



REPORT ON ROTIFER DIVERSITY WITH REFERENCE TO THEIR ROLE IN EUTROPHICATION FROM LENTIC ECOSYSTEMS AT BRAMHAPURI, DIST: CHANDRAPUR (M.S.) INDIA

V. B. Murkute¹ and A. W. Chavan²

¹Chintamani College of Science, Pombhurna, Chandrapur (MS), India.

²Chintamani College of Arts and Science, Gondpipri, Chandrapur (MS),

vb murkute@gmail.com

Abstract:

The rotifers constitute a dominant component of fresh water zooplankton in lentic ecosystems and also an integral link in aquatic food chains because of their rapid turnover rates and partly because of many species feed on detritus and bacteria and also serves as a food for fishes. They are also regarded as valuable bioindicators to depict trophic status of water quality of their environment. Although Chandrapur district is considered as a District of Ponds and Lakes, the rotifer diversity from lentic ecosystem of this district as a whole and the Bramhapuri in particular is not recorded so far. Hence the present contribution deals with rotifer diversity in three lentic ecosystems at Bramhapuri. In the present investigation, 42 species of rotifers are recorded, belonging to 15 families and 21 genera and bioindicators value of some species in aquatic pollution is also discussed. The present study would be very useful in investigation of rotifers and future environmental impact assessment studies.

Keywords: Bramhapuri, Five fresh water ponds, Diversity, Rotifers, polluted status.

Introduction:

Lentic ecosystems in rural areas are exhibiting alarming changes due to pollution and associated eutrophication, as result of this dramatic fluctuation in the physicochemical profiles with consequents impact on fragile plankton community structure and its dynamics are observed. Besides being a dominant consequent of zooplankton community, rotifers form an important link in the transfers of energy from autotrophs to aquatic carnivores and serve as a fish food and regarded as valuable bioindicators to depict the trophic status of water quality of their environment (Sladeczek, 1983).

Although, various taxonomic investigations were undertaken from scattered locality from different geographical areas, our present knowledge of fresh water rotifers fauna is still incomplete and this could be attributed to lack of extensive state wise or regional faunistic studies of diversified lentic ecosystems (Sharma and Michael, 1980).

Rotifer diversity from different regions has been extensively studied by many workers: (George, 1961; Arora, 1966a; Nayar, 1968; Michael, 1968; Sharma, 1992; Chandrasekhar and Kodarkar, 1995; Danapathi, 2000; Somani and Pejavar, 2003; Raut and Pejavar, 2005). But, there are no reports on the rotifer diversity from this area i.e the Bramhapuri from Chandrapur district of eastern Maharashtra.

Therefore, the present work was undertaken to inventory the rotifer diversity from three fresh water lentic ecosystem in and

around Bramhapuri. The three ponds as far as their trophic structure is concerned, constitute oligosaprobic to polysaprobic stata.

Material and Methods:

The plankton samples were taken between 8 to 10 am. At monthly intervals from more than one point in the said ponds during the year June 2005 – May 2007, with the help of plankton net made of bolting silk cloth. Rotifers were narcotized by suddenly adding boiling water to sample which helped to keep delicate illoricate rotifer in well expanded condition making their identification easy. Sample are preserved in 4 % formalin and identified with the help of pertinent literature (Edmondson, 1959; Sharma, 1980; Dhanapathi, 2000).

Result and Discussion:

Biodiversity studies on any ecosystem are absolutely essential for sustainable development and strategic management practices to be followed for control of pollution and eutrophication.

Various workers; Mahajan et al; (1981); Sladeczek, (1983); Takamura et al; (1989); Khan and Rao, (1981); Verma and Dutta, (1987); Chandrasekhar, (1996); Malathi et al; (1998) have evaluated many rotifer species as indicators of eutrophication. In the present investigation, Brachionus species was very common in all three ponds under study. Hutchinson, (1967) observed that Brachionus species are very common in temperate and

tropical waters which indicates alkaline nature of water bodies.

Brachionus calyciflorus, B. angularis and B. plicatilis were numerically abundant in Kalikar and Lendra ponds which indicates their eutrophic status. Brachionus species are much resistant in adverse condition (Davis, 1968). Arora (1966) pointed out B. calyciflorus, B. angularis and Filinia longiseta are common forms predominantly occurring in eutrophic water and he used rotifers as bioindicators of water quality and classified water in to clean, polluted and heavily polluted. He also considered B. falcatus indicating relatively clear water species, same observation was found in present study. In Barai and Khed pond, numerically rich B. falcatus shows its oligotrophic nature.

In the present study, Kalikar pond shows abundance in Rotaria rotaria which also prove its eutrophic nature. Arora (1961) collected high number of Rotaria rotaria from polluted water in Nagpur. He noted that, a complete absence of R. rotaria from pure and clean water indicates its habitats exclusively in polluted water. Similarly, in the present study,

Barai pond does not show any number of this species which indicates its clean status.

Polyathra indica and Trichocerca species were also found in abundance in Kalikar pond which shows its trophic status. Asplanchna species, Synchaeta species and Keratella species were found in abundance in Lendra pond which shows its mesotrophic nature. Similar observations were recorded by Saksena, D.N.(1987). Pejler (1957) observed that Brachionus species, Keratella and Filinia are inhabitants of mesotrophic to eutrophic water.

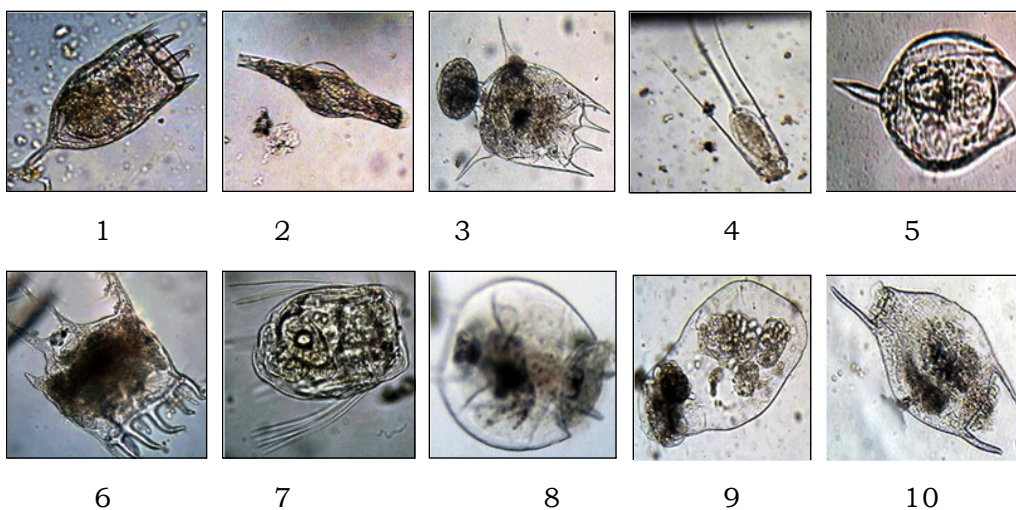
In the present study, Lendra and Kalikar ponds shows the higher number of rotifers throughout the study period indicating their mesotrophic and eutrophic nature respectively, whereas Kurza pond shows moderate pollution and Barai and Khed ponds are oligotrophic in nature.

Depending on the rotifers diversity and variation one can conclude the pollution status of the water bodies. Schinder and Noven (1971) reported enormous growth of rotifers in lakes and reservoirs indicating eutrophic condition.

Table 1: Reported Species of Rotifers from different water bodies understudy.

SN	Name of Species	Kalikar Pond	Lendra Pond	Barai Pond	Khed Pond	Kurza Pond
	Class: Rotifera					
A	Subclass: Monogonata					
A1	Order: Ploimida					
a	Family: Epiphanidae					
1	Epiphanes clavulata	++	-	-	-	+
b	Family: Brachionidae					
2	Brachionus angularis	++++	+++	-	-	+
3	B. caudatus	++	++	-	-	+
4	B. forficula	++	++	-	-	+
5	B. diversicornis	+++	++	-	-	+
6	B. calyciflorus	++++	+++	-	-	+
7	B. c.f. amphiceros	+++	++	+	+	+
8	B. c.v. borge rtii	+++	++	-	-	+
9	B.c.v. dorcus	+++	++	-	-	+
10	B. c.v. hymani	+++	++	-	-	+
11	B. bidentata	+++	+	-	-	+
12	B. plicatilis	+++	++	-	-	+
13	B. ureceolaris	++	+	-	-	+
14	B. quadridentatus	++	+	-	-	+
15	B. falcatus	+	+	++++	+++	++
16	B. durgae	+	+	-	-	+
17	Platylabus patulus	++	+	-	-	-
18	Platylabus longispinosus	++	+++	+	-	++
19	Keratella tropica	++	+++	+	-	+++
20	Keratella cochlearis	++	-	+	-	+++
21	Notholca labis	+	+	-	-	-
c	Family: Collrellidae					

22	Colurella bicuspidata	+	+	-	-	-
d	Family: Lecanidae					
23	Lecane donnerianus	++	++	-	-	+
24	L. luna	+	+	-	-	+
25	L. verecunda	+	+	-	-	+
26	L. bulla	+	+	-	-	+
27	L. cornuta	+	+	-	-	+
e	Family: Proalidae					
28	Proales decipiens	+	-	-	-	-
f	Family: Notommatidae					
29	Cephalodella catellina	+	-	-	-	-
g	Family: Trichocercodae					
30	Trichocerca longiseta	+++	++	-	-	+
31	T. kostei	+++	++	-	-	+
h	Family: Asplanchnidae					
32	Asplanchna brightwelli	+++	+++	++	+++	++
33	Polyarthra indica	+++	++	++	-	-
34	Synchaeta pectinata	+	++	-	+	++
i	Family: Gastropodidae					
35	Gatropus hystopus	+	+	-	-	-
A2	Order: Gnesiotrocha					
j	Family: Conochiloides					
36	Conochiloides dossuarium	+	+	+	-	-
k	Family: Hexarthridae					
37	Hexarthra sp.	+	+	-	-	-
B1	Family: Filinidae					
38	Filinia longiseta	+++	++	-	-	+
m	Family: Testudinellidae					
39	Testudinella mucronata	+	+	-	-	-
n	Family: Trochospheridae					
40	Horae lla brehmi	+	+	-	-	-
B	Subclass: Bdelloida					
B1	Order: Bdelloida					
o	Family: Philodinidae					
41	Rotaria rotatoria	+++	++	-	-	+
42	Philodina flaviceps	+	+	-	++	++



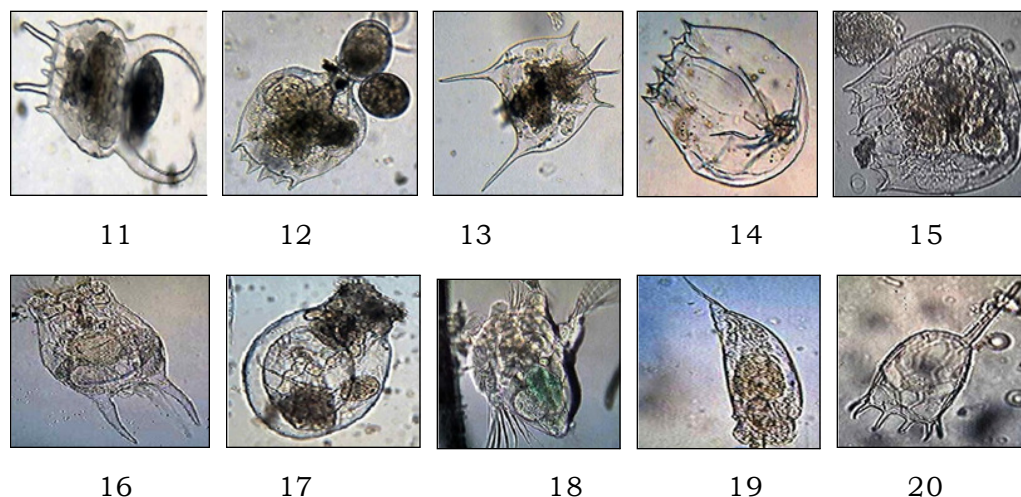


Figure 1: Rotifers From Different Ecosystems Understudy.

1. *Keratella cochlearis*, 2. *Rotaria* Spp., 3. *Brachionus calyciflorus*, 4. *Filinia* Spp., 5. *Lecane* Spp., 6. *Plationus patulas*, 7. *Polyarthra indica*, 8. *Platyas quadricornis*, 9. *Asplanchna* Spp., 10. *B. diversicornis*, 11. *B. falcatus*, 12. *B. bidentata*, 13. *B. quadridentatus*, 14. *B. durgae*, 15. *B. ureceolaris*, 16. *B. forficula*, 17. *Horaella brehmi*, 18. *Hexarthra intermedia*, 19. *Trichocerca* Spp., 20. *Keratella tropica*.

References:

- Arora, H. C. (1961): Rotifera as indicators of pollution, CIPHERI. Bull.3:24pp.
- Arora, H.C. (1966): "Studies on Indian Rotifera-Part III. J. Zool. Soc. India. Vol. 16 (1 and 2): 1-6.
- Arora, H.C. (1966a): Rotifers as indicators of trophic nature of environment. *Hydrobiologia* 27, pp: 146-159.
- Chandrasekhar S.V.A and Kodarkar, M.S. (1995): Studies on *Brachionus* from Saroor Sagar lake, Hyderabad, AP, India. *J.Aqua.Biol.* 10(1and2): 48-52.
- Chandrasekhar, S.V.A (1996): Ecological Studies on Saroor Sagar lake, Hyderabad, AP, India. Ph.D. Thesis, Osmania University, Hyderabad.
- Dhanapathi, M.V,S.S.S.(2000): Taxonomic notes on the rotifer from India. IAAB Pub., Hyderabad. pp: 175.
- Edmondson, W.T. (1959): Rotifera In: Fresh water Biology (Ed II. B.Ward And Wipple) Jonh Willey and Sons. Inc. New York: 420-497.
- George, M.G. (1961): Observation on rotifer from shallow water ponds in Delhi. *Current Science.* (30) pp: 247-250.
- Hutchinson, G. E. (1957): A treatise on limnology, John Wiley and Sons, Inc: N. Y. Vol.1:pp 64.
- Khan, M.A. and Sheshagiri Rao I. (1981): Zooplankton in evolution. WHO workshop on biological indicators and indices of environmental pollution. Cent. Bd. Pre. Con.
- Mahajan, C.L., Sharma, S.P., Sharma, S.D. and Arora, N.K. (1981): Dynamics of rotifer population in Ghana Bird Sanctuary, Bharathpur, Rajasthan. *Ind.J. Plankton Res.*
- Malathi, Chandrasekhar, S.V.A., and Kodarkar, M.S. (1998): Studies on *Brachionus* from lake Hussain Sagar, Hyderabad, India. *J.aqua Bio.* Vol. 13(1and2): 7-12.
- Michael, R.G. (1968): Studies on the Zooplankton of a tropical fish panel. *Hydrobiologia*: 23: 47-48.
- Nayar, C.K.G. (1968): Rotifer fauna of Rajasthan, India. *Hydrobiologia.* 31: 168-185.
- Raut, Nayana S. and Pejaver Madhuri (2005): Survey of diversity of plankton attached to macrophytes from weed infested lake in Thane, Maharashtra. *J. Aqua. Biol.*, Vol. 20(1): 1-7.
- Saksena, D. N. (1987): Rotifer as indicator of pollution, *Curr. Sci.* 46(6); 120.
- Saksena, D. N. and Sharma, S. P. (1981): Zooplankton fauna of some lentic water of Gwalior. I. Govindsagar, Chhatri tank, Sawarkar sarovaland Matsya sarovar, Environment, India.4:13-17.
- Schindler, D. W. and Noven, B. (1971): Vertical distribution and seasonal abundance of zooplankton in two shallow Ontario. *J. of Fisheries Research, Canada.* 28: 245-256.
- Sharma, B.K. (1980): Contribution to the rotifers fauna of Orissa, India. *Hydrobiologia.* 70: 225-233.

- Sharma, B.K and Michael, R.G. (1980): Synopsis on taxonomic studies on Indian Rotatoria. *Hydrobiologia*. 73: 229-236.
- Sharma, B.K. (1992): Fresh Water Rotifers (Rotifera: Eurotatoria) in West Bengal. Faunal Series, ZSI, Calcutta, India. 3(13): 1-121.
- Sheil, R.J. (1995): A Guide to the identification of Rotifers, Cladocerans and Copepods from Australian Waters presented at the workshop held at the Murry- Darling. Fresh Water Research Centre, Albury. 8-10 February 1995.
- Sladeczek, V. (1983): Rotifers as indicators of water quality. *Hydrobiologia*. 100: 169-201.
- Somani, V. and Pejawar, M. (2003): Rotifer Diversity In Lake Masunda, Thane (MS). *J.Aqua.Biol.* 18 (1): 23-27.
- Takamura, K.V., Sugaya, N., Takamura, T., Yosuno, M. and Iwakuma, T. (1989): Primary Production of Phytoplankton and Standing Crop of Zooplankton and Zoobenthos in Hypertrophic Lake Teganuma. *Hydrobiology*. 173: 173-184.
- Verma, R.K and Dutta Munshi, J.S. (1987): Plankton Community Structure of Badua Reservoir, Bhagalpur (Bihar), India. *Tropical Ecologia*, 28: 200-207.