



STUDIES ON MONTHLY VARIATIONS OF ZOOPLANKTON IN KIRHAI DAM OF AMARPATAN, SATNA (M.P.)

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ABSTRACT:

Zooplankton are cosmopolitan in nature and they are found to inhabit all freshwater body. The seasonal density of zooplankton observed during different seasons of one year of study period (January 2020 to December 2020) are represented in Tables and Graph 1 & 2. The average density of each species of zooplankton was determined for winter, summer and rainy seasons of Kirhai dam Amarapatan Satna (M.P.). In total 38 species of zooplankton were identified during present study. Out of 38 species of zooplankton 8 species belonged to Protozoa, 14 species to Rotifera, 5 species to Copepoda, 10 species to Cladocera and 1 species to Ostracoda. Rotifera forms the main bulk of zooplankton comprising 36.84% of species composition followed by Cladocera (26.32%), Protozoa (21.05), Copepoda 13.16% and Ostracoda (2.63%) during study period. The average annual density of zooplankton and their percentage contribution observed during study period Rotifera were the dominant group of Zooplankton recorded with respect to diversity and species density status. They are also important as an index of productivity, eutrophication and pollution of the aquatic ecosystem.



KEYWORDS: Kirhai dam, Zooplankton diversity and density.

INTRODUCTION

The zooplankton consists of diverse assemblage of major taxonomic groups. Many of these forms have different environmental and physiological assemblage. The number type and distribution of these organisms present in any aquatic habitat provide a clue on the environmental condition prevailing in that particular habitat. The occurrence and abundance of zooplankton in the water body depends on its productivity which in turn is influenced by the physico-chemical parameters and level of nutrients. The zooplankton is an important group of micro-organisms which indicates the trophic status of water body. Some of them are also acting as bio-indicator of organic and inorganic pollution of water body.

STUDY AREA-

The above facts related with damming effect on the ecological condition of the reservoir have inspired the present investigation. The present water body namely Kirhai dam is situated in village Kirhai of tehsil Amarpatan, district Satna (M.P.) on the south side of Amarapatan-Ramnagar road, just below the Kamore hills. It was constructed in 1981. Kirhai dam is situated in village, Kirhai, tehsil

Amarpatan, district Satna (M.P.). Amarpatan is located at 24°32'N latitude and 80°98' E longitude. It lies on National Highway No. 7 and connects Rewa to Maihar. Amarpatan is 36 km from district headquarters, nearest Railway station, is Maihar which is 24 km. It has an average elevation of 358 meters (117.4 feet). Kirhai dam is made on KirhaiNalla. It is situated between 24°15'25" N latitude and 81°10' E longitude. It is located on Amarpatan-Ramnagar road, 9 km from N.H.-7 Amarpatan Bus stand. The catchment area of the dam was 0.715 sq. mile (1.852 sq. km).

It is an important water body of this area.

AIMS AND OBJECTIVE OF STUDY:-

The aims and objectives of the present study are following:

- ❖ To Conserve the topography of dam.
- ❖ To check the changes in biological parameters and their temporal and spatial fluctuation.
- ❖ To improve the aquaculture and water quality of dam.

REVIEW OF LITERATURE:-

Quantitative study of zooplankton was carried out by many researchers worldwide. Bhat et al (2014), Chatterjee et al (2014), Koli and Muley (2012), Kulkarni and Surwase (2013), Patole (2015), Pradhan (2014), Sehgal et al (2013), Watkar and Barbate (2013) studied zooplanktons quantitatively to a large extent from Indian continent. The importance of the Zooplankton is well recognized as these have vital part in food chain and play a key role in cycling of organic matter in an aquatic ecosystem Sharma et al (2010). Though numerous works on Zooplankton diversity are being reported from different parts of India but there is scarcity of report from freshwater bodies of different parts of Northeast India except some worth mentioning of Sharma and Sharma (2008); Kar and Barbhuiya (2004); Kar (2013).

MATERIAL AND METHODS:-

Samples were collected monthly from five different sampling stations namely A, B, C & D for one year (January 2020 to December 2020). Then the sample were filtered and placed in Tarson (100 ml) container, subsequently fixed in Lugol's solution and stored in cool and dark place. For studying the diversity of Zooplankton, sample were taken in a Sedgwick-Rafter counting chamber and observed under a light microscope under required magnification (X 10 initially, followed X 40) and the specimens were identified following standard literature of Battish (1992); Edmondson (1959); Michael and Sharma (1998); Sharma (1998); Sharma and Sharma (2008).

RESULT AND DISCUSSION :-

The seasonal density of zooplankton observed during different seasons of one year of study period (January 2020 to December 2020) are represented in Tables and Graph 1 & 2. The average density of each species of zooplankton was determined for winter, summer and rainy seasons of Kirhai dam Amarapatan Satna (M.P.). In total 38 species of zooplankton were identified during present study. Out of 38 species of zooplankton 8 species belonged to Protozoa, 14 species to Rotifera, 5 species to Copepoda, 10 species to Cladocera and 1 species to Ostracoda as given Below:

Group -Protozoa

Amoeba sp., Arcella sp., Chilodonella sp., Diffusia sp., Epistylis sp., Euglena sp., Euglepha sp., Paramecium sp.

Group - Rotifera

Asplanchna brightwelli, Asplanchna sp., Brachionus angularis, Brachionus bidentata, Brachionus caudatus, Brachionus patulus, Brachionus quadridentatus, Brachionus rubens, Filinia longiseta, Filinia terminalis, Keratella tropica, Lecaneaculiata, Monostyla sp., Trichocerca similis.

Group - Copepoda

Cyclops sp., Diaptomus sp., Gammarus sp., Mesocyclops sp., Nauplii.

Group - Cladocera

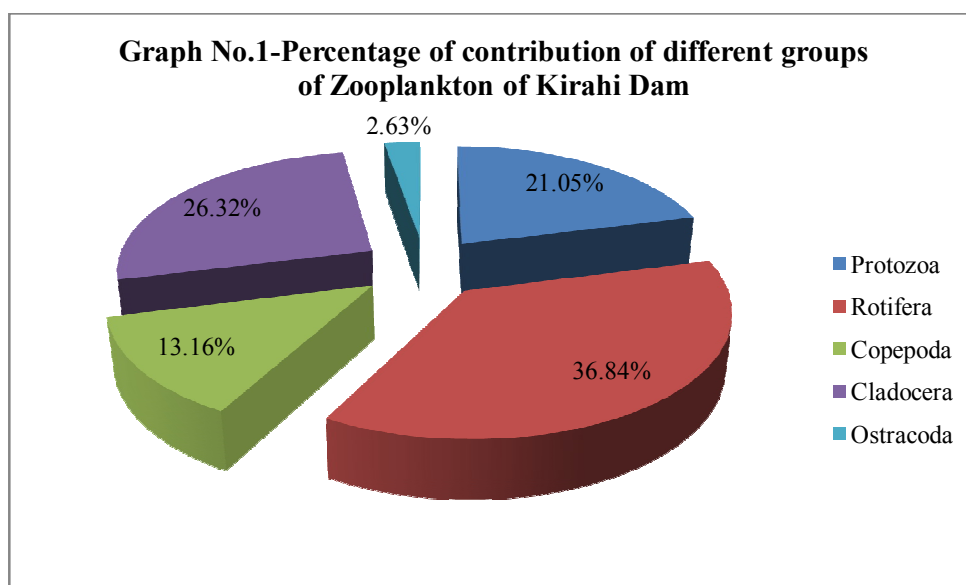
Alonaaaffinis, Alonella sp., Biaperturaaffinis, Bosmina sp., Ceriodaphniasp., Daphniacarinata, Daphnia sp., Moina sp., Monodaphnia sp., Sida sp.

Group - Ostracoda

Cypris sp.

Table-1 The number and percentage contribution of different groups of zooplankton are as follows:

S.No.	Groups	Number of Species	Percentage
1	Protozoa	8	21.05
2	Rotifera	14	36.84
3	Copepoda	5	13.16
4	Cladocera	10	26.32
5	Ostracoda	1	2.63
	Total	38	100.00



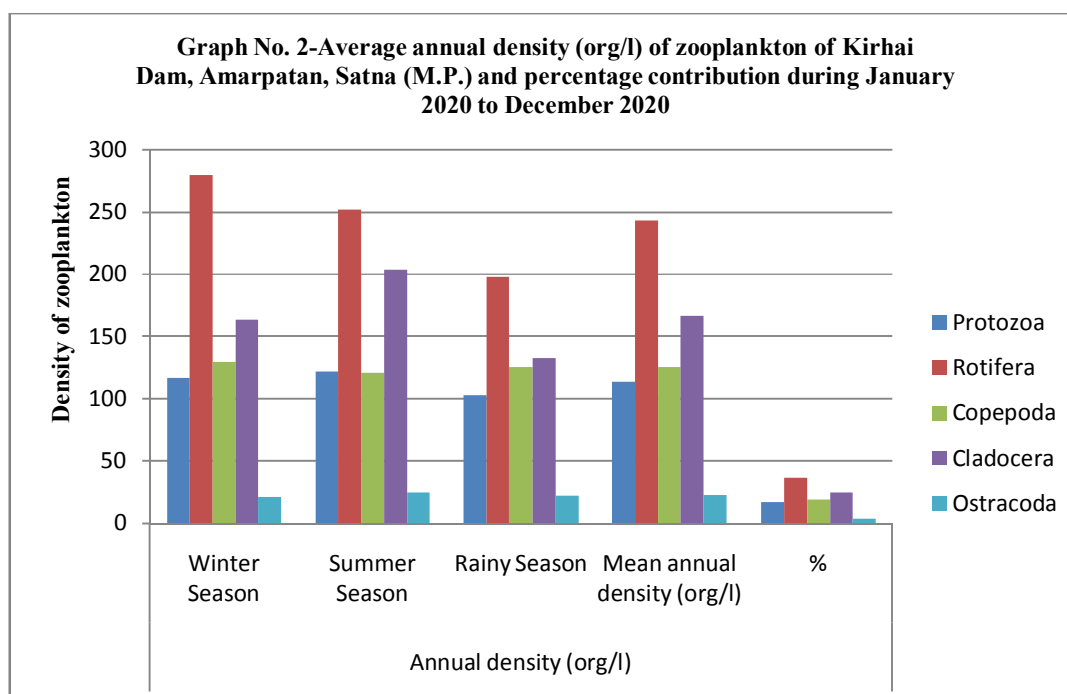
Rotifera forms the main bulk of zooplankton comprising 36.84% of species composition followed by Cladocera (26.32%), Protozoa (21.05), Copepoda 13.16% and Ostracoda (2.63%) during study period.

AVERAGE ANNUAL DENSITY:-

The average annual density of zooplankton and their percentage contribution observed during study period are represented on Table-2. Rotifera showed their dominance followed by Cladocera, Copepoda, Protozoa and Ostracoda during the year.

Table 2. Average annual density (org/l) of zooplankton of Kirhai Dam, Amarpatan, Satna (M.P.) and percentage contribution during January 2020 to December 2020.

S. No.	Taxonomic group	Annual density (org/l)				
		Winter Season	Summer Season	Rainy Season	Mean annual density (org/l)	%
1	Protozoa	116.75	121.75	102.75	113.75	16.94
2	Rotifera	279.75	252.25	197.75	243.25	36.23
3	Copepoda	129.75	120.75	125.25	125.25	18.65
4	Cladocera	163.75	203.50	132.75	166.67	24.82
5	Ostracoda	20.75	24.75	22.00	22.50	3.35
	Total	710.75	723.00	580.50	671.42	100.00



Zooplanktons are considered to be the ecological indicators of water bodies (Gajbhiye and Desai 1981). Factors such as light intensity, food availability, dissolved oxygen and predation effect the population dynamics of zooplankton. Low pH or higher salinity can reduce their diversity and density (Horn and Goldman, 1994). The zooplankton assemblage of this dam consists primarily of rotifer followed by crustaceans and protozoa. Seasonal variation of the zooplankton populations of Kirahi dam correlate to changes in environmental factors.

Similar observation was made by many researchers throughout the country Kar and Kar (2013) reported 26 species of Zooplankton from an oxbow lake of Cachar, Assam; Tyor et al. (2014) studied Zooplankton diversity in a shallow lake of Gurgaon, Haryana revealing Rotifera with highest diversity followed by Cladocera and then Copepoda showing least diversity; Pawar (2014) reported 66 species of Zooplankton in some freshwater bodies around Satara district of Maharashtra, India.

Pahwa and Mehrotra (1966) reported rotifer population from Ganga river, where they constituted 61.5 to 94.4% of population. Govind (1969) reported a rotifer peak in February (24.7%) out of the total zooplankton from shallow zone of Tungbhadra reservoir. Gupta (1989) reported a major rotifer peak in August and in February from two ponds near Jodhpur. Sheebaet. al. (2004) Qualitative and quantitative study of zooplankton in Ithikkara river, Kerala. These exhibited a bimodal pattern with

a major peak in December and a minor peak in August. The second group of zooplankton, Copepoda, also exhibited two maxima (April & August) and two minima (February, March and September).

CONCLUSION:-

The qualitative analysis of zooplankton from Kirahi dam aquatic ecosystems revealed the presence of three taxonomic groups: Rotifera, Crustaceans, Cladocera. The dominance of zooplankton species is highly variable in different types of water body according to nutrient levels, predator and other environmental factors which then affects the other biotic components of the ecosystems. The rapid increase of human activities and assemblage of livestock are creating pollution in the dam water and needs immediate measure. At this critical juncture the local representatives, Government and Non-Government bodies, the educated bodies, the village heads and the reputed figures of the society should come forward and formulate conservational model for the sustainability of this beautiful water body.

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