

Zooplankton Diversity and their Seasonal Variation of a Perennial Lake at Warangal District, Telangana

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Abstract - In the present investigation the selected lake is Velair Lake for the purpose of study. During the study period the total numbers of 18 sps are identified from the selected lake during the present study. The total zooplankton population was dominated by Rotifer, Cladocera, Copepod and Ostracoda. In the present study the total 10 number of Rotifer sps, 4 number of cladocera sps, 3 number of copepod and one species of ostracoda sps, Small insects constitutes most zooplankton communities. They provide food for many species of fish and are therefore, vital in the food web of ponds. They are also used as an index of water bodies. The zooplankton population of Velair lake was studied a period of June 2017-May 2018. Zooplankton taxa were observed in the three seasons.

KEY WORDS: Zooplankton, Rotifers, Cladocera, Copepod and Ostracoda.

I. INTRODUCTION

Zooplanktons are the smallest organisms present in almost all the water bodies and they can be observed only through microscope. In ecologically zooplankton is one of the most important biotic components influencing all the functional aspects of an aquatic ecosystem such as food chains, food webs, energy flow and cycling of matter (Parkland shin, 2007). The zooplanktons community fluctuates according to physico-chemical parameters of the environment especially rotifers species change with biotic factors (Karuthapandi et al 2013). The biodiversity of plankton and zooplankton are also rich in nature (Kangasabathi and Rajan, 2010). Zooplankton study provides a relevant and convenient point focus for research on the mechanism of eutrophication and its adverse impact on an aquatic ecosystem. Zooplankton are an important components in aquatic ecosystems, whose main function is to act as primary secondary links in the food chain. (Huchinson, 1967). Seasonal requirement of plankton assemblages are closely linked to seasonal changes in temperature, external hydraulic, nutrient loads and light availability (Malten et al., 1991), other process acting on as time periods on days to week, like meteorological and hydrological events (Guillermo, 2009) and also pollution stress on them (Raja et al., 2008). Zooplankton diversity rapidly to changes in the aquatic environment. Several zooplankton species are served as bio indicators Ahmad et al., 2011; Mola (2011). Zooplanktons has been a subject of study in India and several researchers worked on Ganapathi (1943). The present study with the studies on zooplankton diversity of the seasonal variation in Velair fresh water lake in Warangal district, Telangana.

II. MATERIALS AND METHODS

The present investigation was carried out from June 2017 to May 2018 located in Velair village, Warangal district, Telangana. This fresh water lake is mainly used for drinking and fish culture, agriculture and irrigation. Water samples were collected monthly basis from the lake for a period of one year. The plankton samples were collected during morning hours in between 7.00 A.M to 10.00 A.M by a plankton net made up of boiling silk (NO.25, mesh size 55 μ). The samples were then transferred to narrow mouth plastic bottles, preserved in 5% formalin and brought to laboratory. Zooplankton samples were identified and counted under microscopic using Sedgwick Rafter Cell Method. Zooplanktons were identified with the help Tonapi 1980. The results of zooplankton count were expressed as org/lit.

III. RESULTS AND DISCUSION

During the study period from June 2017-May 2018. Species were identified in this lake (Table-1&2). The species are belonging to four major groups. i.e. Rotifera, Cladocera, Copepoda and Ostracoda. Among all the four major groups 10 species of Rotifers, 4 species of cladocerans, 3 species of copepods and one species of ostracodes were identified in this study.

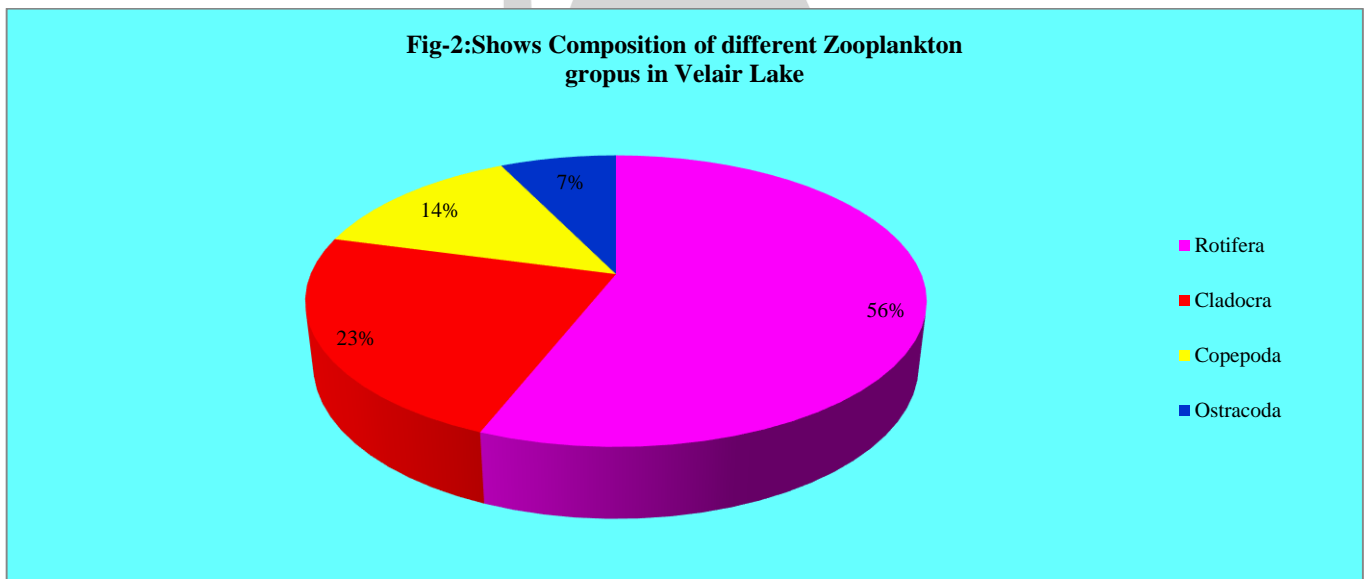
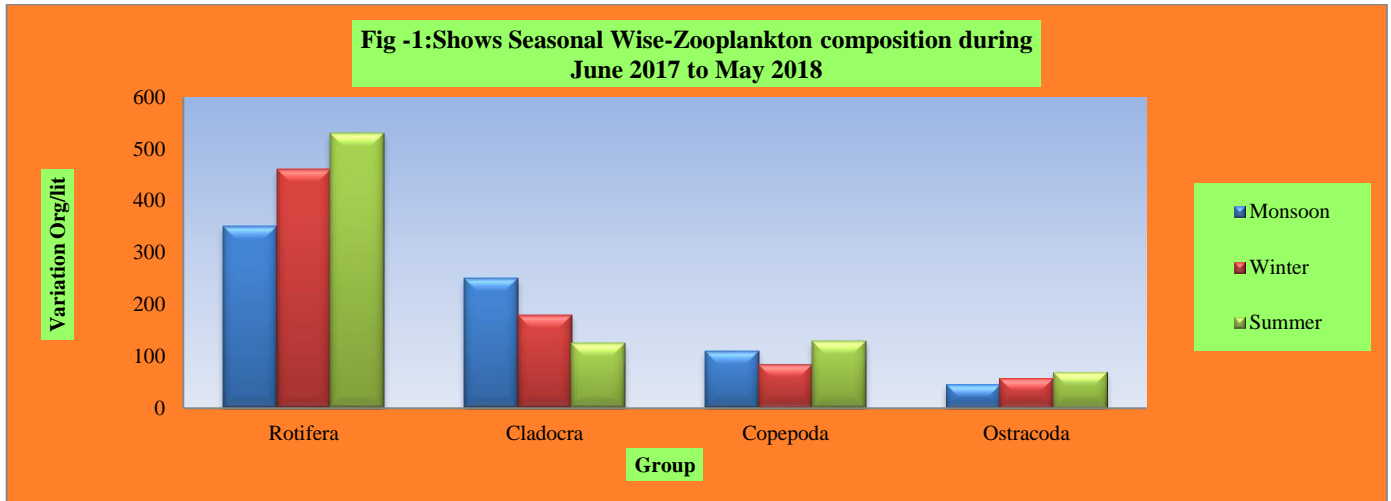
Table-1: Diversity of zooplankton taxa recorded in Velair Lake 2017-2018

Group	S.no	Species
Rotifera	1	<i>B. Caudatus</i>
	2	<i>B. angularis</i>
	3	<i>B. falcatus</i>
	4	<i>B. diversicornis</i>
	5	<i>K. tropica</i>
	6	<i>K. colcherias</i>
	7	<i>Lecane lunaris</i>
	8	<i>Lecanemonostyla</i>

	9	<i>Filina longisepta</i>
	10	<i>Cephalodella gibba</i>
Cladocera	11	<i>M.brachiata</i>
	12	<i>M.macropa</i>
	13	<i>Bosmina longirostris</i>
	14	<i>Daphnia sps</i>
Copepoda	15	<i>M.lucarti</i>
	16	<i>M.hyalinus</i>
	17	<i>Tropocyclopsprasinus</i>
Ostracoda	18	<i>Stenocypris Species</i>

Table-2: Numerical abundance of zooplankton of Velair Lake 2017-2018

S.no	Group	Monsoon	Winter	Summer	Total
1	Rotifera	350	460	530	1340
2	Cladocra	250	180	125	555
3	Copepoda	110	85	130	325
4	Ostracoda	45	58	70	173
	Total	755	783	855	2468



Rotifers are commonly known as wheel animalcules. Rotifer and form a significant component of the zooplanktons. The rotiferans exhibit a very wide range of morphological variations and adaptations. Among the zooplankton rotifers respond more quickly to the environmental changes and used as a change in water quality (Gannon and Stumberger 1978). Rotifers are regarded as bioindicators of water quality. Rotifers play vital role in the tropic tiers of fresh water impoundments and serve as living capsule of nutrition (Suresh Kumar et al., 1999). Since the rotifers have short reproductive stages they increase in abundance rapidly under favorable environmental conditions (Dhanapathi, 2000). The

maximum number of rotifers was recorded in the summer, while the lowest number of rotifers was recorded in the winter season. Similar observations are in Deshmukh, (2001), Rajashekhr et al., 2010). Cladocerans are commonly called water fleas. They mainly inhabit fresh water. Thus they hold key position in food chain and energy transformation (Uttanji, 2001). 110 species have been recorded in India (Patil and Gouder; 1989). Population of cladocerans in different water bodies have been reported by Nayar (1971), Mathew (1985), Kaushik and Sharma (1994). During the study period the highest cladocera population observed in Monsoon, Lowest in summer season. Similar Observations in the present

investigation Balakrishna et al., (2013). Copepods are considered as important food item for various kinds of fish, play a key role in the energy transformation at different trophic levels. Abundance of copepods in summer and winter is due to which is rich in organic matter supporting higher number of cyclopedias, thus suggesting their preponderance in higher trophic state of water. During the study period highest copepod population observed in summer, lowest in winter season. Ostracoda commonly known as seed shrimps. The ostracism is the entomostracans crustaceans having the bivalve carapace enclosing the laterally compressed body. They inhabit all kinds of fresh and marine water. Ostracod density as compared to other groups of zooplankton. Approximately 110 species are known from the inland water bodies of the Indian Subcontinent Patil and Gouder (1989). During study period the highest ostracoda population in summer, lowest in monsoon season.

IV. CONCLUSION

The diversity and density of zooplankton from Velair Lake of Warangal district exhibited by major groups namely Rotifera, Cladocera, Copepoda and Ostracoda. The lake ecosystem is suitable for fish culture. This is indicating that the selected lake is not polluted and rich diversity of planktons. As this lake is a good productive this indicates suitability for raising sustainable crop of planktivorous fishes and in addition to sources of drinking water.

REFERENCES

- [1] Ahmad, V., Praveen, S., Khan, A. A., Kabir, H. A., Mola, H. R. A. and Ganai, A. H. (2011): Zooplankton population in relation to physicochemical factors of the sewage fed pond of Aligarh (U.P) India. *Biol. Medic.* 3:336-341.
- [2] Balakrishna, D., Mahesh, T., Laxmiprasad, K. and Ravinder Reddy, T. (2013). A study of physico-chemical properties and zooplankton diversity of Laknavaram lake, Andhra Pradesh, *International Journal on Chemical Science*, 4(1), pp.33-39.
- [3] Dhanapathi M. V. S. S. S. (2000) Taxonomic notes on the Rotifers from India of IAAB. Publication, Hyderabad FAO, 2000.
- [4] Deshmukh, U. S. 2001. Ecological studies of Chhatra lake, Amravati: with special reference to planktons and productivity. Ph.D. thesis, Amravati University, Amravati.
- [5] Gannon, J. E. and Stemberger, R. S. "Zooplankton especially Rotifers and crustaceans as indicators of water quality". *Trans. Am. Microsc. Soc.* Vol. 97. pp 16-35, 1978.
- [6] Ganapathi, S. V. (1943): An ecological study of garden pond containing abundant zooplankton. *Proc. Indian Acad. Sci. (Botany)*. 17(2):41-58.
- [7] Guillermo, C. (2009): The use of phytoplankton pattern of diversity for algal bloom management. *Limnologia*, 39:225-227.
- [8] Hutchinson G. E. A Treatise on Limnology: Introduction to Lake Biology and the Limnoplankton, Wiley, New York; Vol. 2: pp 1-1015, 1967.
- [9] Kaushik, S and N. Sharma. (1994): Physico-chemical characteristics and zooplankton population of a perennial tank, Matsya sarovar, Gwalior. *J. Environ. Ecol.* 12 (2): 429-434.
- [10] Kangasabapathi, V. Rajan, M. K. (2010) A preliminary survey of plankton in irrukandudi reservoir, Virudhanagar Dist T. N. India. *J. Phycol.* 2(3)63-72.
- [11] Karuthapandi, M. Rao, D. V. Xavier Innocent, B. 2013 zooplankton composition and diversity of Hussain sagar Hyderabad. *Inter. J. Life. Sci. Edu. Res* 1(1):21-26.
- [12] Mathew (1985): Seasonal trends in the fluctuations of plankton and physico-chemical factors in a tropical lake (Govindagarh lake, M.P) and their inter relationship. *Inland Fish. Soc. India*. 17(1&2)11-24pp.
- [13] Malten, M. A., Paeel, H. W., Rudek, J. (1991): Seasonal phytoplankton composition, productivity and biomass in the Neuse River Estuary, North Carolina. *Estuar. Coast. Shelf. Sci.*, 32-609-623.
- [14] Mola, H. R. (2011): Seasonal and spatial distribution of Brachionus (pallas, 1996; Eurotatoria: Monogoranta: Brachionidae), a bioindicator of eutrophication in Lake E1-Manzalah, Egypt. *Biol. Med.*, 3:60-69.
- [15] Nayar (1971): C. K. G Studies on the rotifer population of two ponds at Pilani, Rajasthan. *J. 2001 Soci. India*. 22:168-185.
- [16] Park, K. S. and Shie, H. W. (2007): Studies on phyto- and zooplankton composition and its relation to fish productivity in a west coast fish pond ecosystem. *J. Env. Biol.*, 28-:415-422.
- [17] Patil, C. S. and Gouder B. Y. M. "Freshwater Invertebrates of Dharwad, First edition, Pracaranga, Karnataka University Press", Dharwad. pp 144, 1989.
- [18] Rajashekhar, M., Vijayakumar, K. and Praveen, Z. (2010): Seasonal variation of zooplankton community in fresh reservoir Gulbarga district, Karnataka, South India. *Int. J. Syst. Biol.*, 2:6-11.
- [19] Raja, P., Amaranath, A. M., Elangovan, V. and Palanivel, M. (2008): Evaluation of physical and chemical parameters of river Kaveri, Tiruchirappalli Tamilnadu, India. *J. Env. Bio.* 29-765-768.
- [20] Suresh Kumar, Aliff, R. K. and Raghunathan, M. B. "New record of a Chydorid Cladoceran, pleuroxuy Aducus Jurine, from Chennai, South India, with the description of the Development stages". *J. Aqua. Bio.*, Vol. 14(1&2), pp7-10, 1999.
- [21] Tonapi, G. T. 1980. Freshwater animals of India (An Ecological Approach). Oxford and IBH Publishing Co. New Delhi. PP. 187.
- [22] Uttanji J. C. (2001) Trends in Wildlife and Management, Daya Pub. House., New Delhi, India, 179-221.