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Study zooplanktons in Matiyari dam of Mandla district (M.P.) India

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Abstract
Zooplanktons are freshwater habitats and found cosmopolitan in nature. They are integral part of aquatic food web and contribute significantly to aquatic biological productivity in freshwater ecosystems. It is helpful in evaluating the ecological status of the aquatic habitats as they are important nutritive level as well as used for determining the health of an aquatic ecosystem. The present study reveals that the study site, the Matiyari dam is rich in biodiversity. 18 taxa of Zooplankton were recorded from Matiyari dam which comprised of 5 species of Copepods, 6 species of Rotifera, 4 species of Cladocera and 3 species of Protozoa and one species of Ostracoda. High diversity of Copepoda and Rotifera indicates the presence of suspended material in the water body may lead to the degradation of the perennial water body. The present investigation may help the authorities for conservation and management of these water bodies.

Keywords: fish diversity, economic value, nutritive value, Matiyari dam, district Mandla

Introduction
Fresh water represents a very small part of the total water on earth but it is indispensible as almost all animal that live on the land consume it and it is the habitat for multitude of aquatic animals. The inland water on the surface of the earth such as lakes, ponds become the focus of special attention of an early stage in development of science of ecology. In last 25 years the unrestrained population growth and rapid industrialization coupled with intensive agriculture with excessive input of inorganic fertilizers and insecticides have exerted intolerable stress on the aquatic resources. For effective exploitation of as aquatic ecosystem basic information on its biodiversity is a must.

The animals living in the wetlands provide the best indications of the overall health and ecological condition (Wankhede, 2007) [1]. Every animal has unique environmental requirement to be healthy and to reproduce successfully. The advantage of using bioindicators over chemical and physical tests to evaluate water quality is that the presence of living animals inherently provides information.

Present study involves the quantitative analysis of the zooplankton of Matiyari dam with reference to variety within their community. Zooplanktons provide food for fishes in freshwater ponds and play a major role in fish production. A notable contribution on planktonic forms of freshwater ecosystems is available due to Sharma (1996) [2] and Prasada (1916) [3] was the first to study the limnological profile of freshwater pond in India, subsequently several workers studied water bodies from limnological view point (Purthy, 1933; Sewell, 1934; Sreenivasan, 1970; Jana, 1973; Dutta & Chaudhari, 1986; Michael & Sharma, 1998)[4-9]. Several workers also attempted to study hydro biological profile of varied water bodies (Kaushik & Sharma, 1994 and Sunkad & Patil, 2003) [10-11] and diversity of organisms.

Biodiversity is achieving a tremendous importance in present day research where collection of base line data related to flora and fauna is important. If such studies are not carried out many of the existing aquatic faunal species may go unnoticed. This research article only is an attempt to document zooplankton from Matiyari dam located of Mandla district (M.P.) India.

Material and methods
Description of study area
The present aquatic body "Matiyari dam" was constructed in the year 1986 on Matiyari river of Anjania city district Mandla. It is situated 22°-31'-45" latitude and 80°-34'-30" longitude. The height of the dam is 33.66 mt. and length 1131 mts. The catchment area is 159 sq. km. Mainly the water of this dam is used for irrigation and fish culturing.

For quantitative zooplankton study samples were collected during December 2017 to November 2018 with the help of plankton net made of bolting cloth no. 25 from littoral zone, preserved in 4% formalin & examine under microscope. The planktonic organisms were identified as per Ward & Whipple, (1959) [12] & Battish, (1992) [13].

The zooplankton community in this water body mainly comprised of four major groups viz. Rotifera, cladocera, copepod & Protozoa. Besides that some other organisms also contributed to zooplankton community but only few could be identified. In Matiyari dam altogether 18 species were recorded which comprised 5 species of Copepoda, 6 species of Rotifera, 4 species of Cladocera and 3 species of Protozoa and one species of Ostracoda (Table 1). The monthly variations in zooplankton population is shown in Table 2.

Table 1: List of Zooplankton species occurring in Matiyari dam.

S.No.	Zooplankton species	Matiyari dam
	Copepoda	
1.	*Heliodiaptomus viduus*	+
2.	*Phyllodiaptomus annae*	+
3.	*Neodiaptomus sp.*	+
4.	*Mesocyclops leuckarti*	+
5.	*Eucyclops sp.*	+
	Rotiferra	
6.	*Brachionus caudatus*	+
7.	*Brachionus calyciflorus*	+
8.	*Brachionus rubens*	+
9.	*Keratella tropica*	+
10.	*Asplanchna brightwelli*	+
11.	*Fillinia lingiseta*	+
	Cladocera	
12.	*Daphnosoma sarsi*	+
13.	*Ceriodaphnia cornuta*	+
14.	*Simocephalus vetulus*	+
15.	*Moina brachiate*	+
	Protozoa	
16.	*Arcella sp.*	+
17.	*Diffugia sp.*	+
18.	*Vorticella sp.*	+

Table- 2: Monthly variations of Zooplankton population (u/l) in Matiyari dam.

Months	Total zooplanktons	Copepods	Rotifers	Cladocera	Protozoa	Misc.
Dec. 2017	201	81	84	20	12	4
Jan. 2018	263	117	94	33	16	3
Feb. 2018	297	104	132	26	17	18
Mar. 2018	195	94	56	21	17	7
Apr. 2018	232	74	86	42	22	8
May 2018	420	164	170	38	38	10
Jun. 2018	267	124	76	40	18	9
Jul. 2018	424	173	134	71	35	11
Aug. 2018	457	192	163	60	35	7
Sept. 2018	651	240	245	108	46	12
Oct. 2018	782	310	245	137	82	8
Nov. 2018	483	190	174	72	38	9
Total	4672	1863	1659	668	376	106
Percentage	100.00	39.88	35.51	14.30	8.05	2.27

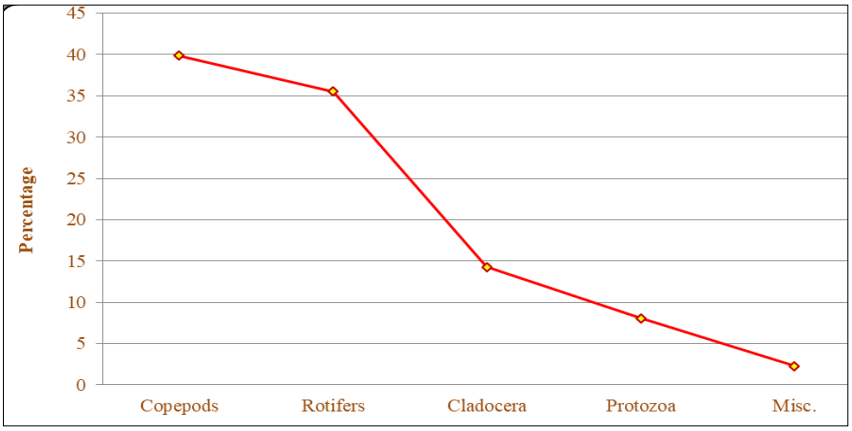

Fig 1: Graphics analysis of percentage variations of Zooplankton population (u/l) in Matiyari dam.

Discussion & conclusion

The zooplankton community, which is a vital link in the aquatic food chain, exhibits relatively lesser diversity in tropical waters than temperate waters because its diversity in influenced by a number of physico-chemical and biological factors. Temperature is considered as one of the determining factors in the seasonal distribution of zooplankton population (Byars 1960) [14]. In the present study the distribution of zooplankton related inversely with water temperature, nitrate, phosphate and positively with pH of water. Similar observations by Sharma (1996) [2]. According to Davis (1999) [15] and Wright (1965) [16] the abundance of zooplankton is chiefly dependent on the abundance of phytoplankton. In the present study the major

peak was observed in summer or early monsoon. The zooplankton community structure in Matiyari dam showed the dominance of Copepods (Copepods > Rotifers > Cladocerans > Protozoans).

Rotifers have shown the ability to survive in different environments as many among of them feed on various phytoplankton, some feed on detritus and bacteria, while other planktonic rotifers feed largely on sediment particles (Hutchinson, 1957) [17]. High adaptive nature of this group apparently favored its good proliferation among zooplankton community in Matiyari dam. The relative abundance of Rotifers in the dames under study may be attributed to infestation of macrophytes and high accumulation of organic nutrients due to their annual decomposition (Edmondson, 1945) [18]. The maximum peak of Rotifers is observed in winter. Among rotifers Brachionus sp and Keratella sp were predominant in winter. In the present study the water temperature ranged between 20°C and 24°C., which seems to be favorable for their growth (Pennak, 1953) [19].

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