



Seasonal Variation of Zooplankton In River Chandrabhaga, Daryapur Tahasil, District: Amravati (M.S)

J. R. Ingle¹ and A. D. Bobdey²

¹G.S. College, Khamgaon Dist. Buldana

²Shri Shivaji Science College, Congress Nagar, Nagpur-12
drad.bobdey@sscni.in

Abstract:

Zooplanktons are highly sensitive to environmental variations. They serve as indicator of pollution. Present investigation aims to study the seasonal variation of zooplanktons. More number of zooplanktons is observed during summer and winter season. During Monsoon municipal sewage and surface run off decreases the number of zooplanktons.

Keywords seasonal variation, Zooplanktons, Chandrabhaga river.

Introduction

Rivers are vulnerable source of fresh water from the dawn of civilization. About 73% of earth's surface is covered with water. Water is important part of our life. It is required to fulfil day today needs of life. It is said that life has originated in water in microscopic form. Thus life and water has a close relation with each other. Man uses water to fulfil his requirement. The thoughtless use of water leads to pollution of water. The contamination of water beyond its assimilation level leads to pollution. Pollution of water by physical and chemical factors has an impact on the life that is present in water. Among the aquatic life zooplankton play an important role in food web of the river. Zooplankton serves as food for fishes in river. Zooplanktons are playing important role in biomonitoring of water pollution (Tyor *et al.*, 2014). Zooplankton communities are highly sensitive to environmental variations, such as water temperature, light, chemistry (particularly pH, Oxygen, salinity, toxic contaminants and food availability such as algae and bacteria and predation by fishes as well as invertebrates (Paterson, 2001).

Zooplankton comprise of four group protozoan, cladocera, copepoda, rotifera and ostracoda. Many workers in India and abroad have studied zooplanktons of fresh water. Zooplankton is rarely important in rivers and streams because they cannot maintain positive net growth rates in the face of downstream losses. (G. Annalakshami and A. Amsath 2012). The variability observed in the distribution of zooplankton is due to abiotic parameters (Beyst *et al.*, 2001, Roff *et al.*, 1988). The present investigation is carried to determine the seasonal variation of zooplankton in river Chandrabhaga in Daryapur tahasil of Amravati district Maharashtra.

Materials and Methods

Chandrabhaga river originates from Devi point in Satpuda ranges in Chikhaldara. Three sampling stations were selected downstream of river Chandrabhaga in Daryapur town station-1 is upstream of river, station-2 is midstream and station-3 is downstream of river. Samples were collected using plankton net made up of silk bolting cloth No. (mesh size 25 µm) by sieving a 50 liter volume of water sample for Zooplankton investigation during 8 am. to 10 am. The data was collected for a period of one year and sampling was done twice every month. The concentration of sample of zooplankton was preserved in 5% formalin. The quantitative analysis of Zooplankton was carried out with the help of S.R. Cell. Zooplankton were observed and identified under research Binocular microscope by using standard key Needham and Needham (1962), Tonapi (1980), APHA (1980).

Results and Discussion

The summer and winter higher zooplankton number is mainly because of organic waste, local and municipal drains that carry effluents in river water. Rainy season turbidity is mainly because of high velocity of water carrying sediment loads of silt from banks of river. High turbidity and increased number of predators reduces the zooplanktonic count. These findings line up with, Kumar (2001), Bhagat V.B *et al.* (2010) in Ambadi irrigation tank, Agale M C (2014) Budki tank in Dhule

Zooplanktons increase in winter because of low temperature and increase in planktonic growth. Increase in phytoplankton increase zooplankton in river. Sapana Khalokar (2014) in reservoir of Shahnur. More availability of food, favorable environmental conditions during winter is another reason for increased in number of zooplankton. This type of seasonal fluctuation is in confirmation with the findings of Choudhari

and Singh (1999) in Boorsa lake, Shaikendra Sharma (2010) in river Narmada, Dedhe and Deshmukh (2015) in river Bhima,

The water of Chandrabhaga river becomes more turbid during summer season as the velocity of water is slow in river, the dilution of sewage and waste is also lesser during this season. Cattle activity, and bathing in summer adds organic waste at sight, S-2, S-3 the municipal sewage channels also add waste at these sights. Increasing load of pollution reduces number of zooplanktons in water upstream to downstream. The zooplankton number is grossly decreasing from station S-1 to S-3. This may be due to dumping of municipal waste and sewerage effluents into the streams of river. Less anthropogenic activities at station S-1 lead to increased number of zooplanktons at these sights. Imaobong Ekpo (2013) in tropical rainforest river of Nigeria.

The station S-2 is characterized by various religious activities and discharge of cremated ashes is observed at station S-6 increasing the organic waste in water. Similar result was observed by G.T Kedar (2002) in Rishi Lake of Karanja Lad Maharashtra. Agriculture and farming in the basin of river adds to organic waste.

During the monsoon season, the surface run off from the surrounding areas and municipal sewage decrease number of zooplanktons as compared to winter season. The banks of Chandrabhaga are mostly made of black soil so in rainy season flood water contains more soil and silt adding to turbidity of water. More amount of water with high velocity in rainy season dilutes the water to greater extent, and reduces the number of zooplanktons. The present findings are in accordance with Steveninck et.al

(1992) in river Rhine, Bias and Agarwal (1995) in Sagar Lake.

Conclusion

The water of river Chandrabhaga is polluted due to organic waste. Less number of zooplanktons is observed in monsoon due to turbidity and surface runoff. Slower velocity of water in summer supports growth of zooplanktons, as well as lower temperature in winter season also supports growth of zooplanktons. Decline in number of organism is seen from station-1 to station-3.

Table 1: Monthly and seasonal variation of zooplanktons in year 2008-09

(Monthly number of zooplanktons in org/lit)

Months	Station-1	Station-2	Station-3
June	24	18	14
July	30	22	18
Aug	34	29	25
Sept	36	27	21
Oct	39	29	23
Nov	42	32	21
Dec	51	34	28
Jan	63	35	37
Feb	45	47	26
Mar	35	32	22
Apr	47	24	31
May	21	37	24

Table 2: Season wise record of Zooplanktons in org/L

Season	Station-1	Station-2	Station-3
Monsoon	124	96	78
Winter	195	130	109
Summer	148	140	103

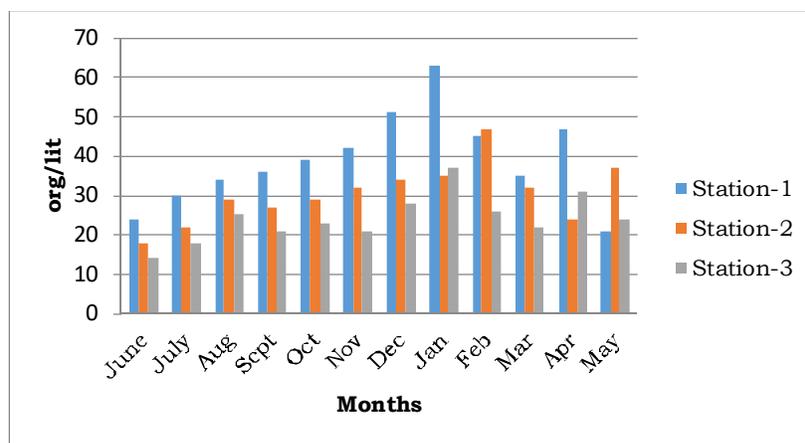


Figure 1: Monthly values of Zooplanktons org/lit

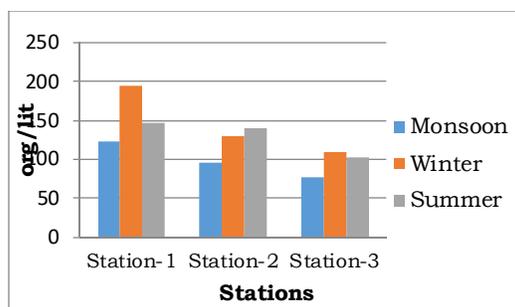


Figure 2: Seasonal variation of zooplanktons



Figure 3: Station-1 Mahuli village (Up stream)



Figure 4: Station-2 Asha-Manisha (Mid stream)



Figure 5: Station -3 Shivaji Nagar locality (Down stream)

REFERENCES

Agale Mahendra Chaitram (2014). Study of Seasonal Variations in Physico-Chemical Parameters and Planktonic Diversity of Budki Medium Irrigation Tank, Shirpur Dist-Dhule (M.S.), India. Ph.D. thesis submitted to North Maharashtra University, Jalgaon.

APHA (2002) Standard methods for Examination of water and waste water American public health Association 20th Ec. APHA, New York.

Bais V. S. and Agrawal N.C. (1995). Comparative study of the zooplanktonic spectrum in the Sagar Lake and Military engineering lake. *J. Environ. Biol.*, **16**(1): 27-30.

Beyst BD, Buysse A, Dewicke and Mees J, (2001). Surf zone hyperbenthos of Belgian sandy beaches: seasonal patterns. *Estuarine, Coastal and Shelf Science*, **53**: 877-895.

Bhagat V. B. and Meshram C. B. (2010) Seasonal variations of Zooplankton abundance in Ambadi Dam of Akot District - Akola (M.S) *Bio Sci. Bio tech. Res. Comm* **2**(2):215-217.

Choudhary S. and Singh D.K. (1999). Zooplankton population of Boosra Lake at Muzaffarpur, Bihar, India. *Environ. Ecol.*, **17**:444 - 448.

Dede A.N. and Deshmukh A.L. (2015). Study on Zooplankton Composition and Seasonal Variation in Bhima River near Ramwadi Village, Solapur District (Maharashtra), India. *Int. J. Curr. Microbiol. App. Sci.*, **4**(3):297-306.

G. Annalakshami and A. Amsath (2012) studies on the hydrobiology of river Cauvery and its tributaries Arasalar from Kumbakonam region (Tamilnadu, India) with reference to zooplankton

International Journal of Applied Biology and Pharmaceutical Technology. Vol. 3(1) pp:325-336.

Imaobong Ekpo (2013) Effect of Physico-Chemical Parameters on Zooplankton Species and Density of a Tropical Rainforest River in Niger Delta, Nigeria Using Canonical Cluster Analysis

The International Journal Of Engineering And Science **2**(4):13-21.

Kedar G. T., Patil G.P. and Yeole S.M. (2008). Effect of physico-chemical factors on the seasonal abundance of zooplankton population in Rishi Lake. The 12th world Lake conference, 88-91. **Khalokar Sapana P.** (2014). Study of zooplankton population in Shahanur reservoir with reference to fishery activity. *Int. J. of Life Sciences*, **2**(1):90-92.

Kumar K. S. (2001). The fresh water zooplankton of some lakes in Dharmapuri district Tamilnadu. *J. Aqua. Biol.*, **16**:510.

Needham, J G. Needham, P. R. (1962). A Guide to the study of freshwater biology. Holdend-day inc. Sanfrancisco, California: 108.

Paterson, M.J. (2001). Ecological monitoring and assessment network (EMAN) protocols for measuring biodiversity: zooplankton in fresh waters. EMAN protocols. 45-62.

Patil. P. R. S. K. Dhande, A. D. and Pawar, N. S. (2003): Water quality of river Tapi at Bhusawal Town. (North Maharashtra Univ. School of Env. and Earth Sciences Jalgaon Indian *J. Env. Pro.* **22**(6) PP: 620-623.

Roff JC, Middlebrook K and Evans F, (1988.)

Long-term variability in North Sea zooplankton off Northumberland coast: productivity of small copepods and analysis of trophic interactions. *Journal of the Marine Biological Association of the United Kingdom*, **68**: 143-164.

Sharma Shailendra, Siddique Anis, Singh Karam, Chouhan Meenakshi, Vyas Amrita, Solnki C.M., Sharma Dhavni, Nair Smitha, Sengupta Taniya (2010). Population Dynamics and Seasonal Abundance of Zooplankton Community in Narmada River (India). *Researcher*, **2** (9):1-9.

Steveninck E.D., de Ruyter van, W.A. Admiraal, L. Breebaart, G.M.J. Tubbing and B.van Zanten(1992). Plankton in the River Rhine: structural and functional changes observed during down-stream transport, *In: Jour. Of Plankton Research*, **14**(10):1351-1368.

Tonapi G. T. (1962) Fresh water animals of India an ecological approach. Head Department of Zoology, University of Poona. Ganeshkhind Poona 411007.

Tyor, A.K., Chopraand, G., Seema Kumari (2014). Zooplankton diversity in Shallow Lake of Sultanpur National Park, Gurgaon Haryana. *Int. J. Appl. Biol. Pharm. Technol.*, 5(1): 35-40