



BIODIVERSITY OF ROTIFERS IN GHOTNIMBALA LAKE OF BHADRAWATI, DISTRICT CHANDRAPUR, (M. S) INDIA.

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Abstract

Rotifers are microscopic, aquatic invertebrates common in freshwater others live in damp moss or lichens. Some are parasitic some are free-living, some are living individually where as some in community.

Ghotnimbala lake of Chandrapur spread over large area. Water of this lake utilised for different purposes including domestic, agricultural, washing cloths, bathing, washing animals etc causing degradation of water quality if such activities continuously going on causing lake water to unfit for household uses. During study period total 18 Rotifers species from 14 genera were found. According to seasonal changes, change in Rotifers diversity and density observed which is at high level in summer while in monsoon is at lowest level. 17 species observed in summer, 15 species in winter while lowest that is 8 species were recorded in monsoon season.

KEYWORDS: Ghotnimbala Lake, Rotifers, Biodiversity

Introduction

In aquatic ecosystem of world Rotifers play an important role among zooplankton community they provide food to many other animals. Rotifers are common in fresh water. They act as mediator in between microbial organism higher trophic level. The interaction of physical, chemical and biological properties of lake water causing positive or negative impact on population of Rotifers. Rotifers feed upon algae, organic particles, smaller animals etc. Larger animals like birds, insects, beetles, fleas, fungi, other Rotifers act as Predators to several adult Rotifers and their eggs. Rotifers comprise an important portion of the biomass of marine zooplankton (Dolan and Gallegos, 1992).

Nutrients in lake water, biotic and abiotic factors of nature influence on productivity of Rotifers. The fresh water zooplanktons are primary producers and are prey of higher consumers and maintains balance of ecosystem.

MATERIALS AND METHODS

Water from three different sites of lake were collected on monthly basis throughout one year i.e. September 2017 to August 2018 for qualitative and quantitative study of Rotifers. By using plankton net of bolting silk (mesh size 64 μm) from each sampling site 50 Litre of water was filtered . Filtered water sample was preserved in 4% formalin. By using Sedgewick Rafter Cell Method (APHA, 1998). Concentrated sample was observed under binocular microscope for qualitative and quantitative estimation. Rotifers were identified using standard literature like Edmondson (1959), Chandrashekhar and Kodarkar (1995) and other regional publications (Dhanpathi, 1974; Kodarkar, 1995, Kaushik S. and D.N. Saxena (1995). Dhanpathi, 2000). The physico-chemical parameters of lake water were analyzed using (APHA, 1998) to show its relation with density and diversity of rotifers.

OBSERVATIONS AND RESULTS

The water sample of Ghotnimbala lake were examined for one year to analyse physico – chemical parameters and diversity and density of Rotifers .During study period seasonal changes in physico chemical parameters were occurred . During summer season

the Parameters like water temperature, total dissolved solids, conductivity, PH, total alkalinity, chlorides, total hardness, sulphates, total phosphate and nitrates were maximum while in winter season the amount of dissolved oxygen is at highest level.

In present study total 18 Rotifers species from 14 genera were found. Out of that most abundantly occurred genera was Branchionus, namely Branchionus calyciflorus, Branchionus angularis, Branchionus quadridentatus, Branchionus urceus, Branchionus diversicornis. Some of the genera occurred in less number are Keratella, Filinia, Leptodora, Bosmina, Asplanchna etc.(Table 2). Monthly population density of rotifer showed its peak during March 2018 while least density was recorded in July 2018 (Table 3)

Physico – chemical parameters like dissolved oxygen seen (8.3mg/litre)at high level in winter where as other parameters like water temperature (25.05° c), total dissolved solids(762mg/lit), conductivity(186mho/cm) , PH(8.9), total alkalinity(157.0mg/litre), chlorides(62.2 mg/l), total hardness (91.00mg/lit), sulphates(0.24mg/litre), total phosphate(0.25 mg/litre) and nitrates(0.52 mg/litre) seen more in summer season .

Rotifer were shown 17species in summer and 15 winter where as some species like Leptodora kindtii, Bosmina coregoni, Lepadella ovalis, Lecane bulla, Asplanchna priodonta of rotifers not observed in monsoon.

DISCUSSION

The study of Ghotnimbala lake around the year shows effect of various physicochemical factors it is observed due to increasing temperature , high pH, alkalinity the Rotifers population also increases. pH and temperature having positive correlation with Rotifers availability and appearance. pH and temperature are the main factors in the appearance and abundance of different rotifers (Banik and Datta, 1991). Kaushik and Saxena (1995) have also reported abundance of Branchionus in various water bodies of central India. An abundance of Branchionus in tropical region has been registered .According to Dhanpathi (2000) many species of rotifers are having preference for more alkaline water.Due to increasing photosynthetic activity level of alkalinity also increases causing increase Rotifer density.

In Ghotnimbala lake maximum density of Rotifers Observed at alkaline water in summer. In some of the species like Brachionus, Keratella, Mytilina and Platyias more alkalinity of water is suitable for building of more population. In present study it is observed that, In summer due to evaporation and decreased water level, higher the amount of nutrients like sulphate, nitrate, phosphate etc. In water the amount of organic substances increases due to different human activities, sewage water causing increase in population of Rotifers .

It is observed that the diversity and abundance of Rotifers to be decreases in monsoon due to dilution of water causing depletion of nutrient level. Population numbers are highest in association with submersed macrophytes, especially plants with finely divided leaves; densities commonly reach 25,000 per liter (Edmondson, 1944, 1945, 1946).

Among Rotifers Bronchionus forms dominant genus through out study in Ghotnimbala Lake . The same dominance of Brachionus were observed by Sunkad (2004) and Pawar and Pulley (2005) in Rakaskoppa reservoir of Belgaum, North Karnataka and Pethwadaj dam of Nanded District in Maharashtra state. Due to complex changes in different factors like temperature, pH, chemical factors, quality and quantity of food resulting variations in zooplanktons population .

CONCLUSION

In present study of Ghotnimbala lake it is observed that, in determining diversity and density of Rotifers physico – chemical and environmental changes play an important role .

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Table 1

Seasonal Variations of Water Quality Parameters of Ghotnimbala Lake During three seasons

Sr. No.	Physico-chemical Parameters	Winter	Summer	Monsoon
1	Water Temperature ° C	18.7± 0.1	25.05 ± 0.1	23.7± 0.2
2	Dissolved Oxygen	8.3 ± 0.1	7.5± 0.14	7.1± 0.2
3	pH	8.27 ± 0.2	8.911± 0.17	7.47±0.21
4	Conductivity (ms/cm)	115.00± 0.3	186.00±0.27	112.00± 0.2
5	Total Alkalinity	123.00±0.21	157.00± 0.31	86.00±0.24
6	TDS	493±0.2	762±0.25	231±0.27
7	Chlorides	50.7±0.16	62.2±0.18	39.00±0.2
8	Total Hardness	86.00 ±0.29	91.00±0.27	67.00±0.3

9	Sulphate	0.17±0.004	0.24±0.006	0.13±0.12
10	Total Phosphates	0.17±0.02	0.25±0.02	0.14±0.01
11	Nitrate	0.22±0.02	0.52±0.03	0.20±0.02

- All the values are in mg/lit except temperature, pH and conductivity.

Table 2: Bio-Diversity of Rotifers in Ghotnimbala Lake Water

Species Recorded	Winter Month	Summer Month	Monsoon Month
Branchionus calyciflorus	+	+	+
Branchionus angularis	+	+	+
Branchionusquadridentatus	+	+	-
Branchionusurceus	+	+	-
Branchionusdiversicornis	+	+	-
Keratellacochlearis	+	+	+
Filinalongiseta	+	+	+
Leptodorakindtii	+	+	-
Bosminacoregoni	-	+	-
Tripleuchlanisplicata	+	+	+
Trichocercatigri	+	+	+
Testudinella patina	-	+	+
Lepadella ovalis	-	+	-
Lecanebulla	+	+	-
Monostyla bulla	+	+	-
Asplanchnapriodonta	+	-	-
Anuraeopsisfissa	+	+	+
Philodina roseola	+	+	-
Total	15	17	08

+ =Present, - =Absent

Table 3**Population Density of Rotifers in Ghotnimbala Lake Water**

Sr. No	Month	Density (No. /lit)
1	September 2017	38.41 ±0.3
2	October 2017	84.61± 0.3
3	November 2017	95.00 ± 0.2
4	December 2017	101.79 ± 0.2
5	January 2018	107.00 ± 0.12
6	February 2018	119.00 ±0.13
7	March 2018	122.01 ±0.13
8	April 2018	88.11±0.3
9	May 2018	71.02 ±0.2
10	June 2018	66.09 ±0.3
11	July 2018	21.38 ±0.2
12	August 2018	24.41±0.3