

## Study of Microdiversity in Terms of Phytoplankton and Zooplankton, Current Status of Rishi Lake, Karanja Lad, Washim, Maharashtra

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### Abstract

*Microdiversity of any water bodies play a key role for the fish fauna as an important indicator of health profile and survival rate. Such type of study depicts the multidimensional interrelationship of a water body along with flora and fauna. Planktonic diversity imparts the water quality as they are affected by environmental fluctuation quickly. A study was carried out during survey of 2018-19. Standard keys and other literature were used for identification of various phyto as well zooplankton species. Phytoplankton population were represented by members of Bacillariophyceae, Chlorophyceae, Cyanophyceae, Dinophyceae and Euglenophyceae while zooplankton population dominated by protozoa, rotifers, Ostracoda, Cladocera and Copepoda etc. This study is a prediction and estimation of microdiversity for future perspectives of lake and habitat suitability for the survival of aquatic fauna specially fishes.*

**Key words:** *Microdiversity, population, conservation, anthropogenic stress, species*

### Introduction

The study of fresh water fauna especially zooplankton, even of particular area is extensive and complicated due to the environmental, physical geographical chemical variation involving ecological, extrinsic and intrinsic factors. Planktons are the starting point of energy transfer. A strong relationship exists between phytoplankton and zooplankton for instance, the main systematic group of zooplankton including many taxons which feed on phytoplankton<sup>[1]</sup>. Selective grazing by zooplankton is an important factor affecting the structure of phytoplankton communities. The role of zooplankton not only regulates the aquatic productivity by occupying intermediate position in the

food chain also by indicating environmental status in a given time. Following study provides an estimation of microdiversity in lake which imparts the suitability of habitats for lake and fish fauna. Plankton plays a key role in aquatic food web, photosynthesis by the phytoplankton accounts for up to half of global primary production of aquatic food chain. Amytrophic component are phytoplankton and heterotrophic component are zooplankton, but detritivorous Planktonic organism are also present. Larvae of non-Planktonic organisms could also initially live as plankton<sup>[2]</sup>.

### Materials and Methods

Rishi Lake located is about on the east of the karanja (lad). It is situated at above the sea level. It is filled maximally in rainy season as compared to winter and summer. The excess water goes through the outlet located on west side of the lake. The total catchment area of Rishi lake is

about “7.42Km” and submerged area is measured 35.9 Hg. Maximum depth of water at high flood level is 15.5 Ft. and mean depth of water at high flood level is 9.5 Ft. The lake is surrounded by rock hillocks towards north-east side. East and west boundaries are scaled by bunds. The

area of lake is bounded by aquatic weeds and other macrophytes. The boundary of lake is covered by marginal weeds except north. Four sampling site were selected to collect the sample from Rishi lake. Weekly water sampling was undertaken between 9:00 to 12:00 hours during 2019. One liter of water sample was collected in a glass bottle. 10 ml of Lugol's iodine was added and allowed to stand for at least 24 hours to ensure complete sedimentation. The supernatant portion was taken out with the help of pipette. Further the remaining sample was concentrated up to 10 ml for the plankton counting by "Drop Count

### Results and Discussion

Investigation of water sample of Rishi Lake was done for a period of 17 Aug to 28 Feb during from 2018-19 in order to study the microdiversity in term of Zooplankton and Phytoplankton

#### A) Analysis of water sample from Rishi Lake for Phytoplankton

In present study phytoplankton consisted of five groups, chlorophyceae, Dinophyceae & Euglenophyceae. Among the total phytoplankton population the maximum was contributed by Bacillariophyceae followed by chlorophyceae, euglenophyceae, cynophyceae & Dinophyceae. During the period of investigation 34 species of different groups of phytoplankton were identified at 4 Sampling spot. Out of them 17 Bacillariophyceae, 8 Species of chlorophyceae, 4 Species of cynophyceae, 3 species of Euglenophyceae 1 species of Dinophyceae wheres in whole lake (Table 1). Phytoplankton wheres in Whole lake Phytoplankton were in order of Bacillariophyceae < cynophyceae < euglenophyceae < Cynophyceae < Dinophyceae<sup>[6]</sup>.

Some plankton population disappeared at a specified period and repapered during other period. This

Method". Plankton sample was taken in the graduated centrifuged tube. Test tube was centrifuged sample was made up 5 ml. 1 drop of sample was taken over the clean micro slide with the help of standard dropper. The whole drop carefully covered with cover glass of suitable size so that the sample dose not runs out. Then put the micro slide under microscope and focus one edge of the cover glass. Count the plankton species wise while moving the slide with help of movable stage to the under edge. Plankton identification up to genera and whenever possible up to species was done.

situation indicates the diversity in term of seasonal variation their fluctuation also after the fauna and flora quantitatively. During the period of investigation, the maximum Bacillariohyceae individuals were recorded. The dominant species of Bacillariohyceae were noted as Melosira, Navicula, Amphora was moderately recorded. Bacillariohyceae was the dominant group in the present investigation. This group was represented by 16 species.

In present study Clophyceae was the second dominant group in present investigation. This group was represented 11 Species. The dominant species of Chlorophyceae were observed as spirogyra Oedogonium & Cosmarium.

In present investigation Euglenophyceae group was represented by 4 species of the dominant species of Euglenophyceae were observed as phacus.

Also the present study Cynophyceae group was represented by 3 species & Dinophyceae represented with least percentage. The group Dinophyceae is represents by single species peridinium was found at 2 Spots with the minimum population during the period of investigation.

Table1 Phytoplankton diversity of Rishi Lake during 2019

Sr. No.	Phytoplankton	Spot no. 1	Spot no. 2	Spot no. 3	Spot no. 4
	<b>BACILLRIOPHYEEAE</b>				
1	Melosira sp.	++	-	-	-
2	Melosira grnulta	++	-	+	+
3	Amphora sp.	++	+	-	+
4	Amphora veneta	+	-	-	+
5	Amphora Coffeae formis	-	+	+	-
6	Navicula cinata	++	+	+	+
7	Navicula Capitatoradiata	+	++	++	+
8	Navicula dubia	-	+	+	+
9	Navicula product	+++	+	-	+
10	stauronesis anceps	-	+	-	+
11	Achanthes inflata	-	+	+	-
12	Gyrosigama alumintum	-	-	+	-
13	synedra rumpens	+	++	-	-
14	pinnulari abaujensis	-	-	+	-
15	cymbella turgidula	+	+	-	-
16	gomphonema acumianatum	+	-	+	-
17	gomphonema clevatoids	+	+	-	-
	<b>CHOLOROPHYCEAE</b>				
1	Spiragya	+++	-	++	++
2	Oedogonium sp.	++	+	+	+
3	Oedogonium prrrectum	+	+	-	-
4	Chlorella Vulgaris	+	-	-	+
5	Cosmarium depressum	-	-	+	+
6	Cosmarium reniforme	+	-	+	-
7	Cosmarium granatum	+	++	-	+
8	chaetophore attenuate	-	-	+	+
	<b>EUGLENOPHYCEAE</b>				
1	Phacus chloroplast	++	-	+	-
2	phocus pyrum	+	-	++	-
3	phacus gigas	-	+	+	-
4	Trchelomonas Volvocina	-	+	-	-
	<b>CYANOPHYCEAE</b>				
1	Aphanocapsa biformis	+	+	-	-
2	Phormidium sp.	+	-	-	+
3	Dscillatora amphigranulata	-	+	+	+
	<b>DINOPHYCEAE</b>				
1	Peridinium	+	-	+	-

**Analysis of water sample from Rishi Lake for Zooplankton.**

During the period of study. Zooplankton microdiversity of Rishi Lake was reported by 22 species consisting of 9 species of rotifers 8 species of protozoa, 3 Species of ostracoda, 2 species of cladocera (Table 2).

In Present investigation, Rotifera<sup>[3, 5]</sup> was found as the most dominating group in the Rishi Lake & Rotifers are an important part of the freshwater Zooplankton being a major food source & with many species also contributing to the composition of soil

organic matter & Represented by species Borachionus, Colourella obtusa, Kertella sp. Mononata grandis, Rotifers population was recorded. In Rishi Lake microdiversity of protozoans was represented by Amoeba, Vovax, Euglena, Paramecium certium. Protozoans population was recorded. & also common cladoceran observed in Rishi lake were daphnia, ceriodaphnia, during present investigation<sup>[4, 7]</sup>.

**Table 2 Zooplankton microdiversity of Rishi lake during the**

Sr. No.	Zooplankton	Spot no. 1	Spot no. 2	Spot no. 3	Spot no. 4
<b>ROTIFRA</b>					
1	Ascomorpha saltan	+	-	+	-
2	Brachionus calyciflorus	-	-	++	-
3	Brachionus Caudatus	+	+	-	-
4	colurella obtuse	+	-	+	+
5	Brachionus Plicatilis	-	+	+	-
6	Horella brahmi	+	-	-	+
7	Keratella Vulga	++	-	+	+
8	Keratella tropica	-	+	-	-
9	Monommata grandis	+	+	-	-
<b>PROTZOA</b>					
1	Amoeba Prateus	+	+	-	-
2	Volvox aureus	-	-	+	+
3	Paramecium	++	-	-	+
4	Ceratum hirundinella	-	-	+	-
5	Euglena polymorpha	+	-	++	-
6	Euglena Van –goorn	-	++	-	+
7	Euglena pascheri	+	+	+	-
8	Euglena asus Hubner	++	+	-	-
<b>OSTRACODA</b>					
1	Candona ohioensis	-	+	+	-
2	Cyclocypris sp.	-	++	+	-
3	Cyepriis subglovosa	+	-	+	+
<b>CLADOCERA</b>					
1	Daphnia	++	-	+	-
2	Ceriodaphnia Laticaudata	-	-	+	-
<b>COPEPODA</b>					
1	Nauplii	+	++	-	-
2	Diaptomus edax	-	-	+	-

### Conclusion:

Rishi Lake of Karanja (Lad) Dist-Washim (M.S) is historical, natural & perennial water body. Water sample from 4 sampling spot of Rishi lake investigated for the study of microdiversity in term 04 Zooplankton & phytoplankton. During the period of 17 Aug to 28 Feb, observed the microdiversity of Rishi Lake. From the above finding it can be concluded that water of the Rishi Lake which is located near the residential area & due to use of domestic sewage, as all s agriculture waste, various human & cattle activities water become unpotable.

Over all this study depicts extreme vegetation in floral and faunal diversity of macro and micro level. Researchers show very poor situation regarding future Point of view this should be conserve and such type of study depicts the real situation

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