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EFFECT OF CLIMATIC VARIATION ON ZOOPLANKTON DIVERSITY IN LOWER TERNA RESERVOIR AT MAKANI, DISTRICT OSMANABAD, M.S. INDIA.

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Abstract

Plankton diversity is most important factor in aquatic community. The health of aquatic community depends upon phytoplankton and zooplankton community. As zooplankton are dependent on phytoplankton and fishes are dependent on both. The zooplankton is considered an important link between fishes and phytoplankton. So study of zooplankton diversity is very important in terms of ecosystem of a particular water body. The present study is based on observations of diversity of zooplankton in lower Terna Reservoir. This, monthly variation of zooplankton is observed during June 2015 to May 2016. Out of 21 species in the reservoir eight species were of rotifers class, four species of Cladocera class, six species of Copepods class and three of Ostracoda class. The seasonal variation of zooplankton analysis shows that the zooplankton diversity is abundant in winter season, lower in monsoon due to different environmental condition of water bodies.

Keywords- Zooplankton, Diversity of Plankton, Lower Terna Reservoir, Makani.

Introduction

The freshwater ecosystem is the composition of biotic and abiotic factors. The biotic factors are important for aquatic ecosystem. There are limited sources of fresh water like lakes, reservoirs, rivers etc. There for study or management of water bodies is most important part in environmental management. As per diversified geographical, geological, climatic and demographical reasons, the availability and quality of fresh water can also be diversified in nature. Plankton is a natural food of many fishes, especially zooplankton, consumes many omnivorous and carnivorous fishes. Most of the larvae corps are feed on zooplankton (Dewan et.al. 1977), because zooplankton provides protein for good growth and development of gonad for fishes (Prasad and Singh 2003). The variation in nutrient and other favorable conditions of water (water temperature, pH, salinity, DO, alkalinity, free CO2 etc.) during the plankton production is occurred due to variation in population (Welch P.S. 1952). Plankton communities integrated by various human environmental activities, they are providing by urbanization and climate changes of climate changes (Kunz and Richardson 2006). The change of climate effect on plankton and fisheries.

The various studies has been done on the condition of ecology and freshwater bodies in various regions in India (Sinha B. 2002, Singh S.P. 2002, Smith P.G. 2007), but the study of variation of zooplankton diversity on climatic is not that much discovered in Lower Terna reservoir, so this investigation is for zooplankton diversity in lower Terna reservoir.

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Materials Methods-

Zooplankton samples are collected in different seasons from four stations at various parts of Lower Terna Reservoir as from June 2019 to May 2020. The net samples were collected from stations with a 120μm mesh also called plankton net with reducing cone attached at mouth of cone. Till the sample reached the laboratory for analysis and counting from collection point, physical, chemical, and biochemical changes may happen which leads alteration in quality of water sample. So it is quite important to preserve it before shipping. This is done by various methods such as keeping sample in dark, adding chemical preservatives, lowering the temperature to retard the reactions by freezing or a combination of these methods. In this investigation we have added formalin as preservative in collection sample. After filtering through plankton nets, the samples were concentrated in 100ml bottles and fixed with 40% formalin (10ml per sample) which forms a solution as a final formaldehyde concentration with 4%. For Counting purpose sample above made are taken, and Drop count method was used. In this method one drop of sample is taken on a glass slide with the help of calibrated pipette and the planktonic organisms are counted in strip. The total area under the cover slip represents the number of organisms present per given volume of the sample. The organism per liter of water of the lake is yield from this volume of sample expanded to an appropriate factor. For analysis, a colony of plankton is accounted as a single count as some plankton are unicellular while others are multicellular.

Formula for Calculating organisms per liter is:-

Total Plankton count per liter= $A \times \left({}^{1}/_{L}\right) \times \left({}^{n}/_{V}\right)$

Where, A=number of organisms per drop (no)

L=Volume of original sample (l)

n=Total volume of concentrated sample (ml)

V=Volume of one drop (ml)

Observation Table No-1

Season	Rotifera	Cladocera	Copepoda	Ostracoda	Total
Winter	935	480	738	207	2276
Summer	908	395	526	275	2220
Monsoon	734	360	501	123	1802
Average Of all Season	897	412	588	202	

Fig.01- Chart for Seasonal variation of Zooplankton at Lower Terna Reservoir.

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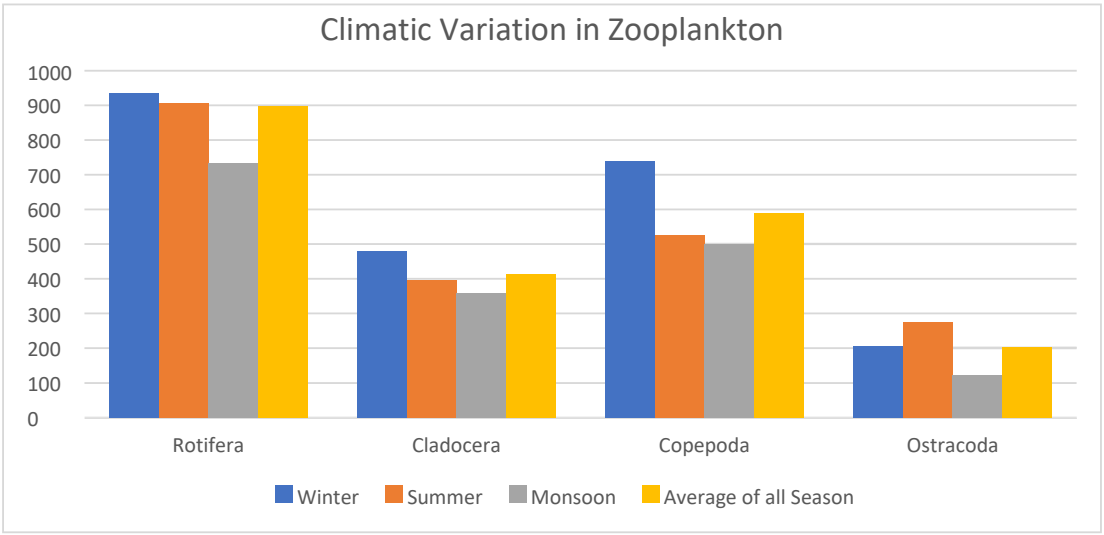

Result and Discussion

In the present study 21species of zooplankton were reported, among those 8 species are of Rotifera, 4 species are of Cladocera, 6 species are of Copepoda and 3 species are of Ostracoda. The record of each species belongs to Four classes are shown in Table No.1.

The seasonal variation of zooplankton are illustrated in Fig.1 shows that, species richness was high in winter season and it was minimum during monsoon season. Same observation was observed by A.M. Watkar and M.P. Barbate (2012).

Rotifers: - The Rotifer are the most important group of zooplankton. It is soft bodies invertebrate (Hutchinson G.E. 1967). In aquatic ecosystem Rotifers are play an important role in food chain. In rotifer Brachinous, Filinia, Keratella are the most dominant species in the Lower Terna Reservoir, which is recorded during this present study. According to Hutchinson G.E. (1967)'s observation the Brachinous species are very common in temperate and tropical waters, indicates alkaline nature of water. In the present study population density of rotifers was maximum in summer season same result is in winter also. Taxonomic dominance of rotifer was reported in several water bodies (Dhanapathi, 2003). The presence of Rotifer are the important indication of pollution of water (Saksena D.N. 1981).

Cladocera: - It is commonly called as "water flea". It is present at deep water and most of the fishes feed on it. So it is most important part of food chain in aquatic life (D. Sinha 1992). In the present study Cladocera are abundant in winter season, when food supply is more and avoiding competition with rotifers because it is less than summer and minimum in monsoon season, some investigation carried by A.M. Watkar and M.P. Barbate (2013). The maximum population in winter season for suitable temperature, availability of food there are most important parameter to controlling the Cladocera (Edmondson, 1959).

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Copepoda: - This group of zooplankton are majorly present in all water bodies, most source of food for fishes and play important role in aquatic ecosystem in an ecological pyramid. In present study the population density is maximum during winter season and minimum during monsoon. The factors like rainfall, river discharge, phytoplankton density are controlled the growth of Copepoda (Bijay Mandan S. and P.K. Abdul A., 1994).

Ostracoda: - The marine and fresh water bivalve of crestaceans are including in the group Ostracoda. They occurs in all kind of water bodies. It provides a good food for all aquatic organisms. In the present investigation three species of Ostracoda are recorded. The maximum population of Ostracoda in summer season while the minimum population in in winter season. Similar observations were also investigated by H.S. Patil (2004). The more species of Ostracoda in fresh water are inhibited by pollution of water (Edmondson, W.T., 1959)

Conclusion

The present study of Zooplankton analysis showed that, the total population density of Zooplankton are more in winter season due to low temperature, it is favorable climate for Phytoplankton growth as an maximum source of food and the low growth of Zooplankton is in the monsoon season due to dilution factors but in summer season the growth of Zooplankton is medium due to stability of water bodies. Availability of food is more due to decomposition of organic matter.

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