

Zooplankton Density at Masoli Reservoir, Parbhani (Maharashtra State), India

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Abstract

Plankton are the basic biotic components of any aquatic ecosystem. These organisms are aquatic autotrophs and play a vital role in aquatic environment. Zooplankton, are primary consumers of aquatic ecosystems, hence, play an important role in transferring of energy from producers to consumers of higher trophic levels. Masoli reservoir is a rural aquatic habitat and hence an attempt has been made to assess its zooplankton diversity and density. Present work has been carried out for the period of one year i.e., from February 2018 to January 2019. During the studies, members of all the possible groups i.e., Protozoa, Rotifera, Copepoda, Ostracoda and Copepoda were recorded. Group Rotifera was recorded as most diversified and with highest density as compared to other recorded groups at the reservoir site.

Key words:- Zooplankton density, Diversity, Masoli reservoir, Parbhani.

Introduction

Zooplankton are microscopic free swimming animal components of an aquatic ecosystem which are primary consumers of phytoplankton. The zooplankton occupy a central position between the autotrophs and other heterotrophs and form an important link in foodweb of a freshwater ecosystem. The occurrence and abundance of zooplankton depends on its productivity, which in turn is influenced by physico-chemical parameters and the level of nutrients in water. The zooplankton community constitute an important components of aquatic ecosystem and many species are suitable as live food in aquaculture. The knowledge of their abundance, species diversity and spatial distribution is important in understanding the prophydynamics and trophic progression of waterbodies (Verma & Datta Munshi, 1987). Hence, an attempt has been made to assess the zooplankton diversity and density Masoli reservoir, Parbhani, Maharashtra State, India.

Materials and Methods

Assessment zooplankton diversity and density of Masoli reservoir, Parbhani (MS), India, was conducted for the period of one year i.e., from February 2018 to January 2019. Water samples from selected water body were collected on monthly basis for the assessment of diversity and density of zooplankton in Masoli reservoir. Sample preparation for estimation of zooplankton diversity and density was done by using standard methods given by APHA (1989) whereas identification of zooplankton was done by using keys and monographs given by Edmondson (1959), Tonapi (1980), Adoni (1985) and Battish (1992)

Result and Discussion

Zooplankton diversity and density of Masoli reservoir, Parbhani was assessed during February 2018 to January 2019. Results are shown in Table 1 to 3 and Fig 1. In the present investigation, 31 species of zooplankton were recorded at Masoli reservoir, Parbhani. In this water body rotifera occupied first position with 11 species whereas last position was taken up by protozoa with 03 species. Second position was collectively secured by copepod and cladocera with six species each and third rank is scored by ostracoda with 05 species (Table 1). Group Protozoa was composed of 03 species namely *Centropyxis sp.*, *Paramecium sp.* and *Vorticella sp.* Rotifera was represented by 11 species, out of which *Brachionus* was the most diversified genera represented by three species viz. *B.angularis*, *B.calyciflorus* and *B.forficula* followed by *Keratella* and *Trichocerca* genera which were represented by 02 species each namely *Keratella cochlearis* & *K.valga* and *Trichocerca cylindrica* & *T.porcellus* while rest of the genera i.e. *Cephalodella*, *Colurella*, *Filinia* and *Lecane* were represented by single species only. Group Ostracoda was represented by 05 species viz. *Candocypris sp.*, *Candona sp.*, *Cyclocypris sp.*, *Eucypris sp.* and *Stenocypris sp.* at Masoli reservoir. Group Copepoda was represented by 06 species namely *Cyclops sp.*, *Diaptomus sp.*, *Eucyclops sp.*, *Mesocyclops leuckartti*, *Microcyclops sp.* and *Nauplius*. Group Cladocera was also composed of 06 species namely *Alona monocantha*, *Chydorus sphaericus*, *Dadaya macrops*, *Daphnia similis*, *Leydigia acanthocercoides* and *Macrothrix sp.* Presence of good diversity of zooplankton at Masoli reservoir suggests its healthy status.

Das and Kar (2013) reported 26 species of Zooplankton from an oxbow lake of Cachar, Assam. Nimbalkar *et. al.*, (2013) reported 15 rotifers, 12 cladocerans and 6 copepods from Ambe Ghosale lake, Thane city of Maharashtra. A total 54 genera were observed during the study of Verma *et. al.*, (2013) in an anthropogenic pond in Madhya Pradesh. Dutta *et al.*, (2017) reported 16 species of microfauna from freshwater wetland in Cachar, Assam.

During quantitative studies, total zooplankton density in Masoli reservoir was recorded as 756.35 Ind/L. Higher contribution was made by rotifera with 624.53 Ind/L (82.57%) followed by cladocera 72.82 Ind/L (9.83%), copepoda 33.13 Ind/L (4.38%), ostracoda 19.67 Ind/L (2.60%) and protozoa 6.20 Ind/L (0.82%) (Table 3 & Fig. 1). In the present investigation net zooplankton count was recorded as maximum in summer season while minimum in monsoon. Increase in the zooplankton abundance during summer probably correspond to the water quality, decaying vegetation, increased levels of organic matter in the sediment and higher abundance of bacteria in the lake during this time (Table 2) (Coman *et.al.*, 2003). Same results were also obtained by Yewale and Patil (2011).

During the present study, rotifera showing highest percentage is supported by other works in the recent years where rotifera were found to be dominating over other groups of zooplankton. Verma *et. al.*, (2013) reported highest population percentage of rotifera over other groups of zooplankton reported from the investigated site. Similarly Kar and Kar, (2016) reported highest abundance percentage of rotifera over other groups of zooplankton in Sat Beel, Cachar, Assam.

References:-

- Adoni, A. D. (1985) : Workbook on Limnology (Ed) Department of Environment, Govt. of India, Bandana Printing Service, New Delhi.
- APHA, (1989) : Standard methods for the examination of water and wastewater 17th Edn. APHA, AWWA, WPCF, Washington DC.
- Battish, S. K. (1992) : Freshwater zooplankton of India. *Oxford and IBH Publishing Co. Pvt. Ltd. Bombay.*
- Coman, F. E.; R. M. Connolly and N. P. Preston (2003) : Zooplankton and epibenthic in Shrimp Ponds factors influencing assemblage dynamics. *Aqua. Res.*, 34 : 359 – 371.

- Das, P. and Kar, D. (2013). Studies on zooplankton diversity and physico-chemical parameters of Ramnagar anua, Cachar, Assam, *International Journal of Current Research*, 5: 3058-3062.
- Dutta, A., Sulata Kar, Papia Das, Uma Das, Satyajit Das and Devashish Kar (2017): studies on physico-chemical aspects and zooplankton diversity of a freshwater wetland in Cachar, Assam. *International Journal of Science, Environment and Technology*, Vol. 6 (3), 1877 – 1885
- Edmondson, W. T. (1959) : *Freshwater Biology* 2nd Edn. Ward and Whipple, *John Wiley Sons Inc* New York.
- Kar, S. and Kar, D. (2016). Zooplankton Diversity in A Freshwater Lake of Cachar, Assam. *International Journal of Applied Biology and Pharmaceutical Technology*; 7(1): 301-305.
- Nimbalkar, R.K.; Kamtikar, V.N.; Shinde, S.S. and Wadikar, M.S. (2013). Studies On Zooplankton Diversity In Relation To Water Quality of Ambe Ghosale Lake Of Thane City,(Ms) India. *Bioscience Discovery*; 4(1):124-127.
- Tonapi. G. T. (1980) : *The fresh water animals of India. An Ecological approach.* Oxford and I B H publ. Co. New Delhi.
- Verma, H.; Pandey, D.N. and Shukla, S.K. (2013). Monthly Variations of Zooplankton In A Freshwater Body, Futera Anthropogenic Pond Of Damoh District (M.P.). *International Journal of Innovative Research in Science, Engineering and Technology*; 2(9): 4781-4788.
- Verma, P. K. and J. S. Datta Munshi (1987) : Plankton community structure of Badua reservoir, Bhagalpur, (Bihar). *Trop. Ecol.*, 28, 200 – 207.
- Yewale, R. M. and G. P. Patil (2011): Nutrient dependent seasonal zooplankton biodiversity studies of three lentic waterbodies of Washim District (Maharashtra). Ph. D. Thesis, Sant Gadge Baba Amravati University, Amravati.

Table 1:- Zooplankton diversity of Masoli reservoir, Parbhani during February 2018 to January 2019

Sr. No.	Name of Group and Species		Sr. No.	Name of Group and Species
A.	Protozoa		D.	Copepoda
1	<i>Centropyxis sp.</i>		1	<i>Cyclops sp.</i>
2	<i>Paramecium sp.</i>		2	<i>Diaptomus sp.</i>
3	<i>Vorticella sp.</i>		3	<i>Eucyclops sp.</i>
B.	Rotifera		4	<i>Mesocyclops leuckartii</i>
1	<i>Brachionus angularis</i>		5	<i>Microcyclops sp.</i>
2	<i>Brachionus calyciflorus</i>		6	<i>Nauplius</i>
3	<i>Brachionus forficula</i>		E.	Cladocera
4	<i>Cephalodella adriatica</i>		1	<i>Alona monocantha</i>
5	<i>Colurella adriatica</i>		2	<i>Chydorus sphaericus</i>
6	<i>Filinia longiseta</i>		3	<i>Dadaya macrops</i>
7	<i>Keratella cachlearis</i>		4	<i>Daphnia similis</i>
8	<i>Keratella valga</i>		5	<i>Leydigia acanthocercoides</i>
9	<i>Lecane monostyla</i>		6	<i>Macrothrix sp.</i>
10	<i>Trichocerca cylindrica</i>			
11	<i>Trichocerca porcellus</i>			
C.	Ostracoda			
1	<i>Candocypris sp.</i>			
2	<i>Candona sp.</i>			
3	<i>Cyclocypris sp.</i>			
4	<i>Eucypris sp.</i>			
5	<i>Stenocypris sp.</i>			

**Table 2:- Seasonal Variations in Various Groups of Zooplankton in Masoli reservoir
During February 2018 to January 2019**

Sr.No.	Group	Winter	Summer	Monsoon	Total
1.	Protozoa	1.66	3.44	1.10	6.20
2.	Rotifera	198.80	265.63	160.10	624.53
3.	Ostracoda	5.81	9.44	4.42	19.67
4.	Copepoda	9.91	16.29	6.93	33.13
5.	Cladocera	25.84	29.52	17.46	72.82
				Net Total	756.35

**Table 3:- Population Density and Percentage Contribution of Different Groups of Zooplankton in
Masoli Reservoir During February 2018 to January 2019.**

Sr. No.	Name of the Group	Population Density (Ind/L)	Percentage Contribution (%)
1.	Protozoa	6.20	0.82
2.	Rotifera	624.53	82.57
3.	Ostracoda	19.67	2.60
4.	Copepoda	33.13	4.38
5.	Cladocera	72.82	9.63
	Total	756.35	100.00

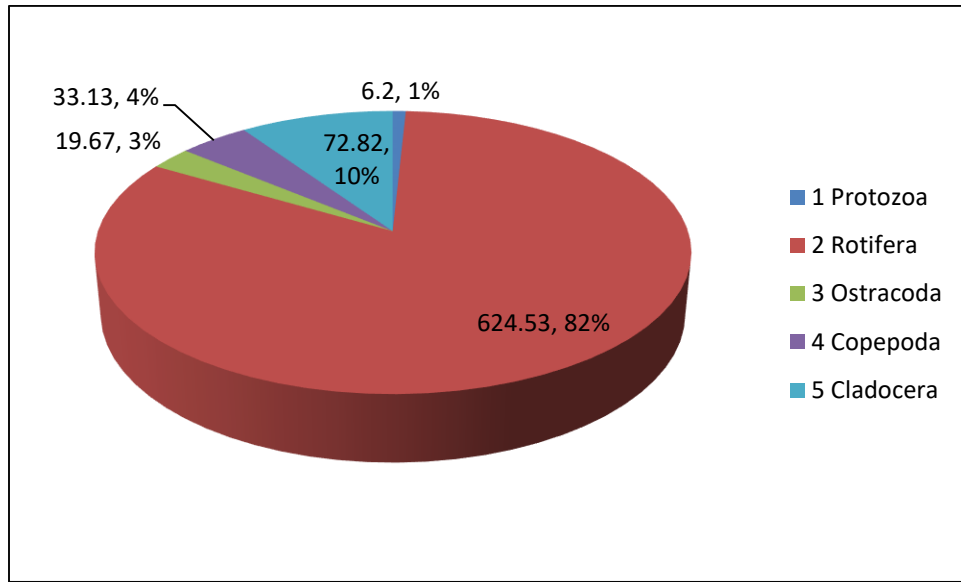


Fig. 1:- Pie Diagram showing Population Density (Ind/L) and Percentage Contribution of Different Groups of Zooplankton in Masoli Reservoir During February 2018 to January 2019.