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Study of the Zooplankton Diversity of Five Study Stations in Amravati Region, Maharashtra and Impact of Seasonal Variations

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Abstract: Lakes help in providing water, preventing floods, pisciculture, transportation, and tourists recreation site. The rapid pace of industrialization, along with the indiscriminate application of chemical fertilizers and pesticides in agriculture, has led to severe and diverse pollution in aquatic environments, resulting in the degradation of water quality and the depletion of aquatic life. The present study was conducted to assess the biological constituents of some water bodies in Amravati region, Maharashtra with particular focus on zooplankton communities. For study five study stations were selected including Wadali lake, Chatri lake, Ghatkhed lake, Rajura lake and Bhor lake. The study revealed the population diversity of zooplanktons at the respective study stations. Zooplankton community analysis revealed dominance of Rotifera, Cladocera, Protozoa, Ostracoda and Copepoda diversity during the study.

Keywords: Plankton, Amravati, Wadali, Chatri, diversity, zooplankton.

Introduction:

Aquatic ecosystems play a crucial role in sustaining biodiversity, regulating climate, purifying water, and facilitating the circulation of materials. These ecosystems encompass natural biological cycles, ecological functions, anthropogenic activities, and various other ecological processes (Batten et al., 2019; Wu et al., 2022). For example, diverse species—including plankton, benthic organisms, aquatic plants, and fish—are interconnected through food chains and food webs, collectively engaging in ecological processes such as nutrient cycling and organic matter decomposition (Dhande, 2022). These processes are fundamental to maintaining water quality and promoting ecological restoration (Qu and Peng, 2025). Nevertheless, the sustainability of aquatic ecosystems faces significant threats from climate change—characterized by increased evaporation and reduced precipitation—invasive alien species, water pollution potentially linked to industrialization, overexploitation of resources, and the development of upstream hydraulic infrastructure. These factors may detrimentally impact water resources, aquatic environments, and ecosystem integrity (Cao et al., 2021). Consequently, there is a pressing need for comprehensive and systematic evaluations of aquatic ecological conditions.
Zooplankton are microscopic, free-floating animals within aquatic ecosystems. The term ‘zoo’ originates from the Greek word ‘zoon,’ meaning animal, while ‘plankton’ denotes ‘wanderers’ or ‘drifters’ (Vairagade, 2024). Zooplankton are cosmopolitan, inhabiting diverse aquatic environments including freshwater, brackish, polluted, and wastewater systems (Jakhar, 2013). They are capable of surviving under a wide range of environmental conditions and serve as bioindicators for various fish species and their population densities. Additionally, certain zooplankton species function as indicators of water quality, with their presence, absence, or community density reflecting levels of organic or inorganic pollution. Zooplankton are generally classified into five groups: Protozoa, Cladocera, Copepoda, Ostracoda, and Rotifera (Vairagade, 2024).

Materials and Methods: The study was conducted in Amravati region, Maharashtra during the study period of 2023-2024. The five water bodies including Wadali lake (S1), Chatri lake (S2), Ghatkhed lake (S3), Rajura lake (S4) and Bhor lake (S4) were selected for the study and designated as Station 1 (S1), Station 2 (S2), Station 3 (S3), Station 4 (S4), and Station 5 (S5) respectively.

Collection of Phytoplankton:

The plankton samples were collected through fine plankton net for which water sample were collected and filtered by repeating several times. The water samples were mixed and collected in phials by adding 4% formalin and brought to the laboratory for analysis.

Results and Discussion

The zooplanktons diversity documented at the selected study stations in Amravti region included Rotifera, Cladocera, Protozoa, Ostracoda and Copepoda diversity.

Rotifera diversity observed during the study of the selected study sites included *Asplanchna brightwelli*, *Brachionus calcyciflorus, B. dimidiatus, B. quadridentalus, B. bidentatus, B. falcatus, B. caudatus, Epiphanes senta, Keratella tropica, K. cochlearis, K. quadratus, Lepadella, Lecane bulla, Mytilina,* and *Platyias*. Zooplanktons belonging to the Cladocera diversity noted during the study included *Alonella, Ceriodaphnia, Daphnia, Macrothrix, Moinodaphnia, Leydigia,* and *Simocephalus vetulus*. Protozoa diversity observed at the selected study sites consisted of *Arcella, Centropyxis, Paramecium caudatum, Difflugia urceolata, Euglena, Platyophrya vorase,* and *Vortecella*. Ostracoda diversity members observed at the selected study sites comprised of *Cypris subglobosa, Cyprinotus, Hemicypris, Stenocypris fontinalis,* and *Strandesia*. Copepoda diversity members observed during the study consisted of to be *Cyclops, Diaptomus, Ectocyclops, Heliodiptomus, Mesocyclops,* and *Neodiptomus* (**Table 1**).

The results of the study showed dominance of Rotifera diversity followed by Cladocera diversity and the lowest diversity was observed to be ostracoda diversity.

Table 1: Zooplanktons Diversity at selected study sites of Amravati region

	S1	**S2**	**S3**	**S4**	**S5**
Rotifera diversity					
Asplanchna brightwelli	+	+	+	+	+
Brachionus calcyciflorus	+	-	-	+	-
B. dimidiatus	+	+	+	+	+
B. quadridentalus	+	-	+	-	+
B. bidentatus	+	+	+	+	+
B. falcatus	-	+	+	+	-
B. caudatus	+	-	-	-	+
Epiphanes senta	+	+	+	+	+
Keratella tropica	+	+	+	+	+
K. cochlearis	+	+	+	+	+
K.. quadratus	+	+	+	+	+
Lepadella	-	+	-	+	+
Lecane bulla	+	+	+	+	+
Mytilina	+	+	+	+	+
Platyias	+	-	+	-	+
Cladocera diversity					

Alonella	+	+	+	+	+
Ceriodaphnia	+	+	+	+	+
Daphnia	+	+	+	+	+
Macrothrix	+	-	+	-	-
Moinodaphnia	+	+	+	+	+
Leydigia	+	+	+	+	+
Simocephalus vetulus	-	+	-	+	+
	S1	**S2**	**S3**	**S4**	**S5**
Protozoa diversity					
Arcella	+	+	+	+	+
Centropyxis	+	-	+	-	+
Paramecium caudatum	+	+	+	+	+
Difflugia urceolata	+	+	+	+	+
Euglena	-	+	-	+	+
Platyophrya vorase	+	+	+	+	+
Vorticella	-	+	+	-	-
Ostracoda diversity					
Cypris subglobosa	+	+	+	+	+
Cyprinotus	-	+	-	-	+
Hemicypris	-	+	+	+	-
Stenocypris fontinalis	+	+	+	+	+
Strandesia	+	+	+	+	+
Copepoda diversity					
Cyclops	+	+	+	+	+
Diaptomus	+	+	+	+	+
Ectocyclops	+	+	+	+	+
Heliodiptomus	+	+	+	+	+
Mesocyclops	+	+	+	+	+
Neodiptomus	+	+	+	+	+

Conclusion: The present study gives a brief overview of the zooplankton diversity of some water bodies of the Amravati region. Brief study regarding the population of zooplanktons will be further conducted.

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