



Epitome : International Journal
of Multidisciplinary Research

ISSN : 2395-6968

STUDIES ON BIODIVERSITY AND POPULATION ECOLOGY OF ZOOPLANKTON



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ABSTRACT : The pioneer work on limnology in India was initiated by Prasad (1916), who studied the seasonal conditions of pond life in Punjab. Further studies on ecology of freshwater bodies from Madras city have been made by Ganapati (1943); Ganapati and Chacko (1951) while working on a fishpond at Madras observed that the age and nature of bottom sediment affects the plankton yield. Das and Srivastava (1956) reported that the quantity of plankton appeared is inversely proportional to the quantity of zooplankton. Recently Choudhary (1991) carried out the studies

on hydro biological parameters on planktons and benthic fauna of Sagar Island, Sundarbans. Verma and Mohanaty (1995) found out the correlation of plankton and certain physico-chemical parameters of Danmukndpur pond. Kodarkar et al. (1998) studied physico-chemical, biological and microbiological status of Hussainsagar Lake at Hyderabad. Hosmaniet at (1999) studied ecological significance of biochemical parameters in certain freshwater lakes of Mysore.

KEY WORDS : Biodiversity Population, Ecology, Zooplankton etc.

RESEARCH PAPER

INTRODUCTION:

The extensive work has been reported on the seasonal variation of plankton from different freshwater bodies. The planktonic population may vary qualitatively and quantitatively depending on depth of water bodies, site, and time, and season, source of water and its geological, biological, organic and inorganic contents and climatic factors. In the present research work quantitative estimation of zooplankton species have been carried out by selecting one station of reservoir from a fixed point. The seasonal fluctuations in the abundance of the various groups of dominant individual species of zooplankton population and their relation to the physico-chemical characteristics of water were studied in depth. The present investigation was carried out for a period of one year from **October 2021 to September 2022** at Yeldari reservoir of Parbhani district, Maharashtra. The data analysed for various physico-chemical factors for the study period, was taken into consideration to understand the distribution pattern of zooplankton. Even one of these factors is less, there is possibility that the given species may die. It is not only the physico-chemical condition of water bodies but also the physiological capabilities to get fit into the new set of conditions are equally important for zooplankton survival. The ecological studies towards understanding the zooplankton and their importance as fish food, indicators of pollution and to assess the tropical status of lentic freshwater bodies of different states have been completed by number of authors. However, attention towards biodiversity pattern of zooplankton and other animal species and their relation to their physico-chemical parameter fluctuations in freshwater bodies of Maharashtra State is not focused yet. Hence, a detail study on population of zooplankton of Yeldari reservoir has been carried out, in order to enhance out knowledge in this field.

MATERIALS AND METHODS: The Yeldari reservoir water spread area is 41.25 square miles with catchment area 2830 square miles. Monthly sample collection for zooplankton was done fortnightly between 8 -10 am for the period of one year. Specifically an attention was imparted on the occurrence, population dynamics, and biodiversity pattern of zooplankton. About 50 liters of water at 1 meter depth from the surface was taken with in to a plastic bucket of 10 litre capacity and filtered through plankton net made of bolting silk No.

16 bearing 10,000 meshes per square inch to which a Borosil glass jar of 250 ml capacity was attached. All care was taken to avoid spilling of the water. Zooplankton samples collected were transferred into 500 ml wide mouth, screw-capped polythene bottle and preserved in 10 per cent formalin solution (Trivedy and Goel, 1986). The zooplankton was enumerated by taking 1 ml sample on counting chamber with the help of a Sedgwick Rafter cell under binocular compound microscope with magnification of 100 X and the number of the various zooplanktons was counted. On an average three counts were made for each sample and the mean concentration were calculated. For this data the total count per litre was calculated and the various zooplanktons were considered as units of organisms per litre of water.

OBSERVATIONS AND RESULTS:

The zooplankton population, Rotifera, Cladocera, Copepoda, Ostracoda and Nauplius (crustaceans) larvae associated members studied at Yeldari reservoir. The 31 species of zooplankton were identified of which 14 belonged to Rotifera, 7 belonged to Cladocera, 8 belonged to Copepods and 2 belonged to Ostracoda. The Nauplius larvae were present throughout the period of investigation. The average percentage composition of the major groups of zooplankton which indicate that, the Rotifera was the dominant group with 33.2 to 34.9 per cent population. The Nauplius larvae are also found in good numbers (20.6 to 24.5%) and the Cladocera, Copepoda and Ostracoda zooplankton population are also better represented.

1. Rotifera: The maximum Rotifera population was found in the month of November 2021 while the minimum was in the month of April 2022. However, they did not show a typical pulse pattern. The Rotifers were richly dominated.

2. Cladocera: In the present investigation Cladocera zooplankton population was not in abundance, however all 7 species of Cladocera have been reported of which *Moina* was common in collections. The relative abundance of the Cladocera was more in March and August.

3. Copepoda: Copepod species though present in the reservoir was not found in large numbers, the pulses were dominated by *Mesocyclops*. The Copepod in the populations was *Diatomus*, *Ectocyclops*, *Eucyclops* and *Macrocylops*. The total populations were maximum in the month of March 2022.

4. Ostracoda: Ostracoda zooplankton population was also not found in large numbers, like Copepoda. During the year the maximum numbers of Ostracoda was found in the month of

March, 2022.

5. Nauplius (Crustacean) larvae: The Nauplius larvae were found in large numbers especially from January to March. This period could be taken as an intensive breeding period of the Copepoda zooplankton population. This fact was confirmed by the increase in the number of adults in April. In the present investigation the maximum number of Nauplius (crustaceans) larvae was recorded in the month of January, 2022.

CONCLUSION:

In aquatic ecosystem, zooplankton plays an important role as it provides an important food sources for other higher organisms. The studies of zooplanktons throughout the year can interpret the physico-chemical composition of the reservoir and vice-versa. The zooplankton population composed of Rotifers, Cladocerans, Copepodas, Ostracodas and Crustacean larvae throughout the year; specifically Rotifers and crustacean larvae dominated the sample. During the year Rotifera zooplankton population was 33.2. Similarly the Crustacean larvae percentage was 23.9 was during the year. Cladocerans ranged between 11.5 to 10.1, Copepods between 18.2 to 20.1 per cent and Ostracods between 13.1 to 14.2 per cent. The obtained results were coincided with those reported by with Khatri (1986), Raghunathan (1990) and Ganabuganapathi et al. (1998). The Yeldari reservoir is stocked with large number of fish which feed on Cladocera, Copepoda and Ostracoda zooplankton population; hence their number is reduced in the plankton sample. However, the Rotifera group dominated in the zooplankton population.

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