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RESEARCH ARTICLE

SEASONAL VARIATIONS OF ZOOPLANKTON DIVERSITY OF NARAYAN TALAB IN SATNA CITY, MP, INDIA

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ABSTRACT

Background The zooplanktons play a major role of converting phytoplankton in to food, suitable for fish and aquatic animals. Hence qualitative and quantitative studies of zooplankton are of very important. The Narayan talab of Satna city has been selected for the present study. Water of this talab is major source of domestic purpose for the population and also utilized for pisciculture, washing of vehicles, cattle's, cloths and disposal of domestic sewage. **Method:** The samples were collected on the monthly basis and identified using standard book from December 2015 to November 2017. The present study was design and carried out in the laboratory of Zoology in the Government PG College Satna. In this study we have analyzed seasonal variation of zooplankton in Narayan talab. **Interpretation and conclusion:** The occurrence of Zooplanktons were dominant in the following increasing order- Winter: Rotifera> Ostracoda> Cladocera>Copepoda> Protozoa. Summer: Rotifera> Copepoda> Ostracoda> Cladocera>Protozoa. Monsoon: Copepoda > Ostracoda> Cladocera> Rotifera >Protozoa. Post monsoon Cladocera >Copepoda> Rotifera > Ostracoda>Protozoa.

INTRODUCTION

Zooplanktons are microscopic and free-floating animals, which play a vital role in the food web of aquatic ecosystem. They acts as main sources of food for many fishes and plays an important role in early detection and monitoring the pollution of water. They play a major role in the study of faunal diversity and in energy transfer to the next higher trophic levels and are also good indicator of water quality. As seasonal changes and human interference with any pond make the parameters to change (Ghanai et al., 2010), so study of this Talab will give us the information about how these parameters affect the pond ecosystem throughout the year. The plankton's growth rate and development depends on various biotic as well as abiotic factors like, light, temperature, available nutrients, hydrodynamics, predation, oxygen concentration, pH etc. Quantity and quality are two major issues occupied in the use of water. Zooplanktons are heterogeneous gathering of miniature floating animal forms found in aquatic ecosystem, are represented by wide array of taxonomic groups (Rotifera, Cladocera, Ostracods and Copepoda). Zooplankton has long been used as indicators of eutrophication. Zooplanktons are capable of concentrating large quantities of heavy metals from water bodies. The selected water body, Narayan talab is surrounded by human habitat and slums which increases the human interference and chances of releasing untreated sewage water and effluent in this lakes.

The objective of present study to observe seasonal fluctuation of zooplankton diversity from Dec 2015 to Nov 2017.

MATERIAL AND METHODS

Study area: Narayan talab is a big talab of Satna city, which situated near bus stand of Satna. Narayan talab is established eastern side of Satna city. It is located between Latitude 24^o-34'3.315"N and longitude 80^o- 5112.044"E. This is perennial and artificial pond. It has a very beautiful garden which is known as maitri bagh. The water is used for irrigation, domestic, drinking purpose by the people of the area. The littoral zone is covered by macrophytes which provides habitat for different types of invertebrates both macro invertebrates and micro invertebrates. Eastern site of talab is habitat for most of the migratory and residential birds due to abundance food availability and less human interference.

Sampling methods and preservation of zooplanktons: Water samples were collected in different selected site of the Talab on monthly basis for a period of two years from Dec 2015 to Nov 2017. Collection of Zooplankton was carried out by using plankton net. Sampling was made between 8.00 am to 10.00 am. The plankton net (mesh size 25 mm) was taken through surface water. 100 liter of surface water were collected through the plankton net and filtered sample were transferred to plastic bottles and 4% formalin was added for sample preservation.

Then these samples brought to laboratory for further studies. The systematic identification of zooplankton was made by using standard keys of Tonapi (1980), Adoni (1985), Battish (1992), Dhanapathi (2000), Altaff (2004).

RESULTS AND DISCUSSION

A total 25 species of zooplankton were recorded from Narayan talab. Among 25 species, Rotifera was dominant with 16 species followed by 03 species of Cladocera, 01 species of copepod, 02 species of Ostracoda and 03 species of Protozoa. The population density of protozoa was higher in the summer season and less in the monsoon season where as population density of Rotifera was higher in the summer season and less in the monsoon season in Narayan talab. Bhowmic, (1968) observed that increase in zooplankton population in post monsoon season was due to increase in photosynthetic activity in water bodies. Rotifer utilizes nutrients more rapidly to build up their population. The comparisons of size structure, fecundity and reproductive strategies of zooplankton's can indicate the nature and extent of pollutant loads. Similar findings were reported by Krishnamoorthy et al., (2007), Season wise grouped data revealed that Copepod was observed maximum during the monsoon and minimum in winter season in Narayan talab. Season wise grouped data revealed that Ostracods were more during summer and less in winter and monsoon season, Sampaio et al., (2002) studied the composition and abundance of zooplankton in the seven reservoirs, Brazil. The abundance of Ostracods were maximum during the winter season and minimum during the rainy season. Choudhary et al., (1999) studied zooplankton population of Boosra lake at Muzaffarpur, Bihar and reported that the abundance of zooplankton were more during winter season and less during rainy season. Surana et al., (2005) studied the community structure of zooplankton groups of Chimdi Lake Sunsari, Nepal and reported that the abundance of ostracods were maximum during winter season and minimum during the rainy season.

Table 1. Seasonal Variations of Zooplankton groups of Narayan talab, MP, India

	Winter	Summer	Monsoon	Post Monsoon
Protozoa	17.875	19.4625	15.365	16.3775
Rotifera	36.935	38.405	19.99	36.11
Cladocera	27.9475	22.32	23.39	39.78
Copepoda	28.79	33.125	51.1675	39.21
Ostracoda	31.48	33.6475	31.815	32.4375
Total	143.0275	146.96	141.7275	163.915

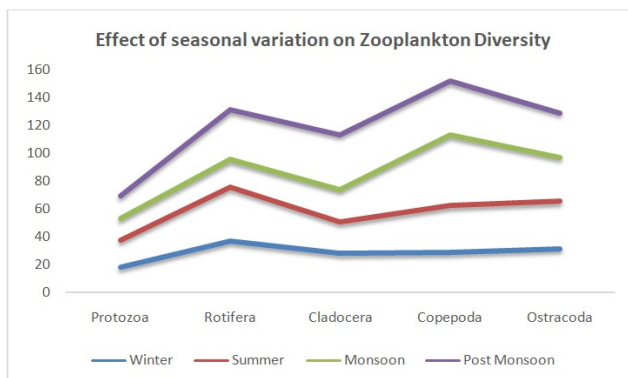


Fig 1. Zooplankton diversity of Narayan talab of Satna (M.P)

The study of Narayan talab revealed that Cladocera is significantly less during summer season when compared to more in post monsoon, winter and monsoon. Similar results are reported by Mondal et al., (2013) in their study on the diversity of Cladocera in Mirik Lake in Darjeeling, Himalaya, that temperature adversely affected Cladocera abundance and more abundant during summer season. The number of Cladocera was found to be maximum during summer season and minimum were seen during monsoon and winter season [Table-1 and

Fig 1). Similar trend has also been reported by Zannatul, (2009), Vanjare, (2013). Prajapati et al., (2019) has studied Zooplankton Species of Perennial Pond of Khoptaal at Chhatarpur District Madhya Pradesh, India. In the present study the occurrence of seasonal percent composition of Zooplankton were dominant in the following increasing order- Winter Rotifera > Ostracoda > Cladocera > Copepoda > Protozoa Summer Rotifera > Copepoda > Ostracoda > Cladocera > Protozoa Monsoon Copepoda > Ostracoda > Cladocera > Rotifera > Protozoa Post monsoon Cladocera > Copepoda > Rotifera > Ostracoda > Protozoa Fig 1

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