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STUDY ON SPECIES DIVERSITY OF BRACHIONUS (ROTIFERA) CONCERN WITH BARAI POND AT BRAHMAPURI, DIST: CHANDRAPUR

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ABSTRACT

Throughout the time of an ample faunistic survey of the lentic ecosystem at Brahmapuri. A total of 15 species are recorded from the Barai pond which is 100 years old. The Purpose of present study is to pay attention towards physiological condition of Rotifers for biomonitering the environmental status of aquatic ecosystem. In the Present Study, Taxonomic notes with a key for their identification are appended and their role as an indicator of pollution is discussed.

INTRODUCTION

Rotifers occur in a variety of aquatic habitats. They are microscopic and range from 40 microns to 2.5mm in size. Most of the rotifers are filter feeders and may be classified as generalist feeders, eating bacteria, algae, and small ciliates. Rotifers are the ruling item of freshwater zooplankton and are used as food for juveniles and adults of economically important cultured species of fish (Sharma,1991). Rotifers are known as a key bioindicator in concluding the trophic status of the water ecosystem (Sladecek,1983; Berzins & Pejler, 1989). The presence of Rotifers is also a condition of eutrophy observed in Govindsagar Lake, Chatri Tank, and Sawarkar Sarovar in Gwalior by Saksena and Sharma (1981).

In India, the members of the family Brachionidae are variously studied and their ecology is also extensively explained. Chandrasekhar and Kodarkar (1995) reported, six species of Brachionus from Saroornagar Lake and seven species from Hussainsagar Lake, Hyderabad (1998). In Wainganga River, Rotifers are abundant during winter season, Chavan et.al.,(2020). The present study also made a concept of Brachionus diversity and its role in the trophic status of the given pond.

Material and Methods:

The samples are collected with the plankton net. A 6mtr. rope is tied to the hook of the net and it was thrown from the periphery **to** the defined depth of the pond. Collected planktons are placed in the tray, inner side of the net is carefully washed to collect the stuck planktons. Planktons are preserved in 4% formalin and observation and identification were done under Digi-2 pro labomed camera. Photography of the planktons taken by the same. Detailed taxonomical identification was carried out by using keys from, Edmondson, (1959); Pennack, (1978); Michael and Sharma, (1988); Sehegal, (1983); Battish, (1992); Roy, (1998); Sharma, (1998); Tonapi, (1980); Plaskit, (1997) and Dhanapathi (2000).

Observation and Result:

We have presented here an annotated checklist of 15 valid species of the family Brachionidae recorded from the pond.

1. Brachionus calyciflorus
2. B. caudatus
3. B. plicatilis
4. B. falcatus
5. B. angularis
6. B. diversicornis
7. B. bidentata
8. B. durgae
9. B. quadridentatus
10. B. ureolaris
11. B. forficula
12. Plationus patulus
13. Keratella tropica
14. K. cochlearis
15. Platyas quadricornis

Classification:

Phylum: Rotifera, Cuvier, 1817
Class: Eurotatoria, De Ridder, 1857
Subclass: Monogononta, Plate, 1889
Order: Ploima, Hudson & Gosse, 1886
Family: Brachionidae, Ehrenberg, 1838
Genus: Brachionus, Pallas, 1766.

Taxonomic Notes:

1. ***Brachionus calyciflorus***: Pallas, 1766.

Characters:

· Polymorphic
· Lorica is flexible and stippled
· Occipital spines are four having variable lengths
· Median spine longer than lateral
· Posterior and posterolateral spines are somewhat absent.

Distribution: Cosmopolitan
Size: Body length: 350micron; Width: 180micron

2. ***Brachionus caudatus:*** Barrois and Daday, 1894.

Characters:

· Lorica is with few occipital spines
· The laterals are slightly longer than the medians.
· Posterior spines are long.

Distribution: Cosmopolitan
Size: Length: 84-168micron; Width: 77-134micron

3. ***Brachionus plicatilis***: O.F. Muller,1786.

Characters:

· Lorica ovoid elliptical shaped.
· Flexible occipital spines are saw-teethed broad-based.
· Pectoral margin is four-lobed.
· Foot is obliterated with small square apertures at the dorsal side and a longer V-shaped aperture at the ventral side.

Distribution: Kerala, Maharashtra, Europe.
Size: 150-252 micron length and 105-182micron width.

4. ***Brachionus falcatus:*** Zacharias, 1898.

Characters:

· Six unequal spines are present at the Anterior dorsal margin, the median spine is long and curved ventrally at the end.
· Very long Posterior spines bent inward, almost touching at the tips in some specimens.

Distribution: Cosmopolitan
Size: Body length: 126-182micron; Width: 110-140micron

5. ***Brachionus angularis:*** Gosse, 1851.

Characters:

· Lorica dotted with two very small protrusions in occipital margins.
· Posterior spines are absent.
· Mental margin rigid and somewhat elevated with a shallow median notch.

Distribution: Cosmopolitan
Size: Body length: 63-128micron, Width: 42-105micron.

6. ***Brachionus diversicornis:*** Daday, 1883.

Characters:

· Lorica elongates with four occipital spines and is longer than the median spine.
· Right posterior spine is long and the left is short
· Foot is long and toes are with characteristic claws.

Distribution: Cosmopolitan
Size: Body length: 250-375micon.

7. ***Brachionus bidentata :*** Anderson, 1889.

Characters:

· occipital spines are six, with laterals and median of the same length.
· Lorica with dorsal and ventral basal plates.

Distribution: India, America, Africa, Europe, China.
Body length: 160micron; Width: 130micron

8. ***Brachionus durgae***: Dhanapathi, 1974.

Characters:

· Lorica is smooth mostly rounded with dorsal and ventral plates, compressed dorsoventrally, anterolateral margin with six spines of almost the same length, anterodorsal margin, and V-shaped sinus. Ventral margin with projections having a truncate edge.
· Pear-shaped foot opening, below the center of ventral plate and bordered by anchor-shaped projection.

Distribution: Tropico-politan
Size: Body Length: 240micron; width: 200micron

9. ***Brachionus quadridentatus***: Hermann, 1783.

Characters:

· Lorica is flexibly bordered having six occipital spines stippled moderately, compressed dorsoventally. Lorica is broader than long with 06 occipital spines, the Median is more extended and curved outward, the Laterals are longer than Intermediates, Posterolateral spines are of differing lengths and the ventroposterior spines are prolonged around the foot.

Distribution: Cosmopolitan
Body Size: Length: 220 microns; Width: 150micron

10. ***Brachionus ureolaris***: O.F. Muller, 1773.

Characters:

· Lorica broad and oval with dorsal and ventral plates. The anterior dorsal margin is with six spines of equal length. The ventral margin is nearly straight foot opening posteriorly.
· Basal plate absent.

Distribution: Cosmopolitan
Size: Body length: 250 microns; width: 190 microns.

11. ***Brachionus forficula***: Wierzejski,1891.

Characters:

· Lorica is rigid and Moderately compressed dorsoventrally, finely stippled.
· Anterior margins with four occipital spines, Lateral is longer than Medians, Posterior spines are strong and inwardly directed and widely separated at their bases, each with a knee-like swelling on the inner side near the base.

Distribution: Assam, Meghalaya, Tripura, West Bengal, Bihar, Andhra Pradesh, Gujrat, Panjab, Maharashtra, Tropics and Subtropics.
Size: Length: 84-119 microns; width: 63-112micron.

12. ***Plationus patulus*** : O.F. Muller,1786.

Characters:

· Lorica firm, subrectangular, somewhat compressed dorsoventrally.
· Antero-dorsal and antero-ventral margin are with Ten spines. The Occipital Median is the longest and curved overhead ventrally.
· Postoral median longest and straight.
· Intermidiates are on both margins and lateral are equal in length.
· Lorica terminates in two spines. foot opening bounded by two short spines are of equal lengths of postero-laterals or somewhat shorter, foot opening is present at the ventral plate, Asymmetric in shape and position, posterior portion of lorica is asymmetrical.

Distribution: Cosmopolitan
Size: Length:128-154micron; width: 98-112

13. ***Keratella tropica*** : Apstein, 1907.

Characters:

. Anterodorsal margin has six spines, the median is long, the intermidiates short, mental edge bifurcate. The posterior spine is unidentical. The width of the lorica at its bases of posterior spines is smaller than the width at the occipital margin.
· Three hexagonal plaques are on the dorsal plate of lorica and a small, four-sided plaques are present between the posterior border of lorica and lastly hexagonal plaques are there.

Distribution: Worldwide
Size: length: 150-240micron width: 65-90micron

14. ***Keratella cochlearis*** : Gosse, 1851.

Characters:

· Lorica oval, three pairs of spines are present anterior, central pair curve towards the ventral surface, next pair separates slightly and meets outer, long spine is at posterior.

Distribution: Worldwide.
Size: length: 270-325micron; width: 120-132micron

15. ***Platyas quadricornis*** : Ehrenberg, 1832.

Characters:

. Lorica is oval, with a regular pattern of facets, dorsoventrally flattened. The anterior end is broader than the posterior. Two occipital spines are present, mental margin without spines. The tips of anterior median spines are invariably curved ventrally.

Distribution: Worldwide.
Size: Length: 305 microns; Width: 178 microns.

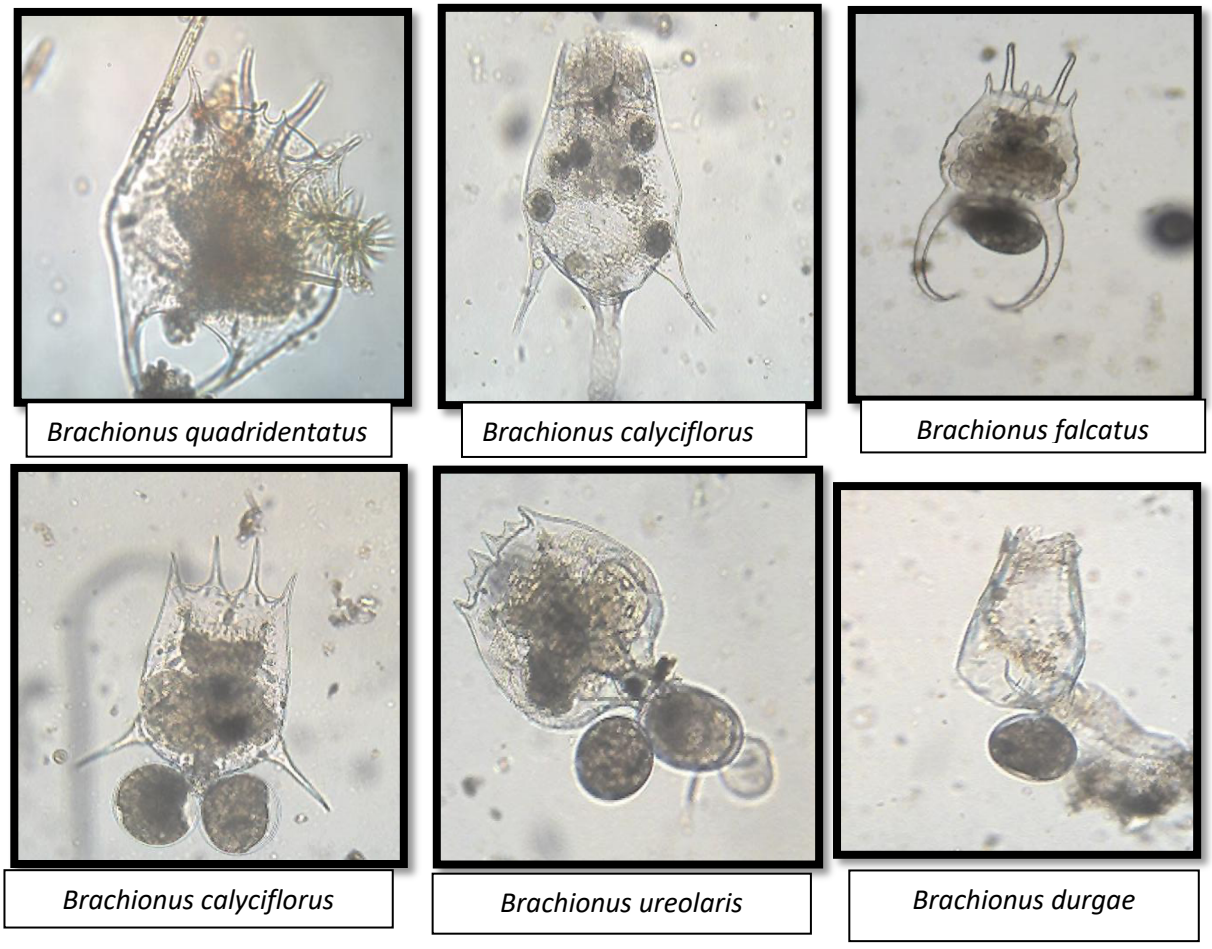
DISCUSSION

Brachionidae is a principal family of Monogononta Rotifera. The Fauna of India has received fairly more attention from Indian workers relying on limnetic collections (Sharma and Sharma, 2008). We have assessed the diversity status of the Indian Brachionidae and provided an annotated checklist of valid species with remarks on their richness and composition. We recognized the 15 valid species of Brachionidae from this pond. These organisms are considered as valuable bioindicators to illustrate the trophic status of the water body (Pejler, 1989). Arora (1963) reported that species of Brachionus have a wide range of occurrences and are found in potable water and diluted sewage tanks.

In eutrophic water, they occur less in number but are abundant in moderately polluted water.

Several studies have evaluated that, Brachionus species as an indicator of eutrophication (Mahajan et. al,1981; Verma and Datta,1987). Chandrasekhar and Kodarkar (1995) described species of Brachionus from Saroornagar Lake, Hyderabad, and reported that *B. calyciflorus* was most dominant and followed by *B. caudatus* in terms of seasonal occurrence and biomass and

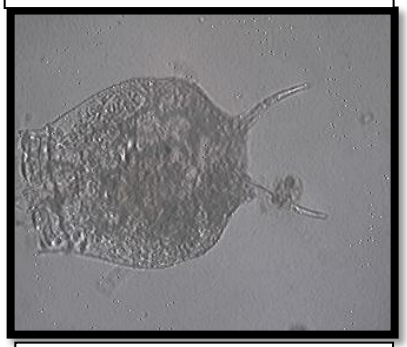
uneven occurrence of *B. angularis* in water quality associated with nutrient concentration in summer.
Somani & Pejawar (2003) in Lake Masunda, Thane reported the dominance of this tolerant genera as an indicator of the onset of eutrophication in the ecosystem.
In the present investigation, *B. calyciflorus* was the most dominant species among Rotiferans concerning parameters that indicate the mesotrophic nature of the pond. The occurrence of the mentioned species of Brachionidae indicates the trophic status of said water body. A variety of Rotifers including Brachionus and Keratella species are inhabitants of moderately clean (Mesotrophy) waters, Saksena, (1987).
Though, more and more knowledge regarding morphological differences and physiological conditions of rotifers should be studied and there, they can used as better indicators of biomonitoring the environmental quality of the aquatic ecosystem.



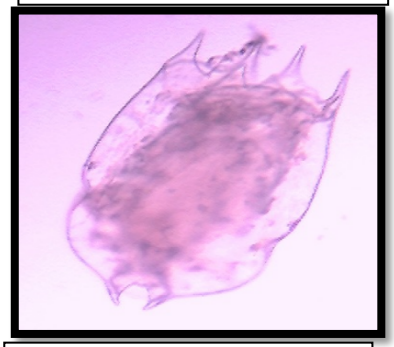
Brachionus diversicornis

Brachionus bidentata

Brachionus quadridentatus



Brachionus caudatus



B. calyciflorus, Pallas.

Keratella tropica

Platyas patalus

Keratella cochlearis

Brachionus forficula

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