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ZOOPLANKTON AND MICROINVERTEBRATES OF RIVER GANGA AT KANPUR

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In the present investigation zooplankton density was conducted of river Ganga between Parmat ghat upto Jajmau bridge covering an area of 10 km during July 2002 to June 2003. Monthly samples were collected from the sites of Parmat ghat, Golla ghat and Ganga bridge (Jajmau). It was observed that zooplankton density was maximum during summer and minimum during rainy season at all the selected sites. Qualitative zooplankton fauna belongs to different groups *i.e.* protozoans, rotifers, cladocerans and copepods. Dominant zooplankton were *Paramecium* sp., *Brachionous* sp., *Filinia* sp. and *Keratella* sp. From the present study it can be concluded that the water quality of river was responsible for qualitative and quantitative variation in zooplankton at the sites studied.

INTRODUCTION

River Ganga is a major river and the best example of freshwater ecosystem, originated from the range of Himalayan mountains and comes to the plains. In the present study a selected stretch of river Ganga at Kanpur is conducted. The stretch has distinct water use like bathing, drinking municipal supply, navigation, irrigation and fishing. Simultaneously, it also used for discharge of industrial effluent, municipal sewage and dumping of solid wastes, all these have resulted a change in biotic composition.

Knowledge on the zooplankton of polluted water is fragmentary though a few contributions have been made by Singh & Singh (1985), Bilgrami & Datta Munshi (1985), Patil *et al.* (1986), Jayaramaraju & Kalavati (1986), Laal *et al.* (1988) and Haque *et al.* (1988). Habitat degradation and related invertebrate macrobenthic population dynamics in river Ganga have been made by Chakraborty *et al.* (1999).

In general an aquatic body contains sufficient quantity of various macro-and micronutrients to support the diverse population of flora and fauna. However, phosphorus and nitrogen are the most significant nutrients which limit the growth of aquatic biodiversity.

The Indian freshwater is under considerable threat owing to the fast pace of development the country is undergoing in the past one or two decades. A survey by NEERI, Nagpur shows that 70% of India's freshwater are polluted.

The poineeer work on Limnology with reference to impact of pollution on biota of various water bodies of India have been reported by Ganapati (1960), Philipose (1960), Sreenivasan (1964) and Seenayya (1971). Similar ecology of large number of nutrophic water bodies have been described in recent years by Palaria (1983), Hedge & Bharti (1984), Joshi *et al.* (1987), Nirmal Kumar (1990 & 1993) and Mishra & Trivedy (1993).

MATERIALS AND METHODS

The present study was carried out on river Ganga which is situated towards the north of Kanpur city. River Ganga is one of the largest natural freshwater body of India. The area of Kanpur lies between 26.28^{0}N latitude to 80.24^{0}E longitude with an elevation of about 126 m above mean sea level (Fig.1). The climate of the area is tropical.

The three selected river sites : (1) Parmat ghat, (2) Golla ghat and (3) Ganga bridge (Jajmau). The sampling was done at all the sites at monthly intervals from July 2002 to June 2003.

Samples were collected in 10 ml plastic tubes by using plankton net (25 No.). Bolting silk cloth from left bank, mid-stream and right bank of river Ganga from selected sites. Through the net approximately 18 litres of river water was filtered randomly. The zooplankton density was studied with the help of microtransect method as described by Lackey (1938) and Edmonson (1974).

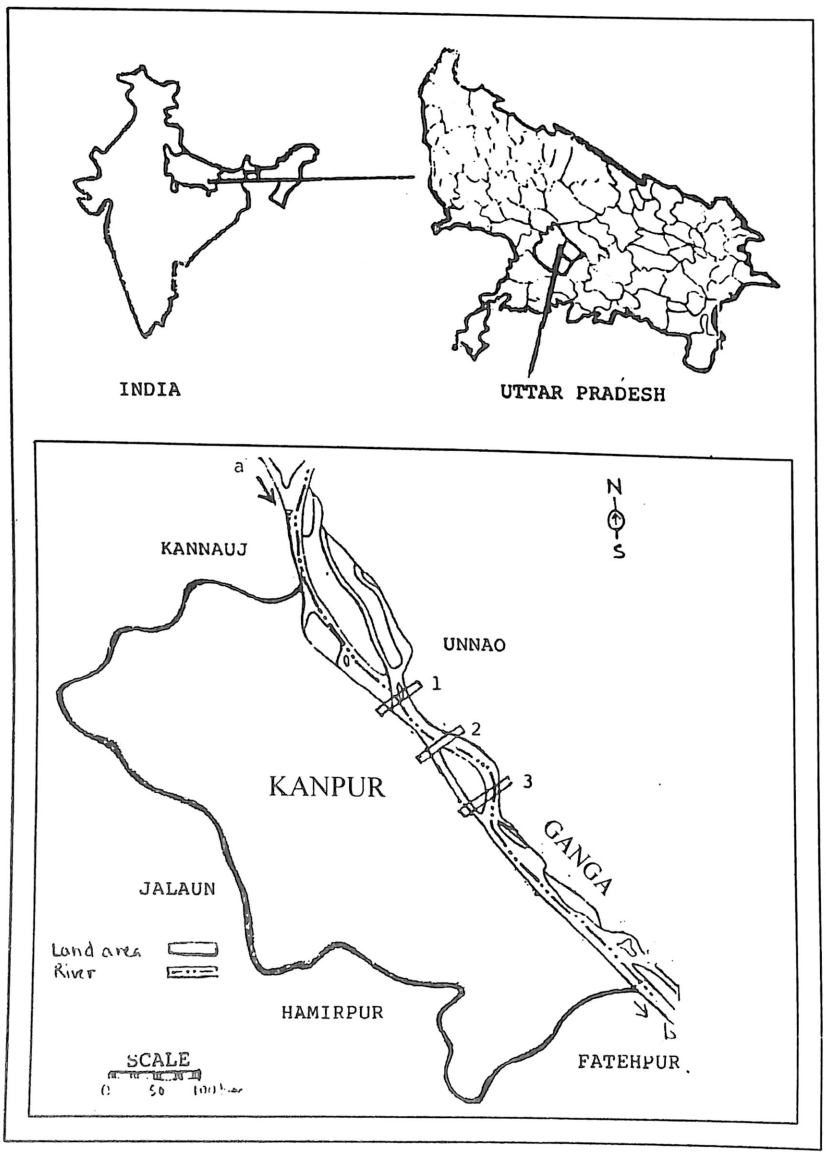

Fig. 1. : Details of location and study sites (1) Pamat Ghat, (2) Golla Ghat and (3) Ganga Bridge (Jajmau) of river Ganga at Kanpur. The course of river Ganga (a-b) in Kanpur.

RESULTS AND DISCUSSION

The chief groups of zooplankton mainly consists of Protozoa, Rotifera, Crustacea and larval insects. Protozoans are represented by *Arcella* sp., *Difflugia* sp., *Euglena* sp., *Paramecium* sp. and *Vorticella*. Among the rotifers the most common species were *Filinia* sp., *Trichocerca* sp. *Asplanchna* sp., *Branchionius* sp., *Keratella* sp., and *Lepadella* sp. Among Cladocera were *Sida* sp., *Daphnia* sp., *Moina* sp., *Macrothrix* sp., *Alonella* sp. and *Chydorus* sp. Among Copepods, *Cyclops* sp., *Diptoneus* sp., *Eucyclops* sp., *Orthocyclops* sp. and *Mesocyclops* sp. were common. Different groups of insect larva were from Plecoptera, Tricoptera, Ephemeroptera, Odonata, Hemiptera and Coleoptera.

The density of organisms in a water body is a useful index of a water quality although the density of some benthic invertebrates fluctuates widely with changes in the seasons by Hynes (1960). The nature and magnitude of the quality of the community also changes with a drastic change in water quality by Olive & Dambach (1978).

In the present study it was observed that the density and diversity of insects changes in response to water temperature, speed of current, clarity of water and input of wastes, which is also in agreement with the findings of Crayton & Sommerfeld (1979). Similar observation was done by Sharma *et al.* (1990).

Zooplankton population was maximum in summer. This might be due to the presence of higher population of bacteria. Abundance of plankton depends on water quality, dead and decaying vegetation as well as burnt and half burnt bodies which result in the increase of the organic matter, resulting in the growth of bacterial population.

Biological indicators like *Paramecium* sp., *Euglena* sp. and *Arcella* sp. were observed besides some pollution indicator species of Rotifers were also collected during the course of study such as *Brachionus* sp., *Keratella* sp. and *Filinia* sp.

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