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Zooplankton Biodiversity Study of Gowrikere Tank, Anandapura, Sagara, Shivamogga, Karnataka, India

Sayeswara HA^{1*}, Vasantha Naik T² and Nafeesa Begum¹

¹Sahyadri Science College (Autonomous), Kuvempu University, Shivamogga-577203, Karnataka.

²D.R.M.Science College, Davangere University, Davangere-577066, Karnataka, India.

ABSTRACT

Zooplankton biodiversity of Gowrikere tank of Anandapura village of Sagara taluk of Shivamogga district of Karnataka was studied for a period of 12 months from January to December 2012. Zooplankton assume a great ecological significance in aquatic ecosystem as they play vital role in food web of the food chain, nutrient recycling, and in transfer of organic matter from primary producers to secondary consumers like fishes. The zooplankton determines the quantum of fish stock. The failure of fishery resources is attributed to the reduced zooplankton population. A total of 29 species of zooplankton representing four taxonomic groups such as Cladocera, Copepoda, Rotifera and Protozoa were recorded. Relative abundance of zooplankton in tank showed maximum of Cladocera (31.04%) followed by Copepoda (27.58%), Rotifera (24.13%) and Protozoa (17.24%). The ecological status of the tank was found to be impoverished in terms of species composition.

Keywords: Zooplankton biodiversity, Gowrikere tank and Anandapura

**Corresponding author*



INTRODUCTION

The zooplanktons play a role of converting phytoplankton in to food, suitable for fish and aquatic animals and acquired importance in fishery research [1]. The zooplanktons can also play an important role, indicating the presence or absence of certain species of fishes or determining the population densities. Zooplanktons have attracted the attention of several workers throughout the world, as they occupy a central position in the food web of aquatic ecosystem [2]. They can be used as indicators of trophic phase of a water body. The distribution of zooplankton community depends on a complex of factors such as, change of climatic conditions, physical and chemical parameters and vegetation cover [3]. Most of the species of zooplanktonic organisms are cosmopolitan in distribution [4]. The zooplanktons determine the quantum of fish stock. The failure of fishery resources is attributed to the reduced zooplankton population [5]. Hence zooplankton communities, based on their quality and species diversity, are used for assessing the productivity vis-à-vis fishery resource, fertility and health status of the ecosystem. The productivity of aquatic environment is directly correlated with the density of zooplankton. Much work has been carried out in India on the zooplanktons of freshwater habitats [6- 9]. Keeping this view in mind, the present study was undertaken to assess the diversity of zooplankton in Gowrikere tank.

MATERIALS AND METHODS

Study area:

Gowrikere tank (Anandapura village) is a perennial freshwater body situated at about 16 km away from the Sagara town, located between 14° 4' N latitude and 75° 38' E longitude. This is medium sized tank, with total water spread of 27.79 hectare, where rain is the main source of water. The river basin of the tank is Krishna. The water has undergone moderate changes in the physico-chemical properties due to overflowing of water from adjacent paddy fields and other excessive human activities. The water is used for agricultural purpose and domestic activities.

Plankton analysis:

For analysis of plankton, one liter of composite water samples at surface level was collected at interval of 30 days from January to December 2012. One liter of sample was fixed with 20 ml of 1% Lugol's iodine solution and kept 24 hours for sedimentation. 100 ml of sample is subjected to centrifugation at 1500 rpm for 20 minutes and used for further investigation. The filtered plankton were collected in separate bottles and preserved using 10% formalin. Zooplankton species identification was done with the help of standard references [10, 11].

RESULTS AND DISCUSSION

Detailed microscopic examination of zooplankton revealed that, a total of 29 species of zooplankton representing four taxonomic groups such as Cladocera, Copepoda, Rotifera and Protozoa were recorded. (Table1). Genus composition of different zooplankton groups are

depicted in Figs. 1-4. Zooplankton showed a dominant position of Cladoceran members (31.04%), followed by Copepoda (27.58%), Rotifera (24.13%) and Protozoa (17.24%). Rajagopal *et al.* [9] has described 24 genera of Rotifers, 8 genera of Cladocera, 9 genera of Copepoda and 4 genus of Ostracode in perennial ponds of Virudhunagar district, Tamilnadu. Mulani *et al.* [8] reported 6 genera of Protozoa, 36 genera of Rotifers, 5 genera of Cladocera, 8 genera of Copepoda, 3 genera of Ostracoda. 2 genus of larvae, 2 genera of Brachiopod, 2 genera of Oligocheta and 2 genera of Nematoda in Panchganga river. Kolhapur. Purushothama *et al.* [12] reported 5 genera of Cladocera, 5 genera of Copepoda, 2 genera of Rotifers and 2 genera of Protozoa in Heggere tank of Sagara taluk of Shivamogga district, Karnataka.

Table 1: List of Zooplankton in Gowrikere tank

Cladocera		16	<i>Paracyclops sp.</i>
01	<i>Alona pulchella</i>	17	<i>Tropocyclops prasinus</i>
02	<i>Ceretodaphnia cornuta</i>	Rotifera	
03	<i>Diaphanosoma excisum</i>	18	<i>Brachionus logirostris</i>
04	<i>Diaphanosoma sarsi</i>	19	<i>Brachionus quadridentatus</i>
05	<i>Daphnia carinata</i>	20	<i>Fillinia longiseta</i>
06	<i>Macrothrix goeldi</i>	21	<i>Keratella tropica</i>
07	<i>Macrothrix laticornis</i>	22	<i>Lepadella ovalis</i>
08	<i>Moina carinata</i>	23	<i>Rotatoria neptunia</i>
09	<i>Leydigia sp.</i>	24	<i>Polyarthra sp.</i>
Copepoda		Protozoa	
10	<i>Cyclops vicinus</i>	25	<i>Arcella sp.</i>
11	<i>Heliidiaptomus vidus</i>	26	<i>Diffflugia sp.</i>
12	<i>Mesocyclops hyalinus</i>	27	<i>Euglena</i>
13	<i>Mesocyclops leuckarti</i>	28	<i>Paramecium caudatum</i>
14	<i>Naupliar larva</i>	29	<i>Vorticella compunulata</i>
15	<i>Neodiaptomus stregilipes</i>		

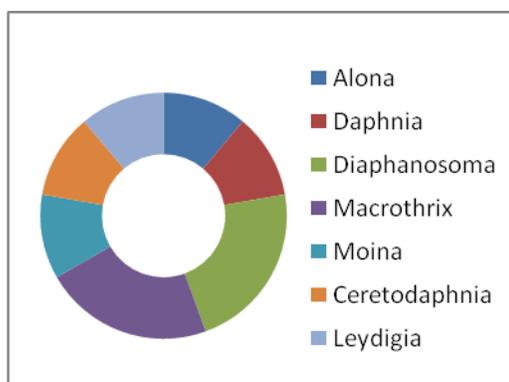


Figure 1: Genus composition of Cladocera

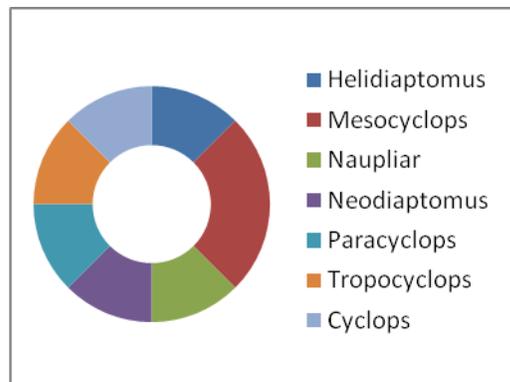


Figure 2: Genus composition of Copepoda

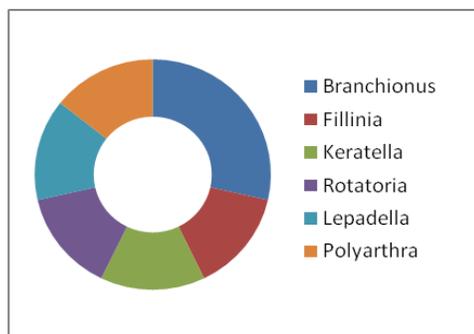


Figure 3: Genus composition of Rotifera

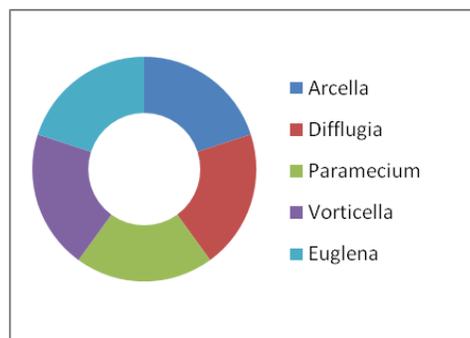


Figure 4: Genus composition of Protozoa

In the present investigation, Cladocera invariably constitute a dominant component of tank. Cladocera is an order of small crustaceans commonly called water fleas. The tank comprises of 7 genera and 9 species of cladocera. The genus *Diaphanosoma* and *Macrothrix* was represented by 2 species, *Alona*, *Daphnia*, *Moina*, *Ceratodaphnia* and *Leydigia* by a single species each. Cladocerans are known to be abundant in water with good littoral vegetation, while ponds and lakes without vegetation have fewer cladoceran species (Idris and Fernando, 1981).

Copepods are aquatic crustaceans, smaller relatives of crabs and lobsters, in terms of their size, abundance and diversity of way of life. Copepods were represented by 7 genera and 8 species. The genus *Mesocyclops* was represented by 2 species, *Heliodyptomus*, *Neodyptomus*, *Paracyclops*, *Tropocyclops* and *Cyclops* by a single species each. Naupliar larva was reported in the studied tank. Copepods are sometimes used as bioindicators.

Rotifers are smallest animals and occur worldwide in primarily freshwater habitats. They are important in freshwater ecosystem as they occur in all biotypes. About 95% of the rotifers are encountered in freshwater, while 5% are from brackish or marine waters and most are free living. Like the other zooplankton, rotifers also form a link in the aquatic food chain. They have a rapid turnover and high metabolic rates and feed on detritus. The organisms serve as bioindicators to depict water quality and are extensively cultured for use as fish feed. Rotifers were represented by 6 genera and 7 species. The genus *Branchionus* was represented by 2 species. *Fillania*, *Keratella*, *Rotatoria*, *Lepadella* and *Polyarthra* were represented by a single species.

Protozoans were represented by 5 genera and 5 species. The genera *Arcella*, *Diffflugia*, *Paramecium*, *Vorticella* and *Euglena* were represented by a single species each.

CONCLUSION

The water samples from Gowrikere tank was collected and analyzed for zooplankton composition. The ecological status of the pond was found to be impoverished in terms of species composition. A rich zooplankton fauna with 9 species of Cladocerans, 8 species of Copepods, 7 species of Rotiferans and 5 species of Protozoans were reported.



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