

STUDENT'S STUDY PROJECTS-2020-21

DEPARTMENT OF ZOOLOGY

**Title: STUDY OF ZOOPLANKTON IN WADDEPALLY LAKE IN
HANUMAKONDA**

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KAKATIYA GOVERNMENT COLLEGE

HANAMKONDA

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Aims and Objectives:

- 1.To know the zooplankton community is an important element of the aquatic food chain.
- 2.To Get out and enjoy local lakes and freshwater ecosystems.
3. To Get involved in their protection by joining a community group or alerting others to the weird and wonderful native species that live in Lakes.

These organisms serve as an intermediary species in the food chain, transferring energy from planktonic algae (primary producers) to the larger invertebrate predators and fish who in turn feed on them zooplankton, small floating or weakly swimming organisms that drift with water currents and, with phytoplankton, make up the planktonic food supply upon which almost all oceanic organisms are ultimately dependent. These microscopic organisms also cycle most of the Earth's carbon dioxide between the ocean and atmosphere. Zooplankton are the animal-like primary consumers of plankton communities. In turn, zooplankton then become food for larger, secondary consumers such as fish include oysters, crabs, and some fish.

Zooplankton are organisms that have animal-like traits. The biggest are only five millimetres long and the smallest are just one thousandth of this size. 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 joining a community group or alerting others to the weird and wonderful native species that live in Lakes

1. 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 joining a community group or alerting others to the weird and wonderful native species that live in Lakes.

2. STUDY AREA

Hanumakonda District has several fresh water bodies, temporary and permanent spread out through the district and offer well scope for fisheries. Most of the Fresh water bodies in this District are seasonal and many of them have disappeared because of human activities such as a consequence of increasing industrialization, urbanization and other developmental activities from the last ten years. Waddepally Lake shows good diversity of Ichthyofauna along with other fauna.

MATERIAL AND METHODS

1. Sampling Programme

The water samples were collected at four identified sampling stations and a composite sample was prepared in order to minimize the error. The water samples have been analyzed. For the analysis of chemical parameters the water samples were collected in plastic cans and brought to the laboratory, physico-chemical parameters were analysed as the procedure given in APHA(2005), Kodarkar (1992), Bhalerao (1998) and Khana (2004).

Physico-chemical Parameters

The ecological studies on Waddepally Lake lake has been investigated to know the physico-chemical and biological parameters with an emphasis on their significance and interrelationship with fish diversity.

The comprehensive study includes estimation of physico-chemical parameters and Distribution of Zooplankton. In the present study, the recorded higher water temperature in the lake can be corroborated with higher density of zooplankton. A rise in temperature leads to the fast chemical and biochemical reactions, and the kinetics of the biochemical oxygen demand is regulated to some extent by water temperature This study indicated that the density of zooplankton was well correlated with water temperature of lakes. The water is generally alkaline in nature due to the presence of carbonates and bicarbonates. The pH variation is also attributed to anthropogenic activities like washing of clothes with detergents and mixing of sewage.

Table: No.1. Shows Monthly variation of Zooplankton Population

S.No.	ROTIFERA	Aug	Sep	Oct	Total
1	<i>Brachionus calCIFlorus</i>	2	1	4	7
2	<i>Brachionus caudatus</i>	2	0	3	5
3	<i>Brachionus falcatus</i>	2	1	3	6
4	<i>Filinia opoliensis</i>	0	0	2	2
5	<i>Keratella tropica</i>	2	2	5	9
6	<i>Testudinella patina</i>	2	1	4	7
	Total	10	5	21	36
	CLADOCERA				
1	<i>Acropenus harpae</i>	1	1	3	5
2	<i>Alona rectangula</i>	0	2	3	5
3	<i>Daphnia carinata</i>	2	0	4	6
4	<i>Daphnia sarsi</i>	2	2	7	11
	Total	5	5	17	27
	COPEPODA				

1	<i>Copepoda naplii</i>	2	1	5	8
2	<i>Cyclops strennus</i>	0	2	4	6
3	<i>Mesocyclops naplii</i>	2	1	3	6
4	<i>Nauplius larva</i>	2	2	6	10
	Total	6	6	18	30
	OSTRACODA				
1	<i>Cypris subglobosa</i>	9	6	6	21
2	<i>Hemicypris fossucula</i>	11	12	09	32
3	<i>Heterocypris sps</i>	11	09	6	26
4	<i>Llycypris gibba</i>	09	08	06	23
	Total	40	35	27	102

1. Zooplankton

In an aquatic ecosystem zooplankton plays an important role not only in converting plant food to animal food but also provide an important food source for higher organisms including fish. 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. This is particularly so with freshwater fauna (Zooplankton) which plays a key role in preservation and maintenance of ecological balance and its basic study is wanting and absolutely necessary. The seasonal fluctuations of the zooplankton population are a well known phenomenon and zooplanktons exhibits bimodal oscillation with a spring and autumn in the temperate lakes and reservoirs .This fluctuation is greatly influenced by the variation in the temperature along with many other factors. Among the several factors temperature seems to exhibit the greatest influence on the periodicity of zooplanktons (Byars, 1960 and Battish and Kumari, 1996). However, in shallow tropical perennial or seasonal 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.

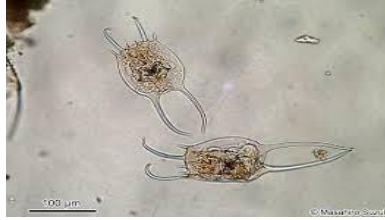


Zooplankton of four groups Viz. rotifera, cladocera, copepoda and ostracoda. The most significant feature of zooplankton is its immense diversity over space and time. Zooplankton species composition and their number in three different seasons were presented in Table.2. During the present investigation, the total zooplankton population was dominated by Rotifers in this lake, followed by Cladocerans, Copepodes and ostracods. The total zooplankton population of this lake has rotifera (38.82%), cladocera (18.37%), copepoda (20%) and ostracoda (22.79%).

1. **Rotifera:** In the present investigation 12 species belonging to rotifera has been identified in Inavolu Lake. *Brachionus forficula*, *Brachionus calciflorus*, *Brachionus falcatus* and *Keratella tropica* were more dominant among the rotiferans. High population was observed during Post monsoon season followed by Pre monsoon season and lowest population observed during monsoon season. 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 investigation the cladoceran populations of Inavolu Lake were maximum during in Pre monsoon season followed by post monsoon season and least during monsoon season. The total 7 species of cladocera were identified in the present study. *Acropenus harpae*, *Daphnia sarsi*, *Daphnia carinata* and *Alona rectangula* were more dominant and observed in this year of total study and they are seasonally fluctuated. Micheal (1969) noted the highest peaks of cladocerans during March and April. Seenayya (1973) also observed the maximum peaks of cladoceran during Pre monsoon.



Copepods: In the present investigation the copepods population of Inavolu Lake were maximum during Post monsoon season followed by Pre monsoon season and least during monsoon season. The total 6 species of copepods were identified in the present study. *Nauplius larva*, *Copepoda naplii*, *Cyclops strennus* and *Mesocyclops hyalinus* were more dominant and observed in this year of total study and they are seasonally fluctuated.



Ostracoda: In the present investigation the Ostracods population of Inavolu Lake was maximum during monsoon season followed by Post monsoon season and lowest during pre monsoon season. The total 4 species of Ostracods were identified in the present study. *Hemicypris fossucula*, *Heterocypris spp* were more dominant and observed in this year of total study and they are seasonally fluctuated. Chandrasekhar (1996), reported higher population of Ostracods during monsoon in Saroornagar lake of Hyderabad.



Conclusion

From the present study, it may be concluded that all the physico-chemical parameters are at nearly permissible limit at all the 4 stations. Results of water quality assessment clearly showed that most of the water quality parameters vary slightly higher in the wet season than in the dry season. 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. This will ensure that some of the parameters in this study will not exceed levels that could be harmful to fish in the environment. Such a measure will guarantee the safety of the aquatic ecosystem, humans and environment for good and healthy production of fish for consumption. At present this fresh water lake is suitable for fish culturing and irrigation purpose.

Monthly Variation in the Zooplankton (Group wise) population

Zooplankton Group	Aug	Sep	Oct	Min	Max
Rotifera	16	21	52	16	52
Cladocera	11	12	28	11	28
Copepoda	9	13	21	9	21
Ostracoda	43	23	20	20	43
Total	79	69	121		

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