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Effect of pollutants on Planktons and Fish Population in Two Water bodies of Hapur and Simbhaoli

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Abstract

The effect of pollutants on planktons in two water bodies has been studied. The observations have been recorded at two sampling stations (near Hapur and Simbhaoli). Zooplanktons comprised of protozoans, rotifers, copepods and cladocerans. The genera of four families of phytoplanktons (Bacillariophyceae, Chlorophyceae, Myxophyceae and Euglinophyceae) were observed. Higher number of planktons was observed in winter. The family Bacillariophyceae was most abundant and constituted the bulk of phytoplanktons. To study fish population in these water bodies five fish species have been selected which were - Labeo rohita (Rohu), Channa punctatus (Sole), Notopterus notopterus, Catla catla and Clarias batrachus. The overall abundance of the fish species was significantly higher at station –I than at station-.II.

Key words: *Water bodies, Effluent, Zooplanktons, Phytoplanktons, Fish.*

Introduction

Aquatic pollution is a problem in many fresh water and marine environments as it causes negative effects on the health of respective organisms, (Mona *et al.,*2013).Industrial waste water entering a water body represents heavy sources of environmental pollution. It affects both the water quality as well as the microbial and aquatic flora (Emongor *et al*., 2005). Water is needed by every cell of the organism ¼s body to perform normal function. Water covers 71% of the earth ¼s surface, mostly in oceans and other large water bodies, with 1.6% of water below ground in aquifers and 0.001% in the air as vapor, clouds and precipitation (U.S. Geological Survey 2000). A more serious aspect of water- pollution is that which is caused by human activity and industrialization (Park, 2009). Microscopic living organism includes many forms and is generally designated as planktons. The study of the fauna is also very important to reveal the status of water body. Fish is the prime aqua-species, being an important source of easily digestible protein comprising of essential amino acids with high biological value for human consumption and fish flesh also refers minerals and vitamins. Industrial effluents released into aquatic environment may not only change the quality of water but also cause a huge fish kill and its food.

The aim of the study is to determine the effect of pollutants on planktons and fish population in water bodies in Assoda (Hapur) and Simbhaoli,Uttar Pradesh.

Materials and Methdos

The Effects of pollutants on planktons and fish population in water bodies of Assoda , near Hapur and Simbhaoli were studied. Two sampling stations were established. The Investigations were carried out for two years i.e. 2013 and 2014 in three seasons naming winter ,summer and monsoon.

Sampling Stations -

Samling Station- I

Water body of Assoda, near Dheerkhera Industrial area, Hapur.

Sampling Station- Ii

Confluence point of Simbhaoli Sugar Mills and Distillery**,** drain into Ganga River at Pooth Village.

Biological Parameters -

Under the head biotic parameters phytoplanktons, zooplanktons, and fishes were studied. **Phytoplanktons -** In the present study the phytoplanktons studied included the members of the families, Bacillariophyceae Chlorophyceae, Myxophyceae and Euglinophyceae

Zooplanktons-

Among zooplanktons protozoans, rotifers, copepods and cladocerans were identified.

Fishes-

To study fish population in water bodies five species of fishes have been selected which were *Labeo rohita, Notopterus notopterus , Catla catla ,*

Clarias batrachus and *Channa punctatus*.

Sampling Procedure –

For the collection of planktons, plankton net was used which was prepared with preshrunk standard silk bolting cloth no.25 having 79 meshes per centimeter. The collection of samples was made by using a slow moving paddle boat. The organisms were identified up to genera both from quantitative and qualitative collection by the method of Ward and Whipple (1959) and Wetzel and Likens (2000). The counting of planktons was done by Drop sedimentation method given in Standard method, (APHA *et al*., 2005).

The Phytoplanktons were calculated by using the following formula. (Wright, 1954. And Tiffany and Britton, 1951).

$$\text{No of cells per litre} = S^n \times P^n \times C^n \; / \; TP^n \times T^v \times W^v$$

Where, S^n = No. of the slides examined,

P^n = No. of the paths examined,

C^n = No. of the cells per liter,

T = Total no. of the paths examined,

= Total volume of the water filtered.

The Zooplanktons were calculated by using the following formula.

No. of the organisms per liter =×/×

Where, = Volume of the concentrate

= No. of the organism counted.

= volume of the concentrate examined.

= Total volume of the water filtered**.**

Methods For Fish Collection and Identification –

The fishes were collected from both sampling stations by taking the help of local Fishermen. The proper nets have been used for this purpose. The Identification of Fishes was done by taking the help of *"The Fishes of India"* Day (1878) and Hora and Mukherji (1937).

Results and Discussion-

The present attempt have been made to establish correlation between the availability of planktons and fishes at different sampling stations and intensity of pollution in water bodies of Assoda and Simbhaoli. Following results were obtained.

Phytoplanktons-

In water bodies of Assoda and Simbhaoli during investigation 28 genera of phytoplanktons were observed. Higher number of phytoplanktons (587) was observed in winter 2013 at station -II while in 2014 maximum number of phytoplanktons (595) was also recorded in winter at station -II. Out of 28 genera 10 belonged Bacillariophyceae, 10 Chlorophyceae, 6 Myxophyceae and 2 of Euglinophyceae. The Bacillariophyceae was most abundant and constituted the bulk of phytoplanktons. The Euglinophyceae was least in number**.**

1-Bacillariophyceae-

The members of this family were represented in 10 genera. The maximum number of specimens observed was 264 in winter 2013 and 282 in winter 2014. Whereas the minimum 124 in summer 2013 and 132 in summer 2014 was observed.

2-Chlorophyceae-

The members of chlorophyceae were represented by 10 genera namely *Spirogyra, Cosmarium, Scenedesmens, Denticula, Chlorella, Eudorina, Pendarina, Actenastrum*, Tetradron *and Chlamydomenas*. The maximum number of the observed specimens was 175 in winter 2013 and 179 in summer 2014. Minimum 72 were noted in summer 2013 and 61 in summer 2014.

3-Myxophyceae-

The family myxophyceae was represented by 6 genera. The highest number 103 was observed in winter 2013 at station - II and the highest genera 107 were observed in winter 2014. Minimum number 48 were observed in summer 2013 while 47 in summer 2014.

4-Euglenophyceae-

The members of this family were represented in 2 genera. The genera observed were *Euglena* and *Phacus*. Maximum number of specimens observed were 45 in winter 2013 while minimum 18 in summer 2013.

Zooplanktons –

The number of Zooplanktons was low as compared to phytoplanktons throughout the period of study. The Zooplanktons comprised of Protozoans, Rotifers, Copepods and Cladocerans.

1-Protozoans –

The Protozoans included *8 genera*. The highest number of protozoans 109 was noted in winter 2013 at station II while minimum 55 was found in summer 2013 at station-I.

2. Rotiferans-

Rotiferans mainly consisted of *Anabus, Brachinus, Monostyla*, *Distylla*, *Rotatoria, Testudindla.* The highest number 47 were observed in winter 2013 while minimum 22 were found in summer 2013.

3- Copepods-

The copepods were represented by *Cypris* and *Cyclops.* The highest number of copepods 37 was noted in winter 2013 at station-II. whereas minimum 18 were found in monsoon of 2014 at station-I.

4- Cladocerans-

The cladocerans were represented by *5 genera*. The number of individuals of this group was found highest 40 in monsoon of 2013 and minimum 9 in summer 2014 at station-I.

Fishes-

There are common belief among the local fishermen that fish species were considerably decreased in water bodies because of industrial and sugar mill discharge. All the major groups of the fishes were represented in these two sites. These were *Notopteres notopteres, Catla catla,*

Labeo rohita, Clarias batrachus and *Channa punctatus.*

Site-I –

All five species of fishes were present in both the years. Maximum number 37 was found in monsoon of 2014. While minimum 1 in Summer 2014.

Site- Ii-

At this site there were some variation in fish number. Maximum number (42) of fishes was found in monsoon of 2014 and minimum 9 in summer of both years..

Thus we can say that the low concentration of planktons and decreasing number of fishes in water bodies can be considered as indicator of heavy water pollution and the water body can be considered as dead.Threreby proper steps should be taken to control their pollution and suggestions can be made how we can save biodiversity of local water bodies**.**

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