

Original Research Article

Variation in zooplankton diversity of Kalisarar Dam of Gondia District, Maharashtra

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ABSTRACT

Zooplankton diversity reflects the quality of water hence constitutes the important ecological parameter to assess it. These are not only useful as bioindicators, but are also helpful for ameliorating polluted waters. Zooplankton community is cosmopolitan in nature and they live in all freshwater habitats of the world. Zooplankton is the transitional link between phytoplankton and fish. They are good indicators of the changes in water quality because they are strongly affected by environmental conditions & respond quickly to changes in water quality. Hence qualitative and quantitative studies of zooplankton are of great importance. In the present paper qualitative and quantitative studies of zooplanktons in Kalisarar dam of Gondia district were carried out during June 2017 to May 2018. Using microscopic studies of zooplankton, this investigation revealed that 11 genera belonging to five major groups *i.e.* Cladocera (two genera), Copepoda (three genera), Ostracoda (one genus), Protozoa (two genera) and Rotifera (three genera) were present.

KEYWORDS

Zooplankton | Kalisarar Dam | Gondia District

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Introduction

Zooplankton are microscopic, free floating organisms occurred in all natural water bodies. They are a major form of energy source between phytoplankton and other aquatic animals According to Dadhick and Saxena (1999) the zooplankton plays an integral role and serves as bio- indicators. Zooplanktons comprise the food source of organisms at elevated trophic levels (Gajbhiye, 2002). They occupy a transitional place in the aquatic food web (Altaff, 2004). It is a well suitable device for understanding water pollution status (Contreras *et al.*, 2009). Due to their huge density, shorter lifespan, drifting nature, high species diversity and different tolerance to the stress, they are being used as indicator organisms for the physical., chemical and biological processes in the aquatic ecosystem.

A number of studies has been carried out on the condition of ecology and freshwater bodies in various parts of India (Smitha *et al.*, 2007) but in some parts of Vidarbha region (M.S), the ecological studies of freshwater bodies especially zooplankton studies is very scanty. So the present study was undertaken to investigate the zooplankton diversity in Pujaritola lake through different months and season during the period June 2017 to May 2018 in order to assess the species composition, population density and seasonal fluctuation of this faunal group.

Study Area

Kalisarar Dam, is an earth fill and gravity dam on Kalisarar River near Salekasa, Gondia District in the state of Maharashtra in India. The height of the dam above lowest foundation is 25.52 m (83.7 ft.) while the length is 830 m (2,720 ft.).

The volume content is 697 km³ (167 cu mi) and gross storage capacity is 30,460.00 km³ (7,307.74 cu mi) Kalisarar (latitude: 1.1768487N, longitude: 80.4540825E). It is about 45 Km from the Gondia city.

Collection of sample

Water samples were collected from Kalisarar dam every month during June 2017 to May 2018 in the morning between 6 AM to 7 AM. For collection of zooplanktons sample 25 litres of surface water passed through standard plankton net of bolting silk No. 25. The collected samples were preserved in 4% formalin solution and stored in 250 ml bottles. The naming of zooplankton was made by using standard keys of Dhanapathi (2000) and Altaff (2004). The quantitative analysis of planktonic organisms was carried out using Sedgwick Rafter's plankton counting chamber.

Observation

As shown in Table 1 for month wise population density (No./lit) of unlike zooplankton groups from June 2017 to May 2018.

Cladocera: In this study two species out of 110 species recorded in India (Patil *et al.*, 1989) were recorded. They play key role in food chain and energy transformation (Uttangi, 2001). The Cladoceran population showed minimum in monsoon, *i.e.* in June 35/lit and maximum in winter, *i.e.* in December 179/lit. This variation in population was due to favourable temperature and availability of food, while in monsoon the factors like temperature, turbidity, and transparency play an important role in controlling the diversity and density of Cladocera (Edmondson, 1965).

Copepods: In the present investigation, they were found to be maximum during summer, *i.e.* 125 in April and minimum during winter, 85/lit in October. They serve as food to several fishes and play a major role in ecological pyramids. Similar trend was observed in Renukalake, Himachal Pradesh (Chauhan, 1993).

Ostracods: In the present investigation one species of ostracods were recorded. Maximum ostracods population was recorded in summer, 84/lit in March month while minimum in monsoon, *i.e.* 18/lit in July. They occur in all kinds of freshwater and marine environments. The abundance of these provides a good food for aquatic organisms. Similar observations were also made in Fort Lake of Belgaum, Karnataka (Sunkad *et al.*, 2004).

Protozoa: Two species had been reported from the Pujaritola lake where density was maximum in winter, *i.e.* 162/lit in December, while it was minimum in monsoon, *i.e.* 9/lit in June. They are both herbivores and consumers in the decomposer link of the food chain. They also control bacteria populations and biomass to some extent (Alcama *et al.*, 2009).

Rotifers: The rotifers are being considered as the most important soft bodied invertebrates (Hutchinson, 1991). The dominance of rotifers was reported in several water bodies. In this study population density of rotifers was maximum in winter, 275/lit in December and minimum in monsoon, 30/lit in June.

Results and Discussion

Zooplanktons are fine indicators of changes in water quality, because they are strongly affected by environmental conditions and responds quickly to changes in environmental

quality. Hence, qualitative and quantitative studies of zooplanktons are of great importance. The monthly and seasonal variations of zooplankton are tabulated (Table 1).

In the present investigation, total 11 species of zooplanktons were recorded. Two species belonging to Cladocerans were recorded as *Three* species of Copepods were recorded as *Cyclops strenuus*, *Diaptomus pallidus* and *Heliodiaptomus viduus*. Belonging to Ostracods one species *Cypris subglobosa* were recorded. Two species of Protozoa were found as follows; *Vorticella*, *Paramecium*. In Rotifera three species such as *Asplanchna*, *Brachionus durgae* and *Keratella valga* were recorded.

The physiochemical parameters such as temperature, light, pH, organic and inorganic constituents and the interrelationship with their organisms play an important role in determining the nature and pattern of fluctuation of population densities of zooplanktons. Maximum species richness was observed during winter season and minimum was during monsoon. The maximum species richness was observed in group Rotifera and minimum in group Ostracods. The total number of zooplanktons was recorded maximum in the month of December and minimum number observed in month of June (Table 1).

Conclusion

The zooplankton investigation showed that, the total zooplankton density was more in winter season due to low temperature, favourable for phytoplanktonic growth as an abundance of food.

Month	Monsoon Season				Winter Season				Summer Season				Total
	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	
Groups													
Cladocera	35	103	115	105	122	156	179	103	82	93	51	39	1183
Copepoda	67	61	88	95	85	83	85	84	98	119	125	110	1100
Ostracods	18	07	50	28	41	30	08	19	65	84	70	55	475
Protozoa	09	31	44	100	144	130	162	128	108	90	85	57	1088
Rotifers	30	49	43	182	214	241	275	261	121	101	94	75	1686

Table 1: Monthly population density (No./ lit) of different zooplanktons

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