

## RESEARCH ARTICLE

# Seasonal Study of Zooplanktons Quantitative and Qualitative Analysis in Bhiwapur Lake Dist: Nagpur (M.S) India

Ingale PP,<sup>1</sup> Bobdey AD<sup>2</sup> and Lonkar AN<sup>3</sup>

<sup>1</sup>Sevadal MahilaMahavidyalaya, Nagpur.

<sup>2</sup>SSES Amt's Science College Congress Nagar, India - 440012.

<sup>3</sup>16/5 Priyadarshaninagar, Civil lines Nagpur-440001.

## Manuscript details:

Available online on  
<http://www.ijlsci.in>

ISSN: 2320-964X (Online)  
ISSN: 2320-7817 (Print)

**Editor: Dr. Chavhan Arvind**

### Cite this article as:

Ingale PP, Bobdey AD and Lonkar AN (2016) Seasonal Study of Zooplanktons Quantitative and Qualitative Analysis in Bhiwapur Lake Dist: Nagpur (M.S) India, *Int. J. of Life Sciences, A6*: 173-176.

**Copyright:** © 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.

## ABSTRACT

Zooplankton is free swimming microscopic animals play an integral role in transfer of energy to the consumers and form second trophic level in the energy flow. Total 19 species are reported of which Rotifer 10 species, Cladocera 4 species, Copepoda 4 species, Ostracoda 1 species and Nauplius also found in the study area. Rotifera was most dominant group observed throughout the study period. Zooplanktons studied with respect to species diversity and the season wise analysis was recorded in Bhiwapur Lake. The present study revealed that it is good source for Aquaculture.

**Keywords:** Zooplankton, microscopic, energy, dominant, Aquaculture.

## INTRODUCTION

Zooplankton encompassing of rotifera, cladocera, copepoda and ostracoda are considered to be chief organisms in the terms of population density, biomass production, grazing and nutrient regeneration in any aquatic ecosystem. Due to their very short life duration (diverges between few days to few weeks for different species), zooplanktons respond frisky to the environmental change (Dutta and Patra, 2013). Zooplankton, in the middle of various communities in aquatic ecosystem gives a reasonable idea of the prominence of all the communities because they interconnected each other and they share food in the food web and contribute suggestively to aquatic efficiency in freshwater ecological unit. They are also very good bioindicators to assess the pollution of any freshwater body and condition of the Lake and biological diversity are interrelated to virtually all component of the ecosystem (Chatterjee Bhattacharjee, 2015). To conserve these valuable resources from further deterioration there is a need for regular monitoring of the aquatic ecosystem.

## MATERIALS AND METHODS

Bhiwapur Lake is located at three districts border area in Bhiwapur tahsil such as, Nagpur, Bhandara and Chandrapur. Bhiwapur is a tehsil, situated east from Nagpur at 74 km. having 79°, 31'04.78"E latitude and 20°45'40.77"N longitude. Selection of five sampling stations such as A, B, C, D

and E. A study was conducted from July 2012 to June 2013. Samples were collected for every month during July 2012- June 2013 at regular interval in early morning between 8.30 to 11.00 a.m. collected zooplankton samples were preserved in 4% formaldehyde for analysis. The preserved zooplankton samples were diluted to 80 ml with distilled water for their taxonomic study and numerical estimation. For the quantitative study of zooplankton, a 'Sedgwick Rafter Counting Cell' was used to implement the technique delineated by Welch (1948). All the zooplankton in the counting chamber was observed and identified using standard keys (Battish, 1992; Needham and Needham, 1962; Altaff, 2004) and counted under a compound microscope.

## RESULT AND DISCUSSION

During the entire study period 19 species of zooplankton were observed of which 10 species belongs to Rotifera such as: *Asplanchna sp.*, *Branchionus calyciflorus*, *B. divesicornis*, *B. falcatus*, *B. plicatus*, *B. ruben*, *Filnia longiseta*, *Keratella tropica*, *Lecan sp.*, *Monostyla sp.* 4 species of Cladocera such as: *Bosmina longirostris*, *Moina brachiate*, *Moina daphnia*, *Moina crocopa*. Copepoda have 4 species such as: *Cyclop sp.*, *Deptomus sp.*, *Eucyclops sp.*, *Mesocyclop* and only single species of Ostracoda i.e. *Cypris*. A nauplius larva was present. The zooplankton community of Bhiwapur Lake, the total standing crop of zooplankton showed peak population during the winter followed by the summer and

minimum during the monsoon. The diversity study revealed four groups of zooplankton such as: Rotifera, Cladocera, Copepoda, Ostracoda and Nauplius larvae were also recorded in various densities.

In present study four major groups of zooplankton were recorded such as rotifera, cladocera, copepoda, ostracoda and nauplius larvae. Rotifera dominant over all groups recorded 10 species, followed by cladocera and copepoda, 4 species respectively and 1 species of ostracoda. In all the station rotifera, cladocera, and copepoda maximum diversity observed during winter season followed by summer and monsoon and the maximum diversity of ostracoda and nauplius larvae during summer followed by monsoon and minimum during winter. The maximum population recorded at station B and E. Similar work observed by Shastrakar and Tijare (2012).

The seasonal study reveals that, the rotifers diversity was minimum during monsoon season and maximum during the winter season followed by summer season at all stations of the lake during the study period. In the middle of observed rotifers, *Branchionus calyciflorus*, *Branchionus falcatus* and *Keratella sp.* were pollution indicator species and were abundantly found at all sampling stations. In the present investigation in rotifers *Brachionus sp.*, having maximum number of species, density and showed its dominance. Rotifers found a maximum population at all the sampling stations. Similar findings by Goswami et al., (2012)

**Table 1: Seasonal Investigation of Zooplanktons in Bhiwapur Lake during July 2012-June 2013.**

Zooplanktons (unit/l)	Seasons	A	B	C	D	E
Rotifera	Monsoon	24.5 ± 5.91	32.0 ± 6.01	27.25 ± 6.020	19.75 ± 6.435	33.0 ± 4.882
	Winter	53.0 ± 10.41	74.0 ± 8.346	63.5 ± 8.704	47.5 ± 7.218	54.0 ± 3.852
	Summer	34.25 ± 5.022	33.0 ± 6.98	30.5 ± 7.805	24.5 ± 3.776	41.75 ± 6.613
Cladocera	Monsoon	6.0 ± 2.415	7.5 ± 3.01	7.75 ± 2.137	5.25 ± 0.631	8.0 ± 3.189
	Winter	14.25 ± 4.836	17.5 ± 2.986	17.0 ± 4.378	11.5 ± 3.405	19.5 ± 2.902
	Summer	13.0 ± 2.483	16.75 ± 3.20	12.75 ± 2.175	8.5 ± 2.5	17.5 ± 3.571
Copepoda	Monsoon	13.75 ± 3.64	16.75 ± 4.23	15.5 ± 3.775	7.0 ± 3.083	19.75 ± 5.514
	Winter	20.0 ± 1.354	25.5 ± 1.190	23.75 ± 2.626	13.0 ± 1.780	31.25 ± 1.315
	Summer	20.0 ± 2.738	21.25 ± 2.32	16.0 ± 2.346	11.5 ± 2.18	25.75 ± 3.093
Ostracoda	Monsoon	5.25 ± 1.55	6.25 ± 1.55	7.25 ± 1.26	5.75 ± 2.137	3.75 ± 1.109
	Winter	0.25 ± 0.25	0.25 ± 0.25	0.25 ± 0.25	0.0 ± 0.0	0.0 ± 0.0
	Summer	12.0 ± 1.080	12.75 ± 1.25	11.0 ± 0.913	6.0 ± 0.913	11.25 ± 0.479
Nauplius larvae	Monsoon	2.25 ± 0.629	3.25 ± 0.85	4.25 ± 0.479	1.5 ± 0.646	2.25 ± 0.630
	Winter	3.0 ± 1.224	4.5 ± 0.957	4.5 ± 0.646	3.75 ± 0.630	2.75 ± 0.25
	Summer	8.75 ± 1.493	8.0 ± 0.912	6.0 ± 0.913	3.75 ± 1.182	6.75 ± 0.629

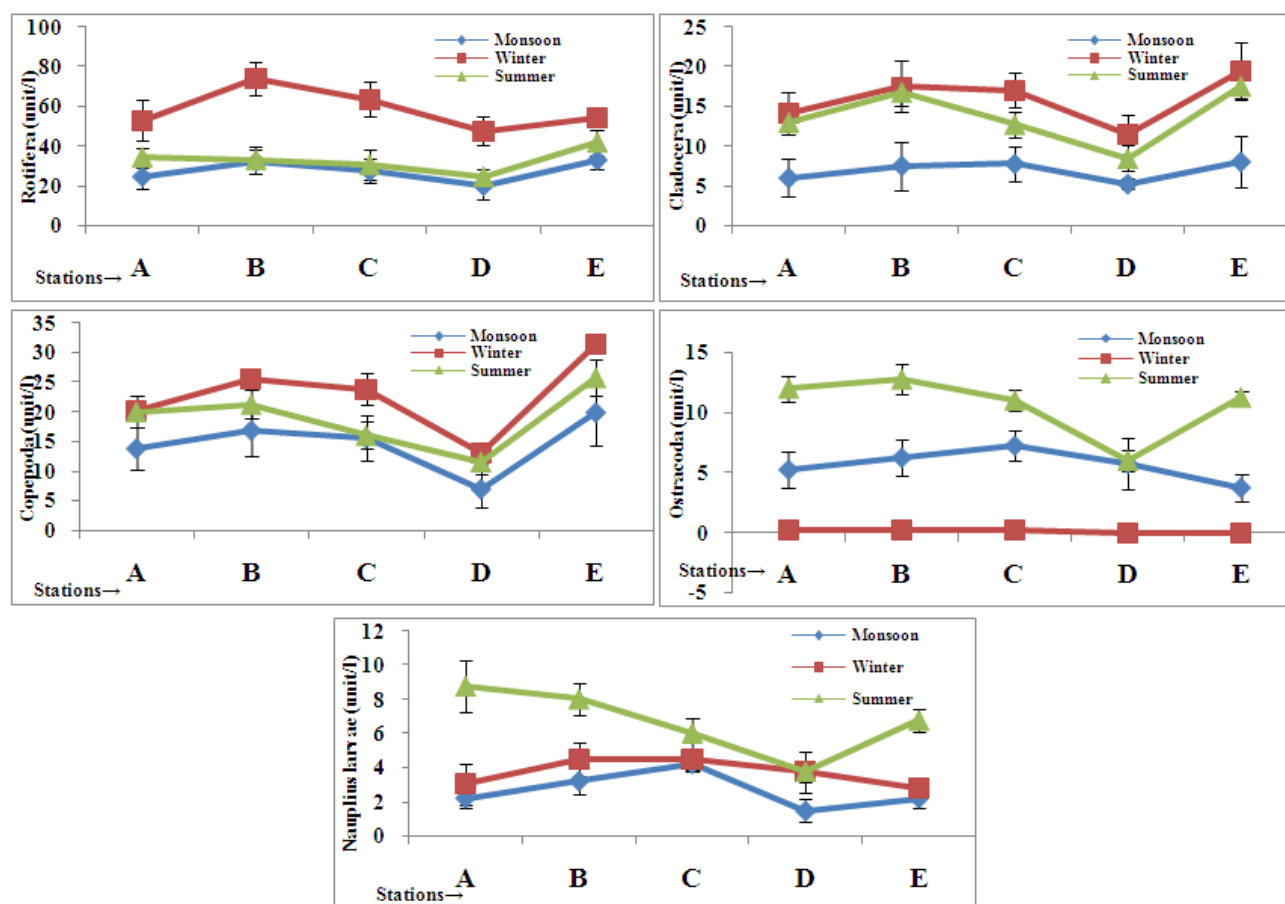


Fig 1: Zooplankton seasonal variation in Bhiwapur Lake during July 2012-June 2013.

Cladocerans diversity was minimum during the monsoon season and maximum during the winter season followed by summer season at all stations of the lake during the study period. In the present investigation in cladocera, *Moina daphnia* showed its density and dominance. Cladocera stand with 3rd position as compared with the other zooplankton population at all the sampling stations. Similar work done by Sehgal *et al.*, (2013). Copepoda diversity was minimum during the monsoon season and maximum during the winter season followed by summer season at all stations of the lake during the study period. The *Cyclop sp.* showed its density and dominance in all the species of copepoda and stands with 2nd position as compared to other

zooplankton population at all the sampling stations. Analogous finding by Dutta and Patra (2013). Ostracoda diversity was minimum during the winter season and maximum during the summer season followed by the monsoon season at all stations on the lake during the study period. The *Cypris* stand with 4th position as compared to other zooplankton population at all the

stations. Analogous observation by Narasimha and Benarjee (2013). The nauplius diversity was minimum during the monsoon season and maximum during the summer and winter season at all stations on the lake during the study period. Similar work done by Sehgal *et al.*, (2013).

## CONCLUSION

This work is very important from environmental as well as ecological point of view. The rotifers, cladocerans and copepods population density observed maximum during the winter season followed by summer season at all the stations of the lake during the study period. Copepods and nauplius are present throughout the year. They serve as a good source of food for fishes. This in turn should ensure good fish production.

## ACKNOWLEDGEMENT

Authors giving special thanks to Dr. Pravin Charde, Principal, Sevadal Mahila Mahavidyalaya, giving positive direction in the present investigation and kind help during the research work and Assi. Professor

Subhash Somkuwar, department of Botany, D.A.C. Nagpur for making available the research paper publication platform for this paper.

## REFERENCES

- Dutta Tapas kumar and PatraBidhan C (2013) Biodiversity and seasonal abundance of Zooplankton and its relation to physico – chemical parameters of Jamunabundh, Bishnupur, India, I J S R P, Volume 3, Issue 8.
- Chatterjee Nilanjana and Bhattacharjee Baibaswata (2015) Quantitative study on the impact of the seasonal change in the aquatic physicochemical parameters on zooplankton population density in “Sahebbandh”, Purulia, West Bengal, India Discovery Nature, 9(19), 11-19.
- Welch PS (1948) In: Limnological Methods (Blackston Co., Philadelphia) 381.
- Battish SK (1992) Freshwater Zooplankton of India, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, India.
- Needham JG, Needham PR (1962) A guide to the study of freshwater biology, Holden-day, Inc, San Francisco.
- Altaff K (2004) A manual of zooplankton. University grants commission, New Delhi, APHA (1989): Standard methods for the examination of water and waste water. 17th edition,
- Washington USAAPHA (1985) Stranded methods: for the examination of water and wastewater, 16th edition, American Public Health Association, (1985).
- Shastrakar and Tijare (2012) Diversity of zooplankton in Asholamendhalake, Distt. Chandrapur, (M.S.), India. J. Bionano Frontier, Sp. issue 0974-0678-65.
- Goswami AP and Mankodi PC (2012) Study on Zooplankton of Fresh Water Reservoir Nyari- II Rajkot district, Gujarat, India. ISCA J. Biological Sci. Vol. 1(1), 30-34
- Sehgal K, Phakade GG, Chakraborty SK and Reddy Vijay Kumar (2013) Studies on Zooplankton Diversity in Dimbhe Reservoir, Maharashtra, India. PRL AASSR Vol 4(1):417-420.
- Narasimha Ramulu K and Benarjee G (2013) Physico-Chemical Factors Influenced Plankton Biodiversity and Fish Abundance - a Case Study of Nagaram Tank of Warangal, Andhra Pradesh. I J L B P R. Vol, 2 No 2.