# "STUDY OF ZOOPLANKTON FROM KADAKPURNA DAM DISTRICT- BULDHANA (M.S) INDIA".

**Shivaji Ubarhande Shivaji Andhale* and Akshay Parhad****

P.G, Department of Zoology, Rajarshi Shahu Arts, Commerce and Science College, Pathri, Phulambri, Chh.Sambhajinagar.

*Department of Botany, K.A.N.M.S Arts, Science and Commerce College Satana Nashik.

** Research Scholar (P.G ) P.G, Department of Zoology, Rajarshi Shahu Arts, Commerce and Science College, Pathri, Phulambri, Chh.Sambhajinagar.

Email:- Shivaji.ubarhande@gmail.com

**Abstract:-**During the study period June 2021 to May 2022, During the study period 06 genera have been reported from this area. Zooplankton diversity in water of Kadakpurna dam showed that mainly three group's viz., Rotifera, cladocera, copepoda like Copepoda - *Cyclopoid naupli, Calanoida naupli, Calanoida, &* Rotifera - *Brachionous quadridentatus, B. species, B. calyciflorus, B. fulcatus,* and *B. forficula* occur dominantly in various locations.

**Key words**:- Zooplankton Diversity,Khadakpurna Dam, Buldhana.

## INTRODUCTION

Zooplankton are an important constituent of the food chain in aquatic ecosystem. Zooplankton feed on the phytoplankton, bacteria, aggregates of detritus and micro-organisms as well as other zooplankton species. Almost all freshwater fish feed on zooplankton at some stage in their life history. Zooplankton are heterotrophic planktonic animals. These are suspended in water with limited power of locomotion. Like phytoplankton, they are usually defused in water. Freshwater zooplankton are dominated by four major groups of animals Protozoa, Rotifera and two sub-classes of Crustacea,Cladocera and Copepoda.

The zooplankton feed on phytoplankton and facilitate the conversion of plant material into animal tissue and in turn constitute the basic food for higher animals including fishes, particularly their larve. The stability of

zooplankton community in any aquatic body of water is of profound importance, because they represent important and sometimes unique food source for fish and many other aquatic vertebrates.Zooplankton are a diverse group of heterotrophic organisms that consume phytoplankton, regenerate nutrients via their metabolism, and transfer energy to higher trophic levels [22] Zooplankton are central components of aquatic food webs and contribute suggestively to aquatic productivity in freshwater ecosystems. Zooplankton is microscopic organisms which do not have the ability of locomotion but move at the compassion of the water movements and wind.

They occupy transitional position in the food web. Zooplankton mediate the transfer of energy from lower to higher tropic level thus zooplankton represent an important link in aquatic food chain and contribute significantly to secondary production in fresh water ecosystem [17]

It plays an important role in recycling nutrients as well as cycling energy within their respective environment. These are the main sources of natural food for fish which is directly related to their survival and growth and are base of food chains and food webs in all aquatic

The zooplankton are more varied as compared to phytoplankton, their variability in any aquatic ecosystem is influenced mainly by patchiness, diurnal vertical migration and seasons.

During the study, a large number of zooplanktons like Cladocera- *Bosmina longirostris, B. exuvia, Moina spp., Macrothrix sp., Chydorous sp., Alona rectangular,* Copepoda - *Cyclopoid naupli, Calanoida naupli, Calanoida, &* Rotifera - *Brachionous quadridentatus, B. species, B. calyciflorus, B. fulcatus,* and *B. forficula.* Indetification them by referring to the standard literature of algae [7,8] and [1]

**STUDY SITE**

Kadakpurna dam is a large irrigation project constructed by Irrigation department, Government of Maharashtra, on river Kadakpurna, village Deolgaon mahi, taluka deolgaon raja, district Buldhana (M.S) India.

The dam was constructed in the year 2011,and is situated on latitude 20°05' 09.33" N and longitude 76°09' 15.78" E [10]. The river Purna is one of the tributaries of river Godavari, sub basin Purna, basin Godavari. River Purna originates from hilly regions of Ajanta ranges district Aurangabad, (M.S). The river flows from North West to East. (Toposheet index no 56A/10, C-1). The river travels 300 km through four districts

(Aurangabad, Jalna, Buldhana, and Parbhani) and joins Godavari at Kanteshwar taluka Purna, district Parbhani and hence called as life line of that region. The distance from Ajantha ranges to Khadakpurna is 160 km. The length of dam is 2000 m and having 19 gates. The length of the right canal is 38 km, Khadakpurna to devkhed and left canal 9 km Khadpurna to kairav and backwater upto Jafrabad. The main purpose of this dam is to water for drinking, irrigation and domestic purpose, for district Buldhana.

Three major irrigation dam construct on Purna river Kadakpurana, Yeldari and Shideshwar before meet Godavari river.The basic purpose of this dam is to supply water for drinking, domestic use and irrigation purpose to near by villages. Fishing practices are carried under Assistant Commissioner of fishery Buldhana.

**"STUDY OF ZOOPLANKTON FROM KADAKPURNA DAM**

**DISTRICT- BULDHANA ".**




## MATERIAL AND METHODS

The water samples from each locality were collected once in a month in the morning between 8.00 a.m. to 10.00 a.m. The collections were made during June 2021 to May 2022, during the years. For phytoplankton and zooplankton analysis, water samples were collected by plankton net, as per the method adopted by [9]

05 liters of surface water was collected by dipping a jug and filtered though the plankton net and was collected in 1 lit. wide mouth bottle. 20 ml of water sample was preserved in 4% formalin. The morphological studies of specimens were done by using Olympus Research Microscope and the photographs were taken using Kodak EazyShare cx 7330 camera.

Identification of taxa was done using [1,11,12] and other relevant literature.

## RESULT AND DISCUSSION

### I. *Cladocera*

The Cladoceran population identified from Akola Dev during the present study were represented by 02 species belonging to 1 genera and 1 families; Bosminidae, Moinidae, Chydoridae, Aloninae, Daphnidae and Macrotricidae. Quantitative analysis during the period of study showed that the family Bosminidae exhibit maximum diversity of species.

It is represented by 2 species; *Bosmina longirostris* and *B. exuvia*. *Moina spp.* belongs to the family Moinidae, found to be predominant species. From all other families only a single species were recorded.

### II. *Copepoda*

The Copepod population identified from Akola Dev during the present study were represented by 1 species. Copepoda exhibit highest peak at during post monsoon. It can be explained as the result of settling of rainwater and return of favorable condition. The minimum number was found in monsoon season.

This decrease in the density of copepod may be due to environmental variation. So there exists seasonal fluctuation in the density of copepod population of Akola Dev.

### III. *Rotifera*

The Rotifer population identified from Akola Dev during the present study were represented by 3 species belonging to 1 genera and 1 families; namely Branchionidae. Quantitative analysis during the period of

study showed that the family Branchionidae exhibit maximum diversity of species. This group exhibit highest peak during summer.

Zooplanktons forms an important link in aquatic food chain various researches carried out work to study the zooplanktons of different fresh water bodies. Influence of eutrophication on zooplankton community in a shallow lake was studied [5] studied zooplankton diversity of river Kayadhu, near Hingoli city Maharashtra.

The availability of food is more due to production of organic matter and decomposition. These factors contribute for high species density. In most of the aquatic ecosystem different zooplankton groups acts as one of the major primary consumer as a result, their diversity, abundance and seasonality affects the other biotic.

Plankton have immense value as food and play an important role in disposal of sewage and natural purifiers of water. Zooplankton diversity is one of the most important ecological parameter in water quality assessment. Many workers has been done work on zooplankton diversity but very few reports available from Jharkhand. [04] reported that the rotifera group Brachionus sp is an indicator of organic pollution and it is very common in temperate and tropical waters that showed the alkaline nature of water.

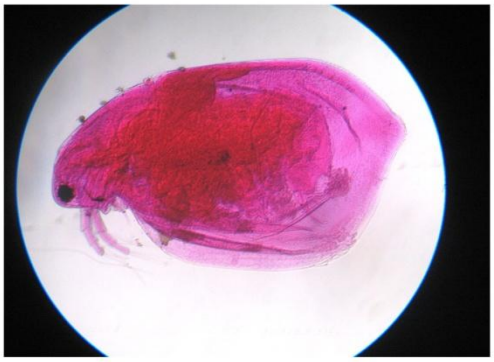
[25] reported that the rise in diversity of zooplankton were signal of the healthier environmental state while less diversity suggested fewer species dominance most likely due to sewage environmental pressure. [20] reported that copepods take much time to build up their population than rotifers and other zooplankton. However, once dominant, they continue to dominate the habitat.

[16] reported that the population of rotifers was high in summer and deprived in winter possibly due to high population of bacterial species and organic matter of dead and decaying vegetation. Rotifers respond very quickly to environmental changes than other planktonic species. The rotifers were dominant in municipal and industrial discharges while copepods and cladocerans were less abundant.

[3] observed the high density of copepod during October because the water temperature and availability of food to organisms which actually affected the copepod population during summer. [21] reported that cladocerans mostly observed during winter season may be due to favourable temperature and availability of food, nanoplankton, suspended detritus. The physicochemical factors like DO, water temperature and turbidity also play crucial role in diversity and density of cladocerans. [2]however documented that the wetlands of

Jharkhand, cladocerans were abundant from March to June and were either absent or present in very negligible numbers during the rest of months. [26]) reported the rise in atmospheric temperature caused enhancement in the evaporation rate and the positive correlation of copepods with temperature indicated their better development in warm periods after winter.

[14] documented rotifers globally as pollution indicator organisms in the aquatic environment. [18] reported that decline in the number of cladocerans during rainy months may be due to race between cladocerans and other groups of zooplankton however the cladoceran richness was also reported higher in summer and minimum in winter. [24] reported zooplankton from a polluted river,Mula of pune India, with record of Brachionusrubens [4] epizoic on Moinamacrocopa (Straus, 1820) the occurrence of which coincided with lower dissolved oxygen (DO) content. Qualitative and quantitative studies of zooplanktons in Rajura Lake of Buldhana district were carried out by [6] during February 2010 to January 2011. [21] studied the rotifer community around Washim region and prepare a checklist of Rotifers in Washim region. Study of qualitative diversity of rotifer community of freshwater Katepurna reservoir, district Akola, Maharashtra, India was carried out by [23].Zooplankton diversity reflects the water quality and they are the good indicators of changes taking place in the water resources, [15] carried out a research work to analyze zooplanktons of Fresh water ecosystem in Washim town, Maharashatra, India.






**CONCLUSION :** During the study period 06 genera have been reported from this area. Zooplankton diversity in water of Kadakpurna dam showed that mainly three group's viz., Rotifera, cladocera, copepoda like Copepoda - *Cyclopoid naupli*, *Calanoida naupli*, *Calanoida*, & Rotifera - *Brachionous quadridentatus, B. species, B. calyciflorus, B. fulcatus,* and *B. forficula* occur dominantly in various locations.

The objective of this investigation was to know the zooplankton diversity in a fresh water pond Kadakpurna and to develop our knowledge about the fact that the biodiversity of a fresh water dam is endowed

with a great different fauna, especially the zooplankton as they are playing a vital role in the stability and integrity of aquatic ecosystem.

This study revealed diversity of zooplankton in one pond so for develop much stronger information advance study is needed for any scientific utilization. Also a depth information and knowledge is needed to analyze its community and dynamics.

**Acknowledgement :** Author is thankful to the principal Rajarshi Shahu college for encouraging to work on such topic , as well as Head, Department of Zoology , Dr.B.A.M.U for their kind guidance

**REFERENCES**

1) **Ashtekar, P.V. (1980)** *Studies on the freshwater algae of Aurangabad district.* Ph.D. thesis, Marathwada University, Aurangabad.
2) **Bohra S, Kumar K (2004)**,Plankton diversity in the wetlands of Jharkhand. In: Kumar A (ed)) Biodiversity Environ. APH Publishing Corporation, New Delhi (India), 91122.
3) **Choubey U (1997)** Population dynamics of copepods in relation to water quality of jannapura Tank. J Aqua Biol. 21(2):67-71.
4) **Hutchinson GE (1967)** A treatise on Limnology, Vol. II: Limnoplankton. Wiley New York, 1015.
5) **Jayabhaye,U.M. (2010):**A Study of Zooplankton Diversity of River Kayadhu, Near Hingoli City, Hingoli District , Maharashtra. International Research Journal ,Vol. II, 47-49. International Journal of Advance and Innovative Research Volume 6, Issue 2 (II): April - June, 2019 336 ISSN 2394 - 7780 ·
6) **Joshi, P.S. (2011):** A Study of zooplanktons of Rajura Lake of Buldhana district, Maharashtra J.India. Science Research Reporter 1(3): 132 -137. **Kabra, P.D., J.R. Somatkar and D.S. Dabhade (2016):** Quantitative analysis of zooplanktons of fresh water ecosystems in Washim town, Maharashtra, India. Indian Streams Research Journal. Vol. 6 (5). 1-11. ·
7) **Kamat, N.D. (1963-a)** The algae of Kolhapur, India. *Hydrobiologia* **22** (3-4): 209-305.
8) **Kamat, N.D. (1963-b)** The algae of Mahabaleshwar. *J. Uni. of Bombay* **31** (3 & 5): 28 41.
9) **Narkhede, P.N. (2006)** Genus *Nitzschia* and *Surirella* from Hatnur dam, Jalgaon district, Maharashtra. *J. Aqua. Biol*. **21** (2): 19-22.
10) **Patel, R.J. and I. George (1977)** Chlorococcales of Gujarat, India- *Pediastrum* Meyen, *Sorastrum* Kuetzing and *Hydrodictyon* Roth. *J. Indian bot. Soc*. **56**: 172-178.
11) **Petersen F., (2010)** An illustrated key to the Philippine Freshwater Zooplankton.
12) **Philipose, M.T. (1967)** *Chlorococcales*, Indian Council of Agricultural Research, New Delhi.

*13)* **Rath, J. and S.P. Adhikary, (2005)** *Algal flora of Chilika Lake*, Daya Publishing House, Delhi.

14) **Kamble BB, Meshram CB (2005)** A preliminary study on Zooplankton diversity at Khatijapur tank, near Achlapur, District Amravati, Maharastra. J Aqua Biol. 20(2):45-47.

15) **Kar S and Kar D (2016)** International Journal of Applied Biology and Pharmaceutical Technology International Journal of Applied Biology and Pharmaceutical Technology.7 (1). 301-305.

16) **Marneffe Y, Descy JP, Thome JP (1996)** The zooplankton of the lower river Meuse, Belgium: seasonal changes impact of industrial and municipal discharges. Hydrobiol. 319:1-13.

17) **Mulani, S.K., M.B. Mule and S.U. Patil (2009):** Studies on water quality and zooplankton community of the Pancangangariver in Kolhapur city. J. Environ. Biol.30: 455-459. ·

18) **Pandey BN, Ambasta OP, Thakur AK, Kumar S, Kumari R (2009)** Zooplankton diversity in relation to certain physicochemical parameters of swamp of Kishanganj, Bihar. Environ Conserv J. 10(1, 2):9-14.

19) **Pawar, J.R. and D.S. Dabhade (2016)**:Study of qualitative diversity of rotifer community of freshwater Katepurna reservoir, district Akola, Maharashtra, India.International journal of researches in biosciences, agriculture and technology. Vol. 4 (3). 11-13. ·

20) **Prabhavathy G, Sreenivasan A (1977)**. Ecology of warm freshwater zooplankton of Tamil Nadu. Proc Sym warm water zooplankton, N.I.O., Goa. 319-99.

21) **Pullie JS, Khan AM (2003).** Studies on zooplankton community of Isapur dam water. Ind Poll Res. 22:451-455.

22) **Steinberg D K and Robert H (2009).** Zooplankton of the York River. Journal of Coastal Research. 57: 66-79.

23) **Tayade S.N. and D.S.Dabhade (2011):** Checklist of rotifers in Washim district of Maharashtra, India. International journal of innovations in bio-sciences. Vol. 1:27-31 ·

24) **Vanjare , A. I. , S. M. Padhye and K. Pai (2010):** A Study of Zooplankton from a polluted river, Mula (India), with record of Brachionusrubens(Ehrenberg, 1838) epizoic on Moinamacrocopa(Straus, 1820). J.Opusc. Zool. Budapest. Vol. 41(1): 89–92.

25) **Wilhm JL and Dorris TC (1968)** Biological parameters for water quality criteria. Bioscience. 1968; 18(6):477-81.

26) **Winkler HM (2002).** Effects of eutrophication on fish stocks in Baltic lagoons. In Baltic Coastal Ecosystems (Eds. G. Schernewski and U. Schiewer), Springer-Verlag, Berlin. 65-74.