

Diversity and Abundance of Zooplankton at Saheb Bandh, Purulia, West Bengal

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Abstract— The Saheb Bandh is an artificial lake located in the District Purulia. In this present study, we have shown monthly changes in diversity and density of Zooplankton in Saheb Bandh of Purulia. The study was done from March 2021 to August 2021 for six months. The average Zooplankton diversity at Saheb Bandh consisted of 20 genera, classified into four major groups, viz, Rotifera > Cladocera > Copepoda > Ostracoda. The Zooplankton sample consisted of 40% Rotifera, 35% Cladocera 15% Copepoda, and 10% Ostracoda respectively. Rotifera was the dominant group of Zooplankton recorded with respect to diversity and population density status. The current study on Zooplankton diversity at Saheb Bandh provides useful knowledge on a general freshwater ecosystem. In freshwater aquaculture management, it will be helpful strategies to protect the aquatic biodiversity in the agriculture area.

Keywords— Zooplankton, Shaheb Bandh Lake, Rotifera, Zooplankton diversity, Abundance

I. INTRODUCTION

Zooplankton is regarded as the most important fauna of the aquatic ecosystem. These are most adaptive in harsh environmental conditions. Zooplankton plays a crucial role in the study of the faunal biodiversity of aquatic ecosystems. Zooplanktonic fauna consists of Rotifera, Cladocera, Copepoda, and Ostracoda these are free-floating, microscopic organisms. In the aquatic ecosystem, Zooplanktons are an intermediate part of the aquatic food chain [1]. Zooplankton constitutes an essential food source for many aquatic animals [2]. Zooplankton also may serve as indicators of water quality [3]. They play a crucial role in energy transfer from phytoplankton to fish populations, control phytoplankton production, and save pelagic ecosystems. The zooplanktons stability in every aquatic ecosystem is crucial because they are an important and unrivaled source of food for fish and other aquatic animals [4]. Among zooplankton species, Rotifer responds more rapidly to something changes in the water quality and is used to measure changes in the aquatic environment [5]. The Zooplankton community reacts to a broad range of issues, such as acidification, sediment intake, nutrient loading, and so on. It is an excellent tool for understanding the water pollution status [6]. This will provide important information regarding the water characteristics of this lake. This lake very much important source of water in this drought area.

II. RELATED WORK

The aquaculture technique is currently playing an important role in global economic growth. Thus, keeping

in view, particular emphasis should be placed on the conservation of zooplankton and freshwater lakes. In this point, several kinds of research have been done by various researchers to establish and enumerate the significance of zooplankton diversity and abundance that includes [7], [8].

III. MATERIALS AND METHODS

Study Site

Saheb Bandh is located at Purulia district of West Bengal. It lies between 23°20'01"N and 86°21'3"E. It is almost 1.5 km from the main town of Purulia. This lake is located in the south-west corner of Purulia town. This artificial lake is manmade and supposed to be maintained by Purulia Municipality.



Figure 1. Location of Study site in the Google satellite map of Saheb Bandh

Zooplankton sampling

The Zooplankton sampling was carried out from March 2021 to August 2021 for six months in Saheb Bandh at Purulia. The collection protocol included a weekly sampling of Zooplankton from the site following standard methods [9]. Then filtering 50 liters of water the specimen was collected by using a standard plankton net for the collection. The collected specimen was kept in a 250ml bottles, after then Lugol’s iodine was used for the fixation of the samples and stored in a dark and cool place. Then the sample was carried out in the laboratory for studying the diversity of Zooplankton, sample were taken in a Glass Sedgwick-Rafter counting cell and observed under a binocular digital light microscope under required magnification (X 10 initially, followed X 40). The identification of specimens as per the standard methods. The Shannon diversity index was used to calculate the monthly variation in zooplankton diversity.

IV. RESULTS AND DISCUSSION

In the present study, 20 genera of Zooplankton were recorded from the lake belonging to the four groups as, Rotifera, Cladocera, Copepoda, and Ostracoda. According to collected data the recorded genera, 8 belong to Rotifera, 7 belong to Cladocera, 3 from Copepoda and 2 genera belong to the Ostracoda group (Table 1). Many researchers have done these similar kinds of observations before. The Zooplankton diversity status recorded from Saheb Bandh was mentioned in the Fig 2. The present study has shown that the investigated freshwater body was comprised of Cladocera (7 genera), Copepoda (3 genera), Ostracoda (2 genera), and Rotifera (8 genera) where Rotifera constituted the most dominating group contributing 40% to the total Zooplankton followed by Cladocera contributing 35%, Copepoda contributing 15% and Ostracoda contributing 10% to the total amount of Zooplankton. Different species of Zooplankton showed their abundance according to the favorable condition.

The monthly variation status of the Zooplankton recorded from Saheb Bandh was mentioned in Fig 3. During the experiment period, among Rotifera, *Keratellac* sp, *Philodina* sp, *Brachionus* sp, *Polyarthra* sp, *Asplanchna* sp, *Filinia* sp, *Pompholyx* sp, *Platyias* sp, were recorded throughout the six months; among Cladocera, *Alona* sp, *Daphnia* sp, *Moina* sp, *Alonella* sp, *Sida* sp, *Bosmina* sp, *Ceriodaphnia* sp, were recorded throughout the six months and among Copepoda, *Eucyclops* sp, *Cyclops* sp, *Diaptomus* sp were recorded throughout the six months and among Ostracoda, *Candona* sp, *Cypria* sp, were recorded throughout the six months. The current analysis suggests that the high value of species abundance reflects the lake's appropriateness for the dominating species [10]. In the present analysis, the study location was characterized by a greater diversity of Zooplankton species during the monsoon season.

The current study reports that the Rotifera group was to be dominant within all other Zooplankton groups. In tropical

freshwater lakes, the dominance of the Rotifera group is a common characteristic similar was reported from the studies of [11]. The present investigations revealed that the density of the population of the Rotifera group reported from the study site vary in different seasons.

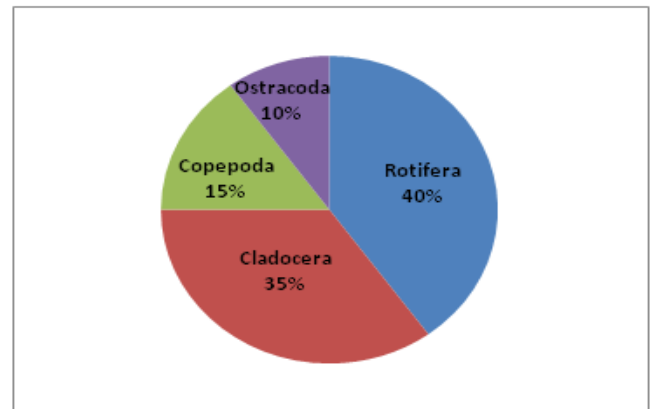


Figure 2. Percent composition of Zooplankton diversity at Saheb Bandh, Purulia

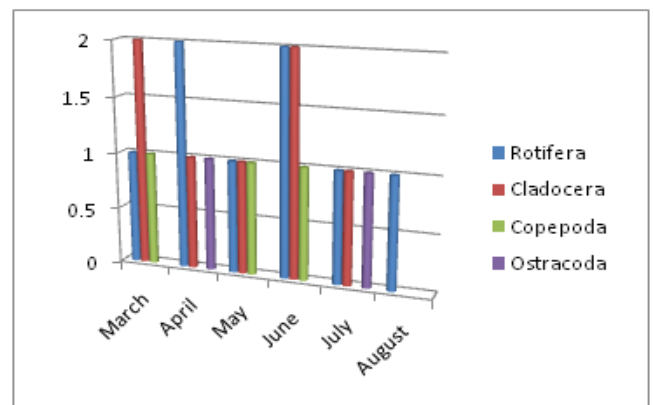


Figure 3. Monthly variation of Zooplankton groups at Saheb Bandh, Purulia

Table 1: List of Zooplankton species observed from Saheb bandh at Purulia

Zooplanktons	Observation					
	March	April	May	June	July	Aug
Rotifera						
<i>Keratellac</i> sp.	+	+	+	+	+	+
<i>Philodina</i> sp.	+	+	-	-	+	-
<i>Brachionus</i> sp.	-	+	+	+	+	+
<i>Polyarthra</i> sp.	+	-	+	+	-	-
<i>Asplanchna</i> sp.	+	+	+	+	+	+
<i>Filinia</i> sp.	-	+	+	+	+	+
<i>Pompholyx</i> sp.	+	-	+	-	+	+
<i>Platyias</i> sp.	+	+	+	-	+	+
Cladocera						
<i>Alona</i> sp.	+	+	+	-	+	+

<i>Daphnia sp.</i>	+	+	+	-	+	-
<i>Moina sp.</i>	-	+	-	+	+	-
<i>Alonella sp.</i>	-	-	+	+	-	+
<i>Sida sp.</i>	+	-	+	+	+	-
<i>Bosmina sp.</i>	+	+	-	+	-	-
<i>Ceriodaphnia sp.</i>	+	-	-	+	+	-
Copepoda						
<i>Cyclops sp.</i>	+	+	-	+	-	+
<i>Diaptomus sp.</i>	-	+	+	+	-	-
<i>Eucyclops sp.</i>	+	-	+	+	-	+
Ostracoda						
<i>Candona sp.</i>	+	+	-	-	+	+
<i>Cypria sp.</i>	+	+	+	-	+	-

V. CONCLUSION AND FUTURE SCOPE

The present analysis on Saheb Bandh shows that rich and diversified population of Zooplankton is present in this lake habitat. Rotifer is the dominant group in this artificial lake. This lake is very much suitable for aquaculture. Zooplanktons, particularly rotifers, are considered to be the best food source for farmed fish larvae. This study is an important contribution to understanding the variety of zooplankton in a freshwater manmade lake, which on the other hand is beneficial in supporting aquaculture in freshwater lakes in particular. Thus, keeping in view the significance of the study, some necessary initiatives should be taken for the conservation and maintenance of the freshwater lake.

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