



## Zooplankton Diversity of Chulod Lake of Gondia District, Maharashtra

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### Abstract:

Zooplankton community is cosmopolitan in nature and they inhabit all freshwater habitats of the world. Zooplankton is the intermediate 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. 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. Hence qualitative and quantitative studies of zooplankton are of great importance. In the present paper qualitative and quantitative studies of zooplanktons in Chulod Lake of Gondia district were carried out during August 2013 to August 2014. Using microscopic studies of zooplankton, this investigation revealed that 15 genera belonging to five major groups i.e. Protozoa (three genera), Cladocera (three genera), Copepoda (four genera), Ostracoda (two genera) and Rotifera (three genera) were present.

### Key words:

Zooplankton diversity, Gondia district, Chulodlake.

### Introduction:

Zooplankton are microscopic, free floating organisms occurred in all natural water bodies. They are a major mode of energy source between phytoplankton and other aquatic animals. They occupy an intermediate position in the aquatic food web (Altaff, 2004). Zooplanktons constitute the food source of organisms at higher trophic levels (Gajbhiye, 2002). According to Dadhick and Saxena (1999) the zooplankton plays an integral role and serves as bio- indicators. It is a well suited tool for understanding water pollution status (Contreras *et al.*, 2009). Due to their large 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 Chulodlake through different months and season during the period August 2013 to August 2014 in order to assess the species composition, population density and seasonal fluctuation of this faunal group.





## Material and methods:

### Study Area

Chulod lake is situated in the Gondia district of State Maharashtra. It is 5.9 km away from the Gondia city. Chulod lake located latitudes 20.39 and 21.38 North and longitudes 79.27 to 80.42 East.

### Collection of Sample

Water samples were collected from lake every month during August 2013 to August 2014 in the morning between 6 AM to 9 AM. For collection of zooplanktons sample 50 liters 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 200 ml bottles. The systematic identification 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.

### Result and discussion:

As shown in Table 1 for month wise population density (No. /lit) of different zooplankton groups from August 2013 to August 2014.

#### *Protozoa:*

Protozoa are an important food source for micro invertebrates. They are both herbivores and consumers in the decomposer link of the food chain. They also control bacteria populations and biomass to some extent (Alcarno *et al.*, 2009). All the three species had been reported from the chulod lake where density was maximum in winter, i.e. 157/lit in December, while it was minimum in monsoon, i.e. 24/lit in June.

#### *Cladocera:*

They play key role in food chain and energy transformation (Uttangi, 2001). In this study three species out of 110 species recorded in India (Patil *et al.*, 1989) were recorded. The Cladoceran population showed minimum in monsoon, i.e. in June 50/lit and maximum in winter, i.e. in December 174/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:*

They serve as food to several fishes and play a major role in ecological pyramids. In the present investigation, they were found to be maximum during summer, i.e. 120 in April and minimum during winter, 80/lit in October.





Similar trend was observed in Renukalake, Himachal Pradesh (Chauhan, 1993).

#### *Ostracods:*

They occur in all kinds of freshwater and marine environments. The abundance of these provides a good food for aquatic organisms. In the present investigation two species of ostracods were recorded. Maximum ostracods population was recorded in summer, 79/lit in March month while minimum in monsoon, i.e. 02/lit in July. Similar observations were also made in Fort Lake of Belgaum, Karnataka (Sunkad *et al.*, 2004).

#### *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, 270/lit in December and minimum in monsoon, 45/lit in June.

#### *Discussion:*

In the present investigation, total 15 species of zooplanktons were recorded. Three species of Protozoa were found as follows; *Vorticella*, *Paramecium* and *Amoeba*. Three species belonging to Cladocerans were recorded as *Alonapul chella*, *Ceriodaphnia cornuta*, *Moin amicrura*. Four species of Copepods were recorded as *Cyclops strenuus*, *Diaptomus pallidus*, *Heliodiaptomus viduus* and *Mesocyclops leuckarti*. Belonging to Ostracods two species *Cyclocypris globosa* and *Cypris subglobosa* were recorded. 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).

Zooplanktons are good 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).





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

Month	Monsoon Season				Winter Season				Summer Season				Total
	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	
Protozoa	24	36	49	115	149	145	157	132	113	95	90	62	1167
Cladocera	50	98	110	110	117	152	174	108	97	98	56	44	1214
Copepoda	92	93	99	100	80	88	90	89	93	114	120	111	1169
Ostracods	13	02	45	32	36	35	09	34	70	79	75	60	490
Rotifers	45	54	48	187	239	256	270	256	126	109	100	80	1770

## Conclusion:

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

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