

# SEASONAL FLUCTUATION OF DIFFERENT GROUPS OF ZOOPLANKTONS IN RIVER YAMUNA IN DISTRICT ETAWAH AND AURAIYA, UTTAR PRADESH, INDIA

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## ABSTRACT:

The present study has been focused on the identification of the seasonal fluctuation of different groups of Zooplanktons of the river Yamuna. The Zooplanktonic community of river Yamuna was represented by Protozoa, Rotifers, Nematodes, Crustaceans and Larvae. The Protozoan included ciliates and flagellates and the maximum and minimum abundance were 25 ind/litre and 19ind/litre respectively. Crustaceans and larvae, the largest group comprised a minimum of 19ind/litre and a maximum of 26ind/litre. Rotifers, the second largest group were represented by minimum of 19ind/litre and maximum of 25ind/litre. In other groups nematodes were found to be in lower profile which showed no definite pattern of their seasonal fluctuation.

**KEY WORDS:** - District Etawah, Auraiya, Seasonal Fluctuation, River Yamuna, Zooplanktonic groups.

## INTRODUCTION

Zooplanktons achieve central position in food chain which is found in diverse strata of trophic level in aquatic ecosystem. The plankton plays an important role as a supplier of organic matter which directly or indirectly serves as food to all the living organisms in water. The occurrence and abundance of Zooplanktons depend on its productivity which in turn is influenced by several physico-chemical factors such as amount of gases, salts, minerals transparency, light intensity etc. In spite of carrying such a vital importance adequate and accurate information on the nature and fluctuations of the fresh water plankton is very scanty. Therefore, knowledge of the distribution of zooplanktons in relation to the environmental conditions is of prime importance for the proper utilization of natural waters. Probably there was the first study of the limnological characteristics of fresh water pond in India in the year 1916. Subsequently, several workers studied water bodies from limnological viewpoint<sup>1,3,5,8,9</sup>.

Near border of Etawah, Auraiya and Jalaun districts of Uttar Pradesh, India four rivers Chambal, Pahuj, Sind, and Kunwari merge in Yamuna called Pachnada which in local dialect means a place where five rivers meet to form a conflux.

This paper delineates studies of seasonal fluctuation of different zooplanktonic groups of river Yamuna.

## MATERIAL AND METHODS

The present study on the river Yamuna (District Etawah and Auraiya) was conducted fortnightly at four sampling stations within a stretch of nearly 65 km.

Samples were collected periodically during the years 2017 to 2019 in a wide mouthed polythene bottle (250ml.) tied to a planktonic net. Through the Plankton collecting net approximately 40 litres of river water was filtered randomly for each sample. These water samples were preserved in 5% formalin solution on spot and were brought to the laboratory for microscopic examination.

The sample thus obtained was reduced in volume by centrifuging the zooplankton which was done by taking one ml. of preserved concentrated sample in a Sedgwick rafter chamber and counting entire contents of the chamber of different zooplankton species. The observations were presented as individuals/ litre (ind./litre). For identifying the fauna, standard literature was consulted<sup>6,11</sup>.

## RESULTS AND DISCUSSION

The identified seasonal numerical zooplankton abundance of river Yamuna is given in table.

TABLE: Seasonal numerical abundance of different zooplanktonic groups (ind./litre) of river Yamuna from 2017-2019.

Year & seasons	Protozoa	Rotifers	Nematodes	Crustaceans & Larvae	Total No. of Zooplankton
(2017)					
WINTER	24	23	07	23	77
SUMMER	23	22	08	23	76
MONSOON	23	22	05	19	69
AUTUMN	24	24	02	20	70
(2018)					
WINTER	22	25	08	25	80
SUMMER	23	24	09	26	82
MONSOON	24	23	06	24	77
AUTUMN	23	19	05	25	72
(2019)					
WINTER	25	25	09	26	85
SUMMER	23	25	08	23	79
MONSOON	22	23	05	20	70
AUTUMN	19	24	04	19	66

Ind./litre=Individuals/litre

Generally in natural waters, an approximate biological equilibrium exists, although abundance of zooplankton varies from season to season. Such seasons are mostly related to abiotic factors.

Zooplankton showed three cycles i.e. 2017, 2018 and 2019 during investigation period. In the first cycle (2017) the first peak 77ind./litre was in winter season followed by a gradual decrease upto monsoon season. While in autumn season, it was 70 ind./litre. In the second cycle (2018), the highest peak 82 ind./litre was in summer season and other two peaks were monsoon 77 ind./litre and autumn 72 ind./litre. Whereas in winter season, it was 80 ind./litre. In the third cycle (2019), the total zooplankton was recorded 85ind./litre in winter season which was followed by a gradual decrease upto autumn season.

The chief groups of zooplankton mainly consist of Protozoa, Rotifers, Nematodes, Crustaceans and Larval insects. In eutrophic water *Arcella* sp. and *Diffugia* sp. of Protozoans were reported. Rotifers form the dominant zooplanktonic fauna the most common species were *Filinia* sp., *Trichocera* sp.; *Branchinius* sp. and *Keratella* sp. Among crustaceans *Daphnia* sp., *Macrothrix* sp., *Sida* sp., *Cyclops* sp., *Diptoneus* sp., *Eucyclops* sp. and *Mesocyclops* sp. were common. Larvae of insect groups were from Odonata, Trichoptera, Plecoptera and Hemiptera.

*Diffugia* sp. and *Arcella* sp. were reported in eutrophic waters<sup>12</sup> while rotifers form the dominant zooplankton fauna in many aquatic habitats<sup>4</sup>. Crustacea of river Yamuna was followed by the copepods and cladocerans were found as most abundant groups in Harike Wetland<sup>2</sup>.

In the present study, it was observed that the growth of zooplankton is influenced by seasonal variation in various abiotic factors. The annual changes in the community of zooplankton depend on the succession of its component species. Some plankton species increase slowly and more or less uniformly reaching the maximum while other species start speedy development and within a very short period of time attains numerical dominance from minimal population over the whole planktons.

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