

Seasonal variation in rotifer diversity of temple ponds of Nashik District (M.S.) India

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Abstract

In the present investigation zooplankton diversity was studied during February 2010 to January 2011. Different zooplanktons were noticed during study period, amongst them rotifers are more dominant group than others. In the present study 17 genera recorded from rotifera and genus *Brachionus* is abundant and more common to both the ponds. The variation in diversity and density of rotifer is observed in different months and seasons.

Keywords: Zooplankton, Rotifers, Diversity, Temple ponds, Nashik.

INTRODUCTION

The occurrence and abundance of zooplankton depend on productivity of water body which in turn is influenced by biotic and abiotic factors. They link the primary producer, phytoplankton with higher large trophic level organisms. Zooplankton community responds to a wide variety of disturbances including nutrient over loading [6]. Zooplankton also plays a key role in aquatic food chain [19]. Owing to this they have attracted the attention of a large number of researchers throughout the world [8], [9], [16]. Rotifers are highly nutritious food for the larvae of aquatic crustaceans and fish, aquaculture technologies have been producing enormous quantities of rotifers in very large culture systems for more than 30 year. In this regard, rotifers may be seen as living nutrients that is tiny, free-swimming, food for crustaceans and fishes.

The present study is undertaken to investigate the zooplankton diversity in the temple pond around Nashik district because zooplankton diversity is not reported earlier from these water bodies

MATERIAL AND METHODS

Study Area: Amrutkund Pond

It is situated in the middle of city Trimbakeshwar in the complex of temple and about 24 km away from Nashik city. It lies at 19°03'19" north latitude and 73° 53'04" east longitude. Shri Nana Saheb Peshawa in 1755-1768 built this pond. This pond is stagnant, perennial and filled with rain water only. In summer season water is used for drinking purpose in the temple complex. The area of pond measures about 45 x 48 feet and 80 feet deep and its access is restricted.

Ramkund Pond

It is situated in the middle of Nashik city, shri Chitrarao of Satara in 1689 built the Ramkund Ghat in Panchati on the bank of river Godawari. It lies at 20° 00'82" north latitude and 73° 79' 21" east longitude. Here after every twelve years of time falls the Kumbh mela. In this time the saints and monks of Vaishnav religion take bath here. This pond is feed directly from river and its flow is regulated by a gate. The area of pond measures about 85 x 65 feet and 7 feet deep and it is open for all the people resulting in high human disturbances.

For the study of zooplankton, samples were collected at fortnight interval during Feb 2010 to Jan 2011. Three sampling stations were selected at each pond. The zooplanktons were collected by filtering 50 Liter of water through plankton net of pore size 45µ. Filtered planktons were then preserved in 4% formalin and few drops of glycerin were added to it which prevents hardening of zooplankton. Zooplankton sample were identified qualitatively and quantitatively under the microscope using drop count method. Planktons were identified with the help of identification keys and standard reference [1], [4], [7], [21] and [22]. The density of organism was expressed as organism per liter using following formula [1].

$$N = n \times v/V$$

Where,

N: total no. of organism per liter of filtered water,

n: Number of organism counted in one ml of concentrated sample.

v: Volume of concentrated sample (ml),

V: Volume of total water filtered (liter).

RESULT AND DISCUSSION

Considering all the data of two sampling ponds, a total 17 genera of rotifers were reported (Table No. I and II). The population density of rotifers in different seasons showed in table no. I and II and seasonal occurrence of rotifers with graphical representation showed in figure 1 and 2. In pond Amrutkund 21 species of rotifers were recorded belongs to 15 genera, while in pond Ramkund 23 species were recorded belongs to 14 genera during the study period.

In the present study total 17 genera were recorded among them the most abundant genera were *Brachionus* (Pallas, 1776) and *Keratella* (Apstein, 1907). The maximum diversity of rotifers was observed in the monsoon season in both Amrutkund and Ramkund

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pond. Similar findings were also reported by Paulose and Maheshwari [13]. High temperature increases the multiplication and metabolic rates of rotifers resulting in their abundant growth similar results found by Rumana [15]. The findings about density and diversity of rotifers are similar to other water bodies. However, the variation in the rotifer diversity is unique to each temple pond.

Ascomorpha (Party, 1850), *Elosa* (Segers, 1993), *Notholka* (Muller, 1786), *Pompholyx* (Gosse, 1851), were reported from Amrutkund pond and their complete absence in Ramkund pond is recorded during study period. Whereas *Brachionus plicatilis* (Muller, 1786) *B. urceolaris* (Muller, 1773), *Harringia* (Gosse, 1850), *Platyias* (Harring, 1914), *Rotatoria* (Scapoli, 1777) were observed in Ramkund pond and their complete absence in Amrutkund pond (Fig 3.). Result shows that some species of rotifer was restricted to particular water body. *Ascomorpha* (Party, 1850) observed in monsoon season and *Elosa* (Segers, 1993) was observed in winter

season only. *Brachionus plicatilis* (Muller, 1786), reported in summer season, *B. urceolaris* (Muller, 1773), reported in winter season, *Harringia* (Gosse, 1850) was reported in monsoon season, *Rotatoria* (Scapoli, 1777) was reported in monsoon and winter season.

Genus *Brachionus* (Pallas, 1776) and *Keratella* (Apstein, 1907) were found to be perennial, *Brachionus* was also reported to be dominant form in and around Bikaner [3]. It was observed that the high temperature, length of the day, the intensity of sun light during the summer and the acceleration of phytoplankton and algae are some of the limiting factors for the growth and abundance of rotifera. These findings are in line with the report of Sharma and Srivastava, Ahmed and Shayeshefar [2], [18], [20]. Rotifers are used as an important aquatic faunal component for bio-monitoring. Taxonomic dominance of rotifer was reported in several freshwater bodies. This pattern is common in tropical and subtropical freshwater, Weather in lake, ponds, reservoir or streams [12], [17].

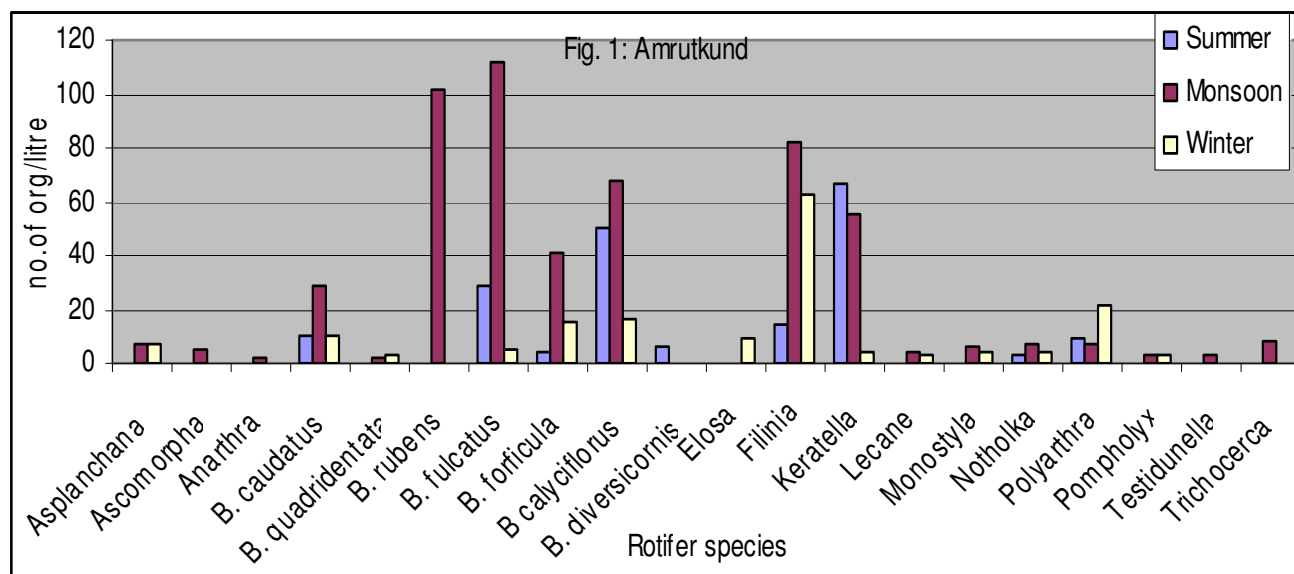


Fig 1. Graphical representation of seasonal variation in rotifer from Amrutkund.

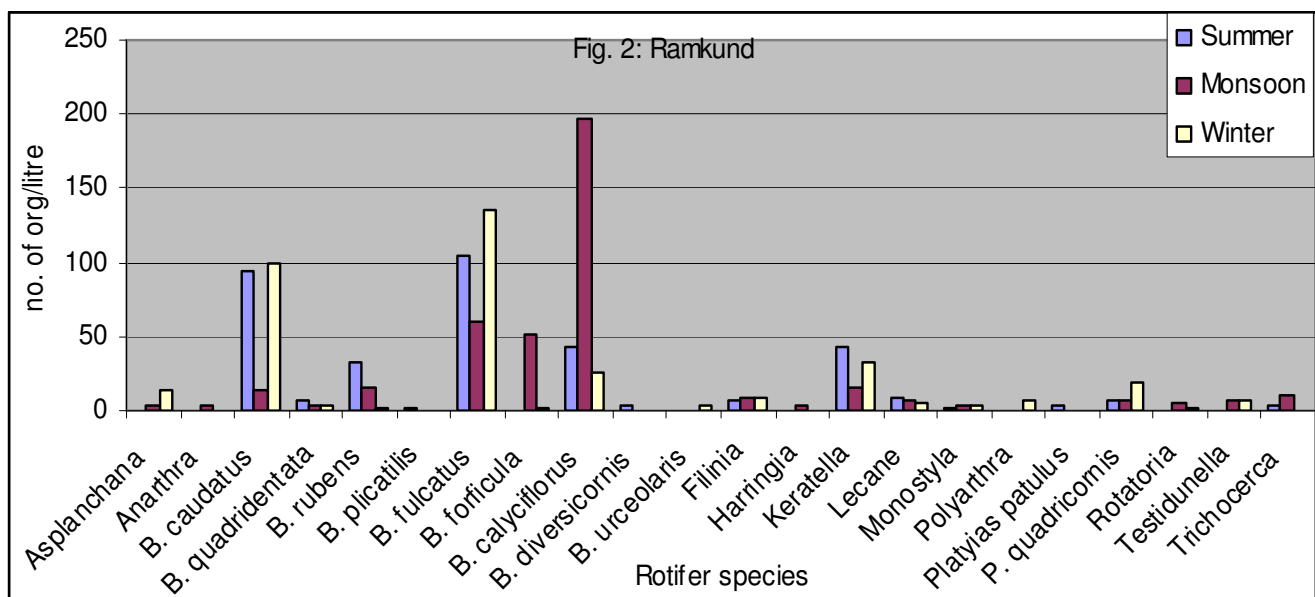


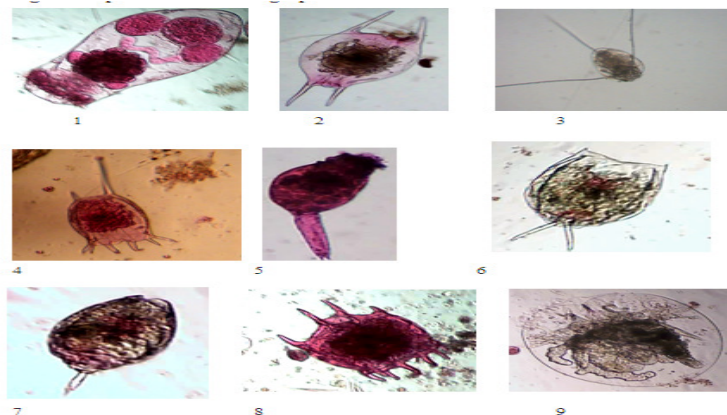
Fig 2. Graphical representation of seasonal variation in rotifer from Ramkund.

Table I. Seasonal variation of Rotifers Observed in pond I- Amrutkund (org./liter) for the period February 2010 - January 2011

Sr. No.	Rotifers	Summer	Monsoon	Winter
1	<i>Asplanchna</i> sp.	0	7	7
2	<i>Ascomorpha</i> sp.	0	5	0
3	<i>Anarthra</i> sp.	0	2	0
4	<i>Brachionus caudatus</i>	10	29	10
5	<i>Brachionus quadridentata</i>	0	2	3
6	<i>Brachionus rubens</i>	0	102	0
7	<i>Brachionus fulcatus</i>	29	112	5
8	<i>Brachionus forficula</i>	4	41	15
9	<i>Brachionus calyciflorus</i>	50	68	16
10	<i>Brachionus diversicornis</i>	6	0	0
11	<i>Elosa</i> sp.	0	0	9
12	<i>Filinia longiseta</i>	14	82	63
13	<i>Keratella tropica</i>	67	55	4
14	<i>Lecane luna</i>	0	4	3
15	<i>Monostyla bulla</i>	0	6	4
16	<i>Notholka</i> sp.	3	7	4
17	<i>Polyarthra</i> sp.	9	7	22
18	<i>Pompholyx</i> sp.	0	3	3
19	<i>Testudinella</i> sp.	0	3	0
20	<i>Trichocerca</i> sp.	0	8	0
Total No. of Rotifers		192	543	168

Table II. Seasonal variation of Rotifers Observed in pond II – Ramkund (org./liter) for the period February 2010 - January 2011.

Sr.No.	Rotifers	Summer	Monsoon	Winter
1	<i>Asplanchna</i> sp.	0	4	13
2	<i>Anarthra</i> sp.	0	4	0
3	<i>Brachionus caudatus</i>	94	13	99
4	<i>Brachionus quadridentata</i>	7	3	3
5	<i>Brachionus rubens</i>	32	16	1
6	<i>Brachionus plicatilis</i>	2	0	0
7	<i>Brachionus fulcatus</i>	105	60	136
8	<i>Brachionus forficula</i>	0	51	2
9	<i>Brachionus calyciflorus</i>	43	197	26
10	<i>Brachionus diversicornis</i>	4	0	0
11	<i>Brachionus urceolaris</i>	0	0	4
12	<i>Filinia longiseta</i>	7	9	9
13	<i>Harringia</i> sp.	0	3	0
14	<i>Keratella tropica</i>	42	15	33
15	<i>Lecane luna</i>	8	6	5
16	<i>Monostyla bulla</i>	2	4	3
17	<i>Polyarthra</i> sp.	0	0	6
18	<i>Platylas patulus</i>	3	0	0
19	<i>P. quadricornis</i>	6	7	18
20	<i>Rotatoria</i> sp.	0	5	1
21	<i>Testudinella</i> sp.	0	7	6
22	<i>Trichocerca</i> sp.	3	10	0
Total No. of Rotifers		358	414	365



1. *Asplanchna* sp. 2. *Brachionus* sp. 3. *Filinia* sp. 4. *Keratella* sp. 5. *Herringia* sp. 6. *Lecane* sp. 7. *Monostyla* sp. 8. *Platylas* sp. 9. *Testudinella* sp.
Fig 3. Representative Photographs of Some Rotifers

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