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REVIEW OF RESEARCH

BIODIVERSITY OF ZOOPLANKTON FROM NATHSAGER DAM PAITHAN

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ABSTRACT :

Zooplankton biodiversity serves as an ecological indicator of aquatic environment due to theirrapid response according to environmental changes. In the present investigation we study , impact of seasonal changes onzooplankton biodiversity was conducted in the Nathsager dam form Paithan district Auranagabad Maharashtra. The biodiversity of zooplankton taxa were studied for a period from January 2017 to December 2017 on seasonal basis. During this time period, in total, 28 species of zooplankton were noticed, which includes 9species of each Rotifera and Cladocera and 5 species of Copepoda and Ostracoda.

In this present observation,total abundance of Rotifera was found to be predominant with 35%, followed by Cladocera 29%, Copepoda 29%and Ostracoda 7%. The population density of various group of zooplankton was observed, and it was found tobe following order Rotifera>Copepoda>Cladocera>Ostracoda. The high and low population densities wererecorded in summer and early monsoon season respectively. This higher zooplankton population density insummer might be due to the temperature acceleration in the Nathsager dam.The present study revealed that zooplankton productivity was found to be higher in the Nathsater dam.When the temperature was increased in summer season. It indicates that the temperature has influence onthe zooplankton diversity. Therefore, increased temperature due to global climate change might have influenceon the zooplankton production. Assessment of zooplankton biodiversity will be useful to monitor the health(water quality) and wealth (fishery productivity) of this lake system in the near future.

KEY WORDS - *Biodiversity, Zooplankton, Nathsagar dam, Cladocera.*

INTRODUCTION:

Zooplankton biodiversity is one of the important ecologicalindicators of the aquatic environment. Zooplankton biodiversity is essential to keep our ecosystem healthybecause each species plays a specific role in the ecosystem and some species may allow naturalecosystem to function in a healthy manner.

Zooplankton are crucial elements offreshwater lake ecosystems as they occupy the center ofthe aquatic food web and being as an important food foralmost all freshwater fish species at some stage in their life. zooplanktoncommunities are sensitive to anthropogenic impactsand their study may be useful in the prediction of longtermchanges in dam ecosystems, as these community esare highly sensitive to environment fluctuations.

Changes in zooplankton abundance, species diversityand community composition can indicate the change ordisturbance of the environment; it has been reported byseveral studies that zooplankton can serve as an indicatorof changes in trophic dynamics and the ecological state oflakes related to changes in nutrient

loading and climateis potentiallyaffected by both “natural” dam change inthe physico-chemical conditions in aquatic systems brings acorresponding change in the relative composition andabundance of organisms thriving in the water; therefore,they can be used as a tool in monitoring aquaticecosystems, hence, zooplankton have been consideredas ecological importance organisms .

The increasing human population in India leads tonumber of industrialization which creates the problemsof disposal of waste water products. An undesirablesubstance is regularly discharged into the lake waterthrough surface runoff that degrades the water quality.The water quality is defined in terms of the chemical,physical and biological contents of water .

The aspect informationof water quality and states of affected living organismsof water bodies are necessary for implementation of anymanagement strategies.The plankton diversity was mainly important ofecological parameter in freshwater and marine water.The species diversity of each community is composed oftaxonomically as well as morphologically differentspecies. Species diversity refers to numbers of differentspecies in the community including both in abundantand rare species. The species diversity is very high innatural communities like tropical and subtropical,whereas it is very low in physically or human-controlledcommunities. Species diversity has two components:species richness and species evenness. In simple words, species richness refers to different types of species andtheir numerical strength. Technically, it refers to ratiobetween different speciesand total number of species(N). Species evenness refers to a measure which qualifiesas to how even species are in terms of their number.The species diversity can be measured by using variousdiversity indices—the mathematical expressions based onspecies abundance data. The species diversity can be measuredseparately either as species richness or evenness ordiversity as a whole. In the present study, Nathasager dam isa natural habitat dam attached with river Godavery, Paithan.

The availability and valueof freshwater in this lake is important because it provideemployment to local fisherman and main source of livelihoodof some of very poor community of this area. Hence,current study was undertaken to investigate the impact ofseasonal changes in zooplankton biodiversity in Nathsager dam in Paithan.

MATERIAL AND METHODS

Study area

The Nathsager dam (Lat19° 29’8.7 N and Long 75° 22’12” E)ecosystem is located in Paithan city, Aurangabad district Maharashtra ,India . This lake water spread over an area of 21,750 km2 (8398sq. mi) with average depth of 41.30 m(135ft), and it is filled up when the rains lashed the city.A part of the lake is regularly used for dumping domesticand municipal wastes. The lake is also used for regularfishing by local fishermen.

Results

Physico-chemical parameters In the present study, the recorded atmospheric and surfacewater temperature of four different seasons. The results reviled that the recorded atmosphericand surface water temperature ranged between 22.78 ± 0.87to 24.94 ± 1.01 °C and 20.61 ± 0.55 to 25.92 ± 0.39 °C respectively.Among four different seasons, monsoon showedthe minimum atmospheric and surface water temperature,whereas summer season showed the maximum minimumatmospheric and surface water temperature during thestudy period. The recorded pH and salinity of lake rangedbetween 8.34 ± 0.35 to 8.57 ± 0.61 and 1.81 ± 0.09 to 1.22 ±0.21 mg/l during the study period.Theminimum and maximum level of pH was noticed duringmonsoon and summer seasons respectively. In context,the minimum and maximum salinity was recorded duringthe post-monsoon and summer season respectively.

Table 1 List of freshwater zooplankton recorded in the Nathsager dam

Group	Family	Genus	Species
Rotifera	Brachionidae	Brachionus Pallas,	Brachionusangularis
			Brachionuscalyciflorus Pallas,
			Brachionuscaudatuspersonatus
			BrachionusdiversicornisDaday,
			Brachionusfalcatus
			Brachionusquadridentatus
			Brachionusrubens
			Keratella
			keratellatropicaApstein,
Asplanchnidae	Asplanchna		Asplanchnaintermedia
cladocerasididae	Ceriodaphnia Dana	Diaphanosoma	Diaphanosomasarsi
		Daphnidae	Daphnia Muller
			Daphnia carinata king,
			Daphnia magna Straus,
			CeriodaphniacornutaSars,
			Ceriodaphnia reticulate Jurine,
		Moinidae	Moin Baird
			MoinabrachiataJurine,
			MoinamicruraKurz,
		Moinodaphnia	Moinodaphniamacleayi
	Macrothricidae	Macrothrix Baird	Macrothrixgoeldii
Copepoda	Diaptomidae	Helodiaptomus Kiefer	Heliodiaptomusviduus
	Sinodiaptomus Kiefer	Sinodiaptomus (Rhinediaptomus)	indicus Sewell
	Cyclopoidae	Mesocyclops Claus	MesocyclopshyalinusRehberg
			Mesocyclopsleuckarti Claus
		hermocyclop	ThermocyclopshyalinusRehberg
	OstracodaCyprididae	Cypris Muller	Cyprisprotubera Muller
		EucyprisVavra	Eucyprisbispinosa
			Cyprinotus Brady,
			Cyprinotusnudus
			Heterocyprisdentatomarginatus
			Heterocypris

RESULT AND DISCUSSION:

Knowledge on hydrology of any lake is essential forproper utilization. Physico-chemical parameters andnutrient quantity of lake water play a significant role inthe distribution patterns and species composition ofplankton In aquatic habitats, environmental factorsincluding various physical properties andchemical properties of water are very important for growth anddispersal of phytoplankton on which zooplankton dependfor their existence. In the current study, Nathsager dam showed significant variation in physico-chemicalparameters of water, species composition, populationdensity, species diversity, species evenness and speciesrichness of different zooplankton species. It suggests thatphysico-chemical parameters of water influenced bydifferent season variations and it led to significant differencesin the density, diversity, evenness and richness ofzooplankton in the Nathsager dam. Surface watertemperature is one of the most essential and changeableenvironmental factors, since it influences the growth anddistribution of flora and fauna of lake ecosystem. Also,influence of surface water on limnological phenomenon,such as stratification, solubility of gases, pH, conductivityand planktonic distribution are well known .A rise from the temperatureleads to the fast chemical and biochemical reactions. Inthe growth and death of microorganisms, the kinetics ofthe

biochemical oxygen demand that is also regulated tosome extent by water temperature have also been reported

CONCLUSIONS

The results from this study indicated that the increasedlevel of temperature led to increased water evaporation,followed by rich nutrients and elevated level of zooplanktonabundance in the dam during the summer season, whereaszooplankton falls during the monsoon due to dilution of dam by rainfall. Therefore, the present study suggests thatthe water temperature can positively support the populationdiversity of zooplankton with the evidence from highdegree of positive correlation between temperature, totaldissolved solids and plankton density. However, furtherstudies are warranted on the continuous monitoring of thislake ecosystem to know the future impact of climatechange on distribution of zooplankton which can help toidentify the sensitive and sentinel species to formulate theeffective conservation strategies.

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