Zooplankton density of Katepurna reservoir, District Akola, Maharashtra, India

Pawar JR, Dabhade DS

R.A. Arts, Shri. M.K. Commerce and Shri. S.R. Rathi Science College, Washim, Maharashtra, India

Abstract
The present study is conducted to study the zooplankton density of Katepurna reservoir from District Akola, Maharashtra, India. Monthly samples of zooplankton were collected for two years, first year from August 2013-14 and second year August 2014-July 2015. During 2013-14 the increased density of zooplankton during monsoon is observed. During 2014-15, zooplanktons were reported in abundance during summer.

Keywords: Katepurna reservoir, zooplankton density, District Akola

1. Introduction
Density of zooplankton can be explained according to their population i.e. population density. The population density of zooplankton is always represented by counting the number of individuals those are found in a particular water body. The criteria of zooplankton density dependent upon volume of water, depth of water, the kinds of organisms. The density of the zooplankton is an important factor due to which quality of water can be determined, it can be expressed either in number of organisms per net haul, per lake surface area, per volume of water strained through the plankton net.

The zooplankton density in the flood plains are the excellent and huge source of habit and food to increase the growth rate and the population density of the fishes. The information of zooplankton density are specially used to evaluate the relative year class strength of the young fishes those specially use the zooplankton as a food resource, relative abundance of older planktivores, and predator- prey ratios.

Zooplankton density in a lentic water body has been always found plentiful, supplying a diverse and abundant food source for resident ichthyoplankton [1]. In addition to their floodplains value as trophic resources on the floodplain, high density zooplankton communities within floodplains are often displaced from lentic backwaters in to the river during flood events[2]providing an influx of forage for riverine fishes. As zooplankton feeds on phytoplankton, so it can be opined that the alteration of the dynamics of the phytoplankton is totally depends upon the density zooplankton.

Study of zooplankton density also provides an overview of the variations in seasonal succession of zooplankton and also follows the investigation of possible environmental drivers in relation to changes in their population densities. Hence the present study is carried out to know the zooplankton density of Katepurna reservoir from District Akola, Maharashtra, India.

2. Materials and Methods
2.1 Study site
Katepurna reservoir is an earth fill reservoir which is located on Katepurna River of "Mouje Mahan" of Taluka Barshitakli of District Akola, Maharashtra, India. The length of the reservoir is 2,000m (6,600ft). The surface area of the reservoiris 12.430 km2 and it is situated in N 20.53962 E 77.08797 468 Meters above the mean sea level. The height is of 32.31 Meters. The latitude of the reservoir is 77 – 09' – 00"whereas the longitude is 20 – 28' – 30". The main purpose of reservoir is use of its water for irrigation and drinking. The other intension is the fishing through which availability of the economy and the employment also takes place as the fishes are major source for the people living in the villages around the reservoir.

2.2 Collection of zooplankton samples
It was carried out monthly for two years August 2013-July 2014 and August 2014-July 2015. Collection of zooplankton were made from different sites of the reservoir i.e.S1, S2, S3 and S4 from the directions i.e. East, West, North and South. Among the collection sites, the name of S1 site was Gupteshwar Temple, second site was wall of the dam which is named as S2, S3 was the Jambharun Village whereas S4 site was near village Warkhed during the hour's of early morning i.e. from 8.00 a.m. to 12.00 noon.by using the Nylon Plankton Net of mesh size 25µ.

2.3 Preservation of zooplankton
Zooplankton samples were preserved in 4% formalin.

Fig 1: Topographic Map showing location of Katepurna Reservoir, Mahan.

3. Result and Discussion
The monthly densities of zooplankton were recorded. Monthly zooplankton densities during the study of two years i.e. 2013-14 has exhibited the variations. The higher density of the zooplankton were recorded during the monsoon in both the years however the lower zooplankton densities during the

monsoon due to its dilution and decreased photosynthetic activity by primary producers were also recorded [3].

Monthly densities of rotifers were observed high in month of August with 13.91Ind./l followed by September with 13.87 Ind./l, October with 13.65 Ind/l and lower in the month of June with 6.9 Ind./l during 2013-14 (Table 1). Largest density variations among sites were observed during August. In 2014-15, the density exhibited its high value September, October, April, May, June and July i.e. 13.8 Ind./l, 13.68 Ind/l, 13.65ind./l, 13.83 Ind/l. (Table 2), Graph plate I, (Figure A) respectively while the lower value was obtained during the month of January and February.

Density variations of the cladocerans were recorded with high value during in summer month i.e. May as 14.13 Ind./l and June as 14.25 Ind./l, the record agrees with Manickam *et al.*, [4]. From they recorded the maximum density of the cladocera during summer in the month from Barur lake, Krishnahgiri District while it's recorded by low value in the months of January and February as 8.1 Ind./l and 8.28 Ind./l. during 2013-14 (Table 1). Density variations of the cladocerans during 2014-15 were recorded higher in the month of August as 12.9 Ind /l while it was recorded lower in the month of April as 8.1 Ind./l and May 8.25 Ind/l. (Table 2) Graph plate I, (Figure2).

Copepods exhibited the high value of densities were noticed in the month of August and October whereas lower densities were observed in the month of April with 6.48 Ind./l and May with 6.37 Ind/l (Table 1) in 2013-14 while during 2014-15 in the months of August with 11.1 Ind./l, May with 11.2 Ind/l were recorded as higher value of copepod density and in the months of September with 6.26 Ind/l, February with 6.48Ind./l and March with 6.56 lower value of copepod density was recorded (Table 2) Graph plate II (Figure C). Higher population density with more number of copepods species were earlier observed [5] in Gulf of Kachchh.

Ostracods density recorded higher in the months of July with 11.10 Ind./l while their lower values are recorded in the months of April with 5.64 Ind/l and May with 5.29Ind./l (Table 1) during 2013-14. During 2014-15 the Ostracods exhibited the higher density values in the month July as 9.03 Ind./l followed by the month of September with 8.55 Ind./l and August with 7.98 Ind./l and their lower values was recorded during April with 4.23 Ind./l followed by May with 4.57 Ind./l and June with 4.98 Ind./l(Table 2), Graph plate II, (Figure D). However, the maximum density of the zooplankton was recorded in the summer season, while low density was observed in monsoon season [6, 7].

In the present study during 2014-15 the quantitative analysis indicated that the density of zooplankton was maximum during the summer season and in this study the rotifera dominated the overall population of zooplankton, the similar findings were recorded from the study of Kunj Lake, Punjab [8, 9] from the wetlands of Santal Pargana, Bihar.

Table 1: Monthly Density of zooplankton in 2013-2014 of Katepurna Reservoir of District Akola.

Months	Rotifera density (Ind./l)	Cladocera density (Ind./l)	Copepoda density (Ind./l)	Ostracoda density (Ind./l)
August	13.91	10.12	13.53	9.3
September	13.87	9.33	13.2	9.3
October	13.65	9.48	13.31	9.6
November	10.98	8.7	10.42	10.08
December	9.9	8.66	9.6	8.17
January	10.12	8.1	9.75	7.68
February	8.6	8.28	9.22	6.56
March	8.21	13.61	7.08	5.85
April	8.02	13.31	6.48	5.36
May	7.1	14.13	6.37	5.02
June	6.9	14.25	6.93	6.82
July	12.41	12.3	13.23	10.53

Table 2: Monthly Density of zooplankton in 2014-2015 of Katepurna Reservoir of Distric Akola.

Months	Rotifera density (Ind./l)	Cladocera density (Ind./l)	Copepoda density (Ind./l)	Ostracoda density (Ind./l)
August	12.9	13.42	11.1	7.98
September	13.8	12.3	6.26	8.55
October	13.68	10.57	8.13	6.82
November	9.93	9.97	8.4	5.02
December	9.86	9.41	7.83	5.47
January	9.52	9.00	7.98	4.87
February	9.37	8.88	6.48	5.58
March	10.61	8.28	6.56	5.92
April	13.65	8.1	10.8	4.23
May	13.83	8.25	11.02	4.57
June	13.46	12.52	11.02	4.98
July	13.23	12.22	9.67	9.03

Graph plate I

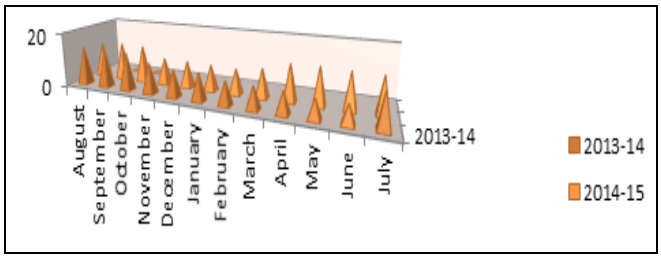

Fig A: Monthly density of Rotifera in 2013-14 1nd 2014-15 Katepurna of Reservoir

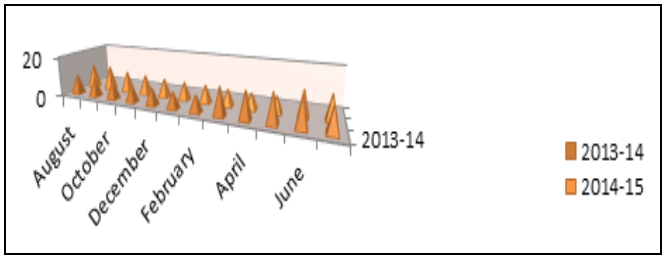

Fig B: Monthly Density of Cladocera in 2013-14 and 2014-15 of Katepurna Reservoir

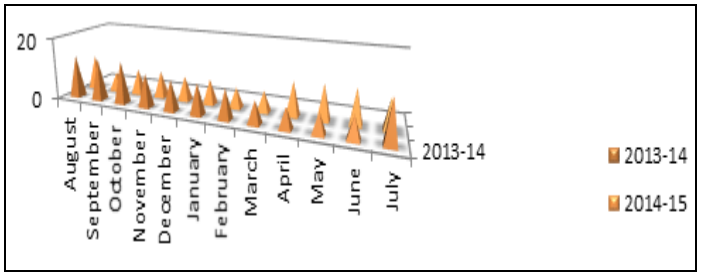

Fig C: Monthly Density of Copepoda in 2013-14 and 2014-15 of Katepurna Reservoir.

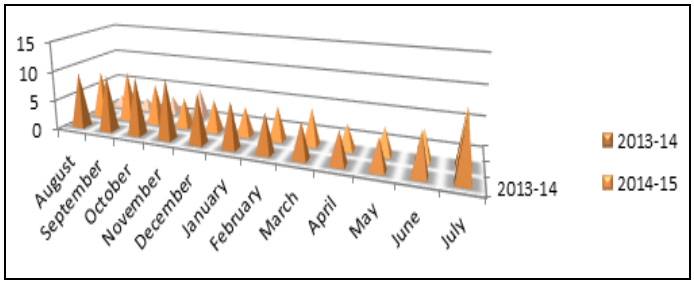

Fig D: Monthly Density of Ostracoda in 2013-14 and 2014-15 of Katepurna Reservoir.

4. Conclusion

During 2013-14 the increased density of zooplankton during monsoon is observed. It is due to the increased numbers of phytoplankton on which they feed. Phytoplanktons get increases during monsoon due to the favourable environmental conditions which are the main source of food material for zooplankton growth and survival. During 2014-15, zooplankton found maximum during summer season because water body get stable and decomposition of organic matter more amount of food material get available and during this season the number of predators also get decreased which is responsible for higher number of the zooplankton.

5. References

1. Kling AJ. Density and distribution of potential prey for larval fish in the main channel of a floodplain river: pelagic versus epibenthic fauna. River Research and Applications. 2004; 20:883-897.
2. Wahl DH, Goodrich J, Nannini MA, Dettmers JM, Soluk DA. Exploring riverine zooplankton in three habitats of the Illinois River ecosystem: Where do they comefrom? Limnology and Oceanography. 2008; 53(6):2583-2593.
3. Bais VS, Agrawal WL. Seasonal Variation of Nutrition content in Hydrilla verticollata. J Freshwater Biol. 1993; (3):259-265.
4. Manickam N, Bhavan PS, Santhanam P, Muralisankar TV, Vijayadevan V, Bhuvaneswari R. Biodiversity of freshwater zooplankton andphysico-chemical parameters of Barur Lake, Krishnagiri District, Tamil Nadu, India. Malaya Journal of biosciences. 2015; 2(1):1-12.
5. Paulinose VT, Devi CBL, Nair VR, Ramaiah N, Gajbhiye SN. Zooplankton standing stock and diversity in the Gulf of Kachchh with special reference to larvae of decapoda and Pisces. Indian J Mar. Sci., 1998; 27:340-345.
6. Kumar P, Vanganeo R, Vanganeo A, Sonaullah F. Preliminary study onIchthyofaunal diversity of ShershahSuri pond, Sasaram, Bihar, IJEST. 2011; 3:1582-1583.
7. Kumar A Periodicity and abundance of rotifers in relation to certain physicochemical characteristics of two ecologically different wetlands of Santal Pargana, Bihar. Indian J Ecol. 1994; 21:54-59.
8. Kaur H, Bath KS, Mander G, Dhillon S. Aquatic invertebrate diversity of Kunj lake, Punjab. Indian J Env. And Ecoplan. 1999; 2(1):37-41.
9. Kedar GT, Patil GP, Yeole SM. Effect of physico-chemical factors on the seasonal abundance of zooplankton population in Rishi Lake. Preceedings of Taal. The 12th world lake conference. 2007-2008, 88-91.