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"STUDY OF ZOOPLANKTON IN RIVER ODDA AT REWA (M. P.)"

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ABSTRACT

The present paper deals with the Zooplankton composition, seasonal fluctuation and diversity indicies in river Odda, Rewa from Oct. 2019 - Sep. 2020. The Zooplankton composition of river Odda at three sampling stations were composed of 38 species belonging to 5 groups viz. Rotifer, Cladocera, Copepod, Protozoa and Ostracoda. The Zoolankton community was dominated by Rotifers (40%) followed by cladocera (29%), copepoda (18%), protozoa (8%) and ostracoda (5%). Several types of indices such as dominance index (simpson, 1949) varied from 0.94 to 0.96 while shannon's diversity index 3.18 to 3.46 and dominance -D varied from 0.04 to 0.06 of river Odda were calculated. The dominance of Brachionus indicates the level of organic matter in the river.

KEYWORDS: *River, Odda, Rewa and Zoolankton.*

INTRODUCTION

Water is among the prime necessities of life required for growth and daily activities of all living organism in the globe. The river Odda Valley is one of the major hot spot for aqua-biodiversity in M.P.. Biodiversity conservation and management are worldwide concern (Ramesh *et al.*, 2010), where determining the diversity levels of indicator groups of ecosystem should permit the prediction of other taxa to be present i.e. the importance and appropriateness of using the invertebrate groups as indicator (Oliver and Beattie, 1993) and (Pearson, 1994). The use of indicator taxa in conservation efforts from pollution control to biodiversity has been the focus of attention (Landers *et al.*, 1988). Biodiversity describes the variety of biological organisms in a given habitat, area or ecosystem. It includes several components involving variation in species, ecosystem and genetics. Biodiversity is essential stabilization of ecosystem, protection of overall environment quality for understanding intrinsic worth of all species on the earth (Nelson 2006).

Zooplanktons are microscopic free swimming heterogeneous assemblage of minute flowing animal forms found in aquatic systems are represented by wide array of taxonomic groups (Protozoans, Rotifera, Cladocera, Ostracoda and Copepoda). Zooplankton communities have been investigated in numerous reservoirs, lakes, and shallow water bodies (Abbasi *et al.*, 1996) and Sugunan (1980). The dominance of zooplankton in shallow water bodies by rotifers, cladocera or copepods varies according to the degree of organic pollution Moitra and Bhowmik (1968), Verma and Munshi (1987). The survival strategies of the zooplankton have been reported in a few studies and examined in some detail recently

by Khatavkar *et al.*, (1989). Due to their higher density, shorter life span, drifting nature, high group or species diversity, different tolerance to the stress and often respond quickly to environmental change and water quality. Zooplanktons form an important link in the transformation of energy from producers to consumers Shastree *et al.*, (1991). Thus, in order to find out the status of a fresh water body it is necessary to evaluate the seasonal diversity and abundance of zooplankton. The present study is an effort to study the diversity and seasonal abundance of zooplankton in a river Odda, Rewa (M.P).

Materials and Methods:

Study area: The present study was carried out for one year from Oct. 2019-Sep. 2020 due to which include all four seasons. Different species reproduce in different season hence, we choose whole year for study. Rewa District is a district of the Madhya Pradesh state in central India. The city of Rewa is the district headquarters. Rewa is also known as the 'Land of White Tigers' as the first White Tiger was discovered here by Maharaja of the province, Martand Singh in 1951 in the nearby jungle of Govindgarh. Madhya Pradesh's only Sainik School is also situated in Rewa. Rewa was Capital city of Vindhya Pradesh. Rewa lies between 24^0 18' and 25^0 12' north latitudes and 81^0 2' and 82^0 18'. The district is bounded on the north by Uttar Pradesh, on the east and southeast by Sidhi, on the south by Shahdol, and on the west by Satna. Rewa district is part of Rewa Division and has an area of 6,240 km^2.

Collection and preservation of Zooplankton was done at the study sites while method of identification of zooplankton was applied in the laboratory. Samples were collected seasonally from three sampling stations during the study period. For qualitative and quantitative studies of zooplankton, 10 lits. of surface water were passed through a No. 25 bolting silk cloth net of mesh size 63µm and concentrated to 100ml and were preserved by adding 2ml of 4% formalin simultaneously. The samples were observed and identified under microscope using keys and monographs of Edmondson (1959), Pennak, (1978), Battish, (1992), Dhanapathi, (2000) and Adoni, (1985). Zooplanktons were counted with the help of Sedgwick Rafter cell method. 10ml of concentrated sample was used for the identification of different groups of zooplankton like Rotifera, Copepoda, Cladocera, Protozoa and Ostracoda. For their numerical estimation, the organisms were observed under light microscope using "Sedgwick Rafter Cell" as per procedure given in standard methods APHA, (1991). Average 5 to 10 counts for each sample were taken and results were expressed in number of organisms/litre. The results have been expressed as ind./l (Wanganeo and Wanganeo, 2006).

RESULTS AND DISCUSSIONS:

During the entire study of Odda river, a total of 33 species of zooplankton, belonging to groups Rotifera (14 species), Cladocera (9 species), Copepoda (6 species), Protozoa (2 species) and Ostracoda (2 species) was registered from all the study sites (Table 1):

Table 1: Diversity of different groups of zooplankton.

S.No.	Groups	Odda river
1	Rotifera	14
2	Cladocera	9
3	Copepoda	6
4	Protozoa	2
5	Ostracoda	2
Total		**33**

During the one years (Oct. 2019-Sep. 2020) of present investigation of zooplankton diversity in the Odda river, site I recorded relatively maximum number of species (28) followed by site II (26 species), which in turn was followed by site III documenting 23 species

Table 2: Station Variation of Diversity of Zooplankton

Odda River			
Groups	**Site I**	**Site II**	**Site III**
Rotifera	10	11	8
Cladocera	8	8	7
Copepoda	5	3	4
Ostracoda	3	2	2
Protozoa	2	2	2
Total	**28**	**26**	**23**

Rotifera: The Rotifera shows a wide range of zooplankton. In Odda River, Rotifera was the most dominant group among all the identified groups. Rotifera shows the maximum diversity in summer season at site I with 525 ind./l and minimum was observed in monsoon season at site I with 35ind./l. Maximum diversity may be due to the production and decomposition of organic matter Majagi and Vijaykumar (2009) and minimum may be due to the rainfall and heavy floods, poor water quality and less food availability.

Cladocera : Cladocera plays an important role in the integrity and stability of aquatic ecosystems and also serve as important fish diet Dodson and Hanazato (1995). Cladocera group identified from River Odda were representing (9) species. Maximum diversity of Cladocera were recorded in summer season at site II with 285 ind. /l and minimum were recorded in winter season at site III with 40 ind./l. The highest diversity may be due to the availability of food and nutrients. The density and biomass of the Cladocerans was determined by the food supply (Wright 1995, Sharma and Mankodi 2011). The lowest diversity may be due to the low temperature and low water level.

Copepoda : The living Copepods constitute an important link in aquatic food web. They serve as food to several fishes and play an important role in the energy transformation at various tropic levels. During the investigation (06) species of group Copepoda were recorded, maximum. Copepod species were identified during the summer season at Site- II (upstream) with 220 Ind. /l which may be due to the enrichment of nutrients. The minimum. Copepod species were recorded during the post monsoon season at site I (near Sethanighat with 40 Ind. /l, which may be due to low population of phytoplankton.

Ostracoda : Ostrocoda commonly known as "Seed shrimps". Ostracoda were found in all fresh water bodies. Ostracoda group were recorded with only 2 species, maximum diversity of ostracoda species were identified in the summer season at site II (Upstream) with 110 Ind./l, which may be due to high temperature which is favorable for the growth of ostracod species and minimum diversity of ostracod population were recorded in the winter season at site I and II which may be due to low water level and low water temperature. Sunkad and Patil (2004) also recorded maximum ostracod population in summer season in fort Lake Belgeum.

Protozoa Protozoa act as bio-indicators for pollution. Environmental bio-monitoring has been recognized since long particularly in water purification plants and activated sludge process (Kolwitz *et al.*,). The protozoa population in the Odda river contributed Only 8% of total Zooplankton during Oct-19-Sept. 2020 were representing 3 species, while maximum protozoa species were identified during summer season at site II with (85 ind./l)and minimum protozoa species were recorded in post monsoon season at site I with (5ind./l).

Dominant and abundant Genera of Zooplankton in river Odda.

During the present study, among the Rotifera community the most abundant genera is represented by *Brachionus species*. The species has cosmopolitan distribution and it was represented by five species viz., *Brachionus calyciflorus, Brachionus havanaensis falcatus, Brachionus quadridentata and Brachionus scliifere.* Mageed (2008) and Uzma (2009) started that presence of more than five species of *Brachionus* reflects eutrophication of water bodies. The dominance of *Brachionus* is an indication that the water body under study is eutrophic and their abundance was due to the presence of high levels of organic matter in the river (Matsumura, *et al.*, 1990). According to the observation the *Brachionus*

species are very common in temperate and tropical waters (Hutchinson, 1967), indicates alkaline nature of water. According to several authors, the permanent dominancy of Rotifer species such as *Brachionus* can be consider as a biological indicator of more eutrophic waters (Maemets, 1983, Nogueira., 2001 and Dirican *et al.*, 2009) .

The Cladocera were second identified group in order of dominance with abundance of *Daphnia plexus* species. D*aphnia* is associated with clear lake healthy support fish population (Mazumdar, 1994). Low population of *Moina* was observed in the present study same was reported by Choubey (1992) from Gandhi Sagar reservoir.

The Copepoda group observed as third dominant group. Copepoda during the entire period was mainly represented by *Cyclops* sp.and *nauplii larvae*. Joshi (1987) reported dominant population of Copepoda (Cyclops sp.) throughout the year from Sagar Lake. *Cyclops* is srictly pollution sensitive taxa (Bhatnagar *et al.*, 2013, Bhatti and Rana 1987, Wolfram *et al.*, 2002). Protozoa was observed in minor quantities.

CONCLUSION:

The relative taxonomic report summarizes to reveal the studies during Oct. 2019-Sep. 2020. works on zooplanktons of river Odda. This report provides knowledge of diversity of various species for further detailed study. Conservation of biodiversity is necessary for healthy environment so we can use bio indicator species in place of chemical for pollution assessment as well as anthropogenic activities. Hence there is an urgent need to create awareness among local peoples on the importance of riverine habitat as well as its fauna and the need to conserve them for future generations.

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