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STUDY OF VARIATION AMONG PHYTOPLANKTONIC DENSITY DUE TO SEASON CHANGE IN THE WATER OF RIVER KARAMNASA AT BUXAR ,BIHAR.

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Abstract

In aquatic ecosystem, planktons are one of the most important biotic components which influences all the functional aspects of the aquatic body.Planktons are microscopic water organism that float with the water movement. Among Planktons, phytoplanktons are the free floating ,unicellular organisms that grow photoautotrophically. The density of phytoplanktons is highly influenced by variation in season as well as by hydrochemical factors.

The present investigation is done to demonstrate the variation among phytoplanktonic density due to season change in the water of river Karamnasa at Buxar, Bihar. For this purpose, the phytoplanktonic samples were collected from different sampling sites and quantitative analysis was done by dropping method of APHA (2005). The result conclude that the phytoplanktonic population exhibited a seasonal variation at all the sampling sites during the whole period of investigation from January 2018 to December 2018 . These show a Bimodel peak ,one peak during May to July and another peak during December to January.

Keyword: Population density, Phytoplanktons, Seasonal variation ,Hydrochemical factors, Karamnasa river, Buxar, Bihar

1.INTRODUCTION

River body is one of the important natural aquatic ecosystem. Any river ecosystem is characterised by its biotic constituents. The quality of a river body and its aquaculture activities is determined by the population of Planktons. Planktons are the microscopic free floating water organism that move with water movement. Planktons are grouped into two types- phytoplankton and zooplankton. Phytoplanktons are free floating unicellular organisms that live near the water surface where there is sufficient light to support photosynthesis. While, zooplanktons are heterotrophic planktons.Phytoplanktons play an important role in biosynthesis of organic material.

Planktonic population exhibits a higher phytoplankton density than zooplankton. Pati and Sahu (1993) found that in planktonic population, phytoplankton density constitute approx. 86.8% and zooplankton density constituents 13.2% in a water body.

However, the population of phytoplanktons is highly influenced by various seasonal and hydrochemical factors. Studies on the phytoplankton communities of river was started with Roy (1949). Various investigations were also done to attempt the variation among population density of phytoplanktons as Laxminarayana (1965),Bhatt S.D.(1985),Pandey et al.(1993),Saha et al.(2001),Das et al.(2002),Pawar et al.(2006),Laskar & Gupta (2009), Hosmani(2010).Bony (1975) also suggested that the composition of phytoplanktons in a river body is affected by various climatic factors.

Therefore, In the present paper, an attempt was done to find out the variation among population density of phytoplanktons due to season change in the water of river Karamnasaat Buxar, Bihar. For this, the three sampling sites named Banarpur (site-1), Narbatpur (site-2) and the Mixing zone of river Karamnasa and Ganga (site-3) are selected.

2.MATERIAL AND METHOD

River Karamnasa is an important tributary of river Ganga. It originated a height of 350 meters on the Northern face of Kaimur range near Sarodag, in the Kaimur district of Bihar. It flows in a North Westerly direction through the plains of Mirzapur, then forms the boundary between U.P. and Bihar. It covers the districts of Sonbhadra, Chandauli, Varanasi and Gazipur on the left side (U.P. side) and districts of Kaimur and Buxar on the right side (Bihar side). It finally joins the river Ganga near Chausa at Buxar, Bihar.River Karamnasa has a length of 192 Km. Out of which 116 Km lies in U.P. and rest 76 Km forms the boundary between U.P. and Bihar. The total drainage area of this river is approx. 4521 sq. miles.

River Karamnasa carries the discharge of many canals, effluents of households, washing, bathing, cattle wallowing, organic and inorganic residues from agricultural field of the adjoining areas. The water level of river Karamnasa increased in rainy season and decreased in summer season. All the three sampling sites show a varied ecological conditions as well as physico-chemical characters and hence be helpful in analyzing biotic features of the river.

3.COLLECTION AND PRESERVATION

The phytoplanktonic samples were collected by filtering 50 litre of water of the river Karamnasa from different sampling sites which stretches to a distance of 5 km covering the entire length of river passing through Buxar district upto the confluence with the river Ganga. For this purpose, a plankton net having mesh size 55 mm is used. The plankton net was attached with a glass tube of 10 ml capacity at the bottom. The phytoplanktonic samples were preserved in 20%(v/v) aqueous formalin solution.

4.ANALYSIS AND IDENTIFICATION

From phytoplanktonic samples phytoplanktons were identifed with the help of keys given by Edmonson (1959). A key given by Needham and Needham (1962) and Michael (1973) was also considered for this purpose. Quantitative analysis of phytoplanktonic population was done by the help of Sedgwick rafter plankton counting cell. Enumeration of phytoplanktons was also done by dropping method of APHA (2005).

5.RESULT AND DISCUSSION

The result of this finding conclude that the phytoplanktons exhibit a seasonal variation at all three sampling sites during the whole period of investigation. These show a Bimodel cycle with two peak period. One peak during the month of May to July and second peak during December to January. Phytoplanktons of present study mostly belongs to three Groups- CHLOROPHYCEAE, BACILLARIOPHYCEAE AND MYXOPHYCEAE (CYANOPHYCEAE). The Chlorophyceae was more than rest of the two in number. While, Myxophyceae constitute the smallest group at all the three sites. The dominant species belong to above groups are shown in following table –

Table : Showing different phytoplankton groups and their dominant species

GROUPS	DOMINANT SPECIES
CHLOROPHYCEAE	*Chlorella,Clostrium,Cosmarium,Eudorina,Hydrodictyon,Chara,Pondorina, pediastrium,spirogyra*
BACILLARIOPHYCEAE	*Cocconeis,Cyclotella,Navicula,Noctiluca,Pinnacularia*
MYXOPHYCEAE	*Anabaena,Merismopedia,Nostoc,Oscillatoria,Rivularia*

Table : Showing monthly variation of population density of different groups of phytoplanktons in river Karamnasa(Unit of measurement-units/l)

MONTH	CHLORO-PHYCEAE	MYXO-PHYCEAE	BACILLARIO-PHYCEAE	MEAN	STANDARD DEVIATION
JANUARY	22.5	16.7	60.8	33.3	19.6
FEBUARY	53.9	17.8	28.3	33.3	15.2
MARCH	68.1	10.6	21.3	33.3	24.7
APRIL	44.2	36.1	19.7	33.3	10.2
MAY	76.2	6.8	17.0	33.3	30.5
JUNE	3.8	72.2	24.0	33.3	28.7
JULY	5.2	38.6	36.2	26.7	15.2
AUGUST	75.2	6.3	8.5	30.0	31.9
SEPTEMBER	78.3	3.3	18.4	33.3	32.4
OCTOBER	65.2	3.6	31.2	33.3	25.2
NOVEMBER	35.2	38.2	26.5	33.3	4.9
DECEMBER	31.8	39.6	23.6	31.7	6.5

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