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Biodiversity and Seasonal Fluctuations of Zooplanktons in Jagatunga Samudra Reservoir of Kandhar, India

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Abstract

The zooplankton community is a heterogeneous assemblage of animals covering many taxonomic groups comprising mostly of invertebrates. It includes herbivores, carnivores, detritivores and omnivores constituting an efficient food chain utilizing the energy transfer from the primary to the secondary level. Thus zooplankton forms a major link in the food chain and is significant in assessing the fertility of the water bodies. The study of zooplankton communities is important because it provides way of predicting and increasing the productivity of lakes. The present paper deals with the biodiversity and seasonal fluctuations of zooplanktons of Jagatunga Samudra Reservoir, Kandhar, Dist. Nanded, (M.S), India. The maximum number of zooplankton observed during winter season and minimum during monsoon season.

Keywords: Seasonal fluctuations, zooplankton, Jagatunga Samudra, Reservoir

Introduction

Zooplanktons are important component in aquatic ecosystems and act as primary and secondary links in the food chain (Hutchinson, 1967). However, zooplankton community are also influenced by biological interactions, predation and inter specific competition for food resources (Neves et al, 2003) these communities also be used as the indicators of changing tropic status of an aquatic ecosystem (Blancher, 1984). Zooplankton have long been used as indicators of the eutrophication (Vandysh, 2004; Webber et. al, 2005), eutrophication influences both the composition and productivity of zooplanktons (Bohra and Kumar, 2004). Zooplanktons are very sensitive to environmental changes and thus are of considerable potential value as water quality indicators (Gannon and Stemberger, 1978) of the specific waters and the specific, density of zooplankton is directly correlated with fishery potentiality (Sreelatha and Raja Lakshmi, 2005)

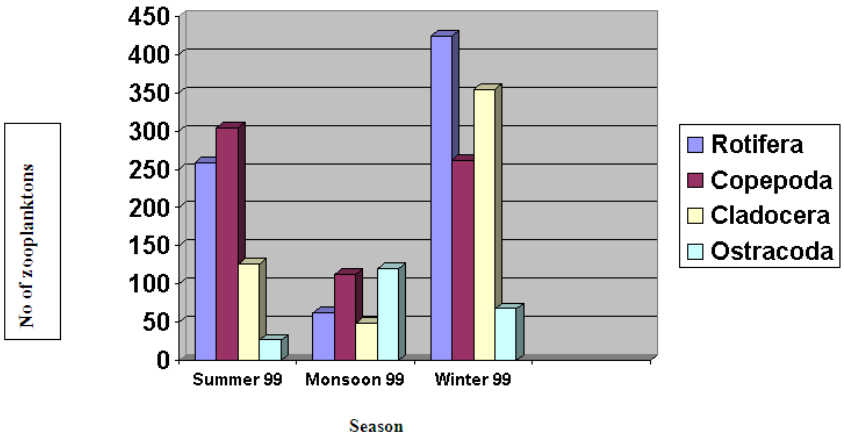
The present investigation deals with the diversity and seasonal fluctuations of zooplankton of Jagatunga Samudra Reservoir. It is one of the ancient, historical reservoir constructed to full fill the need of water for Kandharpur. Rastrakut king, Krishna third (AD 929-937) constructed a Jagatunga Samudra Reservoir in the honour of his elder brother Jagatunge. The reservoir is surrounded by natural hill-ocks on the three sides and there is a huge valley at the fourth sides of the reservoir.

Material and Methods

Collections of zooplankton were made using plankton net. Collection of sampling on monthly basis was carried out for a period of one year from February 1999 to January 2000 at the three sampling site from Jagatunga Samudra Reservoir. The samples were fixed with 4% formalin for quantitative estimation of the zooplankton. It was determined using Sedgwick rafter cell. For qualitative analysis a compound binocular microscope are used. Standard key and other literature was used for identification of different species of zooplankton.

Results

Graph I showing the biodiversity and seasonal fluctuations in principal components of zooplanktons. During the study period February 1999-January 2000, the summer population decreased during monsoon and increased in winter. Among three seasons, winter has relatively stable environmental condition in term of water quality and there were abundance of food. (Phytoplankton) and hence the zooplankton population showed an increasing during winter. In the present study zooplankton population was observed belong to 12 genera, out of these 3 genera belong to copepods, 5 genera belong to cladocera, 3 genera belong to rotifera and 1 genera belong to ostracoda.



Graph I – Biodiversity and Seasonal fluctuation of zooplanktons (February 1999 – January 2000)

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The four principal components of zooplankton exhibited marked variation over a study period of one year observation. Seasonal abundance (No/liter) of zooplankton group wise in the following increasing order.

Summer : Ostracoda → Cladocera → Rotifera → Copepoda

Monsoon : Cladocera → Rotifera → Copepoda → Ostracoda.

Winter : Ostracoda → Copepoda → Cladocera→ Rotifera

The summer population of Rotifera which was 259 organisms / Liter decreased to 62 organisms/Liter in monsoon and again increased to 425 organism/Liter in winter. Summer population of copepodes 305 organisms / Litre decline to 112 organism / Liter in monsoon and 262organism/Liter in winter. The cladocera exhibited the summer population 126 organisms / Liter dropped to 48 organism /Liter in monsoon and rise to 355 organism / Liter during winter. The ostracoda seasonal population was lowest in summer 26 organisms /Liter and increased to 119 organism / Liter in monsoon and 67 organisms / Liter in winter season.

Discussion

The result indicates that the maximum number of zooplankton observed during winter season and minimum during monsoon season which is also reported by Abdus Saboor and Altaff, 1995, Kumar, 2001. The high zooplankton population density during the winter season could be related to stable hydrological factors, while low density during the monsoon season is attributed to heavy flood and freshwater inflow (Santhanam et.al. 1975; Rajasagar; 1998 and Santhanam and Perumal 2003). The minimum values of zooplankton density were observed in the monsoon. Similar observation were earlier made by Sujata Mishra and Panigrahy,1999.In the monsoon fall of zooplankton density of all the groups during the study period can be attributed to the dilution effect (Bais and Agrawal 1993). The rotifera, cladocera and ostracoda were maximum in winter can be linked to favorable temperature and availability of abundant food in the form of bacteria, nanoplankton and suspended detritus (Edmondson, 1965: Baker, 1979).

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