

“STUDY OF ZOOPLANKTON IN WADDEPALLY LAKE AT HANUMAKONDA DISTRICT, TELANGANA STATE”

Ganesh Konda* Associate Professor

Department of Zoology

Kakatitya Government College, Hanumakonda, Telangana State

ABSTRACT

The present study was undertaken to study zooplankton diversity of Waddepally Lake in Hanumakonda. The Lake is used for drinking and agricultural purpose. Lake is located at Latitude: $17^{\circ}59' 37'' N$ $79^{\circ}31' 15'' E$ and Longitude: $17.993662^{\circ}N$, $79.520878^{\circ}E$. Zooplanktons are one of the important faunas in water body which act as bio-indicators of pollution and play direct role in food chain of fishes. It is rich source of nutrients to fishes. Present investigation was carried out during the year of 2022-2023. Total 21 species of zooplankton were recorded. Among these 06 species belonging to Rotifera, 04 species belonging to Copepoda, 04 species belonging Cladocera and 04 species belonging to Ostracoda were found. - Species belonging to Rotifera are dominant among zooplankton which indicates the polluted nature of the lake water.

Key words: Rotifera, Copepoda, Cladocera, Diversity, Zooplankton

INTRODUCTION

Zooplankton is the important component of aquatic fauna which serves as a major component of aquatic food chain. It also maintains proper equilibrium between biotic and abiotic components of the aquatic ecosystem. The freshwater zooplankton is comprised of Four major groups of invertebrate animals: Rotifers, Copepods, Ostracoda and Cladocerans occurring abundantly in all types of aquatic habitats and plays a vital role in energy transfer in an aquatic ecosystem and act as bio-indicators of pollution. It occupies an intermediate position in food web many of them feed upon bacteria and algae and in turn fed by numerous invertebrates, fishes and birds. Zooplankton diversity and their ecology greatly contribute to as understanding of the basic nature and general economy of aquatic habitats. Physico-chemical factors also regulate zooplankton population in water body. Various researchers carried out work to study the zooplanktons of different fresh water bodies. Jayabhaye (2010), studied zooplankton diversity of river Kayadhu, near Hingoli city Maharashtra. Tayade and Dabhade (2011) studied the rotifer community around Washim region and prepared a checklist of Rotifers in Washim region.. The Biodiversity of aquatic life conservation is an important task because day to day pollution is

increasing and their direct effect is on aquatic life. In present days, the biodiversity is in danger due to pollution and human activities. Conservation of biodiversity is essential so it is compulsory to keep update knowledge of every aquatic species diversity. The density of planktons in water body determines stocking rate of fishes because they are the chief sources of the food of commercially important fishes as well as development in production of inland fishery sector. The presence and dominance of zooplankton species played a very significant role in the functioning of freshwater ecosystem. Therefore, present investigation was undertaken to study zooplankton diversity in Waddepally Lake in Hanumakonda.

Zooplankton are organisms that have animal-like traits. They float, drift or weakly swim in the water. In fact, the name plankton comes from the Greek word 'planktos' which means 'wanderer' or 'drifter'. Zooplankton encompass a wide range of both unicellular and multicellular animals. While most zooplankton are 'heterotrophs' – that is they obtain their energy from consuming organic compounds, such as algae or other zooplankton - some zooplankton, such as the dinoflagellates, may also be fully or partially photosynthetic - gaining their energy, as plants do, from sunlight.

Zooplankton are a vital component of freshwater food webs. The smallest zooplankton are eaten by the larger zooplankton which, in turn, are eaten by small fish, aquatic insects and so on. Herbivorous zooplankton graze on phytoplankton or algae, and help maintain the natural balance of algae. Get out and enjoy local lakes and freshwater ecosystems. Get involved in their protection by alerting others to the weird and wonderful native species that live in Lakes.

Zooplankton plays an important role in an aquatic ecosystem not only in converting plant food to animal food but also provide an important food source for higher organisms. The study of freshwater fauna especially zooplankton, even of a particular area is extensive and complicated due to environmental, physical, geographical and chemical variation involving ecological, extrinsic and intrinsic factors. The seasonal fluctuations of the zooplankton population are a well known phenomenon and zooplankton exhibits bimodal oscillation with a spring and autumn in the temperate lakes and reservoirs Welch, (1952). This fluctuation is greatly influenced by the variation in the temperature along with many other factors. Temperature seems to exhibit the greatest influence on the periodicity of zooplankton (Byars, 1960, Battish and Kumari, 1996). However, in shallow ponds such a regular food cycle cannot be seen. Thus, in any aquatic ecosystem zooplankton not only take part in transferring food from primary to secondary level but also switch over conversion of detritus matter into edible animal food.

MATERIALS AND METHODS

In present investigation water samples were collected from Waddepally Lake in Hanumakonda. The samples were transferred to the bottle and brought to the laboratory without disturbances. The water samples were collected by monthly intervals from the sampling stations for a period of six. The samples were collected during morning hours with the help of net of mesh size 25 micron as well as net numbers 25 bolting silk cloth. Plankton net acts as a filter, it is the most common method for collection of zooplanktons. The concentrated zooplankton samples were carefully transferred to another container. 5 ml of 4% formalin, 2 to 3 drops of glycerin's were added to it. A pinch of detergent powder was also added to avoid the aggregation of zooplankton. Samples were collected in separate glass phials with label containing name of site, date of sampling, time of sampling, etc. Identification of zooplankton was done with the help of a compound microscope. A dissecting microscope is also used for sorting and counting. Specimens were mounted on glass slides and examined at 25-100X magnification, with its standard identification and its monographs as well as keys which were suggested by APHA (1985); Tonapi (1980); Dodson and Frey (1991) and Williamson (1991) and following the systematic key by Battish (1992) and Altaff (2004).

Population density was quantified by Drop count method of Lackey (1938) and was calculated using the following formula of Lackey (1938): $N = n \times v / V$ Where, N = Total no. of organisms/ lit of water filtered, n = Number of zooplankton counted in 1 ml plankton sample, v = Volume of concentrate plankton sample (ml), V= Volume of total water filtered through (L) Population density was quantified by Drop count method of Lackey (1938) and was calculated using the following formula of Lackey (1938): $N = n \times v / V$ Where, N = Total no. of organisms/ lit of water filtered, n = Number of zooplankton counted in 1 ml plankton sample, v = Volume of concentrate plankton sample (ml), V= Volume of total water filtered through (L) Population density was quantified by Drop count method of Lackey (1938) and was calculated using the following formula of Lackey (1938): $N = n \times v / V$ Where, N = Total no. of organisms/ lit of water filtered, n = Number of zooplankton counted in 1 ml plankton sample, v = Volume of concentrate plankton sample (ml), V= Volume of total water filtered through (L) of Rotifers. Shayestchfar (1995), studied biodiversity of zooplankton. During the present study, among all groups of zooplanktons, the Rotifers were found dominant in all groups. Similar results were previously observed by many researchers (Banerjee et al. (2008), Abdullah et al.(2007), Adeyemi et al.(2009), APHA (1989), Balamurugan et al. (1999)

RESULT AND DISCUSSION:

Zooplankton of four groups *Viz.* rotifera, cladocera, copepoda and ostracoda. The most significant feature of zooplankton is its immense diversity over space and time. Zooplankton species composition and their number in three months in Table.1 During the present investigation, the total zooplankton population was dominated by Rotifers in this lake, followed by Cladocerans, Copepods and ostracods.

Rotifera: In the present investigation 6 species belonging to rotifera has been identified . *Brachionus calyciflorus* , *Brachionus falcatus* and *Keratella tropica* were more dominant among the rotiferans. High population was observed during October followed by September and August months. Fluctuations in zooplankton density have been attributed to turbidity. Welch (1952), Roy (1955), Tandon and Singh (1972) have shown a direct relationship between rotifera population and water temperature. Dissolved oxygen has been correlated with abundance of rotifers.

Cladocera: In the present study the cladoceran populations were maximum during in October followed by September and August month. The total 4 species of cladocera were identified in the present study, and observed in this period total study and they are seasonally fluctuated. Micheal (1969) .

Copepods: In the present investigation the copepods population were maximum in the month of October The total 4 species of copepods were identified in the present study. *Nauplius larva*, *Copepoda naplii*, were more dominant and observed in this period of total study and they are seasonally fluctuated.

Ostracoda: In the present study the Ostracods population was maximum August and September .The total 4 species of Ostracods were identified in the present study. *Hemicypris fossucula*, *Heterocypris spp* were more dominant and observed in this period of total study and they are seasonally fluctuated. Chandrasekhar (1996), reported higher population of Ostracods during monsoon in Saroornagar lake of Hyderabad.

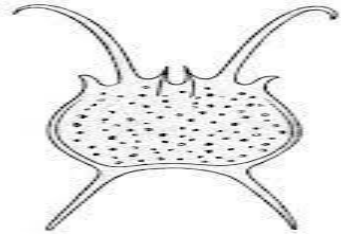
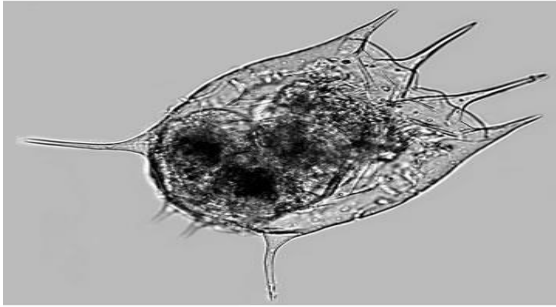
Table.No.1. Monthly Variation in the Zooplankton (Group wise) population

Zooplankton Group	June	July	Aug	Sept	Octo	Nov	Min	Max
Rotifera	06	04	05	05	07	04	04	0
Cladocera	03	04	05	05	06	06	03	06
Copepoda	03	05	04	06	06	01	01	06
Ostracoda	04	04	05	04	05	02	02	05
Total	16	17	19	20	24	13		

Table: No.2. Shows Monthly variation of Zooplankton Population

S.No.	ROTIFERA	Jun	July	Aug	Sep	Oct	Nov	Total
1	<i>Brachionus calciflorus</i>	3	2	2	2	1	4	14
2	<i>Brachionus caudatus</i>	2	3	1	2	0	3	11
3	<i>Brachionus falcatus</i>	3	2	3	2	1	3	14
4	<i>Filinia opoliensis</i>	2	1	1	0	0	2	06
5	<i>Keratella tropica</i>	2	3	2	2	2	5	16
6	<i>Testudinella patina</i>	3	2	1	2	1	4	13
	Total	15	13	10	10	5	21	74
	CLADOCERA							
1	<i>Acropenus harpae</i>	2	1	2	1	1	3	10
2	<i>Alona rectangula</i>	2	2	1	0	2	3	10
3	<i>Daphnia carinata</i>	3	2	1	2	0	4	12
4	<i>Daphnia sarsi</i>	2	2	1	2	2	5	14
	Total	9	7	5	5	5	15	47
	COPEPODA							
1	<i>Copepoda naplii</i>	2	3	1	2	1	5	14
2	<i>Cyclops strennus</i>	1	2	3	0	2	4	12
3	<i>Mesocyclops naplii</i>	1	2	2	2	1	3	11
4	<i>Nauplius larva</i>	3	2	1	2	2	6	16
	Total	7	9	7	6	6	18	53
	OSTRACODA							
1	<i>Cypris subglobosa</i>	2	3	2	9	6	6	28
2	<i>Hemicypris fossucula</i>	1	2	1	11	12	9	36
3	<i>Heterocypris sps</i>	2	2	1	11	9	6	31
4	<i>Llycypris gibba</i>	2	3	1	9	0	6	21
	Total	7	10	5	40	27	27	116

Images of Zooplanktons



4. *Brachionus falcatus* n. sp.

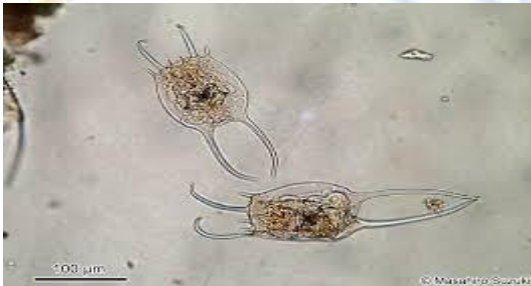
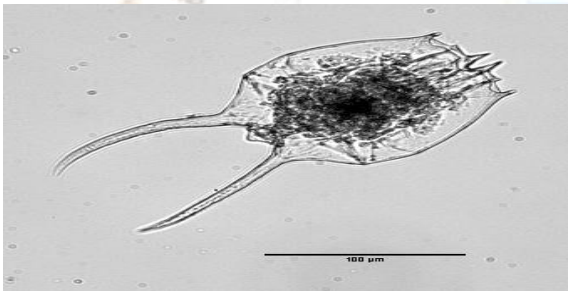


Fig 1: Maps of Telangana state, and Waddepally Lake showing Study Sites

located at Latitude: $17^{\circ}59' 37'' N$ $79^{\circ}31' 15'' E$ and Longitude: $17.993662^{\circ}N$ $79.520878^{\circ}E$



Waddepally Lake

CONCLUSION

The present investigation reveals that the diversity of zooplankton plays very significant role in the functioning of freshwater ecosystem. We recorded 21 species of zooplankton among which 06 species belonging to Rotifera, 04 species belonging to Copepoda, and 04 species belonging to Cladocera, and 04 species belonging to Ostracoda. The Diversity and population of zooplanktons in water provided significant information about the available sources for supporting life for fishery development. In present days, the biodiversity is in danger due to pollution and human activities. So, Conservation of biodiversity is essential so it is compulsory to keep update knowledge of every aquatic species diversity. The density of planktons in water body determined stocking rate of fishes because they were the chief sources of the food of commercially important fishes as well as development in production of inland fishery sector. The presence and dominance of zooplankton species played a very significant role in the functioning of freshwater Ecosystem. This lake was not considered to be more polluted. This lake has shown rich biodiversity of aquatic fauna. Therefore, it is suggested that the immediate measures are necessary to be initiated to avoid further contamination of lake due to anthropological activities. The baseline data generated would help planning and future management decisions to develop fresh water lakes for better water quality and production of fish in the fresh water. At present this fresh water lake is suitable for fish culturing and irrigation purpose.

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