Global Journal of Science Frontier Research: C
Biological Science
Volume 17 Issue 2 Version 1.0 Year 2017
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Zooplankton Seasonal Abundance in Relation to Physico-Chemical Features in Mahapolilake, Bhiwandi, Maharashtra

By Patel Naziya & Nisar Shaikh
G. M. Momoin Womens college Bhiwandi

Abstract- Physico-chemical analysis and zooplankton survey of the Mahapoli Lake was carried out on monthly basis for the period of one year from February-2016 to January-2017. PH determined alkaline nature of the lake ranging 7.2 to 7.9, Dissolved oxygen 4.2-7.77mg/l was recorded. Alkalinity (97 to 183mg/l), total Hardness (69 to 142 mg/l), chlorides (45 to 63 mg/l) and the nutrients like phosphates and nitrates were at maximum in summer and minimum in rainy season. During the study period, total 10 species of zooplankton were identified by three groups such as Rotifera (4sp), copepoda (3sp) and cladocera (3sp).The highest numbers of zooplanktons were recorded in summer months and lowest in rainy season.

Keywords: *physico-chemical, zooplankton, rotifera, cladocera, copepoda, mahapoli village.*

GJSFR-C Classification: *FOR Code: 039999*

Strictly as per the compliance and regulations of :

Zooplankton Seasonal Abundance in Relation to Physico-Chemical Features in Mahapolilake, Bhiwandi, Maharashtra

Patel Naziya [α] & Nisar Shaikh [σ]

Abstract- Physico-chemical analysis and zooplankton survey of the Mahapoli Lake was carried out on monthly basis for the period of one year from February-2016 to January-2017. PH determined alkaline nature of the lake ranging 7.2 to 7.9, Dissolved oxygen 4.2-7.77mg/l was recorded. Alkalinity (97 to 183mg/l), total Hardness (69 to 142 mg/l), chlorides (45 to 63 mg/l) and the nutrients like phosphates and nitrates were at maximum in summer and minimum in rainy season. During the study period, total 10 species of zooplankton were identified by three groups such as Rotifera (4sp), copepoda (3sp) and cladocera (3sp).The highest numbers of zooplanktons were recorded in summer months and lowest in rainy season.

Keywords: physico-chemical, zooplankton, rotifera, cladocera, copepoda, mahapoli village.

I. Introduction

Zooplanktons are the smallest organisms present in almost all the water body. Zooplankton acts as main sources of food for many fishes and plays an important role in early detection and monitoring the pollution of water. According to Dodson (1992) zooplankton communities respond to a wide variety of disturbances including nutrient loading. Zooplankton is being influenced strongly by all the physical and chemical processes and often used as models for ecological paradigms. Zooplankton communities are highly sensitive to environmental variations and responds quickly to environmental change because most species have short generation times. In an aquatic ecosystem zooplankton are the important component. They provide the main food item of fishes and can be used as indicators of the tropic status of water body said byVerma et al.,(1987). They are the primary consumers. The zooplankton feed upon the phytoplankton which in turn forms a suitable food for fish and other aquatic animals. They also play a key role in the aquatic food chain (Sharma, 1998). The present study deals with the impact of various physico-chemical factors on the abundance of Zooplankton in MahapoliLake.

II. Material and Methods

a) Study area

The present study was undertaken in the Mahapoli village. Mahapoli is a village panchayat located in the Thane district of Maharashtra state, India. The district is situated between 18° 42' and 20°20' north latitudes and 72°45' and 73°48'east longitudes. The latitude 19.4010673 and longitude 73.0847979 are the geo-coordinate of the Mahapoli. It is located around 56.40kmaway from Mumbai.

b) Sample collection and analysis

The present investigation was conducted for the period of one year from February-2016 to January-2017. The samples were collected in morning between 7 to 9 am. The water samples were collected from 4 different points of the lake. Water samples were collected by using one liter wide mouth plastic container at each sampling station. Water quality parameters were analyzed as per methods of APHA (2005), Trivedy and Goel(1984). DO was fixed at sampling stations itself and further analysis was done in the laboratory. For the quantitative and qualitative estimation of plankton, 50 liters of water samples were filtered by using the 125µ mesh size plankton net and preserved in 4% formalin. Literature was used for taxonomic position and identification of the plankton (Tonapi, 1980; APHA 2005).

Author α σ: Department of Zoology, G. M. Momin Women's College, Bhiwandi, Dist. Thane. e-mail: naziyapatel1987@gmail.com

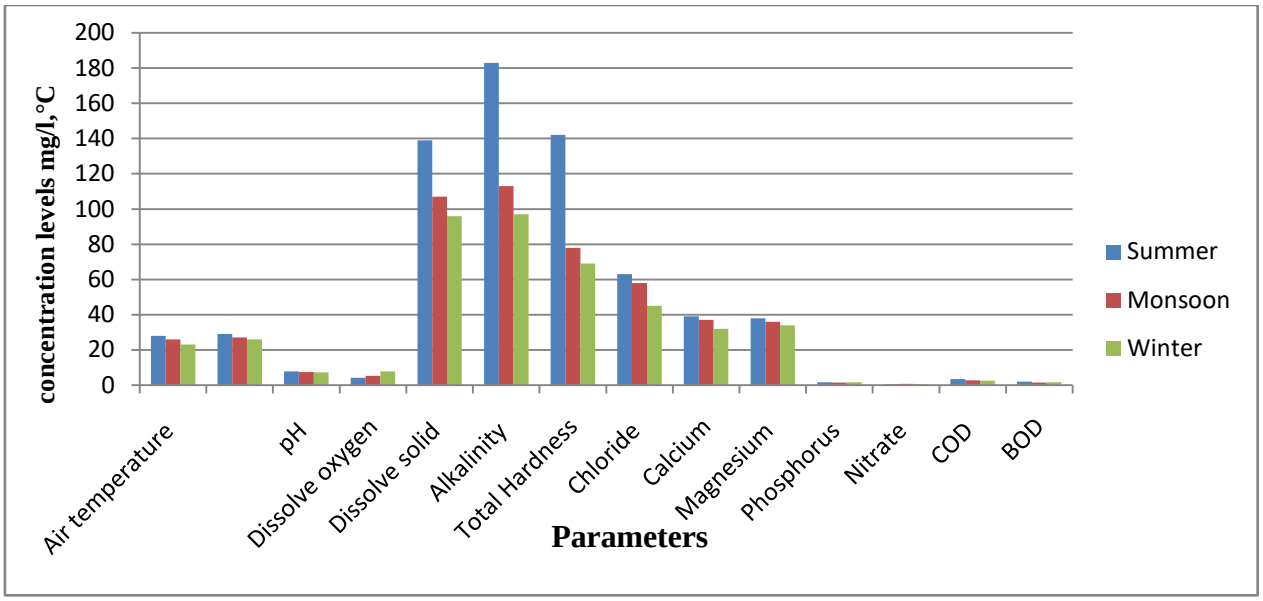

Figure 1: Seasonal average value variation in physico-chemical parameters of Mahapoli lake during February-2016 to January -2017

III. Results and Discussion

In the present investigation, seasonal variation in the physico-chemical parameters of Mahapoli Lake has been illustrated in Figure 1. Water temperature, a regular factor for various physico-chemical as well as biological activities in ecosystems, is found to fluctuate markedly with the variations in air temperature was investigated by Sharma and Kumar (2002). It was maximum during summer comparatively less during monsoon and minimum during winter. Same results as observed in the present study also found by Kannan et al., (1980). Recorded PH of water confirms the alkaline nature of the lake. The parameters like Alkalinity, Total Hardness, minerals and nutrients like phosphates and nitrates were recorded maximum in summer and minimum in monsoon season (Figure 1). According toEdmondson, (1965); Baker (1979)in monsoon the factors like water temperature, DO and Turbidity play an important role in controlling the diversity and density of Cladocera.In the present investigation zooplankton belonging to Rotifera, Copepods and Cladocera groups were identified in the study period of one year. The members belonging to Rotifera are *Filliniasp, Gastropussp, Keratellasp*, and *Brachinus sp*. The Copepod is represented by three members which are *Microcyclopsp, Mesocyclopsp*, and *Nauplius* larvae. The Cladocera members are *Moinasp, Daphnia sp*, and *Bosmina sp*. Qualitative and quantitative assessment of zooplankton was done by zooplankton density.

Table 1: Of Zooplankton Species recorded in MahapoliLake during 2016-2017

Rotifera	Copepoda	Cladocera
Filliniasp Gastropussp Keratellasp Brachinussp	Microcyclopsp Mesocyclopsp Nauplius larvae	Moinasp Daphnia sp Bosminasp

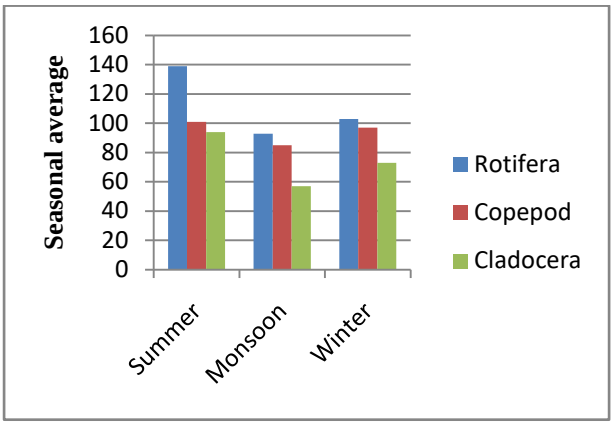

Figure 2: Seasonal Average value variations in ZooplanktonAbundance in Mahapoli Lake during 2016-2017

The diversity and population dynamics of zooplankton is under the control of number of factors such as physico-chemical environmental, tropical status, pollution influence and all types of interaction among biotic communities. A number of studies indicate that temperature, dissolved oxygen, and organic matter have major influence on the zooplankton community.

As stated above the zooplankton of the lake at four sampling station consisted of Rotifers, Copepods,

Cladocerans and some of the larval forms. Rotifers and Copepods mostly dominated the zooplankton population at all the stations during the study period. Theminimum population density of zooplankton was noticed in monsoon whereas maximum population density observed in pre monsoon and post monsoon. George (1961) and many other workers have stated that temperature is the important factor influencing the growth of zooplankton.

Among zooplankton Rotifers comprises the integral part in the aquatic food chain. They are the prominent group among zooplankton of a water body irrespective of its trophic status. This may be due to the less specialized feeding, parthenogenetic reproduction and high fecundity (Sampaio et al, 2002). Maximum density of Rotifers could be recognized with the favorable temperature and availability of abundant food in the form of bacteria and suspended detritus. The lower density of Rotifers as noted in August i.e. during monsoon may be due increase in water level. Alkalinityincreases zooplankton population in the present study zooplankton shows positive correlation with alkalinity. Similar observations were made by Rajshekhar et al., (2010) while studying seasonal variation of zooplankton.

In the present investigation the Copepods were next in dominance to Rotifers. Das et al., (1996) stated that Copepods are high in density in stable environmental conditions and they disappear as pollution level increased. The seasonal variation of Copepods was studied in Indian water bodies by Mathew (1985). In the present study maximum density of Copepods was observed in pre monsoon while minimum was noted in monsoon period. The Cladocera by their abundance and diversity, form the important group in the zooplankton community. Pennak (1958) stated that group Cladocera is well established to form the food of both young and adult fishes. Maximum density was reported in pre monsoon which may be due to availability of food and competition with other species. Seasonal variation of Cladocerans population in Indian reservoirs and lakes has been reported by Rajshekhar et al (2010). Overall Zooplankton population fauna of the lake was not much more diversified indicating the MahapoliLake as nutrient rich water body and good for aquaculture.

IV. Acknowledgement

I am extremely thank full to my parent I would like to express my deepest gratitude to my advisor Dr. NisarShaikhDept of Zoology , G.M.Momin Women's College, Bhiwandi, Thane for the excellent guidance, caring, patience, and providing me with an excellent atmosphere for doing research.

References Références Referencias

1. APHA, (2005): Standard methods for examination of water and wastewater, 21st ed., APHA, AWWA, WPCF, Washington DC, USA.
2. Baker S. L. (1979): Specific status of Keratellacochlearis (Gosse) and K. Ahlastrar (Rotifera: Brachionidae): Ecological considerations, Can. J. Zool, 7(9): 1719- 1722.
3. Das, R. K, (1996): Monitoring of water quality, its importance in disease control, paper presented in Nat. Workshop on fish and prawn disease, epizootics and quarantine adaptation in India. CICFRI: 51-55.
4. Dodson, S. (1992): Predicting crustacean Zooplankton species richness. Limnology and Oceanography. 37(4): 848-856.
5. Edmondson, N. T. (1965): Reproductive rates of planktonic rotifers related to food temperature in Nature. Ecol, 5: 61-68.
6. George MG (1961): Observations on the rotifers from shallow ponds in Delhi.Curr. Sci. 30: 268-269pp.
7. Kannan, V. & S. V. Job, (1980): Diurnal, seasonal and vertical study of primary production in Sathiar reservoir, Hydrobiologia 70, pp. 171-178.
8. Pennak, R.W. (1978): Freshwater invertebrate of United States, 2nd edn. John Wiley and Son, Newyork. 303 Pp. Purushothama, R., Sayeswara, H.A., Goudar, Studies on the diversity of zooplankton and their seasonal variation in Govindgarhlake at Rewa (M.P), India. *Indian J. Appl. Res.,* 3(11): 544 546.
9. Rajashekhar, M., Vijaykumar, K. and Parveen, Z. (2010): Seasonal variations of zooplankton community in a freshwater reservoir, Gulbarga district, Karnataka, South India. *International Journal of Systems Biology*, 2 (1): 6-11.
10. Sampaio, E. V., O. Rocha, T. Matsumura-Tundisi and J.G. Tundisi, (2002): Composition and abundance of Zooplankton in the limnetic zone of seven reservoirs of the Paranapanema River, Brazil. Braz. J. Biol., 62: 525-545. DOI: 10.1590/S1519-69842002000300018.
11. Sharma RC, Kumar. K. (2002): Conservation and management of lakes of Garhwal, Himalaya.In ecology and conservation of lakes, reservior and rivers.ABD publishers, Jaipur. India. 2:562 580.
12. Sharma, B. K. (1998): In: Faunal diversity of India (Eds. J.R.B. Alfred, A.K. Das and A.K. Sanyal). Zoological survey of India, Environmental centre: 57-70.
13. Tonapi G. T., (1980): Fresh water animals of India. Oxford IBH publishing. Co. New Delhi, 311.
14. Trivedi R. K. and Goel P. K. (1984): Chemical and Biological methods for water pollution studies. Environmental Publications, Karad, India. Pp.122.

15. Verma, P. K. and Munshi, D. (1987): Plankton community structure of Baduareservoir,Bhagalpur (India). *Tropical Ecology*, 28: 200-207.
16. Mathew, P. M. (1985): Seasonal trends in the fluctuations of plankton and physico-chemical factors in a tropical lake (Govindgarhlake, M.P) and their inter-relationships. *J. Inland Fisheries Society of India*, 17 (1 and 2): 11-24.