figs. 31 & 32; Chengelath & Mulumoottil, 1974, p. 952, figs. 46 & 47.

Material: APR, MNP, MST, SR.

Characters: Lorica broadly oval in outline; its width almost 4/5 of its length. Anterior margins not coincident, dorsal margin nearly straight or slightly convex and overlapping the ventral margin; lorica broadened and drawn out at external angles. Dorsal plate almost oval, truncate at posterior end, its surface marked with four rows of raised
wrinkles. Ventral plate slightly narrower than the dorsal plate and marked by a transverse fold in front of the foot and several longitudinal folds. Posterior segment broadened, rounded posteriorly and projecting beyond the dorsal plate. Coxal plates rounded posteriorly. First foot joint ending in a small knob, second foot joint quadrangular. Toes long, slender, about 1/3 the loria length, straight and parallel sided, terminating into acute claws; toes fused for about 1/4 of their length.

The only record of this rotifer earlier from India is by Wulfert (1966) from Baroda.

Measurements: Length dorsal plate 58; length ventral 64; width dorsal plate 56; width ventral plate 46; toe 16; claw 8.

Distribution: America, Ceylon, Germany, India.

**Locane (Monostyla) bulla** (Gosse, 1851).

(Pl. X, figs. 1 & 2)

**Monostyla bulla** Gosse, 1851, p. 200; Hudson & Gosse, 1886, p. 99, pl. 25, fig. 4; Jennings, 1900, p. 93, pl. 21, figs. 37-39; Murray, 1913a, p. 353, pl. 15, fig. 33; Harring & Myers, 1926, p. 388-389, pl. 37, figs. 1 & 2; Vaisith & Battish, 1971d, p. 367, figs. 10-13; Ihanapathi, 1976a, p. 14.

**Locane bulla** Denner, 1954, p. 86, fig. 20, a-c; Hauer, 1963, p. 187; Wulfert, 1966, p. 70, fig. 15, a-c; Chengalath & Fernando, 1973, p. 22, figs. 33 & 34; Chengalath & Mulamoottil, 1974, p. 952, figs. 48-50.

Material: APR, BH, BH, BN, BL, BPR, IL, GR, IMT, MNP, MST, SR.

Characters: Lorica somewhat elongate-oval in
outline. Anterior dorsal margin with a shallow sinus, ventral margin with a deep sinus, rounded at the posterior end and with small cusps at external angles. Dorsal plate elongate-oval and rounded posteriorly. Ventral plate identical in outline and almost the same width, marked by a transverse fold in front of the foot. Posterior segment small, rounded and projecting beyond the dorsal plate. Coxa plates small, rounded posteriorly. First foot joint indistinct; second joint large. Toes long, slender and ending in long, slender, acutely pointed claw with distinct basal spicule. Claw with a distinct median line but not divided.

Earlier reports from India are by Edmondson & Hutchinson (1934) from Punjab, Kashmir, Ladakh and Nilgiri Hills; Pasha (1961) from Madras; Wulfert (1966) from Baroda; Nayar (1968) from Rajasthan; Vasisht & Gupta (1967), Vasisht & Battish (1971d), Das & Akhtar (1976) and Sharma (1976) from North West India; Dhana-pathi (1976a) from Andhra Pradesh; Anderson (1889) and Tiwari & Sharma (1977) from Calcutta. This species is also widely distributed in the present collections.

Measurements: Length dorsal plate 112; length ventral plate 118; width dorsal plate 82; width ventral plate 80; claw 50; toe 6.

Distribution: Cosmopolitan.

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

(Pl. XII, figs. 3 & 4)

*Monostyla closterocerca* Schmarda, 1859, p. 59, pl. 14, fig. 125; Murray, 1913a, p. 357, pl. 15, fig. 39; Haring, 1914.
Material: APR, AMT, BB, BRP, IMT, MNK, MGP, MST, SR, SRK, THK, TOL.

Characteristics: Lorica subcircular in outline. Anterior dorsal and ventral margins coincident and with a shallow sinus. Dorsal plate nearly circular, rounded posteriorly and its anterior edges curving inwards. Ventral plate broadly oval, narrower than the dorsal plate and marked with a transverse fold in front of foot joint. Posterior segment, broad, semicircular and projecting beyond the dorsal plate. Coxal plates large, rounded posteriorly and terminating slightly beyond the first foot joint. First foot joint indistinct and second joint subsquare. Toes long, parallel sided for half of its length and tapering to a slender, acute point.

Earlier reports from India are by Edmondson & Hutchinson (1934) from Punjab, Kashmir, Ladakh and Nilgiri Hills; Wulfert (1966) from Baroda; Nayar (1968) from Rajasthan and Vasisht & Battish (1971d) and Las & Akhtar (1976) from North West India.

Measurements: Length dorsal plate 58; length ventral plate 68; width dorsal plate 55; width ventral plate 50; toes 24.

Distribution: Cosmopolitan.
Lecane (Monostyla) crenata (Harring, 1913).
(Pl. XII, figs. 5 & 6)

Monostyla crenata Harring, 1913, p. 399, pl. 36, figs. 4-6;
Harring & Myers, 1926, p. 386, pl. 36, figs. 5 & 6; Hauer,
1929, p. 158-159, fig. 16.
Lecane crenata Chennalath & Mulamoottil, 1974, p. 954, figs. 58
& 59.

Material: IMT, TIM.

Characters: Lorica broadly ovate in outline. Anterior dorsal margin very slightly concave and ventral margin
with a slightly deep sinus. Dorsal plate broadly ovate and
slightly truncate posteriorly. Ventral plate broadly ovate and
narrower than the dorsal plate, marked by a transverse fold in
front of the foot. Posterior segment small, rounded and project­
ing beyond the dorsal plate. Coxal plates rather small and
obtusely pointed. First foot joint oval; second joint robust.
Toe long, slender, parallel sided and terminating in a short claw
with two minute basal spicules.

Recorded earlier from India by Edmondson & Hutchinson (1934)
from Punjab, Kashmir and Nilgiri Hills and Vasisht & Gupta (1967)
and Das & Akhtar (1976) from North West India.

Measurements: Length dorsal plate 122; length
ventral plate 130; width dorsal plate 93; width ventral plate 81;
toe 52; claw 16.

Distribution: Apparently cosmopolitan.

Lecane (Monostyla) decipiens (Murray, 1913).
(Pl. XII, fig. 7)

Monostyla decipiens Murray, 1913a, p. 360, pl. 15, fig. 43;
Material: ACP, BB, MNP, MST.

Characters: Lorica broadly ovate in outline. Anterior margins coincident and with deep V-shaped sinus, rounded posteriorly and with a cusp opposite the incurved edges of the dorsal plate; no frontal spines present but two triangular, acute cusps formed by the anterior sinus and the edges of the lorica. Dorsal plate broadly ovate and rounded posteriorly. Ventral plate ovate, slightly narrower than the dorsal plate, without any surface markings. Posterior segment small, obtusely posteriorly and projecting considerably beyond the dorsal plate. First foot joint semi-elliptical; second joint broadly ovate and widest posteriorly. Toe long, slender, parallel sided for half of its length and tapering gradually to an acute point.

This species has been recorded earlier from India only by Vasisht & Gupta (1967) and Battish (1971d) from North West India; Tiwari & Sharma (1977) from Calcutta (West Bengal).

Measurements: Length dorsal plate 82; length ventral plate 90; width dorsal plate 90; width ventral 54; toe 38.

Distribution: America, Canada, Ceylon, India.

**Lacana decipiens** Chengalath & Fernando, 1973, p. 23, figs. 37 & 38; Chengalath & Mulamoottil, 1974, p. 954, figs. 60 & 61.

**Lacana (Monostyla) furcata** (Murray, 1913)

(Pl. XII, figs. 8 & 9)

**Monostyla furcata** Murray, 1913a, p. 358, pl. 15, fig. 10; Harring,
1914, p. 548; Haring & Myers, 1926, p. 407, pl. 43, figs. 5 & 6; Hauer, 1929, p. 154-155, fig. 11, a-b.

Lecane furcata Chengalath et al., 1974, p. 84-85, figs. 9 & 10;
Chengalath & Mulamoottil, 1974, p. 954, figs. 64 & 65.

Material: APR, BB, CK, DMT, MNP, MST, SR.

Characters: Lorica broadly ovate or subcircular in outline. Anterior dorsal and ventral margins straight, not coincident. Dorsal plate subcircular, without any posterior truncation and larger than the ventral plate. Ventral plate almost parallel sided anteriorly and rounded posteriorly. Posterior segment completely covered by the dorsal plate. Coxal plates rounded posteriorly. First foot joint almost parallel sided; second joint stout. Toe short, stout, straight parallel sided, terminating into two distinct claws, immobile and separated by a V-shaped notch.

This rotifer is reported earlier only from North West India by Sharma (1976).

Measurements: Length dorsal plate 64; length ventral plate 60; width dorsal plate 52; width ventral plate 46; toe 16; claw 4.

Distribution: America, Canada, Ceylon, Germany, Indonesia, India.

Lecane (Monostyla) hamata (Stokes, 1896).

(Pl. XII, figs. 10 & 11)

Monostyla hamata Stokes, 1896, pl. 21, pl. 7, figs. 6-8; Jennings, 1900, p. 94, pl. 22, figs. 42-44; Murray, 1913a, p. 359, pl. 15, fig. 41; Haring, 1914, p. 548; Haring & Myers,
Material: APR, BB, DMT, MST, SR, TOP, TUL.

Characters: Loricata elongate in outline.

Anterior margins not coincident. Dorsal margin with a shallow lunate sinus. Ventral margin with a deep V-shaped sinus, rounded posteriorly. No frontal spines but two acute angled cusps formed between the external edges of the ventral plate and the anterior sinus. Dorsal plate oval and rounded posteriorly. Ventral plate elongate oval, slightly narrower than the dorsal plate and marked by a transverse fold in front of the foot. Posterior segment obtusely pointed, projecting beyond the dorsal plate. Coxal plates obtusely pointed posteriorly. First foot joint small, oval; second joint large and subsquare. Foot long, slender, parallel sided for half of its length, tapering to an acute point.

It has been reported previously from India by Edmondson & Hutchinson (1934) from Punjab, Ladakh and Nilgiri Hills; Pasha (1961) from Madras; Wulfert (1966) from Baroda; Nayar (1968) from Rajasthan and Vasisht & Battish (1971d) from North West India.

Measurements: Length dorsal plate 67; length ventral plate 71; width dorsal plate 46; width ventral plate 40; toe 24.

Distribution: Cosmopolitan.

Lecane (Monostyla) lunaria (Ehrenberg, 1832).

(Pl. XII, figs. 12 & 13)
Lepadella lunaria Ehrenberg, 1832, p. 127.
Monostyle lunaris Hudson & Gosse, 1886, vol. 2, p. 98, pl. 25, fig. 2; Jennings, 1900, p. 92, pl. 21, fig. 41; Murray, 1913a, p. 351, pl. 15, fig. 31; Harring & Myers, 1926, p. 384, pl. 35, figs. 1-6; Hauser, 1929, p. 157, fig. 15, a-b; 1936, p. 541-542.


Material: ACP, BPR.

Characters: Lorica broadly ovate in outline. Anterior dorsal margin narrow and with a V-shaped sinus, ventral margin wide and with a deep sinus. Dorsal plate broadly ovate and rounded posteriorly. Ventral plate broadly oval, narrower than the dorsal plate and marked by a transverse fold in its posterior portion. Posterior segment large, rounded and projecting beyond the dorsal plate. Coxal plates obtusely pointed. First foot joint indistinct; second joint subsquare and robust. Toe long, slender, almost straight and parallel sided. Claw long, slender, acutely pointed and with two minute spicules.


Measurements: Length dorsal plate 68; length ventral plate 76; width dorsal plate 66; width ventral plate 60; toe 40; claw 8.

Distribution: Cosmopolitan.

Lecane (Monostyle) pawlowskii Wulfert, 1966.

(Pl. XII, figs. 14 & 15)

Lecane pawlowskii Wulfert, 1966, p. 77, fig. 22, a-c.
Material: MNP.

Characters: Lorica almost oval in outline, flattened laterally. Anterior dorsal margin very slightly concave, ventral margin with a U-shaped sinus; corners rounded and without any spine. Dorsal plate almost oval and truncated posteriorly. Ventral plate narrower than the dorsal plate and marked by a few folds. Posterior segment distinct, narrowing posteriorly, projecting beyond the dorsal plate. Coxal plates small and rounded posteriorly. First foot joint broad; second trapezoid. Toe long, slender, parallel sided for 2/3 of its length and terminating into acute point.

This species was described by Wulfert (1966) from Baroda.

Measurements: Length dorsal plate 60; length ventral plate 74; width dorsal plate 52; width ventral plate 44; toe 26.

Distribution: India.

Lecane (Monostyla) pyriformis (Laday, 1905).

(Pl. XII, figs.16 & 17)

Monostyla pyriformis Laday, 1905a, p. 330; 1905b, p. 112, pl.17, fig. 6; Haring & Myers, 1926, p. 409, pl. 45, figs. 1 & 2; Hauser, 1929, p. 156, fig. 13, a-b; 1953, p. 168.

Lecane pyriformis Chengalath et al., 1974, p. 87, figs. 19 & 20; Chengalath & Mulamoottil, 1974, p. 956, figs. 74 & 75; Koste 1974b, p. 34, fig. 13.

Material: APR, MST, SR.

Characters: Lorica broadly ovate in outline. Anterior margins coincident, almost straight and rounded at the
external angles. Dorsal plate broadly ovate and rounded posteriorly. Ventral plate ovate, narrower than the dorsal plate. Coxal plates small, obtusely pointed posteriorly. First foot joint semi-elliptic; second joint robust and subsquare. Toe long, parallel sided for 1/2 of its length, then tapering gradually to a slender point.

Represents new record from this subcontinent.

Measurements: Length dorsal plate 44; length ventral plate 48; width dorsal plate 49; width ventral plate 38; toe 20.

Distribution: Cosmopolitan.

Lecane (Monostyla) sinuata (Hauer, 1938).

(Pl. XII, fig. 18)

Monostyla sinuata Hauer, 1938, p. 545, fig. 67, a-b. Lecane sinuata Wulfert, 1966, p. 79, fig. 33.

Material: BPR.

Characters: Lorica almost oval in outline and its width about 2/3 of its length; anterior body opening small. Anterior dorsal margin with a V-shaped sinus. Ventral margin with a very deep notch in its middle bounded by curving margins; external angles with small spines. Dorsal plate egg shaped, flat and almost rounded posteriorly. Ventral plate narrower than the dorsal plate, its surface markings indistinct except for a transverse fold. Posterior segment small, rounded and projecting beyond the dorsal plate. Coxal plates small. First foot joint indistinct; second joint rectangular. Toe stout, almost parallel sided, terminating into an acute point.
Reported earlier from this country only by Wulfert (1966) from Baroda.

Measurements: Length dorsal plate 73; length ventral plate 76; width dorsal plate 56; width ventral plate 46; toe 30.

Distribution: Sumatra, India.

**Lecane (Monostyle) stanroosii** (Meissner, 1908).

(Pl. XII, figs. 19 & 20)

**Monostyle stanroosii** Meissner, 1908, p. 22, pl. 1, fig. 8; Myers, 1917, p. 476; Harring & Myers, 1926, p. 394, pl. 39, figs. 1 & 2; Ihanapathi, 1976a, p. 15, pl. 2, figs. 1 & 2.

**Lecane stanroosii** Donner, 1954, p. 87, fig. 19, a-e; Wulfert, 1965b, p. 358, fig. 7, a-e; 1966, p. 80, fig. 35, a-e; Chengalath & Fernando, 1973, p. 25, figs. 47 & 48; Changalath & Kulamoottil, 1974, p. 956, figs. 78 & 79.

Material: AMT, BR, MNK.

Characters: Lorica very broadly ovate in outline. Anterior dorsal margin almost straight and ventral margin with a shallow sinus with strongly convex sides and externally with two short, stout, incurved hook-like frontal spines. Dorsal plate oval and narrow anteriorly. Ventral plate broadly oval, broader than the dorsal plate and marked by a transverse fold in front of the foot. Posterior segment small and rounded. Coxal plates large, semi-elliptical. First foot joint oval and indistinct; second joint robust and rhomboid. Toe long, stout, slightly tapering and slightly enlarged in its middle. Claw short, acutely pointed and with two distinct basal spicules.

Earlier records from India are by Edmondson & Hutchinson.
(1934) from Punjab and by Dhanapathi (1976a) from Andhra Pradesh.

Measurements: Length dorsal plate 78; length ventral plate 98; width dorsal plate 78; width ventral plate 82; toe 32; claw 8.

Remarks: Wulfert (1966) described *L. californica* from Baroda, which differs from the present specimens in the shape of the toe.

Distribution: Africa, America, Canada, Ceylon, China, India.

*Lecane (Monostyla) thalera* (Harrington & Myers, 1926).

*(Pl. XII, figs. 21 & 22)*

*Monostyla thalera* Harrington & Myers, 1926, p. 393, pl. 39, figs. 3 & 4.

*Lecane thalera* Hauer, 1963, p. 188, fig. 21; Wulfert, 1966, p. 80-81.

Material: 104.

Characters: Lorica broadly oval in outline. Anterior dorsal margin concave and sinuate, ventral margin moderately deep with a V-shaped sinus; external angles with two small anterior spines. Dorsal plate oval and rounded posteriorly. Ventral plate almost of the outline, narrower than the dorsal plate and marked by a transverse fold in front of the foot. Posterior segment large, slightly truncate posteriorly and projecting beyond the dorsal plate. Coxal plates large and obtusely pointed posteriorly. First foot joint elongate ovate and second joint large. Toe long, spindle shaped. Claw long, strong, acutely pointed and with small basal spicules.
This species has been recorded previously only by Wulfert (1966) from Baroda.

**Measurements:** Length dorsal plate 135; length ventral plate 144; width dorsal plate 94; width ventral plate 88; toe 50; claw 14.

**Distribution:** India, Neotropics and Palaearctic.

**Lecane (Monostyla) quadridentata** (Ehrenberg, 1932).

*Monostyla quadridentata* Ehrenberg, 1832, p. 130; Hudson & Cosse, 1886, p. 100, pl. 25, fig. 3; Anderson, 1889, p. 355; Murray, 1919a, p. 354, pl. 15, fig. 34; Herring, 1914, p. 547; Herring & Myers, 1926, p. 391, pl. 38, figs. 3 & 5; Hauer, 1938, p. 545; 1954, p. 168; Banyar, 1968, p. 177; Dhanapathi, 1976a, p. 15.

**Lecane quadridentata** Wulfert, 1966, p. 54; Chengalath & Fernando, 1973, p. 25, figs. 45 & 46; Chengalath & Mulamoottil, 1974, p. 956, figs. 76 & 77.

**Material:** BPR, IMT, MST, SR.

**Characters:** Lorica broadly ovate in outline. Anterior dorsal margin with a deep, narrow median sinus flanked by two outcurved spines; ventral margin with a pointed V-shaped sinus, its sides very slightly convex in front and with two minute frontal spines. Dorsal plate broadly ovate, slightly truncated posteriorly and narrower than the ventral plate. Ventral plate of the same outline and marked by a transverse fold in its posterior region. Posterior segment small and rounded. First foot joint elongate oval; second joint subcylindrical. The long, parallel
sided. Claw long, slender, acutely pointed and with two basal spicules.

This species is widely distributed in India and has been recorded earlier by Edmondson & Hutchinson (1934) from Kashmir; Arora (1965) from Nagpur; Nayar (1968) from Rajasthan; Vasisht & Battish (1971d); Das & Akhtar (1976) and Sharma (1976) from North West India; Lhanapathi (1976a) from Andhra Pradesh; Anderson (1889) and Tiwari & Sharma (1977) from Calcutta (West Bengal).

Measurements: Length dorsal plate 108; length ventral plate 120; width dorsal plate 76; width ventral plate 80; anterior width 50; toe 50; claw 18.

Distribution: America, Ceylon, Europe, Japan, India.

Leeana (Monostyle) unquitata (Fadeev, 1925).

(Pl. XIII, figs. 1 & 2)

Monostyla unquitata Fadeev, 1925a, p. 9, fig. 7; Hauer, 1938, p. 548, fig. 71, a-b.
Leeana unquitata Wulfert, 1966, p. 82-83, fig. 38, a-e; Chengalath & Fernando, 1973, p. 25, figs. 49 & 50.

Material: IMT, MHK, SR.

Characters: Lorica almost circular in outline; anterior opening relatively small. Anterior dorsal margin almost straight, ventral margin undulating and with a fairly deep sinus in its middle; external angles with fairly deep sinus in its middle; external angles with fairly prominent rounded corners. Dorsal plate almost pyriform, smooth, truncated posteriorly. Ventral plate broader than the dorsal plate and marked by a
transverse fold. Posterior segment small, rounded and projecting beyond the dorsal plate. Coxal plates large and rounded posteriorly. First foot joint indistinct; second joint rectangular. Toe long, strong, almost parallel sided, ending in a fairly long and acutely pointed claw with two basal spicules. An indistinct furrow present on claw.

The only record from India is by Wulfert (1966) from Baroda.

Measurements: Length dorsal plate 90; length ventral plate 100; width dorsal plate 81; width ventral plate 90; toe 24; claw 12.

Distribution: Africa, Ceylon, Indonesia, India.


Trophi virgate, modified for suction. Corona ventral (Notomata-type), often with ciliated auricles. Trunk usually spindle shaped. Foot usually not clearly set off from the body. Toes present.

Only one genus belonging to the mentioned family has been recorded in the material examined for this study.

Genus: Scaridium Ehrenberg, 1830.

Lorica thin. Foot very long and three segmented. Toes about 2/3 the length of foot.

This genus is represented by only one species in these collections.

Scaridium longicaudum (C. G. Müller, 1786).

(Pl. XIII, fig. 3)

Trichods longicauda Müller, 1786, p. 216, pl. 31, figs. 8-10.
Lurcularia loccauda Bory de St. Vincent, 1826, p. 70.

Scaridium lonolcaudum, Ehrenberg, 1830, p. 47; Harring, 1913, p. 95; Hauer, 1938, p. 556; Donner, 1943a, p. 27-28, fig. 5, a-i; Wulfert, 1966, p. 87; Pourriot, 1968, p. 486; Vasisht & Battish, 1969, p. 593-594, figs. 1 & 2; Chengalath et al., 1973, p. 47, fig. 73.

Material: APR, MST, MNP.

Characters: Lorica thin, more or less cylindrical. Foot three-segmented, arising from the posterior end of the body; distal foot segment longest. Toes long and with somewhat blunt distal end. Striated muscle strands prominent, visible in foot segments. Trophi modified virgate, symmetrical. Lateral antennae situated behind the middle of the trunk.

Recorded earlier from India by Edmondson & Hutchinson (1934) from Punjab; Wulfert (1966) from Baroda; Vasisht & Battish (1969) from North West India.

Measurements: Total length 350; length of lorica 125; length of foot 70; toes 160.

Distribution: Cosmopolitan.

Family: TRICOCERCIIDAE Harring & Myers, 1926.

Trophi virgate, asymmetrical. Trunk usually cylindrical, asymmetrical, often arched and with a dorsal crest. Head usually with plates that can close together. Corona similar to Asplancna-type. Foot with equal or unequal bristle-like toes, substyles also present. Eyes on brain. Lateral antennae usually placed asymmetrically.

This family is represented by only one genus in the present account.
Genus *Trichocerca* Lamarck, 1801.

Body with thin lorica of varying shapes, twisted, asymmetrically. Toes equal or unequal. Trophi virgate and asymmetric.

In my material, this genus is represented by five species.

*Trichocerca brasiliensis* (Murray, 1913).
(Pl. XIII, figs. 4 & 5)

*Rattulus brasiliensis* Murray, 1913a, p. 244, pl. 10, fig. 16, a-b.
*Trichocerca brasiliensis* Changalath et al., 1973, p. 48-49, figs. 82 & 83.

**Material:** IMT.

**Characters:** Body moderately long, stout, with dorsal margin distinctly arched. Striated keel of the body extending about less than 1/3 the length of lorica. Posterior segment not distinct in the present specimen. Trophi large; fulcrum expanded at its distal end. Right manubrium large and produced into an inwardly directed projection. Left manubrium relatively reduced, rod shaped and having a small spoon shaped projection. Main toe distinct, longer than the length of lorica.

This species represents a new record from this subcontinent.

**Measurements:** Length of lorica 150; maximum width 75; length of main toe 165; trophi 50; length of right manubrium 36; length of left manubrium 20; length of fulcrum 40.

**Distribution:** South America, Ceylon.

*Trichocerca rattus* (O.F. Müller, 1776).
(Pl. XIII, figs. 6 & 7)

*Trichoda rattus* Müller, 1776, p. 281.
Konocerca rattus Ehrenberg, 1830, p. 46.

Fattulus rattus Jennings, 1903, pl. 11, figs. 100 & 101.

Trichocerca rattus Harring, 1913, p. 101; Wulfert, 1939, p. 615-616, figs. 305, a-g; Lonner, 1943a, p. 28, fig. 6, a-c;
Wulfert, 1966, p. 88, pl. 68; Fidder, 1972, p. 60; Chengalath et al., 1973, p. 50, fig. 92; Chengalath & Mulamoottil, 1975, p. 1408, figs. 36 & 37.

Material: IMT, OR.

Characters: Body stout, cylindrical and arched dorsally. Clearly distinguishable by its wide usually striated keel extending up to 1/2 the length of body. Lateral antennae situated in the distal portion of the body, the right antenna placed higher than the left. Posterior segment not distinct. Main toe almost as long as the length of lorica. Trophi diagnostic. Manubria simple, equally extended downward; the right manubrium slightly reduced as compared to the left. Left ramus strong, plank shaped and its ends with a broad, small and thin tooth arm; right ramus obtuse.

Recorded so far from India by Edmondson & Hutchinson (1934) from Punjab, Kashmir and Ladakh and Wulfert (1966) from Baroda.

Measurements: Length of body 230; maximum width 112; main toe 182; length of trophi 47; fulcrum 32; left manubrium 33; right manubrium 24.

Distribution: Apparently cosmopolitan.

Trichocerca similis (Kierzejaki, 1893).

(Pl. XIII, figs. 8-10)

Liurella stylata Syferth, 1878, p. 85, pl. 5, fig. 23; Harring, 1914, p. 552; Hauer, 1939, p. 379, fig. 26.
Material: APR, JMT, FMK, SRK.

Characters: Body long, slender and tapering gradually; maximum width in the neck region. Anterior end with two equally long spines having a prominence between them. Keel beginning from the base of the anterior spines and extending about 1/3 of the body length. Trophi asymmetrical; fulcrum flat, left uncus with two distinct parallel combs. Foot apparently two jointed; first foot joint overlapped by the projecting posterior end of lorica. Toes short and unequal.

Earlier report from this country is only by Wulfert (1966) from Baroda.

Measurements: Lorica length 160; maximum width 42; right toe 46; left toe 32.

Distribution: Cosmopolitan.

**Trichocerca tigris** (O.F. Muller, 1786).

(Pl. XIII, figs. 11-13)

Trichoda tigris Muller, 1786, p. 206, pl. 29, fig. 8.

**Liurella tigris** Bory de St. Vincent, 1824, p. 568; Haring, 1913, p. 41; 1914, p. 552.

**Notommata tigris** Ehrenberg, 1834, p. 215.


**Trichocerca tigris** Voigt, 1957, p. 321, p. 63, fig. 12, a-e;

Chengalath & Mulamoottil, 1975, p. 1410, figs. 47-49.
Characters: Body stout and fusiform in outline. Head distinctly marked off from the body and composed of a number of folds. Lorsal margin convex and ventral margin nearly straight or slightly convex. Anterior mucron distinct and well developed. Posterior segment clearly marked. Fulcrum long and expanded at its distal end. Left manubrium long and curved inward at its free end. Right manubrium very small and thin. Left ramus with a wide distal alula. Toes two and of almost equal length.

This species is being reported for the first time from India.

Measurements: Body length 150; maximum width 50; toes 70-70; length of trophi 54; fulcrum 40; left manubrium 35; right manubrium 15.

Distribution: America, Germany, Canada.

*Trichocerca weberi* (Jennings, 1903).

*(Pl. XIII, figs. 14-16)*

*Liurella weberi* Jennings, 1903, p. 309-310, pl. 1, figs. 11-14;
Harring, 1913, p. 42; 1914, p. 552; Hauer, 1938, p. 380.

*Trichocerca weberi* Wulfert, 1939, p. 617, fig. 34, a-g; Voigt, 1957, p. 335, pl. 66, fig. 3, pl. 68, fig. 4, pl. 71, fig. 3; Ridder, 1972, p. 62, pl. 9, fig. 2; Chongalath & Muliamoottil, 1975, p. 1410, figs. 52 & 53.

Material: CR, THK, TOL.

Characters: Body short stout, almost cylindrical in outline. Head slightly marked from the body. A distinct spine present on the right anterior margin of lorica. A distinct striated keel extends up to 2/3 of the length of dorsum. Ramí strong and with almost equally wide alulæ. Fulcrum expanded at
its free end. Left manubrium large, slender and directed inward at its free end. Right manubrium reduced to a rod shaped structure. Toes two, almost equally long; the left toe a little longer than the right. Wide based, stylets present at the bases of the toes.

This species comprises a new record from Indian subcontinent.

Measurements: Body length 103; maximum width 42; left toe 45; right toe 38; trophi 45; fulcrum 31; left manubrium 32; right manubrium 12.

Distribution: America, France, Germany, Canada, India, Indonesia, New Zealand.

Family: Asplanchnidae Haring & Myers, 1926.

Trophi incudate. Corona Asplanchna-type. Trunk sacciform, transparent, illoricate. Foot, if present, very short and ventral. No intestine or anus. Often viviparous.

This family is represented by only one genus.

Genus Asplanchna Gosse, 1850.

Illoricate rotifer with delicate, transparent and sacciform body. Corona well developed as circum apical ring of cilia. Intestine, foot and toes lacking. Vitellaria horse-shoe shaped or globose. Trophi incudate, prey seized with trophi. Often viviparous, with one or several embryos.

This genus is represented by two species in my material.

Asplanchna brightwelli Gosse, 1850.
(Pl. XIV, figs. 1 & 2)

Asplanchna brightwelli Gosse, 1850, p. 23; Hudson & Gosse, 1889.
Material: APR, LL, IMT, THK, TOL.

Characters: Body illoricate, transparent, thin and sacciform. Trophi incudate, with rami possessing horn-like projections at outer margins of the base and inner spines at the middle. Vitellarium diagnostic, horse-shoe shaped and with 30-32 nuclei. Flame bulbs 18. Feeds on other rotifers.

Recorded earlier from India by Edmundson & Hutchinson (1934) from Kashmir and Ladakh and by Dhanapathi (1975b) from Andhra Pradesh.

Measurements: Total length 490; maximum width 280.

Distribution: Cosmopolitan.

Asplanchna priodonta Cosse, 1850.

(Pl. XIV, figs. 3 & 4)

Asplanchna priodonta Cosse, 1850, p. 18, pls. 1 & 2; Hudson & Cosse, 1886, p. 123, pl. 12, fig. 2; Brauer, 1912, p. 62, figs. 100-102; Harring, 1913, p. 18; Hauer, 1953, p. 217, fig. 2, a-d; Wulfert, 1956, p. 462; 1966, p. 9; Chengalath et al., 1973, p. 34, figs. 2-4.

Material: BPR, MNK, SR.

Characters: Body illoricate, transparent sacciform. Vitellarium rounded. Trophi characteristic; inner edges of each ramus with 4-6 teeth at the inner side of the anterior
end, also the base of ramus with two lateral prolongations, fulcrum narrow. Carnivorous.

Recorded earlier from India by Edmondson & Hutchinson (1934) from Kashmir and by Wulfert (1966) from Baroda.

Measurements: Total length 520; maximum width 300.

Distribution: Cosmopolitan.


Larvae free-swimming with ciliated foot. Adults creeping, sessile or pelagic. Only family Testudinellidae loricated.

This order is represented by only one suborder in this account.

Suborder: FLOSCULARIACEA Remane, 1933.

Body loricate or illoricate. Trophi malleoramate. Corona Hexarthra- or Conochilus- type. Foot, if present, without toes; in free living forms or in juvenile stages, it terminates into a ciliated cup. Numerous foot glands. Solitary free-swimming, free-swimming colonies or sessile forms; sessile forms often with a gelatinous sheath or tube made up of detritus.

Only three families belonging to this suborder are represented in the present material.

Family: TESTUDINELLIDAE Herring & Myers, 1926.

Creeping, semipelagial forms; not in tubes or in colonies. Body with loria, without any long appendages. Foot, if present, tubiform and terminally ciliated.
In the present material, this family is represented by only two genera.

**Genus Pompholyx** Gosse, 1851.

Lories egg shaped, not broad, truncated posteriorly. Cloacal aperture situated at the posterior extremity of the lorica. Foot lacking.

Only one species of this genus is present in this material.

**Pompholyx sulcata** Hudson, 1885.

(Pl. XIV, fig. 5)

**Pompholyx sulcata** Hudson, 1885, p. 613, pl. 12, figs. 7 & 8;
Brauer, 1912, p. 198, fig. 391; Harring, 1913, p. 87;
Hada, 1938, p. 182, fig. 10, a—by Hauer, 1938, p. 554;

**Material**: AMT, BN, BN, MNK, SR, THK.

**Characters**: Lorica almost egg shaped or circular, tapering towards the posterior end; divided into four lobes in cross-section. Frontal edge of lorica raised into a lobe like projection dorsally, two elevations laterally and with a shallow sinus ventrally. Posterior end truncate, cloacal aperture situated posteriorly. Eggs connected with elastic threads to the posterior end of lorica.

This species has been recorded earlier from India only by Edmondson & Hutchinson (1934) from Ladakh.

**Measurements**: Total length 84; maximum width 68.

**Distribution**: Cosmopolitan.
Testudinella patina (Hermann, 1783).
(Pl. XIV, fig. 6)

Brachionus patina Hermann, 1783, p. 48, pl. 2, fig. 70.
Pterodina patina Brauer, 1912, p. 196, fig. 385.
Testudinella patina Harring, 1913, p. 100; 1914, p. 554; Hada, 1938, p. 180; Hauer, 1938, p. 559; Donner, 1954, p. 110-
111, fig. 17, i; 1963, p. 190; Pourriot, 1968, p. 487;
Chengalath et al., 1973, p. 57, fig. 131.

Material: AMT, DL, DMT, MNP, SR, THK.

Characters: Lorica delicate, transparent and circular in outline; dorsoventrally flattened and composed of dorsal and ventral plates, fused laterally. Corona with marginal cilia and projecting from the gape of lorica in living specimens. Anterior end of lorica with one prominent anteromedian lobe and two flattened lobes. Foot opening circular, almost 1/3 from the posterior end of lorica. Foot annulated retractile and terminating in a ciliated cap.

It has been previously reported from India by Edmondson & Hutchinson (1934) from Punjab & Ladakh; Wulfert (1966) from Baroda; Sharma (1976) from North West India and Tiwari & Sharma (1977) from Calcutta.

Measurements: Length of lorica 170; maximum width 165.

Distribution: Cosmopolitan.


Forms without lorica, body with 3 or 4 setae. Circum apical band with a single circle of cilia. Trophi malleoramate.
This family is represented by only one genus in the present material.

Genus *Filinia* Bory de St. Vincent, 1824.

Body sac-like, truncate anteriorly. With 3 (*Filinia*) or 4 (*Filinia* = *Tetramastix*) setae, which are with or without spinules. Foot absent. Trophi malleoramate, unci with many teeth.

Only three species of this genus are represented in my collection.

*Filinia longissima* (Ehrenberg, 1834).

(Pl. XIV, fig. 7)

*Triarthra longissima* Ehrenberg, 1834, p. 222, p. 18, fig. 1;
Hudson & Gosse, 1886, p. 8, pl. 13, fig. 10; Sewell, 1935, p. 208.

*Filinia longissima* Harring, 1913, p. 48; 1914, p. 554; Edmondson & Hutchinson, 1934, p. 163, fig. 2; Donner, 1954, p. 78, fig. 13, a, b; Arora, 1962, p. 36, pl. 2, fig. 2, text fig. 2; Ruttner-Kolisko, 1972, p. 213; Chengalath *et al.*, 1973, p. 54, fig. 110.

Material: APR, BB, BPR, IMT, GR, THK, TOL.

Characters: Body thin, fairly long, barrel-shaped. With two long anterior lateral setae and one long posterior seta; posterior seta situated ventrally away from the terminal point and its point of attachment variable.

Reported earlier from India by Arora (1962) from Nagpur; Wulfert (1966) from Baroda; Vasisht & Gupta (1967) from Chandigarh; Nayar (1968) from Rajasthan.
Measurements: Body length 175-200; lateral setae 300-330; posterior setae 190-240.

Distribution: Cosmopolitan.

Filinia opoliensis (Zacharias, 1898).

(Pl. XIV, fig. 8)

Tetramastix opoliensis Zacharias, 1898, p. 132, pl. 1, figs. 6-7; Harring, 1913, p. 101; Hauer, 1938, p. 560, fig. 84; Arora, 1962, p. 37, text fig. 3; Wulfert, 1966, p. 88.

Tetramastix opoliensis f. brevispina Koste, 1972, p. 413, pl. 48, fig. 8.

Filinia opoliensis Nayar, 1968, p. 183; Ruttner-Kolisko, 1972, p. 214, fig. 10; Chengalath et al., 1973, p. 54, fig. 113.

Material: AMT, BH, BL, GR, THK, TOP.

Characters: Body long, slender, slightly compressed laterally. Cuticle thick. Anterior lateral setae long, broad-based, equal or unequal. Posterior longer setae with an additional small seta (spine).

This species has been recorded so far from India by Arora (1962) from Nagpur; Wulfert (1966) from Baroda; Vasisht & Gupta (1967) from North West India; Nayar (1968) from Rajasthan.

Measurements: Body length 140-180; longer posterior setae 200-220; small posterior setae 36-50; lateral setae 240-280.

Distribution: Cosmopolitan.

Filinia pejleri Hutchinson, 1964.

(Pl. XIV, fig. 9)

Filinia pejleri Hutchinson, 1964, p. 1-8, fig. 1a; Nayar, 1968.
Material: APR, BR, SR, TOP.

Characters: Body fusiform; width about 1/3 or 1/4 of its length. Setae minutely spinulose. Posterior seta with a broad oblique base inserted terminally at hind end of the body.

This species was described by Hutchinson (1964) from Cotacamund (South India) and has also been reported by Nayar (1963) from Rajasthan.

Measurements: Body length 133; width 50; right anterior seta 340; left anterior seta 300; posterior seta 258.

Distribution: South and East Africa, India, Ceylon, South America.


Body spherical, without lorica and without any body appendage. Corona as a single band of cilia encircling the body (Trochosphaera) or borne apically on a short neck (Horaella).

In the present material, this family is represented by only one genus.


Only one species belonging to this genus is present in the material examined.
**Horselia brehmi** Lonner, 1949.

(Pl. XIV, fig. 10)

*Horselia brehmi* Lonner, 1949, p. 130-140, figs. 1, a-b, 2, b-c and 3, a-c; Chengalath *et al.*, 1973, p. 57, figs. 104-105.

**Material:** TIM, SR.

**Characters:** Body transparent, vesicular and broadly elliptical. Corona simple, consisting of a single ring of cilia and borne on a short neck. Mouth lying beyond the coronal ring, with two eye spots on its sides. Body tapering slightly towards the posterior end and elevated around the cloacal aperture. Trophi malleoramate, anterior end of fulcrum with two wing-like projections. Animals viviparous.

This species has been described by Donner (1949) from Banikpore (Bihar).

**Measurements:** Total length 275; maximum width 200.

**Distribution:** India, Ceylon.

**Superorder:** DIGONONTA Bartos, 1959.

Ovaries paired, with vitellarium. Animals reproducing asexually.

**Order:** BELLIDOIDEA Remane, 1933.

Mostly creeping, sometimes free-swimming forms; body elongated, fusiform, transversely wrinkled into telescopically retractile segments. No definite lorica present. Ciliated rostrum at head, carrying a long dorsal antenna. Lateral antennae
lacking. Two unfold wheel organs consisting of two ciliated discs on pedicles (Philodina-type) or a ventral ciliated area (Adineta-type). Mastax ramata. Larger number of foot glands present.

This order is represented by only one family in this account.

Family: PHILODINIADE Bryce, 1910.

Wheel organ of Philodina-type. Rostrum retractile. Tube shaped stomach lumen. Food excreta not formed into pellets.

Only one genus of this family is recorded in the present material.

Genus Rotaria Scopoli, 1777.

Body fusiform, usually much elongated. Last foot segment with three toes. Viviparous rotifers.

In the present material only one species of this genus has been recorded.

Rotaria neptunia (Ehrenberg, 1832).

(Pl. XIV, figs. 11-13)

Actinurus neptunia Ehrenberg, 1832, p. 145, pl. 4, fig. 23.  
Rotaria neptunia Haring, 1914, p. 536; Barsins, 1953, p. 11;  
Wulfert & Koste, 1964, p. 489; Donner, 1965, p. 167;  
Material: K, S R, S R K, T O L.

Characteristics: Body long, slender and fusiform. Corona with two trochal discs. Rostrum bearing two eyes and provided with an arched nostral lamella. Palp like dorsal antenna present on the first neck segment behind the rostrum. Trunk long and narrowing gradually. Foot very long, slender and telecopically projecting and about half of the total body length. A pair of equal, jointed and pointed spurs present. Last foot joint with three slender and equal toes.

This species has been recorded earlier from India by Dhanapathi (1973) from Andhra Pradesh.

Measurements: Total length 1380; length of trunk 520; length of foot 600; length of toes 80.

Distribution: Apparently wide spread.
Key to the recorded taxa of the Class Rotifera.

1(53). Ovary with vitellarium. Freshwater or brackish water forms. ... Subclass: EUROTATORIA Bartos, 1959.

2(46). Ovary single. ... Superorder: MONOGONGONTA Wesenberg-Lund, 1889.

3(39). Corona of diverse types. Trophi varied. Foot without ciliaries. ... Order: PLOIMIDA Delage, 1897.


5(30). Trophi malleate, not modified for suction. Mouth funnel shaped, in buccal area.

6(27). Head with hood. Corona without lateral lamellae. Eyes on brain, brow or lacking.

7(21). Dorsal surface of lorica without any longitudinal sulcus.

8(23). Only trunk surrounded with lorica.


10(13). Foot present.

11(12). Foot annulated, retractile within body. ... ... ... Genus: Brachionus Pallas, 1766.

11(11). Foot forked, with two unequal toes. ... ... ... sp.: B. diversicornis (=Schisocerca).

12(11). Foot segmented, not retractile. ... ... ... Genus: Platyias Harring, 1913.

13(10). Foot absent.

14(13). Dorsal plate flattened, with facets. ... ... ... Genus: Keratella Bory de St. Vincent, 1822.

15(9). Dorsal and ventral plates joined by flexible membrane. ... Genus: Anuraeopsis Lauterborn, 1900.

16(9). Dorsal and ventral plates joined by a thin membrane, lateral sulci deep. ... ... ... Family: EUCHLANIDAE Bartos, 1959.
Lateral sulci without lateral flange.

Dorsal plate arched, wider than ventral plate. ... Genus: *Euchlanis* Ehrenberg, 1832.

Dorsal plate flat, narrower than ventral plate. ... Genus: *Dipleuchlanis* De Beaufort, 1910.

Lateral sulci with stiff flange projecting laterally. ... Genus: *Tripleuchlanis* Myers, 1930.


With variable anterior and posterior spines. Toes two... Genus: *Mytina* Bory de St. Vincent, 1826.

Head, trunk and foot clearly defined and with lorica. ... Family: *TRICHOTrIDAE* Bartos, 1959.

Dorsum of lorica with spines placed symmetrically with respect to mid-line. Genus: *Macrochaetus* Perty, 1850.

Dorsum of lorica without spines.

Trunk strongly granulated. Foot 3-segmented, with two dorsal spines on first foot joint. ... Genus: *Trichotria* Bory de St. Vincent, 1827.

Head without hood. Corona without lateral lamellae. Eyes lateral. 

Lorica compressed laterally. ... Genus: *Colurella* Bory de St. Vincent, 1824.

Lorica compressed dorsoventrally. ... Genus: *Lepadella* Bory de St. Vincent, 1826.

Trophi malleate, modified for suction. Mouth not funnel shaped... Family: *LECANIDAE* Remane, 1933.

Lorica flattened dorsoventrally. Toes two. ... Genus: *Lecane* Nitsch, 1827.

(i) Two toes, free... Subgenus: *Lecane* (*Lecane*) Nitsch, 1827.
(ii) Two toes, partly fused.

... Subgenus: Lecane (Hemimonostyla) Bartos, 1959.

(iii) Single toe.

*** Subgenus: Lecane (Monostyla) Ehrenberg, 1830.

32(4). Corona of Notommata-type, often with ciliated auricles.

33(35). Trophi virgate, modified for suction. Foot not clearly set off from the trunk.

... Family: NOTOMMATIDAE Herring & Myers, 1926.

34(33). Lorica thin, cylindrical. Foot long, 3-segmented. ... Genus: Scutidium Ehrenberg, 1830.

35(37). Trophi virgate, asymmetrical. Corona similar to Asplanchna-type. Foot with equal or unequal bristle-like toes.

... Family: TRICHOCEPIDAE Herring & Myers, 1926.

36(35). Lorica and trophi asymmetrical. Trunk usually cylindrical.

... ... Genus: Trichocerca Herring & Myers, 1926.

37(35). Trophi incaudate. Corona of Asplanchna-type. Foot present or absent.

... Family: Asplanchnidae Herring & Myers, 1926.

38(37). Foot absent. ... Genus: Asplanchna Gosse, 1850.


... ... Order: OHEIISOTROCHA De Beauchamp, 1965.

40(39). Corona of Conochilus or Hexarthra-type or as a simple ring. Adults free swimming creeping, living in colonies or gelatinous tubes. ... Order FLOSCULARIAE Remane, 1933.

41(47). Corona of Hexarthra-type. Forms free swimming, not in tubes or colonies.

... Family: TESTUDINELLIDAE Herring & Myers, 1926.

42(45). With lorica, without body appendages. Foot present or absent.
43(44). Lorica dorsoventrally flattened. Foot present.
   ... Genus: Testudinosella Bory de St. Vincent, 1826.

44(43). Lorica egg shaped. Foot lacking.
   ... ... ... Genus: Phospholyx Gosse, 1851.

   ... Family: FILINIIDAE Bartos, 1959.

46(45). Body oval, with setae.
   ... ... ... Genus: Filinia Bory de St. Vincent, 1824.
   (i) three leaping setae.
   ... ... ... Filinia (Filinia) Bory de Vincent, 1824.
   (ii) four unequal setae.
   ... ... ... Filinia (= Tetramastax) Puttner-Kolisko, 1972.

47(40). Corona as simple band of cilia. Body saeciform, vesicular or transparent.
   ... ... ... Family: TROCHOSPHAERIDAE Bartos, 1959.

48(47). Corona borne on a short neck.
   ... ... ... Genus: Hormella Donner, 1949.


50(49). Mastax remote. Telescopic or leech like movement.
   ... ... ... Order: BDELLOIDEA Remane, 1933.

51(50). Corona of Philodina type, rostrum retractile.
   ... ... ... Family: PHILODINIDAE Remane, 1933.

52(51). Foot with three toes. Eyes on rostrum.
   ... ... ... ... Genus: Rotaria Scopoli, 1777.

53(1). Ovary without vitellarium. Commensal on marine crustaceans.
   ... * Subclass: SEISONA Bartos, 1959.

* Not dealt in this study.
DISCUSSION

The rotifer fauna of this region seems to be cosmopolitan when compared with the findings of Hauer (1938) and Green (1972b). Though Rousselet (1909), Edmondson (1959) and Green (1972b) considered rotifers to be potentially cosmopolitan animals, cosmopolitan species are also well represented in the present material. In this context, Green (loc. cit.) pointed that the species of tropics are cosmopolitan because the temperatures at temperate latitudes are often high enough to enable a tropical rotifer to develop a substantial population. Moreover, according to him the short life cycle, small size and opportunistic mode of life of the rotifers make them ideal as cosmopolitan. However, certain tropical species are also present in the material studied. Green (1972b) and Chengalath et al. (1974) pointed that the common occurrence of the rotifer genus Brachionus and the absence of another genus Kotholca is characteristic of many tropical faunas and the same is also found to be applicable for the present study. The rotifer fauna of this region shows a 54.9% degree of similarity (vide Sorensen Index), when compared with the fauna of Sri Lanka (Ceylon) which has been listed by Chengalath et al. (1974).

Only the subclass Eutroctatora has been dealt with in this account. A total number of 108 rotifer taxa belonging to 21 eutroctatorian genera and 91 species have been described and illustrated in this study. Out of these, 21 rotifers taxa are being recorded for the first time from this country and 77 rotifers
represent new records from this state. In addition the following rotifer species and forms have been described as new to science: *Lecane* (Lecane) *lateralis*, *Lecane* (Lecane) *crepida* f. *bengalensis*, *Lepadella triprojectus* and *Lepadella ovalis* f. *larga*. One new combination i.e., *Lecane* (Lecane) *luna* forma *dorsalis* has also been proposed by Sharma (1978).

A bulk of the rotifer taxa recorded in the present study comprises of monogonont forms which are represented by 107 rotifers (90 species) belonging to 20 genera. Representatives of order Ploimida composed an important component in the material examined. Moreover, 9 families, out of a total 21 recognised families of this order (Koste, in press), have been recorded in the present account. Out of these, family *Brachionidae* was previously a very large family but Bartos (1959) split it into six families. Amongst the genera now included under *Brachionidae*, only four have been found in this material which are further represented by a total of 22 species.

In this material, the species of the genus *Brachionus* are very common as compared to other represented rotifer genera. Certain alkaline species i.e., *B. angularis*, *B. caudatus*, *B. calyciflorus*, *B. rubens* are very well represented in the various localities. This particularly pointed to the alkaline nature of water bodies in this region. Further from these collections, it has also been possible to make some observations on the episodic nature of the *Brachionus rubens*. De Beauchamp (1932) mentioned that branchionid rotifers may perch on *Daphnia* valves and *Lepadella* and *Lecane* may occur in branchial cavities of decapode crustaceans.
Pennak (1953) also pointed that free living rotifers live as commensals or epizoic on a wide variety of freshwater invertebrates especially insects and crustaceans. As regards the species dealt with in this study i.e., Brachionus rubens, Ahlstrom (1940) stated that it occurred both as free swimming or as commensal on the cladocera genus Daphnia. Neyar (1968) reported a large number of individuals of this rotifer attached to the body of the fairy shrimp, Brachionella cucumeris (Ishikawa). Recently, Mohan & Rao (1976 a) found this species to be attached to dragon-fly nymphs. In the present study it is found to be free swimming but also occasionally attached to the body of the cladocerans i.e., Daphnia carinata, Diaphanosoma excisum, Diaphanosoma sarrei and Monia micrura dubia. In a very few instances, this rotifer is also found attached to the cyclopoid copepods, Mesocyclops leuckartii Claus and still in some other cases also attached to dragon-fly nymphs.

Another brachionic rotifer genus Keratella is represented by five species in the material examined. However, the cosmopolitan alkaline species, K. cochlearis and K. quadrata are very rare in this material. Out of the other species of Keratella, the taxonomic status of Keratella tropica is not well established. Edmondson & Hutchinson (1934) discussed the taxonomy of Keratella valga and recognised eight forms based on the condition of the posterior spine. They were namely, f. valga, f. asymmetrica, f. monstrosa, f. longiremis, f. reducta, f. brehmi and f. aspina. But later on, Carlin (1943) divided these into three forms i.e., forms valga, forms tropica and forma procurva. However, Ahlstrom (1943) for the same forms proposed the status of var. procurva
f. tropica, and f. brehmi respectively. Bernins (1955), while reviewing the valga complex designated four separate species and one variety, namely K. valga, K. tropica, K. procurva, K. lensi, and K. lensi var. helica and his treatment was based only upon the posterior area of the dorsum. Out of these, K. lensi, K. tropica and K. procurva are also represented in my collections. While the importance of dorsal pattern of lorica rather than the length of posterior spines has been pointed out by Sudsuki (1964), but he opined that the posteromedian remnant was only a characteristic of subspecific determination. Though the degree of differences between K. valga and K. procurva corresponds to the different specific level, difficulty arises between K. valga and K. tropica as the two differ only in the absence or presence of posterior remnant. Moreover, Sudsuki (1964) pointed that this difference between these two species is comparable to that between K. lensi and K. lensi var. helica. Thus he suggested to separate the two only at subspecific level. But the geographical distribution of these two indicate that they inhabit different territories; K. tropica being largely distributed between 45° N, and 45° S, whereas K. valga is confined to above 45° N, although the distribution of these two overlap in Rumania, Western Turkey, Southern Russia and Japan. Keratella tropica is also wide spread in Indian waters and most of the Indian workers retained it as separate species. The only record of Keratella valga from this country by Arora (1966b) from Nagpur. Even his identification needs further confirmation. In this study, specific name tropica has been adopted following
the works of Barsins (1955), Green (1960), Nayar (1968), Pajlar (1974).

Amongst the other genera of family Brachionidae, Anuraeopsis is represented here only by two species i.e., A. coelata and A. fisca. The former species described by De Beauchamp (1932) has been considered earlier as a subspecies of A. fisca by Barsins (1962) in his revisionary work on this genus. But in the present study, these two have been treated as separate species after the works of Wulfart (1966), Pourriot (1968) and Koste (1976). Pourriot (loc. cit.) even assigned Beauchamp's species to f. typica and differentiated the same from his new form, lanceolata based on the pattern of dorsum.

The only other brachionid genus is Platypus which has been revised by Wulfart (1965 a). Out of the species presently included under the genus, only one species i.e., quadricornis is present in my collections.

The second monogonont family Euchlanidae has three genera representing in the material studied. Out of the genera Euchlanis, Tripleuchlanis, Myers (1930) considered the last two as subgenera under the former genus. However, in this account, they have been treated as separate genera following the works of Wierzbinski (1954) and Edmondson (1959). Regarding euchlanid rotifer, Tripleuchlanis propatula, Myers (loc. cit.) mentioned that it occurred mainly in marine waters of bays and inlets. Recently, Ihanapathy (1975 b) collected this rotifer from freshwater tank in Kaikalur (Andhra Pradesh) but considered it to be of very rare occurrence in freshwaters. In the present study, a large number of specimens of this rotifer made a sporadic
appearance in a freshwater tank in the compound of Indian Museum, Calcutta. Further studies from other regions are desired to know its exact distribution. Family Mytilinidae is represented only by the genus *Mytilina*, with two species i.e., *sceanthophora* and *ventralis*. The former species represents a new record from this subcontinent. Of the later species some specimens identical with forma *longidactyla* Wulfert, 1965 have also been noticed in this material.

The genera *Macrochaetus* and *Trichotria* are the only members of family Trichoridae present in this material. The former genus is represented by only one species, *Macrochaetus sericus*. The identification of these specimens is based on the revisionary work of Wulfert (1964). The other species i.e., *Trichotria tetractis* is considered to be a very variable species. The variability in this rotifer has been already pointed out by Wulfert (1966).

Family Colurellidae is represented by only two genera i.e., *Colurella* and *Lepadella*. The later is represented by 13 species and one form (including the description of one new species and one new form). Most of the lapadelids are of rare occurrence in this material except *Lepadella patella* and *Lepadella ovalis* which are considerably common. Moreover, it is interesting to note that the specimens of the species of genus *Lepadella* recorded in this study are smaller in size as compared to the specimens described earlier from this subcontinent as well as from other regions.

The lecanid rotifers (family Lecanidae) are represented only by genus *Lecane* which has got maximum number of representa-
tives (38 taxa spreading over 32 species, including one species and one new form). However, they are not abundant numerically. The taxonomic status of the genus *Lacane* has been discussed by various earlier workers. The genus *Lacane* Hititsch, 1827 generally included the species with two well formed toes. Ehrenberg (1930), established the genus *Monostyle* to accommodate lecanids with a single toe. Harring & Myers (1926) and later on Hauer (1929) described some intergrading forms i.e., *Lacane elasnews* Harring & Myers, *Lacane incipinata* Harring & Myers, and *Lacane symplaca* Hauer in which toes are fused to some extent at the base. Hauer (1929) further commented that the extent of fusion of the toes varied considerably within the individuals of the same species. Since *Lacane* and *Monostyle* differ only in the number of toes. Edmondson (1935) suggested to combine these genera under the first genus. Voigt (1957) recognised the force in Edmondson's argument and combined the two genera, retaining the older name *Lacane* but divided the same into three groups; A, B & C. The group A contained forms with two free toes and corresponds to *Lacane* sensu strictu. Group B included lecanids with two toes fused to varying extent and Group C included species with only one toe (*Monostyle*). Bartos (1959) erected the genus *Hemomonostyle* to contain species of *Lacane* included by Voigt under his group B. Sudsuki (1964) accepted Voigt's reasoning but commented that his arguments were based on the characters of females only. However, Sudsuki (loc. cit.) considered the structure of toes as of generic importance and resurrected genus *Monostyle* for specimens with single toe. In the present material no males are available but
representatives of all the three groups proposed by Voigt (1957) are present. I am of the opinion that the character of toes is not sufficient enough to warrant establishment of different genera. At the most, it can be accepted as a subgeneric character as has been done by Chengalath & Fernando (1973), Chengalath et al., (1974) and Chengalath & Mulamoottil (1974). Dr. Walter Koste (Personal communication) also agrees with the criterion which I have followed here. Thus, in the present material Lecane (Lecane) is represented by 16 species and Lecane (Hemimonostyla) and Lecane (Monostyla) by 2 species and 16 species respectively.

Out of the other ploimate families represented in this material, only one species i.e., Scaridium longicaudum is known to represent family Notommatidae.

Family Trichocercidae is represented by five species of the genus Trichocerca Lamarck, 1801. The genus formerly comprised two genera i.e., Liurella, Bory de St. Vincent and Trichocerca Lamarck. However, Edmondson (1935) found some intermediate specimens between these two genera, thereby making it difficult to separate them. Donner (1966) treated them as subgenera under the genus Trichocerca. In the present work Edmondson's view has been followed and only generic name viz., Trichocerca, has been employed.

Genus Asplanchna is the only representative of the family Asplanchnidae in the material examined for this study. This genus is represented by only two species i.e., A. brightwelli and A. priodonta which can be safely distinguished from each other by the shape of the trophi and that of germo-vitellarium. Sudsuki (1964) proposed to split the genus Asplanchna into Asplanchnella.
including the species with 8-12 nuclei but retained those with more than 20 nuclei in the germo-vitellarium in the nominate genus. In the present study the generic name Asplanchna has been preferred for the presently recorded species.

Of the order Gnesiotrocha De Beauchamp (1965), only the suborder Ilosculariacea is represented in this material through a single family, viz., Testudinellidae. Bartos (1959) has split up the older Testudinellidae into three families, i.e., Testudinellidae, Iiliniidae and Trumphaeridae. I have followed Bartos (loc. cit.) in my concept of the family Testudinellidae which now contains only two loricate genera, namely, Testudinella and Phospholyx, each represented in the present collections by one species.

The second family Iiliniidae contained three species belonging to the genus Iilinia. The point of insertion of posterior setae is quite variable in I. longiseta but never terminal. Another species, I. peileri can be differentiated from the former species in having fusiform body. Commenting on the specimens described as I. terminalis by Edmondson & Hutchinson (1934, fig. 2c), Hutchinson (1964), himself, mentioned about the erroneous identification of the above mentioned specimens and described the same as a new species, I. peileri. Hutchinson’s work has also been followed here for identifying the present specimens. The third species i.e., I. opolensis has been invariably treated under the genus Tetramastax by various earlier workers as it possessed four unequal spines. But now (Puttnner-Kolisko, 1972), it is included in the genus Iilinia.
family Trochosphaeridae included only the floscularid rotifers which are without lorica as well as any body appendages. In the present collections, this family is represented by only one genus, i.e., Horaella. The recorded species, H. brehmi was described by Lonner (1949) from Bihar.

In conclusion it is clear that monogonont rotifers are very well represented in the present material and are abundant in the impounded waters of Lower Bengal. It is unfortunate that bdelloid rotifers, which suffer distortion of body form following preservation, could not be properly studied. The only bdelloid form that could be recorded in this study is Rotaria neptunia, the longest known rotifer. Thus further investigations, employing special techniques of bdelloids, are desired to fill up the gap in their knowledge. However, the rotifer fauna of the area investigated is quite rich and varied in its composition. My investigations also indicate while certain species are successful in a wide variety of habitats, some others show a clear preference to a particular type of habitat.
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Fig. 1. Showing general morphology of a loricate rotifer, *Brachionus urceolaris* (ventral view, with only partly protruded head), after Donner, 1966.

Fig. 2. Anterior end of a bdellloid form (ventral view), after Donner, 1966.

Abbreviations: b, bladder; br, brain; cor, corona; ex, excretory system; f, foot; fc, flame cell; fg, foot gland; gy, gastric gland; lr, lorica; m, mouth; mx, mastax; o, ovum; ov, ovary; sh, sensory hair; t, toe; ti, trophi; ul, under lip; vi, vitellarium.
PLATE - II


Patterns of wheel organs (after Donner, 1966):

Figs. 4 and 5, Notommata (ventral view and lateral view).
Figs. 6 and 7, Macrochelea (ventral view and dorsal view).
Fig. 8, Asplanchna (ventral view).
Fig. 9, Conchilus (oblique view from above).
Fig. 10, Hexarthra (view from right side).
Fig. 11, Kuchlania (ventral view).
Fig. 12, Epiphantes (ventral view).

Abbreviations: af, apical field; ba, buccal area; br, brain; c, Cingulum; Ca, circumapical band; da, dorsal antenna; e, eye; m, mouth; mx, mastax; res, retrocerebral sec; sub, subcerebral sec.
Fig. 1. Plan of rotifer trophi.

Rotatory trophi (after Donner, 1966):

Figs. 2 and 3, malleate trophi of *Dapidia* (lateral view and ventral view).

Fig. 4, virgate of *Notonema copeus* (ventral view).

Fig. 5, asymmetrical of *Trichocerca bicristata* (ventral view).

Fig. 6, forcipate of *Dioranophorus epicharis* (ventral view).

Fig. 7, forcipate of *Eoceneum*.

Fig. 8, incudate of *Asplanchna*.

Fig. 9, ramate of *Macrotrachea*.

Fig. 10, malleoramate of *Filinia*.

Abbreviations: fm, fulcrum; ma, mastax; ra, ramus; u, uncus.
PLATE IV

Map of Calcutta and its environs,
showing sites of collections.
PLATE - V

Anureopsis coelata (De Beauchamp):
Fig. 1, dorsal view; Fig. 2, ventral view.

Anureopsis fissae (Gosse):
Fig. 3, dorsal view; Fig. 4, lateral view.

Brachionus angularis Gosse:
Fig. 5, dorsal view; Fig. 6, dorsal view.

Brachionus bidentata Anderson:
Fig. 7, ventral view; Fig. 8, lateral view; Fig. 9, ventral view.

Brachionus bidentata forma adorna Wulfert:
Fig. 10, dorsal view.

Brachionus budapestinensis Daday:
Fig. 11, dorsal view.

Brachionus calyciflorus var. dorcas (Gosse):
Fig. 12, dorsal view.

Brachionus calyciflorus f. anuræiformis (Brehm):
Fig. 13, dorsal view.

Brachionus calyciflorus cf. f. borgèri (Apstein):
Fig. 14, dorsal view; Fig. 15, anterior end (ventral view).

Brachionus caudatus var. personatus Ahlstrom:
Fig. 16, dorsal view.

Brachionus caudatus var. aculeatus (Hauer):
Fig. 17, dorsal view.

Brachionus caudatus var. aculeatus f. lateralis (Hauer):
Fig. 18, dorsal view.

Brachionus caudatus f. vulgatus Ahlstrom:
Fig. 19, dorsal view.
PLATE - VI

Brachionus diversicornis (Daday) :
   Fig. 1, dorsal view.

Brachionus forficula Wierzejski :
   Fig. 2, dorsal view.

Brachionus forficula f. minor (Voronkov) :
   Fig. 3, dorsal view.

Brachionus fulcatus Zacharias :
   Fig. 4, dorsal view.

Brachionus patulus O.F. Müller :
   Fig. 5, dorsal view.

Brachionus plicatilis O.F. Müller :
   Fig. 6, dorsal view; Fig. 7, anterior end (ventral view).

Brachionus pterodinoides Rousselet :
   Fig. 8, dorsal view; Fig. 9, ventral view.

Brachionus quadridentatus Hermann :
   Fig. 10, dorsal view; Fig. 11, ventral view.

Brachionus quadridentatus mirabilis (Daday) :
   Fig. 12, dorsal view; Fig. 13, ventral view.

Brachionus quadridentatus var. cluniorbicularis :
   Fig. 14, ventral view.
PLATE VII

Euschiopus rubens Ehrenberg:
  Fig. 1, dorsal view; Fig. 2, ventral view.

Euschiopus urceolaris O.F. Müller:
  Fig. 3, dorsal view; Fig. 4, lateral view.

Keratella cochlearis (Cosse):
  Fig. 5, dorsal view; Fig. 6, lateral view.

Keratella lensi Hauer:
  Fig. 7, dorsal view.

Keratella procurva (Thorpe):
  Fig. 8, dorsal view.

Keratella quadrate (O.F. Müller):
  Fig. 9, dorsal view.

Keratella tropica (Apstein):
  Fig. 10, dorsal view.

Platyias quadricornis (Ehrenberg):
  Fig. 11, dorsal view.

Euchlanis dilatata Ehrenberg:
  Fig. 12, dorsal view; Fig. 13, lateral view; Fig. 14, cross-section.

Euchlanis orophae Cosse
  Fig. 15, dorsal view; Fig. 16, cross-section.

Dipleuchlanis propatula (Cosse):
  Fig. 17, dorsal view; Fig. 18, cross-section.

Tripleuchlanis plicata (Lavender):
  Fig. 19, dorsal view (extended specimen);
  Fig. 20, lateral view; Fig. 21, cross-section.
PLATE - VIII

**Mytilina acanthophora** Hauer:
- Fig. 1, dorsal view; Fig. 2, lateral view.

**Mytilina ventralis** (Ehrenberg):
- Fig. 3, lateral view.

**Mytilina ventralis** forma **longidactyla** Wulfert:
- Fig. 4, lateral view.

**Macrocheletus sericus** (Thorpe):
- Fig. 5, dorsal view; Fig. 6, ventral view.

**Trichotria tetractis** (Ehrenberg):
- Fig. 7, dorsal view.

**Culurella bicuspidata** Ehrenberg:
- Fig. 8, ventral view; Fig. 9, lateral view.

**Lepadella acuminata** (Ehrenberg):
- Fig. 10, dorsal view; Fig. 11, ventral view;
  Fig. 12, cross-section.

**Lepadella asplicona** Myers:
- Fig. 13, dorsal view; Fig. 14, ventral view.

**Lepadella aspida** Haring:
- Fig. 15, ventral view; Fig. 16, cross-section.

**Lepadella ehrenbergii** (Perty):
- Fig. 17, dorsal view; Fig. 18, ventral view;
  Fig. 19, cross section.

**Lepadella heterostyla** (Murray):
- Fig. 20, dorsal view; Fig. 21, ventral view;
  Fig. 22, cross-section.

**Lepadella imbricata** Haring:
- Fig. 23, ventral view; Fig. 24, cross-section.
PLATE - IX

Lepadella ovalis (O.F. Müller) :
  Fig. 1, dorsal view; Fig. 2, ventral view
  Fig. 3, cross-section.

Lepadella ovalis f. large, new form :
  Fig. 4, dorsal view; Fig. 5, ventral view
  Fig. 6, cross-section.

Lepadella patella (O.F. Müller) :
  Fig. 7, dorsal view; Fig. 8, ventral view
  Fig. 9, cross-section.

Lepadella quadricarinata (Stenroos) :
  Fig. 10, dorsal view; Fig. 11, ventral view
  Fig. 12, cross-section.

Lepadella rhomboides (Cosse) :
  Fig. 13, dorsal view; Fig. 14, ventral view
  Fig. 15, cross-section.

Lepadella rhomboidula (Bryce) :
  Fig. 16, dorsal view; Fig. 17, ventral view
  Fig. 18, cross-section.

Lepadella triprojectus, new species :
  Fig. 19, dorsal view; Fig. 20, ventral view.

Lepadella triptera Ehrenberg :
  Fig. 21, dorsal view; Fig. 22, ventral view
  Fig. 23, cross-section.
PLATE - X

Lecane (Lecane) aculeata (Jakubski) :
Fig. 1. dorsal view; Fig. 2. ventral view.

Lecane (Lecane) arcula Herring :
Fig. 3. dorsal view; Fig. 4. ventral view.

Lecane (Lecane) crepida Herring :
Fig. 5. dorsal view; Fig. 6. ventral view.

Lecane (Lecane) crepida forma bengalensis, new form :
Fig. 7. dorsal view; Fig. 8. ventral view.

Lecane (Lecane) curvicornis (Murray) :
Fig. 9. dorsal view; Fig. 10. ventral view.

Lecane (Lecane) curvicornis var. miamiensis Myers :
Fig. 11. dorsal view; Fig. 12. ventral view.

Lecane (Lecane) flexis (Cosse) :
Fig. 13. dorsal view; Fig. 14. ventral view.

Lecane (Lecane) lateralis, new species :
Fig. 15. dorsal view; Fig. 16. ventral view.

Lecane (Lecane) leontina (Turner) :
Fig. 17. dorsal view; Fig. 18. ventral view.

Lecane (Lecane) ludwii (Eckstein) :
Fig. 19. dorsal view; Fig. 20. ventral view.

Lecane (L.+) ludwii f. brevicaudata Hauer :
Fig. 21. posterior segment.

Lecane (L.+) ludwii f. lacinulata Hauer :
Fig. 22. posterior segment.

Lecane (L.+). ludwii f. laticaudata Hauer :
Fig. 23. posterior segment.
PLATE - XI

Lecane (Lecane) luna (O.F. Müller) : Fig. 1, dorsal view; Fig. 2, ventral view.

Lecane (Lecane) luna f. dorsicalis Sharma : Fig. 3, dorsal view; Fig. 4, ventral view.

Lecane (Lecane) pana (Murray) : Fig. 5, dorsal view; Fig. 6, ventral view.

Lecane (Lecane) chippensis (Herrick) : Fig. 7, dorsal view; Fig. 8, ventral view.

Lecane (Lecane) papuana (Murray) : Fig. 9, dorsal view; Fig. 10, ventral view.

Lecane (Lecane) picoensis (Voigt) : Fig. 11, dorsal view; Fig. 12, ventral view.

Lecane (Lecane) pusilla Harring : Fig. 13, dorsal view; Fig. 14, ventral view.

Lecane (Lecane) unguinata (Cosse) : Fig. 15, dorsal view; Fig. 16, ventral view.

Lecane (Lecane) verecunda Harring & Myers : Fig. 17, dorsal view; Fig. 18, ventral view.

Lecane (Nemimonostyla) inopinata Harring & Myers : Fig. 19, dorsal view; Fig. 20, ventral view.

Lecane (Nemimonostyla) sympoda Hauer : Fig. 21, dorsal view; Fig. 22, ventral view.
PLATE - XII

Lecane (Monostyle) *bulla* (Gosse):
  Fig. 1, dorsal view; Fig. 2, ventral view.

Lecane (Monostyle) *closterocerca* (Schmarda):
  Fig. 3, dorsal view; Fig. 4, ventral view.

Lecane (Monostyle) *cranata* (Harrington):
  Fig. 5, dorsal view; Fig. 6, ventral view.

Lecane (Monostyle) *decipiens* (Murray):
  Fig. 7, ventral view.

Lecane (Monostyle) *furcate* (Murray):
  Fig. 8, dorsal view; Fig. 9, ventral view.

Lecane (Monostyle) *hemata* (Stokes, 1896):
  Fig. 10, dorsal view; Fig. 11, ventral view.

Lecane (Monostyle) *lunaris* (Ehrenberg):
  Fig. 12, dorsal view; Fig. 13, ventral view.

Lecane (Monostyle) *pawlowskii* Wulfert:
  Fig. 14, dorsal view; Fig. 15, ventral view.

Lecane (Monostyle) *pyriformis* (Daday):
  Fig. 16, dorsal view; Fig. 17, ventral view.

Lecane (Monostyle) *sinuata* (Hauer):
  Fig. 18, ventral view.

Lecane (Monostyle) *stenroosi* (Meissner):
  Fig. 19, dorsal view; Fig. 20, ventral view.

Lecane (Monostyle) *thalera* Harrington & Myers:
  Fig. 21, dorsal view; Fig. 22, ventral view.

Lecane (Monostyle) *quadridensata* (Ehrenberg):
  Fig. 23, dorsal view; Fig. 24, ventral view.
PLATE XIII

*Lecane* (Monostyle) *unguitata* (Taddeo) :
Fig. 1, dorsal view; Fig. 2, ventral view.

*Scardium longicaudum* (C.F. Müller) :
Fig. 3, lateral view.

*Trichocerca brasiliensis* (Murray) :
Fig. 4, lateral view; Fig. 5, trophi.

*Trichocerca patturn* (O.T. Müller) :
Fig. 6, lateral view; Fig. 7, trophi.

*Trichocerca similis* (Wierkeiski) :
Fig. 8, lateral view; Fig. 9, anterior end (ventral view) and Fig. 10, trophi.

*Trichocerca tigris* (O.F. Müller) :
Fig. 11, lateral view; Fig. 12, posterior end and Fig. 13, trophi.

*Trichocerca weberi* (Jennings) :
Fig. 14, lateral view; Fig. 15, posterior end and Fig. 16, trophi.
PLATE XIV

Amphlanchne brightwelli Cosse:
Fig. 1, female; Fig. 2, trophi.

Amphlanchne prisconta Cosse:
Fig. 3, female; Fig. 4, trophi.

Eospholyx sulcata Hudson:
Fig. 5, dorsal view.

Testudinella patina (Hermann):
Fig. 6, ventral view.

Filinia loricata (Ehrenberg):
Fig. 7, lateral view.

Filinia opolensis (Zacharias):
Fig. 8, dorsal view.

Filinia pejleri Hutchinson:
Fig. 9, lateral view.

Horaelia bremi Donner:
Fig. 10, dorsal view.

Horaelia neptunia (Ehrenberg):
Fig. 11, lateral view (extended form); Fig. 12, anterior end (enlarged); and Fig. 13, contracted specimen.