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ZOOPLANKTON DIVERSITY OF GODAVARI RIVER AT MUDGAL DAM, PATHARI DIST. PARBHANI (M.S.), INDIA

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Abstract: Aquatic ecosystem has a vast diversity of micro-eukaryotes (rotifers, crustaceans and protists), and such diverse taxonomic groups play important roles in ecosystem functioning and services. Farming organisms such as fish receive nutrients other than minerals by taking food. In nature, most organisms survive by consuming live food such as plankton from the environment. Zooplankton are of great importance and basically essential in fish culture. The present work is carried out for the assessment of plankton diversity of Godavari river water in Mudgal dam area for a period of one year starting from March, 2019 to February, 2020. The zooplankton serves as a food for other higher organisms. During the exploration, authors recorded four groups of zooplankton *namely* Rotifera with 7 species, Cladocera with 5 species, Copepoda 3 species and Ostracoda 2 species.

Keywords: Aquatic ecosystem, Environment, Godavari river, Mudgal dam, Zooplankton.

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INTRODUCTION

Aquatic ecosystems provide unique habitats, supporting a high level of biodiversity, which is maintained with the help of ecological balance (Kumar, 2018). Maintenance of rich biodiversity is the need of today because it has different levels and values (Ashok, 2016). However, excessive and indiscriminate anthropogenic activities, pollution etc. badly affect the environment and biodiversity (Prakash and Verma, 2022; Singh *et al.,* 2023). Freshwater ecosystems occupy approximately 0.8% of the Earth's surface but support almost 6% of all known species (Dudgeon *et al.,* 2006). The river water finds multiple uses in every part of human life such as agriculture, domestic, drinking, industry, transportation, and recreational activities (Siddamallayya and Pratima, 2008). However, many factors, particularly those derived from human intervention such as water pollution and invasive species, have largely degraded freshwater ecosystems over the past several decades (Cazzolla, 2016; Kumar, 2019; Verma and Prakash, 2020a).

The aquatic ecosystem needs to check properly rather to monitor water quality of various rivers to plan out possible restoration measures (Walker *et al.,* 1995; Clausen and Biggs, 1997). Indeed, phytoplanktons are good indicators of environmental changes because their structure and metabolism changes quickly in response to environmental conditions (Venkateswarlu, 1969; Verma *et al.,* 2016). The zooplankton community is composed of both primary consumers (feed on phytoplankton) and secondary consumers (feed on the other zooplankton). They provide a direct link between primary producers and higher tropic levels such as fish. Nearly all fish depend on zooplankton for food during their larval phases, and some fish continue to eat zooplankton for their entire lives (Verma and Prakash, 2020b). The zooplankton community especially rotifer species fluctuates with biotic factors (Karuthapandi *et al.,* 2013; Sugumaran *et al.,* 2020).

Rotifers are the natural trophic link between alga and zooplanktivorous predators such as fish (Wallace *et al.,* 2006). The connections between fish fauna and their development in their habitat can be established by the evaluation of phytoplankton and zooplankton together (Baykal *et al*., 2006; Verma, 2020). Any alteration in the environment leads to the change in the plankton communities in terms of tolerance, abundance, diversity and dominance in the habitat. Zooplankton plays an important role in bio monitoring of water pollution (Tyor *et al.,* 2014; Chakraborty, 2023). The measurement of planktonic productivity helps to understand the various trophic levels and resources as essential inputs for proper management of water body.

MATERIALS AND METHODS

For the collection of water samples from the study area, five different sites were selected. The zooplankton collection was carried out from (1) Wanisangam, (2) Vita (Bu), (3) Vita (khu), (4) Waghalgaon and (5) Mudgal sites during March, 2019 to February, 2020 at different time intervals.

The zooplanktons were collected using plankton net having mesh size 60μm. This net is in the form of a truncated cone with the lower narrow end. Wide end of the cone is sewed above an iron ring with constituting mouth of the net, while the lower end of the bolting cloth sleeve carries a graduated plastic tube (15ml). Plankton net acts as a filter. A mug of 500ml capacity water was taken and about 25 times the water was filtered out. The zooplankton were trapped and collected in the plastic tube and later were preserved. The concentrated zooplankton samples were carefully transferred to another container. After that 5% of formalin was added to samples to settle down zooplankton and solution was kept 24 hours undisturbed. Formalin acts as both fixative and preservative. Zooplanktons were identified by using stereomicroscope and keys of zooplankton (Battish, 1992).

RESULTS AND DISCUSSION

Authors recorded four groups of zooplankton *namely* Rotifera with 7 species, Cladocera with 5 species, Copepoda 3 species and Ostracoda 2 species. Details are shown in table 1.

Table 1: List of Zooplankton species recorded from Mudgal dam.

Rotifera	**Cladocera**	**Copepoda**	**Ostracoda**
Brachionus angularis	*Cario daphnia*	*Eodiaptomus japonicus*	*Cypriochonca alba*
Brachionus caudatus	*Daphnia longiremis*	*Mesocyclops leuckarti*	*Hemicypris fossulate*
Brachionus fulcatus	*Diaphanosoma* sp.	*Tropocyclops prasinus*	
Brachionus calyciflorus	*Monia macrocopa*		
Brachionus vulgaris	*Macrothrix rosea orientalis*		
Brachionus rubens			
Keratella tropica			

Authors recorded the highest population of Rotifera in the month of September (157 org/lit.) at site 1, (121 org/lit.) at site 2 and (97 org/lit.) at site 3 in the study area of Mudgal dam. This is because of availability of abundant food sources from the runoff and temperature appears favourable for increasing rotifers population (Karuthapandi et al., 2013). It was recorded lowest in the month of June (30 org/lit) at site 1, (23 org/lit) at site 2 and (20 org/lit) at site 3. The lower number of rotifers can be attributed to extreme temperature and low dissolved oxygen. More or less similar results were observed by Bais and Agrawal (1993).

High Rotifer density is the characteristic of eutropic lakes (Shinde et al., 2009), however, eutrophication may be a problem for a water body (Zhang et al., 2004). Normally the monsoon is associated with high densities due to photosynthetic activity by primary producers. Among these Brachionus angularis, B. caudatus, B. fulcatus, B. calyciflorus and B. vulgaris were most common forms. The B. rubens and Keratella tropica were observed with minimum population density. B. angularis, B. Caudatus and B. fulcatus comprise maximum population density as compared to other species of Rotifera.

The cladocerans popularly called as 'water flea' prefers to live in deep water and constitute a major item for fish. Thus, they hold a key position in food chain and energy transformation. The cladocerns were represented by 5 species and recorded highest in month of February (43 org/lit) at site 1, (34 org/lit) at site 2 and (41 org/lit) at site 3, and lowest (12 org/lit) at site 1, (5 org/lit) site 2 and (9 org/lit) at site 3 in July. The maximum population of Cladocera were seen in summer due to favourable temperature and availability of ample food in the form of bacteria, nano planktons and suspended detritus. In monsoon and winter seasons, the factors like water temperature and dissolved oxygen play important role in controlling the diversity and density of Cladocera.

Copepods were recorded highest in month of August (39 org/lit) at site 1, (32org/lit) at site 2 and (46 org/lit) at site 3 while minimum (3 org/lit) at site 1, (5 org/lit) at site 2 and (9 org/lit) at site 3, due to less nutrient in water body as well as improper dissolved oxygen and pH. The Ostracods were recorded highest in month of November (23 org/lit) at site 1, (27org/lit) at site 2 and (17 org/lit) at site 3 and lowest in month of May (7 org/lit) at site 1, (9 org/lit) at site 2 and absent at site 3. Ostracodes population may decrease as compared to other zooplankton population due to the feeding pressure by fishes. Thus, it can be concluded that the dam on River studied is suitable for planktons with lowest level of pollution. Authors strongly recommend a detail exploration of the whole Godavari River both for water quality and biodiversity point of views.

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