

## Seasonal Diversity of Protozoans, Rotiferans, Cladocerans, and Copepodans, from Krishna River Ghat near Miraj, Dist.Sangli, M.S., India

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### Abstract

The present paper deals with the study of zooplankton community of Krishna River ghat near Miraj, M.S.India. The qualitative analysis of zooplankton was done from three different sites S1, S2, and S3 at regular interval of fifteenth day of every month from Sept.2010 to Aug.2011. The different species of zooplanktons were identified. About 26 zooplankton species were recorded 11 protozoan species, 7 rotifera species, 4 Cladocera species, 3 copepods species and one nematod species were observed.

**Keywords:** Krishna River - Miraj Ghat - Diversity - Zooplankton

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### Introduction

Information on species diversity, richness evenness and dominance species evolution on the Biological component of the eco-system is essential to understand detrimental changes in environment or deterioration of water quality (Krishnamurthy and Subramanian 1999). Species diversity is a basic measure of community structure and organization and the most important parameter to understand the health status of the ecosystem. The diversity index gives us measure of the way on which individuals in a community are distributed. Zooplankton community of fresh water bodies constitutes an extremely diverse assemblage of organism represented by most of the invertebrate phyla. Copepoda and Cladocera are the dominant represented groups of crustacea in fresh water habitat. Zooplanktons has been used as an indicator for monitoring the water quality, trophic status and pollution level. The temperature, dissolved oxygen and organic matter have influence on zooplanktons community structure. The zooplanktons, which play a role of converting phytoplankton's in to food, suitable for fish and aquatic animals, have acquired importance in fishery research. The Zooplanktons also play an important role in indicating the presence and absence of certain species of fishes and in determining the population densities. Various ecological aspects of Zooplanktons have been a subject of study in India and several workers like Khan 1978, Saxena and Sharma 1981, Haque 1988, Somashekar et al 1994, Chandrasekhar and Kodarkar 1996, Annapurna et al 1999, Pulle 2000 and Narsimha Rao and Jaya Raju 2001 has done enormous work in this field keeping this in view we have selected the Krishna River Ghat near Miraj. The location of Krishna River is approximately 4km from Miraj city. The Krishna Ghat is surrounded by human settlement on both sides of the bank.

### Methodology

The zooplankton samples were collected from selected three different sites at an regular intervals of fifteen days every month from Sept. 2010 to Aug. 2011 for a year. The plankton net of mesh

size 30 mm was swept through subsurface and samples were transferred to 100 ml capacity plastic bottles. The samples were preserved using 4 % formaline solution, standard key and other literature was used for identification of different species APHA 1989 Pennak 1989. The number of planktons per liter was determined by using Sedgwick rafter cell by taking 1 ml of approximately diluted samples and the observation represent number of zooplankton per liter. The samples were collected during daytime between 4 pm to 5 p.m. lots of cloths washing activities are going on from early in the morning till late afternoon. The sites selected are as follows

1. Site 1 : North side
2. Site 2 : West side
3. Site 3 : South side

Title: Monthly occurrence of zooplanktons in Krishna River ghat near Miraj at three different sites from

Sept.2010 to Aug 2011

### Site 1 – Zooplankton

Sr. No	Name of species	Sept	Oct.	Nov	Dec	Jan.	Feb	Mar.	Apr	May	Jun.	Jul.	Aug.
<b>I</b>	<b>PROTOZOA (11 – Species)</b>												
	<b>A.CILIOPHORA</b>	+	+	+	+	+	+	+	+	+	+	+	+
	1)Epistylis olicatilis												
	2)Metopus Sigmoides	+	+	+	+	+	+	+	+	+	+	+	+
	3)Saprodinium dentatum	+	+	+	+	+	+	+	+	+	+	+	+
	4)saphthidium spatula	+	+	+	+	+	+	+	+	+	+	+	+
	5)Stylonchia notophora	+	+	+	+	+	+	+	+	+	+	+	+
	6)Vorticella Compunula	+	+	+	+	+	+	+	+	+	+	+	+
	7)Vorticella microstoma	+	+	+	+	+	+	+	+	+	+	+	+
	8) Paramaecium Sp.	+	+	+	+	+	+	+	+	+	+	+	+
	<b>B) RHIZOPODA</b>												
	9) Arcella discoides	+	+	+	-	-	-	-	-	+	+	-	-
	10) Amoeba proteus	+	+	+	+	+	+	+	+	+	+	+	+
	11) Diffusia Sp.	-	-	-	+	+	+	+	+	+	+	-	-
<b>II</b>	<b>ROTIFERA (7-Species)</b>												
	1)Branchionus Sp.	-	-	+	+	-	-	-	-	-	+	+	-
	2) Colotheca pelgica	+	+	+	+	+	+	-	-	-	-	-	-
	3)keratella cochlearis	-	-	+	+	+	-	-	-	-	-	-	-
	4)Macrochaetus Sp.	-	-	+	+	+	+	-	-	-	-	-	-
	5)Monostyla Sp.	+	+	+	-	-	+	+	+	-	-	-	-
	6) Nothoica acuminata	-	-	-	-	-	-	+	+	+	+	+	+
	7) Philodina rosoela	-	-	-	-	-	-	+	+	+	+	+	+
<b>III</b>	<b>CLADOCERA(4-Species)</b>												
	1)Daphnia cornuta	+	+	+	+	-	-	-	-	-	+	+	+
	2) Cerodaphnia cornuta	-	-	+	+	+	+	+	-	-	+	+	+

	3) Moina micrura	+	+	+	-	-	-	+	+	+	+	+	+
	4) moina brachiata	+	+	+	+	+	+	+	-	-	-	+	+
<b>IV.</b>	<b>COPEPODA (3-Species)</b>												
	1) Nauplius	+	+	+	+	+	+	-	-	-	+	+	+
	2) Diaptomus	-	-	-	+	+	+	+	+	+	+	+	+
	3) Mesocyclops	-	-	-	-	+	+	+	+	-	+	+	+
<b>V.</b>	<b>NEMATOD (1-Species)</b>												
	1)Diplogaster	-	-	+	+	-	-	-	-	-	+	+	-

## Site 2 - Zooplankton

Sr. No	Name of species	Sept	Oct.	Nov	Dec	Jan.	Feb	Mar.	Apr	May	Jun.	Jul.	Aug.
<b>I</b>	<b>PROTOZOA (11 – Species)</b>												
	<b>A.CILIOPHORA</b>	+	+	+	+	+	+	+	+	+	+	+	+
	1)Epistylis olicatilis	+	+	+	+	+	+	+	+	+	+	+	+
	2)Metopus Sigmoides	+	+	+	+	+	+	+	+	+	+	+	+
	3)Saprodinium dentatum	+	+	+	+	+	+	+	+	+	+	+	+
	4)saphidium spatula	+	+	+	+	+	+	+	+	+	+	+	+
	5)Stylonchia notophora	+	+	+	+	+	+	+	+	+	+	+	+
	6)Vorticella compunula	+	+	+	+	+	+	+	+	+	+	+	+
	7)Vorticella microstoma	+	+	+	+	+	+	+	+	+	+	+	+
	8) Paramaecium Sp.	+	+	+	+	+	+	+	+	+	+	+	+
	<b>B) RHIZOPODA</b>												
	9) Arcella discoides	+	+	+	-	-	-	-	-	+	+	-	-
	10) Amoeba proteus	+	+	+	+	+	+	+	+	+	+	+	+
	11) Diffusia Sp.	-	-	-	+	+	+	+	+	+	+	-	-
<b>II</b>	<b>ROTIFERA (7-Species)</b>												
	1)Branchionus Sp.	-	-	+	+	-	-	-	-	-	+	+	-
	2) Colotheca pelgica	+	+	+	+	+	+	-	-	-	-	-	-
	3)keratella cochlearis	-	-	+	+	+	-	-	-	-	-	-	-
	4)Macrochaetus Sp.	-	-	+	+	+	+	-	-	-	-	-	-
	5)Monostyla Sp.	+	+	+	-	-	+	+	+	-	-	-	-
	6) Nothoica acuminata	-	-	-	-	-	-	+	+	+	+	+	+
	7) Philodina rosoela	-	-	-	-	-	-	+	+	+	+	+	+
<b>III</b>	<b>CLADOCERA (4-Species)</b>												
	1)Daphnia cornuta	+	+	+	+	-	-	-	-	-	+	+	+
	2) Cerodaphnia cornuta	-	-	+	+	+	+	+	-	-	+	+	+
	3) Moina micrura	+	+	+	-	-	-	+	+	+	+	+	+
	4) moina brachiata	+	+	+	+	+	+	+	-	-	-	+	+
<b>IV.</b>	<b>COPEPODA (3-Species)</b>												
	1) Nauplius	+	+	+	+	+	+	-	-	-	+	+	+
	2) Diaptomus	-	-	-	+	+	+	+	+	+	+	+	+

	3) Mesocyclops	-	-	-	-	+	+	+	+	-	+	+	+
<b>V.</b>	<b>NEMATOD (1-Species)</b>												
	1)Diplogaster	-	-	+	+	-	-	-	-	-	+	+	-

### Site 3 - Zooplankton

Sr. No	Name of species	Sept	Oct.	Nov	Dec	Jan.	Feb	Mar.	Apr	May	Jun.	Jul.	Aug.
<b>I</b>	<b>PROTOZOA (11 – Species)</b>												
	<b>A.CILIOPHORA</b>	+	+	+	+	+	+	+	+	+	+	+	+
	1)Epistylis olicatilis												
	2)Metopus Sigmoides	+	+	+	+	+	+	+	+	+	+	+	+
	3)Saprodinium dentatum	+	+	+	+	+	+	+	+	+	+	+	+
	4)saphthidium spatula	+	+	+	+	+	+	+	+	+	+	+	+
	5)Stylonchia notophora	+	+	+	+	+	+	+	+	+	+	+	+
	6)Vorticella compunula	+	+	+	+	+	+	+	+	+	+	+	+
	7)Vorticella microstoma	+	+	+	+	+	+	+	+	+	+	+	+
	8) Paramaecium Sp.	+	+	+	+	+	+	+	+	+	+	+	+
	<b>B) RHIZOPODA</b>												
	9) Arcella discooides	+	+	+	-	-	-	-	-	+	+	-	-
	10) Amoeba proteus	+	+	+	+	+	+	+	+	+	+	+	+
	11) Diffusia Sp.	-	-	-	+	+	+	+	+	+	+	-	-
<b>II</b>	<b>ROTIFERA (7-Species)</b>												
	1)Branchionus Sp.	-	-	+	+	-	-	-	-	-	+	+	-
	2) Colotheca pelgica	+	+	+	+	+	+	-	-	-	-	-	-
	3)keratella cochlearis	-	-	+	+	+	-	-	-	-	-	-	-
	4)Macrochaetus Sp.	-	-	+	+	+	+	-	-	-	-	-	-
	5)Monostyla Sp.	+	+	+	-	-	+	+	+	-	-	-	-
	6) Nothoica acuminata	-	-	-	-	-	-	+	+	+	+	+	+
	7) Philodina rosoela	-	-	-	-	-	-	+	+	+	+	+	+
<b>III</b>	<b>CLADOCERA(4-Species)</b>												
	1)Daphnia cornuta	+	+	+	+	-	-	-	-	-	+	+	+
	2) Cerodaphnia cornuta	-	-	+	+	+	+	+	-	-	+	+	+
	3) Moina micrura	+	+	+	-	-	-	+	+	+	+	+	+
	4) moina brachiata	+	+	+	+	+	+	+	-	-	-	+	+
<b>IV.</b>	<b>COPEPODA (3-Species)</b>												
	1) Nauplius	+	+	+	+	+	+	-	-	-	+	+	+
	2) Diaptomus	-	-	-	+	+	+	+	+	+	+	+	+
	3) Mesocyclops	-	-	-	-	+	+	+	+	-	+	+	+
<b>V.</b>	<b>NEMATOD (1-Species)</b>												
	1)Diplogaster	-	-	+	+	-	-	-	-	-	+	+	-

## Result and Discussion

The total number of zooplanktons are recorded per litter and it was noted that the total number of zooplanktons varied from 17 to 30 per litter at site S<sub>1</sub>, 16 to 33 per litter S<sub>2</sub> and 16 to 26 per litter at S<sub>3</sub> during sept.2010 to Aug. 2011

The Seasonal variation of zooplanktons in order of abundance throughout the year as follows,

S<sub>1</sub> - Protozoans > Rotifers > Copepodes > Cladocera > Nematodes

S<sub>2</sub> -Protozoans >Rotifers > Copepodes > Cladocera > Nematodes

S<sub>3</sub> – protozoans > Rotifers > Copepodes > Cladocera > Nematodes

### 1) Protozoans:

The monthly average and total numbers of protozoan varied from 6 to 11 in no. Per litter at S<sub>1</sub> to S<sub>3</sub> Protozoans are very useful in indicating water quality particularly in pollution studies and it also helps in indicating the purity of water.

### 2) Rotifera :

The monthly average and total numbers of Rotifers varied from 1 to 7 per litter at S<sub>1</sub>, S<sub>2</sub> and S<sub>3</sub> Sites. According to Radwan 1980 a nano plankton biomass expert there is direct affect on Rotifer fertility while algae toxicity inhibits their fecundity . Peijler 1957 showed that there is no direct effect if pH on Rotifer population .Edmondson 1965 and Baker 1979 observed that there is high Rotifer population in winter due to favorable temperature and availability of food material. Usha Choubery 1997 found that Rotifer Population is minimum in month of July.

### 3) Copepodes

The monthly average and total no. of copepods varied from 1 to 3 species per litter at S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub> Sites Usha Choubey in 1997 found that there is high density of copepods during October. Allan 1976 observe that the inverse relationship between high populatin of Rotifers and Cladocera and low population of copepods during winter may be due to feeding pressure of stocked fishes on the latter if the Copepodes are removed then there is sudden rise in the popluatin of rotifers and cladocera

### 4) Cladocera :

The monthly average and total no. of cladoceras varied from 1 to 4 per litter at S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub>. The Cladocerans component of zooplanktons plays an important role in the benthic trophodynamics. Quadri and Yousuf 1980 investgited the influence of some of the physico chemical factors on the seasonality of cladocera. The factors like water tempreatur dissolved O<sub>2</sub>, turbidity transferency plays an important role in controlling the diversity of cladocera. In India the limonitic zooplankton community are invariable dominated by the species of cladocera stated by Sharma abd Michel 1987

### 5) Nematodes:

The monthly average and total no of Nematodes varied from 0 to 1 per litter at S<sub>1</sub>, S<sub>2</sub>, and S<sub>3</sub> sites They were present a little amount or neglible amount through out the year

Thus from the above studies of zooplanktons from Krishna River near Miraj Ghat Dist. Sangli M.S.India following 26 speices of zooplanktons were observed .

- a. Species of protozoans : 1. Epistylis olicatilis  
2. Metopus Sigmoides  
3. Saprodinium dentatum  
4. Saphidium spatula  
5. Stylonchia notophora  
6. Vorticella Compunula  
7. Vorticella microstoma  
8. Paramecium Sp.  
9. Arcella discoides  
10. Amoeba proteus  
11. Diffusia Species.
- b. Species of Rotifers : 1. Branchionous Sp.  
2. Colotheca pelgica  
3. Keratella cochelearis  
4. Macrochaetus Sp.  
5. Monostyla Sp.  
6. Nothoica acuminata  
7. Philodina rosoela
- c. Species of Cladocera : 1. Daphnia conuta  
2. Cerodaphnia cornuta  
3. Monia micrura  
4. Monia brachiate
- d. Species of Copepodes : 1. Nauplius  
2. Diaptomus  
3. Mesocyclops
- e. Species of Nematods : 1. Diploglastar

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