

## RESEARCH ARTICLE

# Zooplanktonic Diversity In Kolar River, District Nagpur, (MS) India

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Manuscript details:	ABSTRACT
<p>Available online on <a href="http://www.ijlsci.in">http://www.ijlsci.in</a></p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p><b>Editor: Dr. Chavhan Arvind</b></p> <p><b>Cite this article as:</b> Rawlekar KN and Sawane AP (2016) Zooplanktonic Diversity In Kolar River, District Nagpur, (MS) India, <i>Int. J. of Life Sciences</i>, A6: 181-185</p> <p><b>Acknowledgement</b> Author greatly thankful to Dr. D.B. Tembhare , Ex. Prof. and Head of Department of Zoology, Campus and Dr. D. D. Barsagade, Reader, Department of Zoology, RTM Nagpur Univ. Nagpur.</p> <p><b>Copyright:</b> © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>In the present investigation zooplankton monitoring of river Kolar District Nagpur, Maharashtra state was studied with reference to zooplanktonic community. The study was conducted on monthly basis for a period of two year from February 2010 to January 2012 on all the four sampling sites of river Kolar. Statistical analysis of the analytical data was computed in table.</p> <p><b>Keywords:</b> Zooplankton, Seasonal variation, River.</p> <p><b>INTRODUCTION</b></p> <p>The zooplankton of lotic ecosystems consists of heterogeneous assemblage of minute floating micro-invertebrates and their qualitative and quantitative study provides good indices of water quality and the capacity of water to sustain heterotrophic communities. They act as primary consumers in the aquatic ecosystem and constitute an important link between primary producers (phytoplankton) and the consumers of higher order like fishes in the food chain of aquatic ecosystem. As zooplankton are tolerant to adverse environmental condition. They are capable of measuring the actual response of organisms or population to the environmental qualities. The physiological and biological diversity of zooplankton species allows a wide range of indicator species for various environmental situations. The number, type and distribution of these organisms present in any aquatic habitat provide a clue on the environmental conditions prevailing in that particular habitat. However, it is seen that many environmental factors interact to provide conditions for the growth of plankton both spatially and seasonally Chug, (2000). Since the studies on zooplankton diversity are very less in Kolar river this paper is intended to report zooplankton diversity in present investigation.</p> <p><b>MATERIALS AND METHODS</b></p> <p>The river Kolar is in the vicinity of Khaparkheda town, located at 21.3858107° north latitude and 78.9201379° east longitudes in Nagpur district of Maharashtra state. This river flowing besides the thermal plants (Khaparkheda TPS and Koradi TPS) and some villages in the downstream are</p>

located on the bank of this river and receiving effluents and domestic water. Therefore, the river was monitored by collecting samples from four locations covering the complete stretch of the river receiving discharges during the period of two years from February 2010 to January 2012 in winter, summer and monsoon seasons to know the seasonal variation.

These sampling locations are Site - A (Dam Site), Situated at Nanda Dam, Site - B (Village Site), Situated near Kolar bridge on N.H.69 at Mahadula, Site - C (Village Site), Situated at Khaparkheda, Site - D (Confluence point Site), Situated at Confluence point of river Kolar and Kanhan at Waregoan. The phytoplanktonic biodiversity of river Kolar was evaluated and assessment was made by analyzing parameters of interests. The sampling program was planned taking into account the objectives of the study and the parameters to be analyzed. Efforts were made to centralize the aim of sampling to achieve the representativeness and validity of the samples. The study was conducted on monthly basis for a period of two years from February 2010 to January 2012 on all the four sampling sites of river Kolar. The sampling process was completed in three days every month and two sites were covered in one day. Sampling was done early in the morning from 6.00 A.M to 9.00 A.M. The samples were analyzed by using standard methodology for Isolation and Identification of zooplankton, the keys like Batish, (1992); Ward and Wipple, (1996); and Jayaram, (2000) were followed.

## RESULTS AND DISCUSSION

The need for knowledge of zooplankton diversity is often stressed as reliable indicator for the integrity of aquatic ecosystem Barbosa et al., (1995). Information on the zooplankton community of Indian rivers especially on the factors influencing their diversity and population dynamics is lacking. The zooplanktonic diversity of the Indian rivers is studied by Pahawa and Meharotra (1966) in river Ganga. The major part of present study confined to biodiversity of Fauna composition of river Kolar.

In the present investigation of river Kolar. 31 **species** of zooplankton were found.

**Copepoda (06)** e.g. *Nauplius larvae*, *Anopheles larvae*, *Cyclops bicuspidatus* (Claus) *Cyclops viridis* (Jurine), *Mesocyclops hyalinus*, *Diaptomas siciloides*

**Cladocera (03)** e.g. *Daphenia longispina*, *Moina* sp., *Bosmina* sp.

**Ostracoda (04)** e.g. *Cypris* sp., *Ostracodes*, *Stenocypris malcomsoni*, *Cyprinotus*

**Rotifera (22)** e.g. *Brachionus* sp., *Brachionus calyciflorus* (Pallas), *Brachionus angularis* (Gosse), *Brachionus quadridentatus* (Hermann), *Brachionus rubens*, *Brachionus forficula* (Wierzejski), *Keratella tropica*, *Keratella* sp., *Monostyla leccanogoss*, *Monostyla bulla* (Gossa), *Monostyla* sp., *Gastropus* sp., *Platylas quadricornis*, *Filinia* sp. *Hoarella* sp., *Asplanchna* sp., *Hydatina* sp., *Lecane luna* *Notholka* sp., *Trichocerca longiseta*, *Rotaria* sp., *Monommata* sp., *Conochilus valvox*.

## OSTRACODA

The *Ostracod* populations were found to be higher in the monsoon season while lower in winter season. The higher population of *Ostracod* during monsoon may be due to the abundance of fine detritus to which omnivorous organisms switch over during monsoon from their natural benthic habitat and bacteria, mould and algae as food. The decrease in population of *Ostracods* during winter may be due to the feeding pressure of stocked fishes. *Ostracoda* abundance also dependent upon the availability of food as opined by Joy and Clark (1977).

## ROTIFERA

In the present investigation, the Rotifer numbers per liter were found maximum during summer and minimum during winter season. The high *Rotifer* population in summer can be attributed to the availability of abundant food in the form of bacteria, nanoplankton and fine suspended detritus. *Rotifera* is an indicator of water pollution and the pollution indicator species recorded from the river are *Brachionus* sp., and *Keratella* sp. The *Brachionus* forms the highest percentage in zooplankton community. Sawane et al., (2006) reported maximum number of rotifers in winter from river Erai, Chandrapur. Edmondson (1996) have observed that the high population in winter could be attributed with the favorable temperature and availability of abundance of food material in the form of bacteria, nanoplankton

**Table-1 Distribution of Zooplankton during Feb. 2010 to Jan. 2011 as per Sampling Sites**

Sites	Ostracodes	Rotifers	Copepoda	Cladocera	Total
SUMMER SEASON					
A	591	1170	570	88	2419
B	566	1194	613	82	2455
C	557	1152	558	75	2342
D	512	1204	552	62	2330
RAINY SEASON					
A	923	824	390	65	2202
B	943	767	431	63	2204
C	808	739	438	57	2042
D	802	674	414	55	1945
WINTER SEASON					
A	63	591	345	775	1774
B	60	466	343	756	1625
C	48	568	330	704	1650
D	57	543	336	672	1608
Total	5930	9892	5320	3454	24596
%	24.11	40.22	21.63	14.04	100

**Table 2: Distribution of Zooplankton during 2011 to 2012 as per Sampling Sites**

Sites	Ostracodes	Rotifers	Copepoda	Cladocera	Total
SUMMER SEASON					
A	762	1355	1166	121	3404
B	801	1355	1103	91	3350
C	751	1272	1015	72	3110
D	733	1262	1040	78	3113
RAINY SEASON					
A	557	720	534	99	1910
B	307	703	587	91	1683
C	342	645	590	79	1696
D	366	690	561	72	1689
WINTER SEASON					
A	82	728	485	957	2252
B	74	725	475	916	2190
C	77	669	488	834	2068
D	74	637	513	768	1992
Total	6646	10761	8557	4178	25264
%	22.05	35.70	28.39	13.86	100

**Table 3: Seasonal average distribution of Zooplanktonic groups of river Kolar during 2010 to 2012**

Zooplanktonic groups	2010- 2011			2011- 2012		
	Summer Season	Rainy Season	Winter Season	Summer Season	Rainy Season	Winter Season
<i>Ostracods</i>	556	869	57	761	823	76
<i>Rotifers</i>	1180	751	542	1311	689	689
<i>Copepoda</i>	573	418	338	1081	568	490
<i>Cladocera</i>	76	60	726	90	85	868

Note: Values are expressed in organisms per liter

**Table 4: Correlation matrix for physico-chemical parameters with Zooplankton of river Kolar during Feb. 2010 - Jan. 2011**

Parameters	<i>Ostracodes</i>	<i>Rotifers</i>	<i>Copepoda</i>	<i>Cladocera</i>
Temp.	0.89	0.74	0.75	-0.99
pH	-0.07	-0.29	-0.33	0.19
EC	-0.01	-0.04	0.07	0.02
TSS	-0.09	-0.02	0.09	0.06
TDS	0.13	0.05	0.10	-0.12
T. Hardness	-0.06	-0.16	-0.07	0.12
Calcium	0.32	0.21	0.31	-0.34
Magnesium	-0.52	-0.40	-0.45	0.55
Chloride	-0.07	0.06	0.18	0.01
Alkalinity	0.007	0.53	0.53	-0.24
DO	0.22	0.63	-0.02	-0.07
COD	0.20	0.55	0.58	-0.40
BOD	-0.004	0.01	0.12	-0.01
Phosphate	0.24	0.04	0.09	-0.22

**Table 5 Correlation matrix for physico-chemical parameters with Zooplankton of river Kolar during Feb. 2011 - Jan. 2012**

Parameters	<i>Ostracodes</i>	<i>Rotifers</i>	<i>Copepoda</i>	<i>Cladocera</i>
Temp.	0.98	0.50	0.60	0.00
pH	-0.15	-0.33	-0.36	-0.06
EC	-0.02	-0.009	-0.01	-0.27
TSS	-0.07	0.05	0.02	-0.23
TDS	0.12	0.03	0.05	-0.27
T. Hardness	-0.12	-0.14	-0.16	-0.30
Calcium	0.34	0.15	0.18	-0.18
Magnesium	-0.58	-0.33	-0.34	-0.23
Chloride	-0.03	0.12	0.11	-0.22
Alkalinity	0.20	0.63	0.63	0.23
DO	0.05	0.03	0.04	0.01
COD	0.36	0.53	0.53	-0.28
BOD	0.003	0.03	0.03	-0.32
Phosphate	0.20	-0.07	-0.03	-0.38

and suspended detritus In the river Kolar at the sampling sites under study, maximum rotifers were recorded. Anjeli (1976) reported that simultaneous presence of several rotiferans species is an indication of eutrophic nature of aquatic ecosystem.

#### CLADOCERA

The *Cladocera* were found to be maximum in winter and minimum in monsoon season at all sampling sites viz. A to D. The maximum population of *Cladocera* in winter may be attributed to favourable temperature and availability of abundant food in the form of

bacteria, nanoplankton and suspended detritus. Biswas and Konar (2000), reported six species of Cladocerans from river Damodar in W. Bengal and showed that the Cladocerans was the dominant group in summer at one site and it was highest in all the seasons.

#### COPEPODA

The Copepoda diversity was represented by 4 species and was found in more number in summer season. The low population of *Copepod* during winter is due to the feeding pressure of stocked fish.

Kumar arid Singh (1994) observed that Cyclops are sensitive to pollution and increase with an increase in nutrients and is in agreement with our observations.

## CONCLUSION

Zooplankton community observed diverse than phytoplankton as total 31 species were recorded in the river Kolar. Species diversity, especially in terms of numbers is high in all the sampling locations. The zooplankton groups such as *Ostracods*, *Rotifers*, *Copepods*, *Cladocera*. The monthly and yearly average zooplankton density at different stations of the river and the general average zooplankton density for the whole river suggested that the nutrient impact on the system is quite low, characteristic of oligotrophic system. Since rainfall schedule fluctuate quite random during different years, pronounced seasonal tendencies cannot be expected in systems like Kolar.

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