

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Diversity of zooplankton population at Sorai drain mixing point of Betwa river to check pollution level.

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ABSTRACT

The main group of suspended microorganisms is plankton that is composed of tiny plants and animals species which are floating, drifting or freely swimming in the water bodies. There are three major group of zooplankton which dominates freshwater ecosystems viz. copepods, cladocerans and rotifers. The present study updates the diversity of zooplanktons in the fresh water lotic ecosystem of Betwa river at Vidisha for the assessment of pollution status. Samples obtained from river water showed 8 rotifers, 9 copepod and 6 protozoan species. The zooplankton community is dominated by copepods, which contributed 39% to total abundance, followed by rotifers (35 %) and protozoan were low (26%) and cladocera were completely absent. Hence, the presence of protozoan and absence of cladocera indicate that the river is slightly polluted.

Keywords: Lotic zooplanktons, cladocerans, rotifers, copepods, protozoans.

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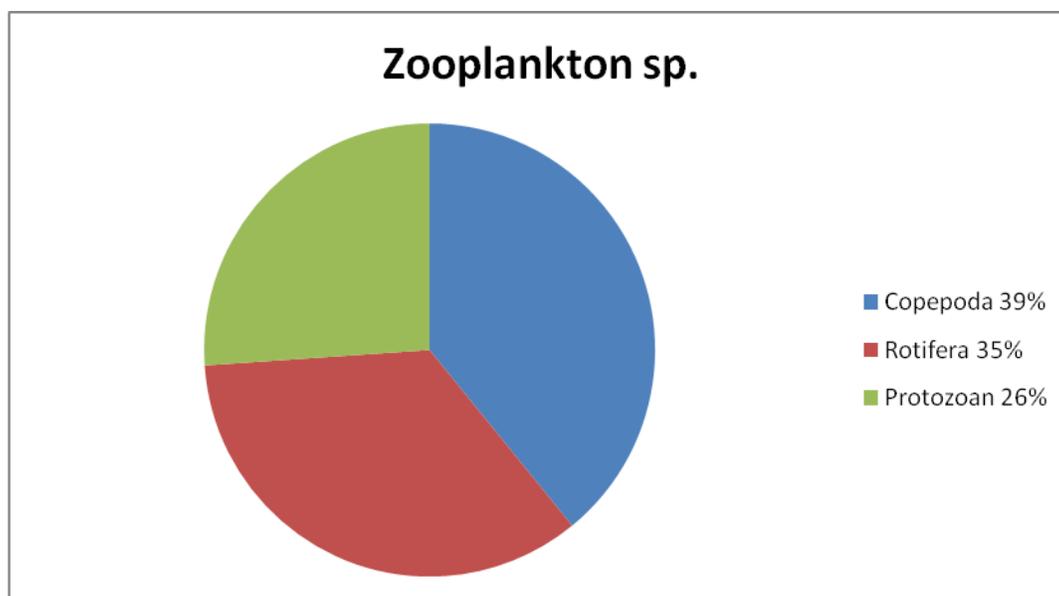
INTRODUCTION

To date pollution has become a major threat to the existence of human beings on earth. The activities of human beings are disturbing the atmosphere by the deterioration of environmental conditions (which are suitable to sustain life), causing pollution. Any type of undesirable changes in the physical, chemical, or biological characteristics of water is called water pollution that create potential hazards to the health, safety or welfare of not only human beings but other living species also. Water is the elixir of life and also the medium of the activities, as it is use for various purposes like drinking, cooking, bathing, cleaning, and washing but due to various activities, organic, inorganic and chemical substances are introduced into water bodies as a result water becomes polluted that is hazardous to health and life of living organisms [1]. Therefore, zooplanktons were studied for the assessment of pollution status in the Betwa river of Vidisha.

MATERIALS AND METHODS

An extensive survey of river Betwa at Vidisha (M.P.) was conducted during the study period from Sept. 2008 to Sept. 2009 and the place of study was selected on the basis of polluted area in the vicinity of river Betwa and referred as Sampling Station I. This station is Sorai drain mixing point. When Betwa flows from Vidisha to Sorai in north direction about 2 & ½ miles, a drain of Sorai mixed in it. Through this drain continuous discharge of city sewage and industrial effluents occurs on the bank of the river. From this station water samples were collected in the plastic bottles for the study of zooplanktons which were carried out at Department of Zoology, S. S. L. Jain P.G. College, Vidisha (M. P.).

RESULTS



Graph1 Percent distribution of zooplankton populations in the selected area of river Betwa.

Table 1: Zooplankton populations* observed in the water of Betwa river during Sept. 2008- Sept. 2009 at Vidisha.

Zooplankton (Unit/Lt.)	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
<u>Protozoa</u>													
1. Arcella sp.	-	-	+	++	++	++	++	++	+++	+++	-	-	-
2. Ceratium sp.	-	-	+	++	++	++	+++	++	+++	+++	-	-	-
3. Diffuzia sp.	-	-	+	++	++	++	++ +++	++	+++	+++	-	-	-
4. Euglypha sp.	-	-	++	++	++	++	++	++	+++	+++	-	-	-
5. Paramecium sp.	-	-	++	++	++	++	++	++	+++	+++	-	-	-
6. Vorticella sp.	-	-	++	++	++	++		++	+++	+++	-	-	-
<u>Rotifera</u>													
1. Asplanchnopus sp.	-	-	+	++	+	++	+	+++	+++	+++	-	-	-
2. Brachionus sp.	-	-	++	+	++	+	++	++	+++	++	+	-	-
3. Filinia sp.	-	-	+	++	++	++	++	+++	++	+++	-	-	-
4. Keratella sp.	-	-	-	+	-	+	++	++	+++	++	+	-	-
5. Lecane sp.	-	-	+	-	+	-	++	+++	++	+++	+	-	-
6. Monostylla sp.	-	-	+	+	+	++	+++	+++	+++	++	+	-	-
7. Polarthra sp.	-	+	++	+	+	++	++	++	+++	++	+++	-	-
8. Trichocera sp.	-	++	+	++	++	+		+++	+++	+++	+	-	-
<u>Copepoda</u>													
1. Bosmania sp.	-	++	+++	++	+	+	++	+++	+++	+++	++	-	-
2. Cerodaphnia sp.	-	+	-	-	-	++	+	+++	+++	+++	++	-	-
3. Cyclops sp.	-	-	+	++	++	+	++	+	+++	+++	+	-	+
4. Cypris sp.	-	-	-	+	++	+	++	++	+++	+++	+	+	-
5. Daphnia sp.	+	+	+	+	++	+	+++	++	+++	+++	+	-	-
6. Diaptomus sp.	-	+	++	+++	++	+	+++	++	++	+++	++	-	+
7. Macrothrix sp.	-	+	+	+++	++	+++	++	+++	+++	++	++	+	-
8. Mesocyclops sp.	-	+	++	+	+	+	+++	+++	+++	+++	++	-	-
9. Nauplius sp.	+	++	++	++	++	++		+++	+++	+++	+++	+	-

*Rare (+); Absent (-); Occasional (++); Common (+++); Abundant (++++).

The present study updates the diversity of zooplanktons in the fresh water lotic ecosystem of river Betwa at Vidisha for the assessment of pollution status. Samples obtained from river water showed 8 Rotifers, 9 copepod and 6 protozoan species. The zooplankton community is dominated by copepods, which contributed 39% to total abundance which is followed by rotifers (35 %) as shown in Graph (1). Diversity values for protozoan were low (26%) and cladocera were completely absent. Hence, the presence of protozoan and absence of cladocera indicate that the river is slightly polluted. The diversity of zooplankton in river is lowest because of lotic / running water. However, the data indicate that all the zooplanktons were observed rare (+) or absent (-) in rainy season, occasional (++) in winter and common (+++) in summer months as shown in table (1).

DISCUSSION

The station I (Sorai drain mixing point) which is nearest to Vidisha city is being more polluted by the presence of more industrial area and by the pilgrims of the temples of Betwa sangam. Odum [8] stated that seasonal variations in ecological parameters exert a profound effect on the distribution and population density of both animal and plant species. Besides this, Adeyemo [3] have described that the productivity in terms of planktonic biomass in freshwater bodies is regulated by various physicochemical factors. Sudhira and Kumar[9] and Adeyemo [2] suggested that rivers are subjected to various natural processes taking place in the environment, such as the hydrological cycle. As a consequence of unprecedented development, human beings are responsible for choking several rivers to death. Storm water runoff and discharge of sewage into rivers are two common ways from where various nutrients enter the aquatic ecosystems, resulting in the pollution of those systems. Mahajan,[6] have reported that zooplanktons are the major trophic link in food chain and being heterotrophic organisms which play a key role in cycling of organic materials in aquatic ecosystem and also act as bio-indicators. The study of planktons serves as an index of water quality in respect of industrial pollution, municipal and domestic sewage pollution [4, 5, 7] have reported the composition, diversity and community dynamics of zooplankton in a tropical caldera lake.

CONCLUSION

Finally, it can be concluded that zooplanktons serves as an index of water quality in respect of industrial, municipal, domestic pollution.

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