

Diversity of Zooplankton in the Rameshwar Dam, Deola, Nashik District, Maharashtra, India

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Abstract: *The study examines the zooplankton composition and seasonal fluctuations in the Rameshwar dam in Taluka Deola in the district of Nashik (M.S.) throughout the year. Thirteen different species were discovered in the dam. This group includes four species of Copepoda, three species of Cladocera, five species of Rotifers, and one species of Ostracoda. Rotifers were the most numerous group throughout the research period. Because different bodies of water experience varied environmental circumstances throughout the year, a study that analysed zooplankton species abundance found that it was average in the winter, lowest during the monsoon, and highest during the summer.*

Keyword: Rameshwar dam, Deola, Freshwater, Zooplankton, Seasonal, Fluctuation, Species

1. Introduction

So that we can learn more about the function of zooplankton in ecosystems. Freshwater is essential for many things, including economic growth, energy and food production, recreation, biodiversity, ecosystem preservation, and the health benefits of ecosystems, in the year 2020 Vári and Báldi. Several quantitative metrics, including biomass, population density, and biochemical components, can reveal the zooplankton population's seasonal fluctuation. In contrast to other nations in the tropics and subtropics, zooplankton have unique characteristics that must be considered while analysing their function (Riccardi and Mangoni, 1999). The heterotrophic activity of zooplankton makes them useful as bioindicators of environmental quality and an essential component of aquatic ecosystems' organic matter cycle processes. The diversity of zooplankton at the Rameshwar dam in Deola Taluka is the subject of this investigation.

2. Material and Method

In the Nasik District of Deola, Tal., stands the Rameshwar dam. Both irrigation and human consumption make heavy use of the water. For one year, during all four seasons, water samples were collected between 9:30 and 10:30 in the morning. For the purpose of sample preservation, a 4% formalin solution was also employed. Pennak (1978), Edmondson (1992), and Battish (1992) provide the conventional key for identifying zooplankton. It is standard practice for Sedgwick Rafter Cell to conduct quantitative and qualitative investigations of the organism.

3. Result and Discussion

According to Seasonal Variation, researchers in Deola Taluka, Nasik District, India, were able to identify several zooplankton species at the Rameshwar dam. This study's findings and analysis are detailed here. There are thirteen species in total, including five rotifers, four copepods, three cladocera, and one ostracoda (Table 1). Table 2 shows the seasonal variation of zooplankton, which is complemented by the bar diagram graphic that is supplied.

Rotifers

According to Suresh Kumar et al. (1999), rotifers play an important role in the freshwater impoundment's food web by acting as a live nutritional capsule. This investigation has uncovered five different rotifer species. According to Kudari et al. (2005), numerous aquatic habitats display taxonomic dominance. Rivers, lakes, ponds, reservoirs, and dams all exhibit this pattern (Neves 2003). It is possible that the rotifers' meteoric summertime water level decline was caused, in part, by the increasing bacterial population and organic elements of decaying plants (Majagi and Vijay Kumar 2009). In an ideal environment, where factors like temperature, nutrition, and photoperiod are present, planktonic rotifers have an extremely little lifespan.

Copepoda

Copepods are abundant in many different kinds of water and are an essential part of the zooplankton community. Copepoda are a staple diet for many fish species and play a significant role in ecological pyramids. In this study, four different species were found. The density of the population is highest during the monsoon season; this pattern of seasonal variation has also been observed at Trigha Reservoir near Gwalior (Mahor 2011). There seems to be an increase in the abundance of cyclopoid copepods at higher trophic levels of the water during the summer and monsoon seasons, when there is a greater abundance of organic materials to nourish them. The low population density in the winter is caused by parthenogenic copepods (Mustapha 2009).

Cladocera

The majority of fish in the food web benefit from crustaceans, which are the most nutrient-dense type of crustaceans. The present investigation uncovered three species. Summertime sees a lower population density of Cladocera than wintertime.

Ostracoda

Among zooplankton groupings, ostracods have incredibly low population densities. One species of Ostracoda was discovered in this investigation. The winter months have the largest population density, whereas the monsoon season has the lowest. Of all the zooplankton, Cladocera has the densest and most diversified population year-round. Another sign

that the water is eutrophic is that Cladocera were able to dominate the river because food was constantly available to them. Copepods were present in usual numbers during the summer and monsoon seasons, but they were very rare during the winter. Cladocera and Ostracoda, in contrast to copepods and rotifers, exhibited very little seasonal variation and kept very stable population sizes all year round. The research indicated that the overall zooplankton population was highest in the winter and summer and lowest during the monsoon season. Throughout the year, copepods and rotifers consistently outnumbered cladocera and ostracoda. These points have also been made by Das (2002). The density of

zooplankton is increased during the summer by the main population. As a general rule, lower population densities are linked to the monsoon season's diluting effect and reduced primary production photosynthetic activity. Salve and Hiware (2010) have discovered comparable results in the Wan reservoir close to Nagpur. Some articles state that a symptom of eutrophication is when certain types of zooplankton are abundant in aquatic food webs (Halbach et al., 1983). The recent investigation revealed that the water body of the Rameshwar dam was getting more eutrophic, as rotifers and copepods predominated.

Table 1: Seasonal Diversity of Zooplanktons

Zooplankton Group	Monsoon				Winter				Summer			
Rotifera												
<i>Brachionous forficula</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Brachionus calyciflorus</i>	+	-	-	+	+	+	+	+	+	-	+	+
<i>Keratella tropica sp</i>	+	-	+	-	+	+	+	+	+	+	+	+
<i>Filina sp</i>	+	+	-	-	+	-	+	+	+	-	-	+
<i>Lacane luna</i>	+	-	+	+	+	+	-	+	+	+	+	+
Cladocera												
<i>Daphnia sp</i>	+	+	+	-	+	+	+	+	+	+	+	+
<i>Monia sp</i>	+	-	-	-	+	+	+	+	+	-	+	+
<i>Alonella</i>	+	+	+	-	+	+	+	+	+	+	+	+
Copepoda												
<i>Cyclope</i>	+	+	+	-	+	+	+	+	+	+	+	+
<i>Calanus</i>	+	-	+	+	-	-	+	+	+	-	+	+
<i>Mesocyclope</i>	+	+	-	-	+	+	+	+	+	+	+	+
<i>Nauplius larva</i>	+	+	-	+	+	+	+	+	+	-	-	+
Ostracoda												
<i>Cypris sp</i>	+	+	+	+	+	+	+	+	+	+	+	+

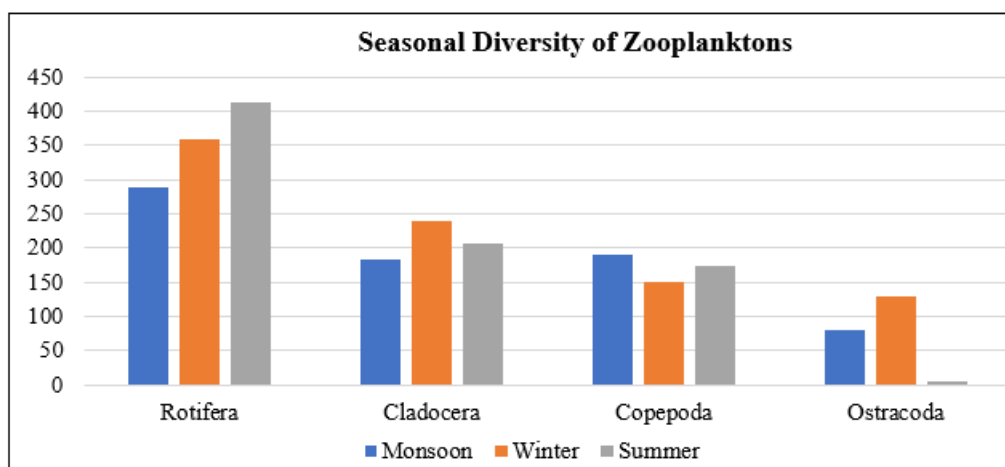


Table 2: Group-wise seasonal population density of zooplankton

Sr. No.	Zooplankton Group	Seasonal Diversity			Total
	Season	Monsoon	Winter	Summer	
1	Rotifera	290	360	412	1062
2	Cladocera	184	240	207	631
3	Copepoda	190	150	173	513
4	Ostracoda	80	130	115	325
	Total	744	880	907	2531

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