

SEASONAL ZOOPLANKTONIC DIVERSITY IN BACK WATER OF SHANKAR SAGAR RESERVOIR VISHNUPURI PROJECT, DIST. NANDED ON RIVER GODAVARI AT DHANGAR TAKLI, MAHARASHTRA.

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Abstract

Zooplankton diversity in back water of Shankar Sagar reservoir, Vishnupuri Project, Dist. Nanded on river Godavari at Dhangar Takli, , Maharashtra was carried out for three years i.e. from July 2010 to April 2013, as in this place a capture fishery was done in abundant quantity. In the present study 22 species of Zooplankton were recorded consisting 10 species of Rotifer, 4 species of Cladocerans, 5 species of Copepods and 3 species of Ostracoda. Rotifer constitutes about 37.65% of total zooplankton found during study whereas Cladocerans, Copepods and Ostracoda constitutes 25.42%, 30.97% and 5.96% respectively.

Keywords: Zooplankton, Godavari, Vishnupuri, diversity.

Introduction

A microscopic community of plants (phytoplankton) and animals (zooplankton), found usually free floating, swimming with little or no resistance to water currents, suspended in water, non motile or insufficiently motile to overcome transport by currents, are called "Plankton". Zooplankton principally comprises of microscopic protozoan, rotifers, cladocerans and copepods. The species assemblage of zooplankton also may be useful in assessing water quality. Zooplanktons occupy a central position between the autotrophs and other heterotrophs and form an important link in food web of the freshwater ecosystem. Zooplanktons constitute the food source of organisms at higher trophic levels. The Zooplankton and fish production depend

to large degree on the phytoplankton (**Boney 1975**). Zooplankton is a good indicator of changes in water quality because it is strongly affected by environmental conditions and responds quickly to changes in environmental quality. The major zooplankton groups vary in their relative abundance and they belong to these groups Rotifera, Cladocera, Copepoda, and Ostracoda (**Joshi, 2011**). The abundance of zooplankton is most pronounced in the slower moving portions of a river system where deeper water tend to reduce velocity of current and silt deposition which make them indistinguishable from typical lentic habitats. The zooplankton of permanent swift-water stream is characteristically reduced both in number of species and biomass (**Jayabhaye 2010**). The present study was carried to investigate the zooplanktonic diversity in back water of Shankar sagar reservoir, on river Godavari at Dhangar Takli through different months and seasons during the period of June 2010 to April 2013 in order to assess the species composition, population density and seasonal fluctuation of this faunal group.

Materials and Methods

One of the largest lift irrigation projects in Asia was constructed on the river Godavari, at Asarjan, Dist. Nanded for irrigation and water supply, in the year 1988. The back water of this project at Dhangar Takli 19°7'12"N 77°3'28"E was selected as a study area.

The physical and chemical characteristics of water affect the abundance, species composition, stability and productivity of the indigenous populations of aquatic organisms. The biological method used for assessing water quality includes collection, counting and identification of aquatic organisms. Detailed taxonomic identification of Zooplankton was earned out with **Victor and Fernando (1979)**, **Michael and Sharma, (1988)**, **Kodarkar (1992)** and **Dhanapathi (2000)**.

Detailed analysis of plankton and plankton population was done by estimating the numbers of each species. Preserved samples were mixed uniformly by gentle inversion and then exactly 1ml of the sample was pipette out into the S-R cell for analysis.

The *Sedgwick-Rafter cell* of 50 X 20 X 1 mm is used for plankton counting. It is covered by a relatively thick cover slip and is calibrated to contain exactly 1.0 ml. For Plankton analysis, samples were collected monthly by using standard plankton net with uniform speed. The plankton sample was fixed in 70% ethyl alcohol. For quantitative estimation of the zooplankton,

50 liters of surface water was filtered through small plankton net. Zooplankton numbers were expressed as individuals per liter.

RESULTS AND DISCUSSION

In the present study 22 species of Zooplankton were recorded consisting 10 species of Rotifer, 4 species of Cladocerans, 5 species of Copepods and 3 species of Ostracoda. The monthly variations of zooplankton species is illustrated in Table No 01 and 02 and Fig. 01. Species richness was high in the month of October and minimum during June –July. Zooplanktons are the intermediate link between phytoplankton and fish, and are the primary consumers. They are good indicators of change in water quality as they are strongly affected by environmental conditions. Hence, qualitative and quantitative studies of zooplanktons are of great importance in relation to fish culture.

Rotifers

Rotifers are the microscopic faunal component living mostly in fresh water, are characterized by the presence of an anterior wheel like rotating structure called “Corona”. They are being considered as the most important soft bodied invertebrates **Hutchinson (1967)**.

They play a significant role in aquatic food chain and thereby constitute an important food items for fishes. In the present study 10 species of rotifera were recorded. The most abundant species were *Brachionus caudatus*, *B. angularis*, *B. falcatus* and *Asplanchna sp.* This constitutes about 37.65% of total zooplankton found during study. All these species had been earlier reported by **(Jayabhaye, 2010)**.

Cladocerans

Cladocerans popularly called as ‘water flea’ prefers to live in deep water and constitute a major item of food for fish. Thus they hold key position in food chain and energy transformation **(Uttangi, 2001)**. During the present study 4 species of cladocera were recorded. the abundant species were *Alona intermedia*, *Moina micrura* and *Ceriodaphnia cornuta*. The cladocerans population showed minimum in monsoon and winter and maximum in summer. 25.42% was recorded during the three years of study. The maximum population in summer and winter may be attributed to favorable temperature and availability of food in the form of bacteria, nanoplankton and suspended detritus while in monsoon the factors like water temperature, dissolved oxygen,

turbidity and transparency play an important role in controlling the diversity and density of cladocerans. (Edmondson, 1965).

Copepods

Freshwater copepods constitute one of the major zooplankton communities occurring in all types of water bodies. They serve as food to several fishes and play a major role in ecological pyramids. 120 species of free living freshwater copepods are known from India (Uttangi, 2001). In the present study, most abundant species were *Cyclops sps*, *C. viridis*, *Diaptomus edax*, *D. minutus* and *Mesocyclops leuckarti*. They found maximum during summer and minimum during winter and are second largest phylum constitutes about 30.97% among all zooplankton. Similar trend was observed by (Chauhan R, 1993) in Renuka lake, Himachal Pradesh and (Jayabhaye, 2010) in river Kayadhu near Hingoli city.

Ostracods

Ostracods are bivalve and have a shape like small seeds. They inhabit all kinds of fresh water and marine environments. The abundance of these provides a good food for aquatic organisms. In the present investigation 3 species of Ostracods were recorded namely *Cyclocypris globosa*, *Cypris subglobosa* and *Stenocypris fontinalis*. Maximum ostracodes population was recorded in summer and minimum in rainy season and their percentage was 5.96% this was low as compared to other three phyla during the study period. Similar observations were also made by Sunkad and Patil (2004) in Fort lake of Belgaum (Karnataka) and (Jayabhaye, 2010) in river Kayadhu near Hingoli city

Table No. 01 Zooplanktons of river Godavari at Dhangar Takli from July 2010 – June 2011, July 2011– April 2012 and July 2012– April 2013.

Year	July 2010 – June 2011			July 2011– April 2012			July 2012– April 2013			Total
	Jul y- Oct	Nov -Feb	Mar -Jun	Jul y- Oct	No v- Feb	Ma r- Ap r	Jul y- Oct	No v- Feb	Ma r- Ap r	
Rotifers										
<i>Brachionus caudatus</i>	2	27	52	0	28	54	0	30	58	251
<i>Gastropus sp.</i>	3	21	28	0	26	60	0	35	66	239
<i>Asplanchna herricki</i>	0	15	73	0	16	55	0	16	53	228
<i>Asplanchna sp</i>	0	29	55	0	19	48	0	19	48	228
<i>Brachionus falcatus</i>	0	23	74	0	29	52	0	27	62	267
<i>Brachionus durgae</i>	0	22	44	0	24	67	0	22	57	236
<i>Brachionus angularis</i>	0	19	73	0	20	69	0	25	54	260
<i>Brachionus pallas</i>	0	30	46	0	24	59	0	28	50	237
<i>Brachionus calyciflorus</i>	0	29	72	0	22	61	0	21	42	247
<i>keratella vulga</i>	0	19	38	0	17	44	0	14	40	172
Cladocerans										
<i>Daphnia sps</i>	26	63	40	27	68	45	23	81	48	421
<i>Moina micrura</i>	13	78	43	16	70	50	20	69	47	406
<i>Alona intermedia</i>	24	66	36	21	78	39	17	57	42	380
<i>Ceriodaphnia cornuta</i>	22	58	48	19	75	48	22	64	34	390

Table No. 02 Zooplanktons of river Godavari at Dhangar Takli from July 2010 – June 2011, July 2011– April 2012 and July 2012– April 2013.

Year	July 2010 – June 2011			July 2011– April 2012			July 2012– April 2013			Total
	July	Nov	Mar	July	Nov	Mar	July	Nov	Mar	
Species	-	-	-	-	-	-	-	-	-	
	Oct	Feb	Jun	Oct	Feb	Apr	Oct	Feb	Apr	
Copepods										
<i>Cyclops sps</i>	33	75	53	27	71	50	31	72	41	453
<i>C.viridis</i>	22	61	49	26	66	47	34	69	47	421
<i>Diaptomus edax</i>	11	59	51	16	62	46	28	54	39	366
<i>Diaptomus minutes</i>	19	61	28	27	68	33	25	59	40	360
<i>Mesocyclops leuckarti</i>	23	71	27	19	74	30	21	51	29	345
Ostracodes										
<i>Cyclocypris globosa</i>	0	24	19	07	26	18	6	25	26	151
<i>Cypris subglobosa</i>	0	09	22	03	12	17	9	22	22	116
<i>Stenocypris fontinalis</i>	0	07	15	02	08	16	9	20	29	106

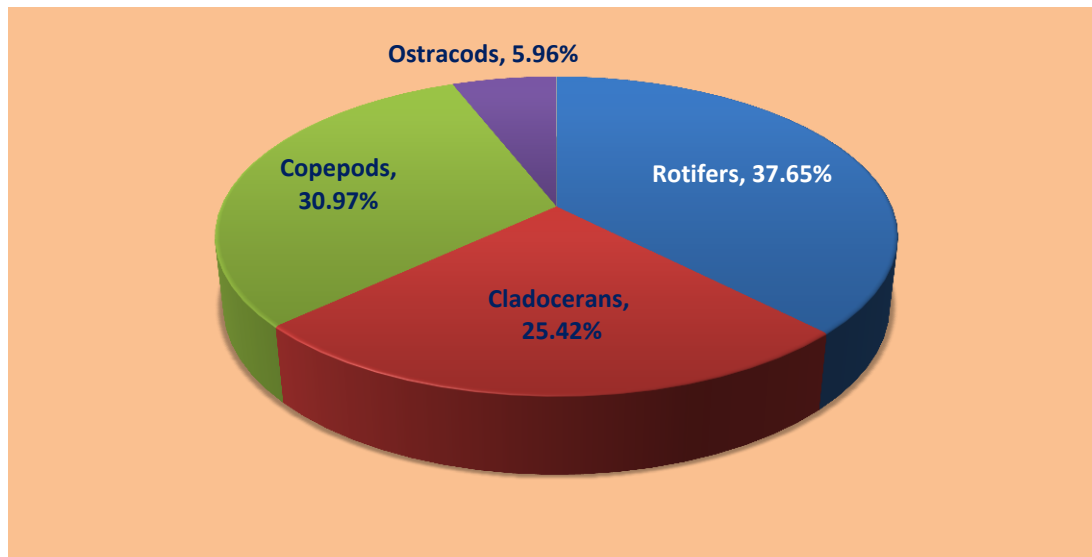


Fig. 01 Percentage (%) of Zooplanktons of river Godavari at Dhangar Takli during July 2010 to April 2013.

Acknowledgement

The author is thankful to UGC (SA) New Delhi for Award of Rajiv Gandhi National Fellowship for carry out this research work. Author is also thankful Principal, N.E.S. Science College, Nanded for providing facilities & continuous encouragement during study.

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