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Zooplankton diversity and distribution in Yelahanka Lake, Bangalore, Karnataka, India

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Abstract
In the present study, it provides quantitative information on the seasonal variation of zooplankton at Yelahanka Lake, Bangalore, Karnataka. The result revealed that 4 groups viz., Rotifera, Cladocera, Copepoda and Ostracoda. Rotifera shows its dominance followed by Cladocera, Copepoda and Ostracoda.

Keywords: zooplankton, lake, diversity, yelahanka

Introduction

Zooplanktons are the heterotrophic type of planktons. These are organisms drifting in the water column of oceans and fresh water bodies. Zooplankton plays a role of converting phytoplanktons into food, suitable for fish and aquatic animals and acquired importance in fishery research. Fresh water zooplanktons are an important component in aquatic ecosystems whose main function is to act as a primary and secondary links in the food chain (Hutchinson, 1967).

Zooplankton communities are very sensitive to environmental changes and thus, they have considerable potential value as water quality indicators (Gannon and Stemberger, 1978). Since, zooplanktons community composition and structure is affected by eutrophication, these communities can be used as an indicators of changing trophic status of an ecosystem (Bhati and Rana, 1987). Adequate knowledge of zooplanktons communities and their population dynamics is a major requirement for better understanding of life processes in a fresh water body since eutrophication influences both the composition and productivity of zooplanktons (Bhora and Kumar, 2004).

Zooplanktons have long been used as indicators of the eutrophication (Vandysh, 2004 and Webber et al., 2005). According to Ahmed (1996); Murugan et al. (1998); Dadhick and Saxena (1999); and Contreras et al. (2009) the zooplanktons plays an integral role serves bioindicators and it is a well suited tool for understanding water pollution status. The higher abundance of zooplanktonsic fauna recorded during summer, while lower value during rainy season. This fluctuation of zooplanktons is mainly due to environmental changes (Sunkad and Patil, 2004; Sheeba and Ramanujan, 2005).

Materials and Methods

During present study phytoplankton sampling were carried out monthly basis for the period of one year Jan. 2015 to Dec. 2015 of Yelahanka Lake Bangalore, Karnataka. The geographical coordination is 12°44.94°N Latitude and 77°32.263E Longitude. Plankton net (mesh size 25 um) was swept on surface water (Secchi's disc transparency zone) and plankton were collected through the net and easily transferred into separate plastic bottle/container. 100 liters of surface water was sieved through plankton net to obtain planktons. These were fixed and preserved in 4% formalin. The formalin fixed plankton samples were centrifuged at 1500-2000 rpm for 10-12 min. The zooplankton were settled at bottom, diluted to a desirable concentration in such a way that they could be easily counted individually, under compound binocular microscope and zooplanktons were measured and multiplied with the dilution factors. Zooplankton species identification was done with the help of standard references zooplanktons by IAAB, (1998); Edmonson, (1963) and Battish, (1992). The quantitative analysis of zooplankton organisms were carried out using Sedgwick-Rafter plankton counting cell.

Results and Discussion

Table 1: Monthly variation in zooplanktons (organisms / liter) at Yelahanka lake (January – December 2015)

Class	Zooplankton	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug.	Sep.	Oct.	Nov.	Dec.
Rotifera	Braochionus calyciflorus	1	2	7	12	6	1	2	2	3	0	0	0
	Braochionus diversicornis	2	4	3	6	8	1	0	0	0	4	2	1
	Braochionus falcatus	3	6	1	8	12	1	1	0	0	1	0	1
	Braochionus forficula	1	3	5	8	10	1	2	0	0	0	0	0
	Braochionus sp.	7	4	10	13	6	1	1	0	0	8	4	5
	Filina longiseta	1	3	4	4	8	2	2	1	1	0	0	0
	Platyias polyacanthus	6	2	0	1	10	1	0	2	2	2	4	4
	Cerodaphnia corunuta	1	3	6	8	5	1	1	0	0	0	1	1

Cladocera	Cerodaphnia macrura	1	2	2	3	4	2	2	2	4	0	0	0
	Cerodaphnia sp.	2	4	6	3	5	1	1	0	1	0	0	1
	Diphanosoma sp.	2	1	0	6	8	0	1	1	2	0	1	1
	Moina brachiata	1	1	0	6	10	2	2	0	0	0	1	2
	Moina sp.	1	1	9	6	5	2	0	2	1	0	1	0
Copepoda	Anostrac sp.	1	3	0	3	7	0	0	1	2	0	0	2
	Calanoid noupli	1	1	3	8	5	1	0	0	1	2	0	1
	Cyclop sp.	2	1	4	5	4	3	0	1	2	0	2	1
	Mesocyclop hyalinus	2	6	3	3	4	2	0	2	2	1	0	0
	Mesocyclop sp.	1	2	4	2	2	2	1	1	0	0	0	1
Ostracoda	Cypris sp.	1	3	1	2	2	2	1	1	0	0	0	1
	Stenocypris sp.	1	1	2	2	1	1	2	2	1	0	0	1

Detailed microscopic examination of zooplanktons has been carried out under compound microscope revealed that there were 4 groups consisting of 20 genera of zooplanktons in the sample scanned throughout the study period (Jan. 2015 to Dec. 2015). The order wise zooplanktons recorded were as follows:

1. Rotifera : 07
2. Cladocera : 06
3. Copepoda : 05
4. Ostracoda : 02

In the present study, zooplanktons have been studied under four groups viz., Rotifera, Cladocera, Copepoda and Ostracoda. Among these groups Rotifera shows its dominance in all the sites. It has been observed that the Yelahanka lake revealed 7 genera of Rotifera, 6 genera of Cladocera, 5 genera of Copepoda and 2 genera of Ostracoda. Similar, results have been reported by Rajagopal *et al*. (2010).

Total zooplanktons showed its higher concentration during summer season and less during monsoon. The Rotifera are found in maximum number and Ostracoda in less number similar observation was noted by Nasar (1977).

In the present study, Rotifera represented 7 species. The higher concentration of Rotifera were found during summer season and least appearance during monsoon. Similar, results have been reported by Rajgopal et al. (2010); Smith et al. (2009). In the present investigation Rotifer shows their dominance than other three groups. Rajagopal et al. (2010) and Pandey et al. (2007) reported that rotifers occur more predominantly than cladocerous and copepods.

Cladocera are a crucial group among zooplanktons and form the most useful and nutritive group of crustaceans for higher members of fishes in the food chain. In the present study the group Cladocera and represented by 6 species among total Cladocera recorded maximum in summer and minimum in winter. Similar results have been reported by Rajgopal et al. (2010); Smith *et al*. (2009).

Copepods are much strongly motile than all other zooplanktons with their tougher exoskeleton and longer and stronger appendages. They have long developmental time and a complex life history with early larval stages difficult to distinguish. In the present study, group Copepoda shows 5 species. During study period higher density of copepod species found in summer and low density in monsoon season. Similar results have been reported by Rajagopal *et al*. (2010); Smith *et al*. (2009).

Ostracoda are bivalved organisms. In the present study, Ostracoda represented by only 2 species. Higher density of Ostracoda species found in summer and low density in monsoon. Similar results have been reported by Rajagopal *et al*. (2010); Smita *et al*. (2009).

Conclusion

The basic information of zooplanktons distribution and abundance form a useful tool for further ecological assessment and monitoring of ecosystem at Yelahanka Lake.

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