BioGecko Vol 12 Issue 02 2023

ISSN NO: 2230-5807

Study of the Zooplankton Community Chikliya pond area District Barwani M.P. India.

Mr.Heeralal Barde[1], Dr.Meenakshi Solanki[2]
Dr. A. P. J. Abdul Kalam University, Indore, Madhya Pradesh, India.
Dr. A. P. J. Abdul Kalam University, Indore, Madhya Pradesh, India.

Abstract- The present study is done to study the zooplankton species of Chikliya pond. Chikaliya pond is located in the area of Menimata village of Barwani district, 35 km from Barwani town. The water of the pond is mainly used for drinking and fish farming purposes. Chikliya pond. The geographical location of the Barwani is $22^{0}02$' north latitude and $74^{0}55$' East longitude and 165.50 M. above MSL. It is bounded by mountain ranges from three sides, namely 'Satpura' in the South; 'Vindhyanchal' in north and Maikal ranges (Part of Vindhyanchal) in the east.River Narmada the 'lifeline of M. P.' makes its north boundary from where district Dhar starts. It touches the boundaries of adjacent district, Khargone in East and North east while Maharashtra is located at Southern and Southern West.Zooplankton are one of the important organisms in the aquatic sector, which act as a bio-indicator of pollution and play a direct role in the food chain of fish. It is a rich source of nutrients for fish. The present investigation has been done during the year 2020-2021 which is found as follows.In the present investigation the zooplankton population was found to be comprising of four major group viz. Protozoa, Rotifers, Copepoda and Cladocera. Study 26 species of zooplankton have been recorded of which 10 belonged to Protozoa, 7 to Rotifers, 4 to Copepoda and 5 to Cladocera respectively.

Keywords: Zooplankton, Species, Chikliya pond.

Introduction- Zooplankton is an important component of organisms found in water, since it serves as a major component of the aquatic food chain. It maintains the balance of biotic and abiotic components among ecosystems in water. Zooplankton in Fresh Water. The author agrees that this article is always open under the conditions.Creative Commons Attribution License 4.0 International License. Invertebrates include the three major groups of animals: rotifers, copepods and cladocerans are found in abundance in all types of aquatic habitats and play an importantrole in energy transfer in an aquatic ecosystem and serve as bio-indicators of pollution. It occupies an intermediate position in the food web, some of them feeding on bacteria and algae and some in turn fed on by invertebrates, fish and birds. Zooplankton diversity and their ecology contribute greatly to the understanding of the basic nature of water habitats and the general economy. The physico-chemical factors also control the zooplankton population in the water body. Various researchers worked to study the zooplankton of various fresh water bodies. Katepurna Reservoir, District Akola, Maharashtra, to qualitatively analyze the zooplankton of freshwater ecosystem in India. Biodiversity of aquatic life conservation is an important task because day by day pollution is increasing and its direct impact on aquatic life. Therefore, it is necessary to study the following objectives and diversity of zooplankton.

Material and Methods- Biological Estimations,Collection, Preservation and Identification of Plankton. The plankton samples were collected following Welch (1953) and Lind (1979) by filtering 40 liters of water through small plankton net made up of bolting silk no. 25 (64u mesh size). The concentrate was preserved in 5 % formalin and Lugol's solution for phytoplankton and zooplankton study respectively. The phytoplankton was identified with the help of key's given by Smith (1950), Edmondon (1959), Prescott (1951 and 62) and Adoni (1985). Counting of the individual phytoplankton was done by drop count method (Adoni, 1985) using the formula.
Phytoplankton / lit. = A x 1/L x n/V

Where; A = Average no. of organism /drop
L = Volume of original sample in ml
n = Volume of one drop in ml.
V = Total volume of the concentrated sample in ml.

The zooplankton was identified with the help of key's provided by Edmondson, 1959; Needhan and Needhan, 1962; Vasisht and Battish, 1971; Tonapi, 1980; Sehgal, 1983; APHA, 1985; and Adoni, 1985.Counting of the individual zooplankton was done by Sedgwick Rafter cell (Adoni, 1985) method using formula.

Zooplankton/ lit. = n (V/v) 1/c x 10^3
Where, n= total no. of individuals in observed transacts
V = Volume of the sample in counting cell in mm^3
v= Volume of Observed transects

$$C = \text{Concentration factor} = \frac{\text{Original Volume of sample (ml)}}{\text{Volumes of sample concentrate (ml)}}$$

Biomass- Biomass values were calculated by filtering a known volume of water. The wet weight, dry weight and ash weight of the collected plankton is expressed in mg/lit.

Productivity- Primary productivity was measured by dark and light bottle technique of Gaarder and Gran (1927). Along with productivity NP/R, NP/GP ratio and percentage of respiration was also calculated. The followings expression was used for calculating gross and net productivity and community respiration.

Gross Oxygen Production = LB – DB
Net Oxygen Production = LB – IB
Community Respiration = IB – DB
Where: LB = Light Bottle
DB = Dark Bottle
IB = Initial Bottle

Table: - Monthly Variation in Zooplankton Diversity in Chikliya pond (No./L) -2020

S.N.	Name of Group & Genera	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Protozoa						
1	Arcella sp.	0	0	12	29	19	114
2	Actinophyrys sp.	0	19	14	9	89	31
3	Difflugia sp.	0	3	0	0	13	11
4	Didinium sp.	0	0	0	11	7	9
5	Epistylis sp.	11	5	10	16	21	14
6	Euglypha sp.	29	0	7	0	10	7
7	Oxytricha sp.	22	7	4	9	0	9
8	Paramaecium sp.	11	9	68	72	0	14
9	Porodon sp.	0	5	7	9	0	0
10	Vorticella sp.	0	21	4	17	0	0
	Total species	**73**	**69**	**126**	**172**	**159**	**209**
	Rotifera						
1	Ascomorpha sp.	0	0	0	0	7	9
2	Branchionuscaudatus	5	3	0	10	9	16
3	Branchionuafalcatus	0	0	0	9	6	14

4	Filina sp.	0	0	0	0	7	11
5	Haxarthra sp.	29	9	12	19	0	0
6	Keretella sp.	7	6	22	0	0	0
7	Notholca sp.	0	0	0	13	19	59
	Total species	**41**	**18**	**34**	**51**	**48**	**109**
	Copepoda						
1	Cyclops	0	9	19	17	57	46
2	Mesocyclops	24	0	29	14	15	0
3	Pseudodiuptomus	56	4	12	9	5	9
4	Naupilla	0	11	0	6	9	5
	Total species	**80**	**24**	**60**	**46**	**86**	**60**
	Cladocera						
1	Conochilus sp.	0	0	0	7	8	9
2	Cypris sp.	7	9	22	17	12	43
3	Daphania sp.	0	0	0	7	6	14
4	Macrothrix sp.	0	12	10	11	7	0
5	Stenocypris sp.	6	8	9	10	0	0
	Total species	**13**	**29**	**41**	**52**	**33**	**66**

Zooplankton

Protozoa

Fig. 1 Arcella Sp.

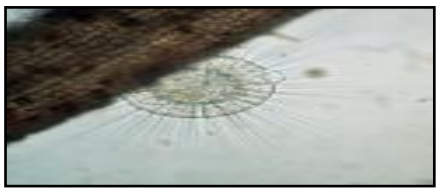


Fig. 2 Actinophrys Sp.

Fig. 3 Didinium Sp.

Fig. 4 DifflugiaSp

	
Fig. 5 Epistylis Sp.	Fig. 6 Euglypha Sp.
	
Fig. 7 Oxytricha Sp.	Fig. 8 Paramaecium Sp.
	
Fig. 9 Prorodon Sp.	Fig. 10 Vorticella Sp.
Rotifera	
	

Fig. 11 Ascomorpha Sp.	Fig. 12 Branchionusfalcatus

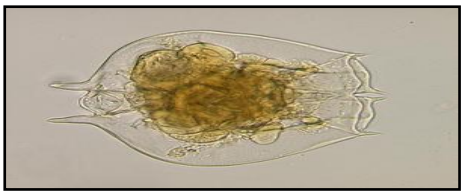
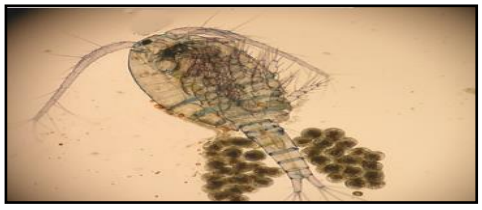
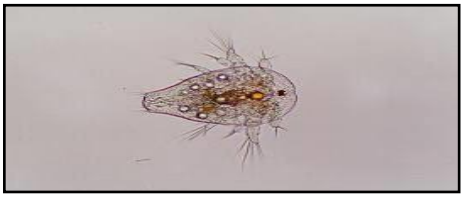



Fig. 12 Haxarthra Sp.	Fig. 14 Keratella Sp.
	
Fig. 15 Notholca Sp.	Fig. 16 Barnchiouscaudalus
	
Fig.17 Filina sp.	
Copepoda	
	
Fig. 18 Cyclops Sp	Fig. 19 MesocyclopsSp

	. 
Fig. 20 Nauplii Sp.	Fig. 21 Pseudodiaptomus Sp.
Cladocera	
	
Fig. 22 Conochilus Sp.	Fig. 23 Cypris Sp.

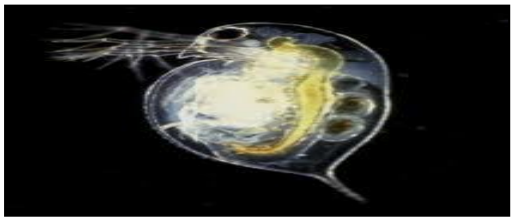
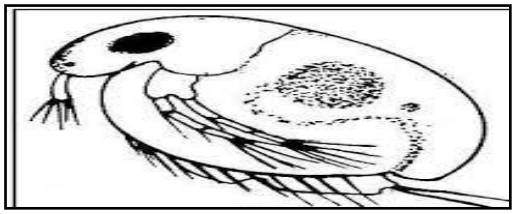

	

Fig. 24 Daphnia Sp.	Fig.25 Microthrix Sp.

Fig.26 Stenocypris Sp.

Result and Discussion- Population of Zooplankton In the present investigation, the population of zooplankton was found to be made up of four major groups. Protozoa, Rotifers, Copepoda and Cladocera.Study 26 species of zooplankton have been recorded of which 10 belonged to Protozoa, 7 to Rotifers, 4 to Copepoda and 5 to Cladocera respectively.

Protozoa- In thethis groupcontributed zooplankton during six month. The protozoa population ranged between 69 No/1it. to 209 No/1it. The minimum density was observed in August and maximum December.

Rotifera- In the this group contributed zooplankton during six month. The density of rotifers fluctuated between 18 No/1it. to 109 No/1it. The minimum density was observed in August and maximum in December.

Copepoda- In the This group contributed zooplankton during six month. The density of this group varied from 24 No/1it. to 86 No/1it. The minimum density was observed August and maximum in November.

Cladocera- In the this group contributed zooplankton during six month. The density of this group varied from 13 No/it. to 66 No/1it. The minimum was noticed during July and maximum in December.

Conclusions- Water is an important component of various types of organisms, plants and human life on this earth, life cannot be imagined without water.And studying the physico-chemical functions of water shows that the water is potable, and aquatic organisms are able to follow. The purity of the water is tested through various parameters and once the water quality is determined, the fish can be reared in the pond.

References:-

[1] Adoni,A.D. and Vaishya, A.K. Phytoplankton productivity; seasonal, diel and vertical productivity in central Indian reservoir; proc. Nat. Symp. Pure and Appli. Limnology, (ed. A.D. Adoni) Bull. Bot. Soc. Sagar (M.P.), 32: 219-228.(1985).

[2] APHA**,** AWWA and WPCF (1985). Standard methods for examination of water and wastewater.16th.Ed.American public Health Assoc. Washington, D.C.(1985).

[3] Edminson,W.T. Ed. Ward and Whipple's Fresh Water Biology 2nd ed. John Wiley and Sons, N.Y.(1959).

[4] Gaarder, T. and Gran, H.H. Investigation on the production of plankton in the oslofjord; Rapp. Proces, Reunion council Perm. Intern. Exploration Mer, 42: 1-48. (1927).

[5] Kabra, P.D,Somatkar J.R, Dabhade D.S. Quantitative analysis of zooplanktons of fresh water ecosystems in Washim town, Maharashtra, India. Indian Streams Research Journal. 6 (5): 1-11. (2016)
[6] Lind,O.T. Handbook of common methods in limnology. The C.V. Mosby Co. 2nd Ed. St. Louis, Missouri, 199pp. (1979).
[7] Smith,G.M.The fresh water algae of the United State. McGraw Hill, New York. (1950).
[8] Needham,M. and Needham, R. A guide to study of fresh water biology Holden day, San Francisco 108p. (1962).
[9] Pawan Panpatil and Deshmukh, S.V.Study of Zooplankton diversity in Rajura Dam at Buldlhana district of Maharashtra. Journal of Global Biosciences ISSN 2320-1355, vol. 10(5), 2021 pp. 8744-8751.
[10] Pawar R.J, Dabhade D.S. Study of Qualitative diversity of rotifer community of freshwaterkatepurna reservoir, district Akola, Maharashtra, I J R B A T, , Vol. IV : 23-47. (2016)
[11] Prescott,G.W.A. Algae of the Western Great lakes area; Institute of Science, Bulletin, No. 31: 946p. (1951).
[12] Sehgal,K.L.Planktonic copepods of freshwater ecosystem, Environmental science series. Interprint New Delhi, 169p. (1983).
[13] TonapiGT. Fresh water animal of India Ecological approach. Oxford and JBH publishing CO; New Delhi, India P. 341. (1980).
[14] Vasisht,H.S. and Battish, S.K.The rotifer fauna of North India; Res. Bull. (N.S.) Punjab University, 22 (1&2): 179-188. (1971).
[15] Welch, Limnological methods: McGraw Hill Book Co. New York. (1953).