QUANTITATIVE ANALYSIS OF ZOOPLANKTONS OF FRESH WATER ECOSYSTEM IN DINDI RESERVOIR, TELANGANA, INDIA.

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ABSTRACT: *Zooplankton plays an important role in aquatic ecosystem. They are assisting the economically in fish culture. Zoophytoplanktons are the grazers of the phytoplankton and a food base for the carnivorous as well as omnivorous fishes. Zooplankton diversity reflects the quality of water also they are good indicators of the changes in water quality because they are strongly affected by environmental conditions and respond quickly to changes in water quality. Hence quantitative studies of zooplankton are of great importance. In the present research work, quantitative studies of zooplanktons in Dindi Reservoir were carried out to provide quantitative information on the variations of zooplankton in the Nalgonda district. In the present study 22 species of zooplanktons were recorded of which, 7 species belongs to rotifera, 5 species belongs to cladocera, 5 species belongs to copepoda and 5 species of ostracoda. The rotifera was dominated accompanied by using Copepoda, Cladocera and ostracoda species. Quantitative and qualitative analysis was made for distribution of the species.*

Key Words: *Zoophytoplanktons, ecosystem, phytoplankton, diversity, environmental*

INTRODUCTION

The Zooplankton community plays an important intermediate link in the pelagic food web by the transfer of energy derived from the phytoplankton to the highest trophic level in the aquatic food web. Being passive drifters, zooplanktons are bound to be influenced by environmental factors and depending on the prevailing tide and currents, organisms may be carried towards the shore or away from the shore. The zooplanktons are animal plankton and move at the mercy of water currents. They occupy central position between the autotrophs and other heterotrophs in an aquatic ecosystem and form a major link in the entire food chain and main energy source for fishes truly planktonic animals in fresh waters are dominated by Rotifera, Cladocera and Copepoda. Protozoans also form a significant part of fresh water Zooplankton. Zooplankton are said to be the ecological indicators of water bodies and distribution of these organisms in polluted and nonpolluted waters can provide useful information on the productivity and pollution of an area where they are found **Gajbhiye and Desai, 1981[2]**. The zooplankton is fundamental character inside the significance of an aquatic ecosystem and plays a key role in the energy transfer. Freshwater zooplankton plays an important role in ponds, lakes and reservoirs atmosphere and food chain. Zooplankton feed on phytoplankton. They're answerable for eating millions of little algae which can develop to an out-of-manipulate state. The insufficient understanding of plankton and their dynamics is a main handicap for the better knowledge of the life system of sparkling water bodies. Aquatic surroundings are suffering from numerous health stressors that significantly expend biodiversity. In destiny, the loss of biodiversity and its consequences are expected to be more in aquatic Atmosphere than terrestrial surroundings. Zooplankton species have special varieties of existence histories stimulated by seasonal variations of biotic elements, feeding ecology and predation strain. The zooplankton community is composed of both primary consumers (feeds upon phytoplankton) and secondary consumers (which feed upon the other zooplankton). They offer a right away hyperlink between number one producers and higher tropic tiers inclusive of fish. Almost all fish rely on zooplankton for meals all through their larval stages, and some fish retain to devour zooplankton for their complete lives. The distribution and diversity of zooplankton in aquatic surroundings rely specially on the physico-chemical properties of water.

Zooplanktons acts as indictors of water quality and may be used to assess over all lake health. The qualitative and quantitative abundance of zooplankton in a lake are of remarkable importance for successful aquaculture management, as they vary from one geographical region to every other and lake to lake in the equal geographical region even inside similar ecological situations.

REVIEW OF LITERATURE

Distribution and abundance of zooplankton in the west coast of India are reported by earlier workers, like Clove (1901), Vinogradov and Voronina (1961 & '62); Voronina (1962); Kasturirangan (1963); Timonin (1971); Wyotki (1974); Fleminger and Hulsemann (1973); Tanaka (1973); Zeitzschel (1973); Pillai (1976); Lawson (1977); Sakthivel (1977); Madhupratap et al., (1977, 79 and '81); Tranter (1977); Rao et al.,(1975); Saraladevi et al., (1979); Haridas et al., (1980); Stephen (1980); Gajbhiye et al., (1982); Goswami (1982); Reddy and Radhakrishna (1982); Smith (1982) Madhupratap (1983) and Ramaiah and Nair (1993), Nandan and Azis, (1994), Goswami and Padmavati (1996) Padmavati and Goswami (1996) respectively[3].

Studies on the Zooplankton communities of rivers are very few. The studies on River Yamuna **Chakraborty et al.,**(1959)[3]. Show large spatica and temporal variations and a dominance of rotifers in polluted section of the river. The overall species richness appears to have declined with growing levels of pollution. Zooplankton in River Ganga have been investigated only in certain stretches but the result are highly variable that making it impossible to draw any conclusion about their seasonal trend or along the river course **Krishnamurti et al**., (1991)[12]

A study on population dynamics and seasonal abundance of zooplankton community in Narmada River was carried out by **Sharma et al**., (2010) and they found that Rotifera was the most dominant group among Protozoa, Cladocera and Copepoda which were reported from the estuary.

Annalakshmi & **Amsath** (2012)[13] investigated the composition, abundance, frequency of occurrence and diversity of net zooplankton species inhabiting in river Cauvery and its tributaries Arasalar at Kumbakonam, Tamil Nadu. The spatial, temporal and tidal dynamics of zooplankton communities of Kodaikkari coastal waters were investigated by Damotharan et al., (2010) to study the role of physico-chemical parameters in determining zooplankton distribution.

Zooplanktons are microscopic animals that eat other plankton. Zooplanktons occupy a central position between the autotrophs and other heterotrophs and form an important link in food web of the freshwater ecosystem. Zooplanktons constitute the food source of organisms at higher trophic levels. The Zooplankton and fish production depend to large degree on the phytoplankton (**Boney 1975**)[15].

The dominance of Zooplankton in shallow water bodies by rotifers cladocera or copepods varies according to the degree of organic pollution Moitra & Bhowmik, (1968), Verma & Munshi, (1995)[7,13].

OBJECTIVE

The main objective of this research paper is to study the Quantitative Analysis of Zooplanktons of Fresh Water Ecosystem in Dindi Reservoir.

METHODLOGY

For the present study, water samples were collected from Dindi reservoir Nalgonda district. For zooplankton collection water samples were collected in early morning hours from the sampling stations by towing the plankton collecting net of mesh size 25 µ and preserved in 4% formalin; 2-3 drops of glycerin added to it. The preserved zooplankton samples were kept stored at low temperature, below 20°C until analysis. Identification of the zooplankton in the respective samples was done separately with the help of the available standard reference materials Shiel (1945). For the enumeration of zooplanktons, Coslab Inverted Microscope and Compound microscope were used. The quantitative analysis of zooplankton was carried out by using Sedgwick-Rafter cell. The species belonging to each group were noted down and number of individuals in each species was counted. Species diversity of zooplankton of Dindi reservoir was determined by Shannon Weaver index Shannon C.E. and Weaver (1949) (H) which reads as follows.

Shannon Index (H) = $\sum pi \ln pi$

Where, i=1, Pi= Proportional importance of each species (n1/N), S=number of species.

STUDY AREA

Dindi Reservoir is a medium water reservoir across Dindi tributary of River Krishna located near Dindi, Mahabubnagar town in Telangana. It is part of Srisailam Left Bank Canal.

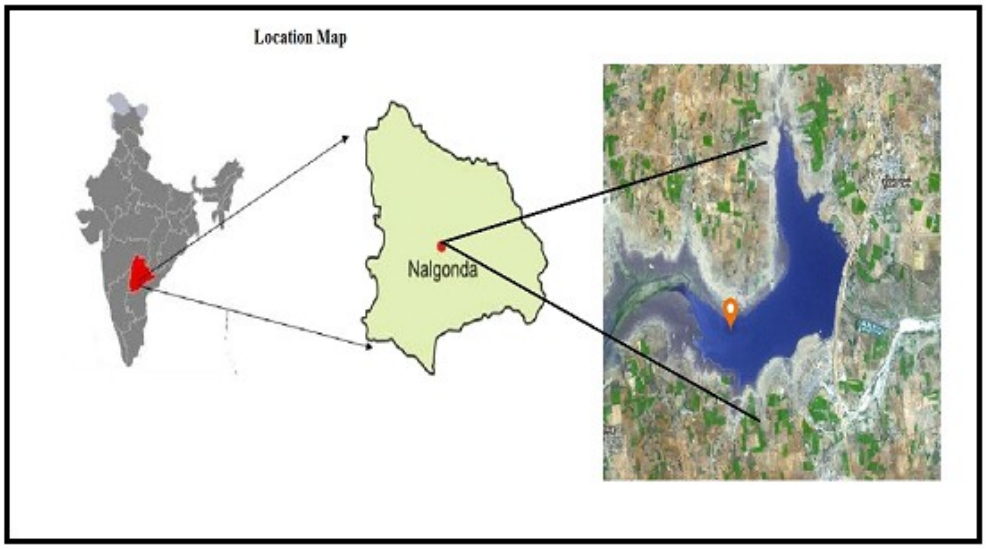

Fig: 1 location of Study area

This medium reservoir has 59 million cubic meters gross storage capacity. It is close to Nagarjunsagar-Srisailam Tiger Reserve, around 95 kilometers from Hyderabad. It is situated in 16° 32′ 10″ N, 78° 39′ 40″ E coordinates[9,10,11].

RESULTS AND DISCUSSION

The zooplankton community in Dindi reservoir comprised of rotifer, cladocera, copepoda and ostracoda. Total of 22 species of zooplankton were reported during the present study which belongs to four taxonomic groups that includes Rotifer (7), Cladocera (5), Copepoda (5) and Ostracoda (5). Total number of zooplankton recorded from the 1st sample was 39.05, 2nd sample was 29.37, 3rd sample was 36.22 and 4th sample was 36.42. Rotifer species reported in the present work are also obtained in the similar work of **Dede and Deshmukh** (2015)[5], **Gayathri et al.,** (2014)[6] that includes Brachinous calcyflorus, Keratella tropica, Asplanchna brightwelli, Brachizonus plicatilis, Filinia longiseta, Brachionus falcutus, Lecane leontina, Brachionus durgae, Asplancha sieboldi. Five species of cladocera were reported during the present study that includes Daphnia scolder, Chydorus herrmanni, Allona affinis, Moina micrura, Dunhevedia crassa, Diaphanosoma brachyuram. Similar findings were also reported by **Sharma** (2013)[14].

The present work also reported Five species of copepoda including Mesocyclops leuckarti, Copepode cyclopes, Calanus copepode, Macrocyclopes albidus, Diaptomus, and one species of ostracoda i.e. Paracondona euplectella, Podocopida, Cyprididae . **Gayathri et al., (**2014**) and Manoharan** et al., (2015)[6] also reported the same from freshwater ecosystem. The results of present study shows that group of ostracoda are reported highest, Cladocera , Copepoda in and Rotifera at all sampling station. The present study concluded Rotifera as the dominant group. Many researchers reported rotifer as dominant species that includes **Verma et al** (2013), **Paulose** and **Maheshwari** (2008), **Kapoor** (2015)[8], Kozuharov et al (2013) , **Sharma and Tiwari** (2011), Balai et al (2013)[2,3], **Annalakshmi and Amsath** (2011)[1] and the order of dominance is as Rotifera > Rotifera> Cladocera> Copepoda, similar result was found **Sharma et al** (2010), **Kulkarni** and **Surwase** (2013)[13]. Mean values of Species diversity of zooplanktons, Eveness and Richness of zooplankton at different experimental sites of Dindi Reservoir.

SUMMARY AND CONCLUSION:

The present study reported Ostracoda as the dominant group and the order of dominance is as Rotifera>Cladocera>Copepoda> Ostracoda. The highest number of Ostracoda was found at 1st and 2nd sample lowest at 4th sample. The highest number of Cladocera was found in 3rd sample and lowest found at 1st sample. The highest number of Copepoda was found at 3rd sample and lowest found at 1st sample. The highest number of Rotifera was found at 3rd sample and lowest number at 1st sample.

Table: 1 list of zooplanktons group Rotifera

Group	Name of Plankton	1st year	2nd year
Rotifera	Euchalanis	√√√√√	√
	Cephalodella	√	NA

	Keratella	√	√
	Trichocera	√	√
	Brachenus	√	√

Source: Field investigation 2015-2016

Table: 2 list of zooplanktons group Cladocera

Group	Name of Plankton	1st year	2nd year
Cladocera	Bosmania	NA	√
	Dadya	√	NA
	Daphnia	√	√
	Cerodaphnia	√	√
	Macrothrise	√	√

Source: Field investigation 2015-2016

Table: 3 list of zooplanktons group Copepoda

Group	Name of Plankton	1st year	2nd year
Copepoda	Nauplris Larvac	NA	√
	Eucyclope	NA	√
	Cyclops	√	√
	Draptomous	√	√
	Mesocyclops	√	√

Source: Field investigation 2015-2016

Table: 4 list of zooplanktons group Ostracoda

Group	Name of Plankton	1st year	2nd year
Ostracoda	Stenocypris	√	√
	Cypris	√	√
	Cyclocyprus	√	√

Source: Field investigation 2015-2016

In conclusion, it can be opinion that, Rotifera are observed the most dominant community throughout the study period while Rotifera and Cladocera exhibited high species richness and diversity indicate slightly increased pollution level. Consequently, the diversity indices create a signal about the good health of aquatic environment. The present water body has exhibited a significant changes and species biodiversity of zooplankton species with their maximum values. Zooplankton is the intermediate link between phytoplankton and fish, which are the secondary producers in the aquatic environment. Zooplanktons are good indicators of changes in water quality, because they are strongly affected by environmental conditions and responds quickly to change in environmental quality. Hence, quantitative study of zooplanktons is of great importance. The information contributed by this investigation will be highly significant and useful in order to create a general awareness in the people to prevent further water pollution and improve aquaculture and other uses of such valuable water sources in the near future.

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