



**DIVERSITY OF PHYTOPLANKTON IN KSHIPRA RIVER-  
TRIVENI STATION, UJJAIN (M.P.)**



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**ABSTRACT**

Planktons are minute organisms and essential links in food chain in aquatic system. Plankton is most importance in the freshwater ecosystem as these are the main source of energy and having a very high nutritive value. The present study is going to centralize on kshipra river, Ujjain (M.P.) in year 2014. The plankton were collected, counted and identified by using the method suggested by APHA and Prescott. The study among all these phytoplankton Bacillariophyceae was recorded as a dominant class in Kshipra River.

**Keywords:**

*Phytoplankton, Ecology, Kshipra River.*

**INTRODUCTION**

Rivers are the major sources of drinking water, besides their usages in agriculture, washing etc. Water pollution in India has come to a critical point. Domestic waste, industrial waste and other household waste are directly discharge into river. Major constituent of aquatic organisms is the plankton –the Zooplankton and Phytoplankton.

Plankton population and their distribution are greatly affected by physical and chemical properties of water (Sharma and Diwan, 1997). Rivers play a major role in assimilating or carrying industrial and municipal waste water, manure discharge and runoff which are responsible for river pollution (Toman, 2009, Suthar et al., 2010). They can be listed and used as pollution indicators (Telkhade et. al 2008)

**MATERIALS AND METHODS**

**STUDY AREA**

The present investigation is going to centralize on Kshipra River at Triveni Station of Ujjain in Madhya Pradesh. The topographical situation of Ujjain is 76°30' longitude and 23° 36' latitude in central India. River Kshipra is a small river supplying water to surrounding areas of the Ujjain for domestic and industrial use. It originates from Kokri Bardi hills Vindhya Range (747 meter high) about 11 km east of Indore. After traveling a distance of 70 km through Indore district, it enters Ujjain district. It receives its tributary river Khan just upstream of Ujjain. The river is perennial and flows all month. It is one of the sacred rivers for Hindus; river has been serves for holy dips on certain festivals like Kumbh, Somvati and Shanichari amavasya.

The water samples were collected with the help of standard plankton net, equalization of phytoplankton was made by filtering 40 liters of water through small plankton net made up of blotting silk cloth no. 25. The filtrate was transferred to a marked glass stopper bottles. The sample was preserved with 5% formaldehyde an ethanol iodine solution. The sample were further concentrated to 5 ml by centrifugation at 2.500 rpm. After sedimentation of phytoplankton the supernatant liquid was siphoned off and the sediment portion was preserved in 5 % formaldehyde. The plankton were collected, counted and identified by using the method suggested by APHA and Prescott.

Keeping in view the day-to-day activities on and around the river the role of changing water condition in determining the abundance and succession of phytoplankton in a set of sample collected in Triveni Station, Kshipra River.

## RESULT AND DISCUSSIONS

The abundance and distribution of phytoplankton is guided by a variety of ecological factors such as temperature, light, pH, organic and inorganic constituents. In Narmada river 21 genera belonged to Chlorophyceae, 14 belonged to Bacillariophyceae and 10 belonged to Cynophyceae were recorded and *Rivularia sps* is most dominant species among the Bacillariophyceae group (Kumari et al 2014).

Results obtained on laboratory examination of phytoplankton samples reveal several varieties of planktonic forms. Distribution of phytoplankton shown in Table-1. Composition of phytoplankton shown in Table-2. Percentage of phytoplankton shown in Graph -1. In the present study 23 species of phytoplanktons were recorded during study period .Out of which 7 species of Cynophyceae and Chlorophyceae , 1 species of Dinophyceae ,8 species of Bacillariophyceae were recorded. Cynophyceae was represented by- *Anabaena sps*, *Chroococcus sps*, *Hyrodichthion sps*, *Microcystis sps*, *Nostoc sps*, *Oscillatoria sps*, and *Spirulina sps*. Among the Cynophyceae group *Spirulina sps*. Occurred throughout the study period and represents most dominant sps. The Cyanophyceae (*blue-greenalgae*) are a group of photosynthetic microorganisms that are more closely related to the bacteria than to higher (eukaryotic) algae. Chlorophyceae was represented by its 7 species-*Oedogonium sps*, *Microspora sps*, *Phyllobium sps* , *Spirogyra sps*, *Ulothrix sps*, *Volvox sps*, and *Zygnema sps*. In this group *Spirogyra sps* was the most dominant sps. The Chlorophyceae are a large and important group of freshwater green algae. Dinophyceae group was represented by its single sps viz. *Ceratium sps*. The algae coming under this family is known as dark yellow to brown algae. Bacillariophyceae consisted most dominant group of phytoplankton population in Kshipra River and it is represented by 8 species viz. *Cyclotella sps*, *Cymbella sps*, *Diatoms sps*, *Navicula cuspidate*, *N.indica*, *Pinnularia spa*, *Synerda sps*, and *Tabellaria sps*. The high diversity index value indicated that Cyanophyceae and Bacillariophyceae grow richly in the polluted area where Chlorophyceae cannot tolerate the pollutants to the same degree as Cyanophyceae and Bacillariophyceae.

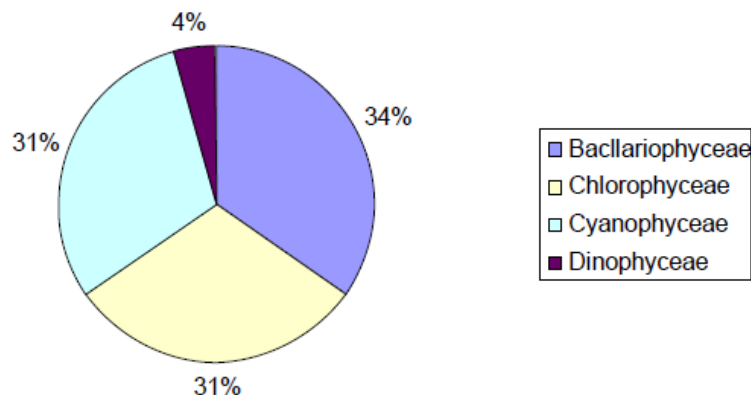
**Table 1:** Phytoplanktonic organism in Kshipra River at Triveni Station

S.No.	Bacillariophyceae
1.	<i>Cyclotella sp.</i>
2.	<i>Cymbella sp.</i>
3.	<i>Diatoma sp.</i>

4.	<i>Navicula cuspidata</i>
5.	<i>Navicula indica</i>
6.	<i>Pinnularia sp.</i>
7.	<i>Synedra sp.</i>
8.	<i>Tabellaria sp.</i>
<b>Chlorophyceae</b>	
9.	<i>Oedogonium sp.</i>
10.	<i>Microspora sp.</i>
11.	<i>Phyllobium sp.</i>
12.	<i>Spirogyra sp.</i>
13.	<i>Ulothrix sp.</i>
14.	<i>Volvox sp.</i>
15.	<i>Zygnema sp.</i>
<b>Cyanophyceae</b>	
16.	<i>Anabaena sp.</i>
17.	<i>Chroococcus sp.</i>
18.	<i>Hyrodichthion sp.</i>
19.	<i>Microcystis sp.</i>
20.	<i>Nostoc sp.</i>
21.	<i>Oscillatoria sp.</i>
22.	<i>Spirulina sp.</i>
<b>Dinophyceae</b>	
23.	<i>Ceratium sps.</i>

**Table 2:** The number of genera belonging to different families.

<b>Group</b>	<b>No. of Genera</b>	<b>Percentage</b>
Bacillariophyceae	8	34%
Chlorophyceae	7	31%
Cyanophyceae	7	31%
Dinophyceae	1	4%
Total	23	100%



**Graph 1:** Number of genera and percentage Phytoplankton in Kshipra River, Triveni Sangam.

## CONCLUSION

In the present study it is concluded that Bacillariophyceae is dominant in Triveni sangam, Kshipra river, river Khan (polluted by industrial waste) coming from Indore city merges with it at Triveni Sangam. So water of this station is organically rich and contaminated. Total plankton count/ml is minimum in monsoon and maximum in post monsoon in Triveni Sangam. This indicates that though not yet polluted, if the care is not taken may get polluted in future as it is having potential for deterioration and eutrophication under the influence of pollution and anthropogenic activities.

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