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Analysis of Zooplankton in Chenugonipally Pedda Cheruvu Gadwal, Telangana State. India

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Abstract- Zooplankton is an integral component of ecosystem and comprises of microscopic animal life that passively float or swim freely. This serves the functional role on the detrital spectrum in water. Chenugonipally Peddacheruvu tank is one of the irrigation tank. It is a small size tank, located between 16.23° N latitude and 77.8° E longitudes in Gadwal Mandal of Mahabubnagar district in Telangana state. Present work has been conducted on zooplankton analysis samples were collected at 30 days of interval between 7 am to 9 am for a period of two years from July 2012 to May 2013 and from July 2013 to May 2014. During the study period total 40 species of zooplanktons were identified belonging to 5 groups, among all 19 species were observed during the 1st year (2012-2013), while 21 species of zooplanktons were recorded during the 2nd year (2013-2014) study. At all the four stations during first year study the dominance of the zooplankton species as follows ;Rotifera > Copepoda > Cladocera > Ostracoda > Protozoa. Similarly during second year study the dominance of the zooplankton species as follows; Copepoda > Cladocera > Rotifera > Protozoa > Ostracoda.

Keywords: *chenugonipally pedda cheruvu, zooplankton, dominance.*

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I. Introduction

Zooplankton is an integral component of ecosystem and comprises of microscopic animal life that passively float or swim freely. The principal components of zooplankton in lentic environment are represented by taxonomic groups Protozoa, Cladocera and Copepoda. In the reproductive biology of many fish, eggs and hatchlings pass through transient Planktonic life. Zooplankton incorporates primary and partly secondary micro faunal consumers operative system. This serves the functional role on the detrital spectrum in water. Zooplankton operations facilitate food web connectivity and cascading interactions in trophic structure of aquatic communities. The multitude of micro level transfer, transformations of biomass and energy mediated by zooplankton help to sustain stability and health of ecosystem. In trophic progression, zooplankton excretions provide nutrient pools in macro habitat for ready exploitation and proliferation by Cyanobacteria. In any prevailing milieu of aquatic pollution and anthropogenic impact activities, qualitative and quantitative changes in the diversity of zooplankton characterize plasticity and resilience and critical pollutant tolerance load of the focused ecosystem. The preferential distributions of species in zooplankton assemblages of saprobian systems provide a bio monitoring tool to maintain quality assurance in sewage treatment technology operations. Zooplankton is essential food for hatchlings and fingerlings in fish biology. The propensity of Rotiferans and Cladocerans is too built up rapidly high population densities under favourable environments. In culture fishery management, this offers opportunity to technology application for their mass culture to meet cost effective live food inputs. In toxicological studies on bio accumulation and bio magnification along food chains, zooplankton species are valuable experimental tools and tags.

II. Materials and Methods

a) Description of study area

Chenugonipally Peddacheruvu tank is one of the irrigation tanks in the Mahabubnagar district, about 90 Km away from the district headquarters and 180 Km away from the state capital Hyderabad. It is a small size tank, located between 16.23° N latitude and 77.8° E longitudes in Gadwal Mandal (Tehsil) of Mahabubnagar district in Telangana state. The present Chenugonipally Peddacheruvu tank receives water from the Jurala Project right canal and also receives sewage water directly from the Gadwal town. It is a perennial tank and the fishermen stocks advanced size carp fish seed every year in the month of July or August.

b) Collection of sample

Present work has been conducted on zooplankton analysis, for this 4 sampling sites of Chenugonipally Peddacheruvu tank was selected for the qualitative analysis of Zooplankton. Site 1 was fixed at near the Chenugonipally village, site 2 in the middle of the tank, site 3 was fixed near the outlet and site 4 was fixed near the Gadwal town side. Zooplankton were collected at 30 days of interval between 7 am to 9 am for a period of two years from July 2012 to May 2013 and from July 2013 to May 2014.

For the collection of zooplankton a known amount of water was filtered through the zooplankton net made up of nylon silk mesh size 55 μm for the precise collection of planktons net is towed horizontally and vertically. After collection of zooplanktons immediately transferred to plastic bottles and are preserved in 4 % formaldehyde.

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III. Results and Discussion

During the study on chenigonipally pedda cheuvu for a period of two years study (2012-13 & 2013-14), total 40 species of zooplanktons were identified belonging to 5 groups, among them 19 species were observed during the 1styear (2012-2013), while 21 species of zooplanktons were recorded during the 2ndyear (2013-2014) study. The number of organisms were tabulated according to their group wise in table no 1, 2, 3, 4, and 5. At all the four stations during first year study the dominance of the zooplankton species as follows

Rotifera > Copepoda > Cladocera > Ostracoda > Protozoa

Group Rotifera was recorded as the dominant group as it comprising of 5 species followed by Copepoda and Cladocera which both of these two groups comprising of 4 species each, which in turn followed by Ostracoda 3 spevies and protozoa 3 species. *Thirupathaiah. M et al (2012)* reported that diversity of zooplankton in Lower Manair reservoir, Karimnagar, AP, India. High rotifer species in the water body indicates enrichment due to direct inflow of untreated domestic sewage from adjacent areas, as it was suggested by *Arora (1966). Chandrashekhar (1998)* recorded diversity of rotifers to be influenced by the different water quality and other chemical factors. Rotifers dominance was also reported by *Solanki VR et al., (2015)* Pandu lake of Bodhan, Telangana State. The zooplanktons community fluctuates according to physico-chemical parameters of the environment, especially rotifer species change with biotic factors *(Karuthapandi et al 2013). Perumal and Santhanam (2002)* reported 37 species of zooplanktons in Vedanthangal lake, Tamilnadu.

Similarly during second year study the dominance of the zooplankton species as follows

Copepoda > Cladocera > Rotifera > Protozoa > Ostracoda

Group Copepoda was recorded as the dominant group during second year study comprising of 6 species followed by Cladocera comprising of 5species, Rotifera comprising of 4 species, which in turn followed by least dominance of Protozoa and Ostracoda comprising of 3 species each. The diversity patterns greatly depend on the water temperature and availability of food in the water body. *Avinash B et al., (2014)* suggested that species diversity indices of zooplankton from Sadatpur reservoir, Ahmednagar. The sufficient nutrient availability and other favourable conditions result in dominance of Copepoda. *Salve B et al., (2010)* observed that the diversity of Zooplankton in Wan reservoir, Nagapur (MS) India. The comparisons of size structure, fecundity and reproductive strategies of zooplankter's can indicate the nature and extent of pollutant loads.

Table 1 : List of zooplankton group Protozoa species obtained in two years of investigation

Group	Name of the Plankton	I Year	II Year
Protozoa	*Colpidium sp.*	√	√
	Arcella sp.	√	√
	Actinophyrus sp.	√	√

Table 2 : List of zooplankton group Rotifera species obtained in two years of investigation

Group	Name of the Plankton	I Year	II Year
Rotifera	*Brachionus sp*	√	√
	Cephalodella sp	√	–
	Trichocerca sp	√	√
	Keratella sp	√	√
	Euchlanis sp	√	√

Table 3 : List of zooplankton group Cladocera species obtained in two years of investigation

Group	Name of the Plankton	I Year	II Year
Cladocera	*Macrothrix sp*	√	√
	Bosmania sp	–	√
	cerodaphnia sp	√	√
	Dadaya sp	–	√
	Daphnia sp	√	√
	Chydorous sp	√	–

Table 4 : List of zooplankton group Copepoda species obtained in two years of investigation

Group	Name of the Plankton	I Year	II Year
Copepoda	*Cyclops sp*	√	√
	Diaptomous	√	√
	Eucyclops sp	–	√
	Mesocyclops sp	√	√
	Cyclopoid copepod sp	√	√
	Nauplius larvae	–	√

Table 5 : List of zooplankton group Ostracoda species obtained in two years of investigation

Group	Name of the Plankton	I Year	II Year
Ostracoda	*Cypris sp*	√	√
	Cyclocyprus sp	√	√
	Stenocypris sp	√	√

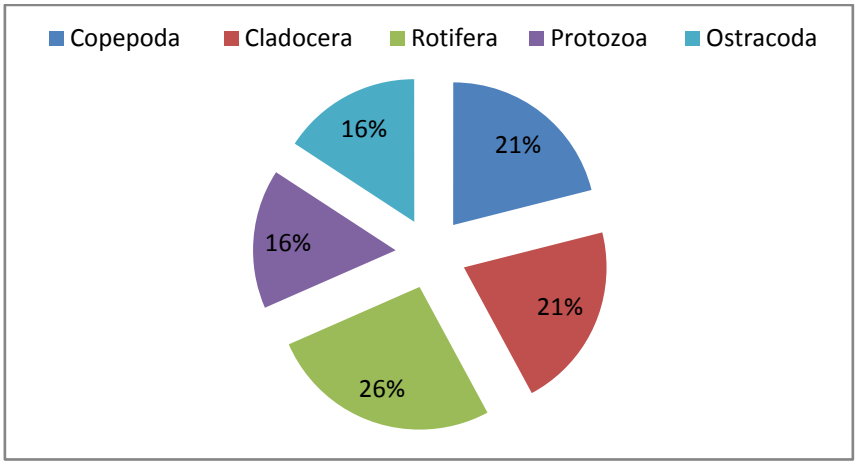

Figure 1 : Zooplankton composition during 2012-13

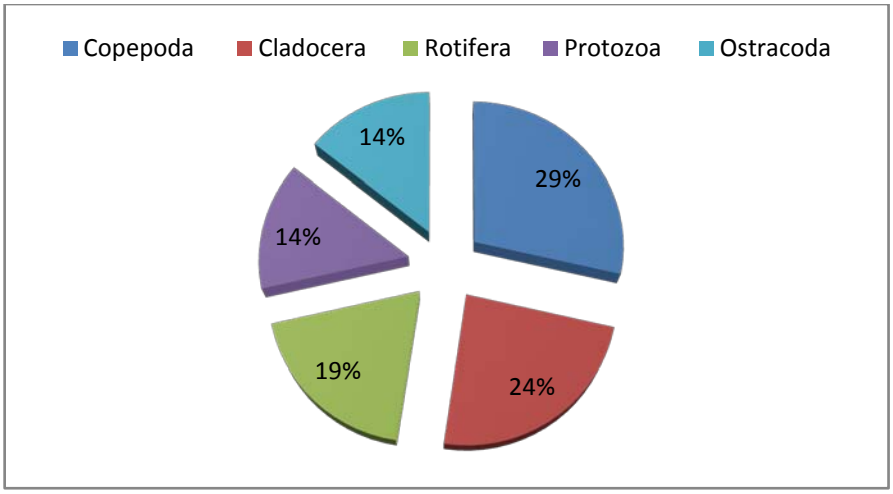

Figure 2 : Zooplankton composition during 2013-14

IV. Conclusion

Rotifer species are considered as good indicators of the trophic state of the water and exhibited high species richness and diversity. Rotifers respond more quickly to the environmental changes and used as a change in water quality. Copepoda appeared to be the most dominant community in the study second year study. Overall zooplankton diversity and abundance in Chenugonipally pedda cheruvu indicated that the water body is rich with nutrients and mesotrophic in nature.

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