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Zooplankton Communities of Uttarmand Reservoir in Patan Tahsil, District Satara (Maharashtra) India

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Water is one of the most precious resources on earth without which there would be no life on Earth. Nowadays, water pollution is a major global problem. It is an acute problem almost in all major rivers and dams in India. Water pollution is increasing and becoming severe day-by-day and posing a great risk to human health and other living organisms [1]. Assessment of water resource quality of any region is an important aspect of developmental activities of the region, because rivers, lakes and manmade reservoirs are used for water supply to domestic, industrial, agricultural and fish culture [2].

Assessment of zooplankton gives valuable information about the management and restoration of aquatic ecosystem. Zooplankton is the best indicator of water quality in aquatic ecosystem [3], can react to water quality change by making changes in species composition, abundance and by morphological abnormalities [4]. Zooplankton are minute aquatic organisms ranging from a few microns to a millimeter or more. They are non-motile or very weak swimmers drifting in ocean, seas and fresh water bodies and are greatly associated with changes in phytoplankton community [5]. They feed on phytoplankton or other members of zooplankton, so they play important role in the food web [6] by acting as major mode of energy transfer between phytoplankton and fish [7]. Zooplankton is good indicators of the changes in water quality because they are strongly affected by environmental conditions and respond quickly to changes in water quality. Thus, it is a well-suited tool for understanding water pollution status.

Uttarmand is a medium irrigation project which was constructed in 2001 across the river Uttarmand, a tributary of Krishna River, near village Mathanewadi in Patan Taluka of Satara district in Maharashtra. It lies between 17°24'16.04"N and 74°1'9.37"E.



Fig 1 Satellite view of study area

Zooplankton sampling

The water samples were collected once in a month during the period of January 2019 to December 2019 by filtering water through conical shape plankton net from the selected sites. The sample of plankton thus collected was preserved in 4% formaldehyde for analysis in the laboratory. Zooplankton were observed and identified under research Binocular microscope by using standard key by Edmondson [8], Needham and Needham [9], Tonapi [10] and online references.

Table 1 Zooplankton diversity of Uttarmand reservoir

Group	Genera
Rotifera	Brachionus species Keratella species Euchlanis Species Filinia Species
Copepoda	Nauplius species Mesocyclops species
Cladocera	Daphnia species Monia species Bosminia species Alona species
Ostracoda	Cypris species

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An attempt has been made to study the zooplankton diversity of Uttarmand reservoir and recorded species were

enlisted in the (Table 1). In Uttarmand reservoir, among the zooplankton four groups of zooplankton communities were identified namely rotifera, copepods, cladocera and ostracoda. Rotifera group was reported to be dominant among all other zooplankton groups. The Ostracods are found to be least dominant while Copepods and Cladocera show near about equal dominance with little difference.

The hierarchy of dominance is as Rotifers > Copepods > Cladocera > Ostracods. Sehgal *et al.* [11] (2013) studied zooplankton diversity in Dimbhe reservoir. The diversity study revealed four groups of zooplankton viz. Rotifera, Cladocera, Copepoda, Ostracoda. Nauplius, insect larvae and insect eggs were also recorded in various densities. Kar and Kar [12] (2013) reported 26 species of Zooplankton from an oxbow lake of Cachar, Assam. Tyor *et al.* [13] (2014) studied Zooplankton diversity in a shallow lake of Gurgaon, Haryana revealing Rotifera with highest diversity followed by Cladocera and then Copepoda showing least diversity. Pawar [14] (2014) reported 66 species of Zooplankton in some freshwater bodies around Satara district of Maharashtra, India. Khan and Pathan [15] (2016) were identified and recorded 19 different zooplankton species in Triveni Lake including five different groups like Protozoa, Rotifera, Cladocera, Copepoda, Ostracods. The zooplankton diversity of Uttarmand reservoir resembled the species spectrum, as supported by these investigators.

SUMMARY

Zooplankton are the smallest organisms present in any aquatic body. They float, drift or weakly swim in the water. Zooplankton are vital components of freshwater food web and contribute to biological productivity. Zooplankton acts as main sources of food for many fishes and plays an important role in early detection and monitoring the pollution of water. Variation in water quality such as changes in nutrient levels, conductivity, temperature or pH can lead to changes in species composition and abundance. Uttarmand reservoir is a medium irrigation project constructed across the river Uttarmand, a tributary of Krishna River in Patan Tahsil of Satara district in Maharashtra. The present investigation deals with study of zooplankton diversity of Uttarmand reservoir to check the status in the area and provide new insights into its ecology. This information can be utilized during the formulation of management measures to improve the productivity the reservoir.

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