ISSN: 2454-9940

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

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www.ijasem.org

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT
ISSN 2454-9940
www.ijasem.org
Vol 19, Issue 2, 2025

Density and Diversity of Zooplankton in Manair Dam, Rajanna Siricilla District, Telangana state

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Abstract

Zooplankton are higely sensitive creatures and considered to be aquatic ecological indicators. The present work aims to study the densty and diversity of zooplankton in **Manair Dam** for the period of one year from January 2024 to December 2024. Throughout the study period, 40 different zooplankton genera belonging to 4 groups were observed with a complete domination from Crustaceans (Cladocera, Copepods and ostracods). Maximum population density of zooplankton was noticed during monsoon season and lowest during summer season. The zooplankton diversity index, species richness and Species evenness were also studied during the study period.

INTRODUCTION

Reservoir is exceptionally variable in their physico-chemical properties and biological composition. Interventions of anthropogenic activities and various kinds of factors alter the quality of water, nutrient flow and trophic status of the ecosystems (Rajashekhar et al., 2009). Among the different fauna of aquatic ecosystems, zooplankton are considered to be key biological agents in food chains and web (Kamble and Meshram, 2005). They water quality and diversity of zooplankton play a major role in productivity of the ecosystems. Zooplankton community is used as biological indicators due to their sensitive nature towards environment. As a result, change in their diversity, composition and abundance which can provide information about ecological health status of ecosystems. The long term studies on Zooplankton communities in fresh water ecosystems may be involved in the forecast of changes in the aquatic ecosystem (Ferrara and Vagaggini, 2002). Several studies of a wide variety of ecosystems reveals that, strong production of ecosystem support the species richness and habitat heterogeneity (Murthuzasab, 2010). Investigation on freshwater zooplankton have been made by many workers in different parts of India (Fatima et al., 2011; Panwar, 2016).

Hence, the present study was undertaken on the analysis of seasonal changes in the abundance and distribution of zooplankton in the Manair Dam, Rajanna Siricilla District during the period of January 2024 to December 2024.

MATERIALS AND METHODS

Study area

Manair Dam is located on the Manair River at 18° 24′ N latitude and 79° 20′ E longitude in Rajanna Siricilla District. The Manair River is a tributary of the Godavari River and the dam is built across the river at the confluence with Mohedamada River. The dam drains a catchment area of 6,464 square kilometers (2,496 sq mi) which includes 1,797.46 square kilometers (694.00 sq mi) of free catchment and the balance is intercepted catchment.

Plankton samples were collected using plankton net made of bolting silk cloth (60µ pore size) by filtering 100 liters of water. The collected Zooplankton samples were filtered through 200µ pore filtering cloth to separate zooplankton. The collected zooplankton sample was made up to a known volume and from which 1ml was taken for analyse the abundance of different groups using a Sedgwick-Rafter type of cell and the values are expressed in number/l. Species diversity (H) and evenness (J') and species richness (d) were calculated for different groups of zooplankton (Pielou, 1975; Margalef, 1967).

RESULTS AND DISCUSSION

A total of 28 species of Zooplankton were recorded from the study area of which 15 species belong to Rotifers, 7 genera belong to copepoda, 5 belongs to cladocera,. Among all collected zooplankton, Rotifer group was found to be dominant genera (72.33%), followed by Rotifers (23.51%), Protozoans (4.16%) and it is depicted in Table 1.

Zooplankton composition was more oscillated during southwest monsoon period. Among zooplankton community, rotifers found to be the more abundant than the others. This could be due to the high degree of adoptions and resistance towards unfavourable conditions.

The zooplankton of study area, exhibited seasonal and spatial differences and maximum during rainy seasons or monsoon and lowest during summer season were observed are presented in table 1 and fig 1. The present study reveals that, high amount nutrients and other environmental factors are played key role in density of zooplankton community in different seasons study area. Similar results were found by Karekal S.M (2009)

The minimum abundance of species might be endorsed to the fewer nutrients in the reservoir, which subsequently result in lower productivity. The predation may be the one of the reason for decrease in the number of species (Jhingran, 1982). During winter season, the interaction of biotic communities operating through nourishing pressure affect the abundance and diversity of zooplankton community (Rajashekar, M., Vijaykumar, K., 2008 and Zebaparveen et al., 2015)

Seasonal variations in Zooplankton species diversity index (H), species richness (d) and Species evenness (J') is presented in Table 2 and figure 2. The Zooplankton diversity index, species richness and Species evenness ranged from 0.617 to 1.166, 1.86 to 5.037 and 0.841 to 0.981 respectively. The highest diversity was found during post monsoon and the lowest values were noticed during summer season. The observed highest value in post monsoon was due to high species composition observed during the study period.

CONCLUSION

The study reveals that, zooplankton community is represented by good number of genera and density of zooplankton reveals that, environmental factors and physic-chemical characters of reservoir, interactions of biota of reservoir play key role in diversity and composition of zooplankton community.

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www.ijasem.org
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Table 1. Composition of zooplankton community of reservoir

S. no.	Zooplankton	Monsoon	Post monsoon	Winter	Summer
I	**ROTIFERS**	**17.05**	**10.74**	**25.37**	**10.64**
1	*Brachionus* spp.	1.89	2.09	6.21	3.25
2	*Asplancha* spp.	0.14	1.36	2	0.51
3	*Branchionus falcatus*	7.65	0.34	7	3.25
4	*Branchionusdiversicornis*	0.16	0.18	0	0
5	*Conochilus* spp.	0	0.48	0.38	0.42
6	*Euchlanis* spp.	0.15	0	0	0
7	*Filina* spp.	1.52	0.36	0	0
8	*Keratella* spp.	1.33	0.85	1.39	2.01
9	*Lecane* spp.	0	2.23	2	0.41
10	*Lepadella* spp.	0	0.19	0.38	0.79
11	*Mytilina* spp.	0	0	2	0
12	*Platyias* spp.	1.2	0	0	0
13	*Rotaria* spp.	0	0.34	3.26	0
14	*Testudinella* spp.	0.45	0.84	0.42	0
15	*Trichocera* spp.	2.56	1.48	0.33	0
II . *COPEPODS*		**74.44**	**78**	**72**	**65.2**
16	*Copepod egg sac*	0.9	0.17	1	0
17	*Copepod nauplies*	51.23	38.56	46.21	44.25
18	*Cyclops* spp.	4.12	11.5	6.12	0
19	*Diaptomus* spp.	11.32	14.23	11.32	9.62
20	*Mesocyclops* spp.	1.56	6.12	4.23	7.21
21	*Paracyclops* spp.	4.21	4.21	3.12	4.12
22	*Tropocyclops* spp.	1.1	3.21	0	0
III	**CLADOCERANS**	**4.67**	**11.13**	**9.25**	**15.86**
23	*Bosmina spp.*	1.82	5.21	4.18	2.14
24	*Daphnia spp.*	1.1	4.11	3.52	6.21
25	*Diaphanosoma spp.*	0.52	0	0.41	0
26	*Macrothrix spp.*	0	0.46	0.43	0
27	*Moina spp.*	1.23	1.35	0.71	7.51
IV	**OSTRACODA**				
28	*Hemicypris*	0.45	0.52	0.33	0.00

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Fig.1. Seasonal variations in compostion of Zooplankton community of reservoir.

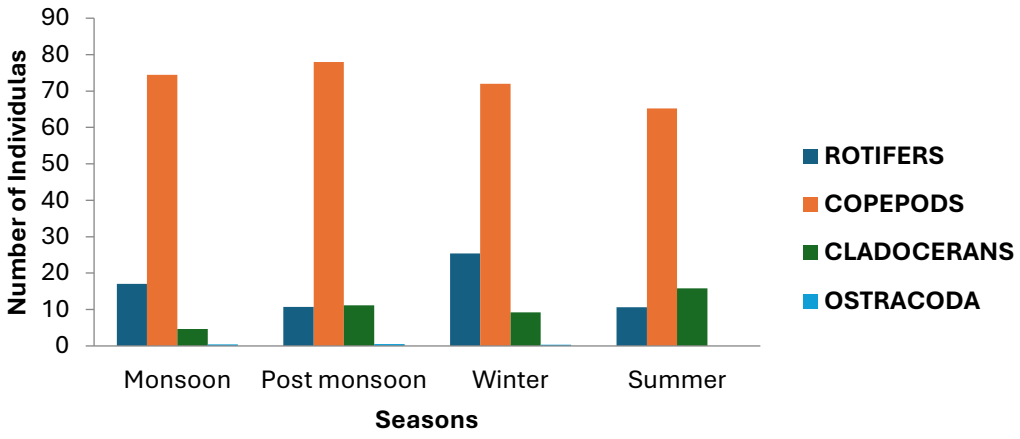
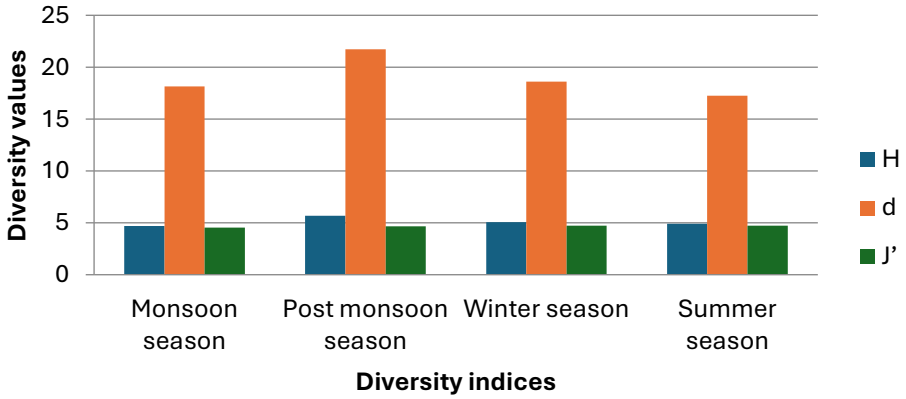


Table 2 : Species diversity indices of species diversity (H), species richness (d) and evenness (J') at different stations of reservoir.

	Monsoon			Post monsoon			Winter			Summer		
	H	d	J'	H	d	J'	H	d	J'	H	d	J'
S1	1.166	4.549	0.956	1.228	5.037	0.953	0.748	2.255	0.961	0.763	2.29	0.981
S2	0.867	4.069	0.846	1.154	4.427	0.937	1.058	3.855	0.95	1.024	3.721	0.949
S3	1.117	4.352	0.841	1.083	3.882	0.945	1.055	4.022	0.8969	1.02	3.792	0.916
S4	0.937	3.322	0.932	1.115	4.115	0.906	1.113	4.103	0.971	1.029	3.379	0.953
S5	0.617	1.86	0.974	1.099	4.253	0.934	1.105	4.379	0.939	1.069	4.077	0.932

Fig 2. Species diversity indices of species diversity (H), species richness (d) and evenness (J') at different seasons of reservoir



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