

## Study of Zooplankton Diversity of Small Lentic Ecosystem, Lohara, Gondia, Maharashtra, India

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### Abstract:

Zooplankton ubiquitously present in all the freshwater bodies of World. The study of Zooplankton structure of the fresh water body reflects the ecological health of it. The study of Zooplankton biodiversity is helpful in evaluating the trophic status of that water body. The present study is carried out in the small lentic ecosystem present at village Lohara of Gondia district. Study reveals that pond harbours total 29 genera of Zooplankton among which 17 genera belongs to group Rotifera followed by Cladocera with 7 genera and 5 genera of Copepoda. High dominance of Rotifers in the water body especially genus *Brachionus* indicating presence of high percentage of suspended particles in it which leads to slight Eutrophication. The present investigation may help the concerned authorities to conserve the water body for the future.

**Keywords:** Zooplankton, Lentic Ecosystem, Rotifers, Diversity.

### Introduction

Fresh water lentic ecosystems are probably the most productive wetlands in the world. One of the most inseparable biotic components of this ecosystem is the Zooplankton. They are the most heterogeneous miniscule organisms found in any aquatic ecosystem. This taxonomic group of organisms comprises protozoa, Rotifera, Copepoda, Cladocera and Ostracoda which are usually equipped with body spines that protect them from their enemies (Verma *et al.*, 2013). Due to high densities, drifting nature, high species diversity and stress tolerance they become inevitable part of aquatic food chain where they efficiently transfer energy from lower trophic level i.e. autotrophs to the higher level i.e. heterotrophs (Bhat *et al.*, 2014). They add significantly to aquatic biological productivity in fresh water ecosystem (Nimbalkar *et al.*, 2013). Zooplanktons are Susceptible for any changes in climatic conditions and Physico-chemical properties of water and plays a pivotal role in indicating presence or absence of fish species (Koli and Muley, 2012; Babre *et al.*, 2019). Zooplankton are excellent fish food, rich in proteins, vitamins and fatty acids (Akin-Oriola, 2003). Zooplanktons are very good indicators of aquatic pollution therefore their abundance, diversity and indicator species dominance can be used for the assessment of water pollution. Zooplankton community structure reflects the ecological status of the freshwater body as they indicate the health of an aquatic ecosystem (Dede and Deshmukh, 2015). A very few studies have been done on the water bodies of Gondia district of Maharashtra. The most notable

contributors are Meshram, 2011; Gadekar, 2014; Bhandarkar, 2015. Work is very scanty; therefore, the present investigation has been carried out to assess zooplankton diversity of a small lentic ecosystem near village Lohara of Gondia district.

### Material and Methods:

#### Study Area:

The present water body (Photoplate I) is situated in the village Lohara of the Gondia district. It lies between 21° 10' 42.08813"N and 80° 23' 7.83247"E. The water body is extensively used by villagers for the various activities such as washing of clothes, vehicles and cattle. It is also extensively used to dump Ganesh idols. The village has dominant population of adivasi tribe 'Gond'. Therefore, lots of Gond rituals take place around the lake. This resulted in cultural eutrophication of water body. Apart from this it also receives heavy agriculture run off from surrounding fields.

#### Zooplankton Sampling:

The sampling was carried out for period of one year from October 2020 to September 2021. The samples were collected in every first week of the month by using zooplankton bolting cloth of mesh size of 40 microns. About 200 litres of pond water is filtered through it. The collected water sample was immediately fixed with 4% formalin and later it is concentrated to 30 ml of volume. Zooplankton specimens were observed under Metzger-M-Co-axial trinocular digital camera research microscope vision plus-5000 DTM. Zooplankton species were identified by using keys from Endmondson, 1959, Battish, 1992, Michael and Sharma, 1998, etc.

**Table I: Abundance of Zooplankton in a small pond at Lohara, Gondia, Maharashtra**

Zooplankton	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
<b>ROTIFERA</b>												
<i>Brachionus sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lecane sp.</i>	+	+	+	+	+	-	+	+	+	+	-	-
<i>Lepadella sp.</i>	-	+	+	+	+	+	-	+	+	+	-	-

<i>Keratella sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Anuraeopsis sp</i>	+	-	+	-	+	+	-	+	+	+	-	-
<i>Asplankhna sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Rotaria sp.</i>	+	-	-	+	-	+	+	+	-	+	-	-
<i>Testudinella sp.</i>	+	+	+	+	+	-	+	+	+	+	+	+
<i>Trichocerca sp.</i>	+	+	+	+	+	+	+	+	+	+	-	+
<i>Cephalodella sp.</i>	+	-	+	-	+	-	+	+	-	-	+	-
<i>Trichotria sp.</i>	+	+	-	+	-	+	+	+	-	+	-	-
<i>Polyarthra sp.</i>	+	-	+	+	+	-	+	+	+	+	-	+
<i>Filinia sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Plationus sp.</i>	+	+	-	+	-	+	+	+	-	+	-	-
<i>Monostyla sp.</i>	+	+	+	+	+	+	+	+	+	+	-	-
<i>Platylas sp.</i>	+	-	-	+	-	-	+	+	-	+	+	-
<i>Gastropus sp.</i>	-	-	-	+	+	-	+	+	+	+	-	-
<b>COPEPODA</b>												
<i>Mesocyclops sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Megacyclops sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Thermocyclops sp.</i>	+	-	-	-	+	+	+	+	+	+	-	+
<i>Neodiantomus sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Heliodontomus sp.</i>	+	-	+	+	+	+	+	+	+	+	+	+
<b>CLADOCERA</b>												
<i>Moina sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ceriodaphnia sp.</i>	-	+	-	-	-	-	+	+	-	-	-	+
<i>Bosmina sp.</i>	+	+	+	+	+	-	+	+	-	+	-	+
<i>Macrothrix sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+
<i>Chydorus sp.</i>	+	+	+	+	+	-	+	+	+	+	-	+
<i>Alonella sp.</i>	+	+	-	-	-	-	+	+	+	+	+	+
<i>Diaphanosoma sp.</i>	+	+	+	+	+	+	+	+	+	+	+	+

### Results and Discussion:

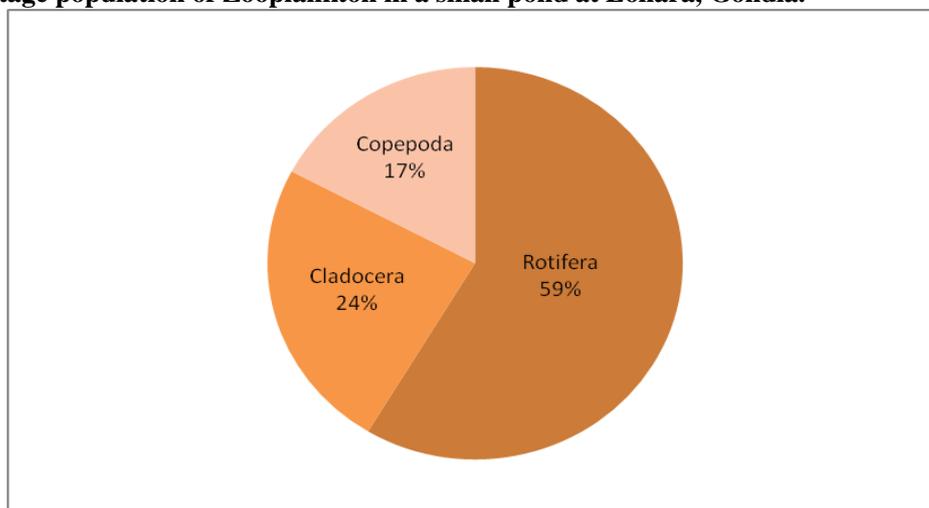
A total of 29 genera of zooplankton were recorded belonging to three groups viz. Rotifera, Copepoda and Cladocera (Table I). The most diverse group was Rotifera, contributing 17 genera followed by Cladocera with 7 genera and then lowest contribution of Copepoda with 5 genera. This is a typical pattern found in tropical waters of this part of the country. Similar kind of observation is also found by Nimbalkar et.al., 2013 in Ambe Ghosale lake, Thane, where they observed 15 rotifers, 12 cladocerans and 6 copepods. Sultana kar et. al., reported 29 genera of zooplankton in Malini Beel, Cachar, Assam of which rotifers are 17, cladocerans are 8 and copepods are 4. Total 66 species of Zooplankton were observed by Pawar (2014) in some freshwater bodies of Satara district. The percentage composition of three groups of Zooplankton is depicted by pie chart (Fig. 2). It clearly shows that rotifers contribute 59% followed by cladocerans with 24% and copepods with 17%. Among rotifers, Genus *Brachionus* has shown highest species diversity. The most notable and

abundant species were *B. falcatus*, *B. caudatus*, *B. calyciflorus*, *B. diversicornis* and *B. angularis*. Among rotifers, species belonging to genera *Brachionus*, *Keratella*, *Asplankhna* and *Trichocerca* are found to be present in water in all the months of study period. Similarly, species of Genus *Mesocyclops*, *Megacyclops* and *Neodiantomus* of group Copepods and species of *Moina*, *Macrothrix* and *Diaphanosoma* of group Cladocera are found throughout the year. It is clearly apparent from the Table I that maximum number of taxa of Zooplankton is found in May month whereas least number of taxa observed in August month of study period. This observation is may be attributing to reduced water level in May month resulting in high amount of nutrients in water causing maximum diversity, while in August month due to monsoon, increased quantity of water results in dilution of water along with the high turbulence of water causing lesser number of taxa in water. Similar findings were also observed by Meshram(2011), Bhandarkar(2017) and Gadwe & Tijare(2021) in other ponds of Gondia district.

### Photoplate I- Beautiful Landscape of small pond at Lohara, Gondia



**Fig. 1: Percentage population of Zooplankton in a small pond at Lohara, Gondia.**



#### **Conclusion:**

The present study reveals that, an appreciable diversity of Zooplankton present in the small lentic ecosystem at Lohara, Gondia. In the present investigation, Rotifers are found to be dominant in terms of diversity and abundance over cladocera and copepods. Dominance of rotifers indicates that water is containing suspended particles. This is may be due to various human activities around the pond which may lead to slight eutrophic condition of water body. However, authorities must take necessary actions to prevent the eutrophication of pond and preserve the water body. People should be discouraged to use the water body for the rough use as well as releasing 'Nirmalya', holly offerings and God idols in water.

#### **Acknowledgement:**

Author is very much thankful of Principal Dr. A. K. Zingare of M. B. Patel College of Arts, Commerce and Science, Deori, Gondia, Maharashtra, India for granting permission to carry out present research in Zoology laboratory.

#### **Competing Interests:**

Author has declared that no competing interests exist.

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