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Plankton Diversity and Density in Pariyat River, Rural Area of Jabalpur (M.P.)

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Abstract: ***The present study was carried out on Pariyat River of Pariyat Village . Pariyat village Is situated in Kundam Tehsil of Jabalpur District,M.P. state. Pariyat village is 20 km. far from its district place Jabalpur. Current population of Pariyat village is about 15000. Pariyat lake is situated on western side of the village. The plankton were collected counted and were identified by using the method suggested by APHA (1995) Present (1970) and Fresh Water Biology (W.T.Edmondson-1959). The plankton were counted by using Sedwick Rafter counting cell.Different class such cyanphyceae, chlorophyceae, bacillariophyceae, euglenophyceae, cilliata, cledocera, copepod and specimens from phylum rotifera were identified during the study. Among all these classes the listed phytoplankton such as Oscillatoria Sp., Tetraedron Sp., Navicula Sp., Nitzschia Sp., Euglena Sp.,and zooplankton such as Ceriodaphnia Sp.,Cyclops Sp., Tropocyclops Sp., Brachionus Sp. and Platias Sp. were recorded as a dominant genera in Pariyat Lake. The study was carried out monthly but was tabulated seasonally by using statistical method.***

Keywords: Pariyat River, Phytoplankton and Zooplankton

1. Introduction

Jabalpur is the largest city of the Madhya Pradesh state .Today the city becomes the Smart City of the M.P. It has its own indefinable charm, combining many traditional elements and the latest international blend. The Pariyat river is the main river of Jabalpur. The Pariyat Dam is the Second important dam of jabalpur. It is located on the western part of Pariyat village. The sewage waste of Pariyat village is directly discharge into this River. The people of village also use this river to wash their cloths, take bath, sanitation, discharge of cow dung by daries etc. The cattle of the villagers also take bath in this River. The length of the river is above 55 Km. long, depth is 21 feet. pariyat river is geographically located at latitude 23 ° 15′0" and longitude 23 ° 15′0".

2. Materials and Methods

The standard method suggested in APHA used for assessing water quality includes collection, counting and identification of phytoplankton and zooplankton. Plankton net number 25 of mesh size 20um was used for collectingsamples. 50 liters of water was measured in a graduated bucket and filtered through the net and concentrated in a 100 ml. bottle. Samples were collected as close to the water surface as possible in the morning hours. The samples were labeled with the date, time, and study area I.e. name of lake and the volume measured and pasted on the containers. Plankton is preserved by using 4% formalin. The sample was allowed to settle for 24-48hours and was further concentrated to approximately 30 ml. by decanting. Sedgwick Rafter countng cell is used to count the plankton.Sedgwick Rafter cell is approximately 50 mm. long, 20 mm. wide and 1 mm. deep. The total volume of the cell is 1 ml. A binocular compound microscope is used to count the plankton with different eyepieces such as 10X and 40X. The microscope is calibrated using an ocolar micrometer. Formula to convert unit/ml of plankton into unit/liter is

$n = (a \times 1000)\ c / l$

Where,

n = Number of plankton /liter of water.
a = Average no. of plankton in one small counting chamber of S-R cell.
l =Volume of original wate filtered in liter.

3. Results and Discussion

Plankton has long been used as indicator of water quality. Because of their short spans, plnkton responds quickly to environmental changes. They flourish both in highly eutrophic waters while a few others very sensitive to organic and/or chemical wastes. Some speciess have also been associated with noxious blooms sometimes creating of fensive tastes and odours or toxic conditions. Because of their short life cycles plankton respond quickly to environmental changes, and hence the standing crop and species composition indicate the quality of the water mass in which they are found.

In the present study 4 different genera of *cyanophyceae* class were recorded from the River. The blue green algae recorded in Pariyat River are *Merismopedia sp., Nostoc sp., Oscillatoria sp.,* and *Spirulina sp*. the minimum algal units were recorded during summer season where as maximum was recorded during winter season.

In Pariyat River 7 different genera of *chlorophyceae* class were recorded. In Pariyat River the algae recorded are *Closterium sp., Closteriopsis sp., Coelastrum sp., Mugeotia sp., Spirogyra sp., Tetraedron sp., Scendesmus sp.,* the minimum value was recorded during summer season whereas maximum was recorded during monsoon season.
From the Pariyat River 7 different genera of *bacillariophyceae* were recorded. In Pariyat River the diatom for *bacillariophycea* class recorded are *Cyclotella sp., Cymbella sp., Gomphonema sp., Gyrosigma sp., Navicula sp*., and *Nitzschia sp.,* The minimum unit of diatom were recorded during winter season whereas maximum unit of diatoms were recorded during summer season.

In the Pariyat 2 genera of euglenoids were recorded. The euglenoid recorded in the River are *Euglena sp.* and *Phacus sp.* In Pariyat River the minimum units of euglenoids were recorded during summer season and maximum unit of euglenoids were recorded during summer season.

In Pariyat River 2 genera of class ciliata were recorded. The ciliate recorded in the River are *Pleuronema sp.* and *Strombidium sp.* and 2 genera of *cladocera* are *Alona* sp. and *Ceriodaphnia* sp. In Pariyat River 5 genera of copepod, *Cyclops sp., Diacyclops sp., Diaptomus sp., Eucyclops sp., and Tropocyclops sp.,* were recorded. The minimum number of *copepods* were recorded during summer season whereas maximum unit of copepods were recorded during winter season.

In the Pariyat River 2 genera of phylum rotifer *Brachionus sp.* and *Platyas sp.* were recorded. The minimum number of *rotifera* were recorded during summer season whereas maximum unit of *rotifer* were recorded during monsoon season. Density of Phytoplankton and Zooplankton were mention in fig. 1 and 2.

4. Conclusion

Therefore from the above study it is concluded that the total phytoplankton count/mi. is more in summer season and *bacillariophyceae* is dominant while total zooplankton count/ml. is more in winter season. Rotifer is dominant in Pariyat River. The total plankton count/ml. is minimum in monsoon season 256/ml. and maximum in summer season 360ml/l (Table-1). This was proved by the above result as the amounts of *cyanophyceae* algae and rotifer were found in Pariyat River, which are indicator of pollution.

Table 1: Seasonal Variation of Phytoplankton in Priyat River

Phyotoplankton		*Sampling season*		
Class	*Genera*	*Monsoon Mean*	*Winter Mean*	*Summer Mean*
Chlorophyceae				
	Closteriopisi Sp.	**10**	**0**	**0**
	Coelastrum sp.	8	0	0
	Mugeotia sp.	0	14	8
	Pondorina sp.	4	0	0
	Scenedesumus sp.	0	0	2
	Spirogyra sp.	0	12	0
	Tetraedron sp.	6	0	8
Total		**28**	**26**	**18**
Cyanophyceae				
	Merismopedia sp.	4	0	0
	Nostoc sp.	0	4	0
	Oscillatoria sp.	14	24	0
	Spirulina sp.	6	0	0
Total		**24**	**28**	**0**
Bacillariophyceae				
	Amphiplrura sp.	2	0	0
	Cyclotella sp.	2	0	2
	Cymbella sp.	4	0	4
	Gomphonema sp.	0	8	4
	Gyrosigma sp.	0	0	24
	Navicula sp.	58	16	96
	Nitzschia sp.	22	20	78
Total		**88**	**44**	**208**
Euglenophyceae				
	Euglena acus	4	2	2
	Euglena gracillis	0	10	2
	Euglena sp.	12	42	66
	Phacus sp.	2	2	0
Total		**18**	**56**	**70**
Total phytoplankton cont/ml		**158**	**154**	**296**
Total phytoplankton count/l		**94800**	**92400**	**177600**

Table 2: Seasonal Variation of Zooplankton in Priyat River

Zooplankton		Sampling season		
Group	Genera	Monsoon Mean	Winter Mean	Summer Mean
Ciliata				
	Pleuronema sp.	2	6	0
	Strombidium sp.	2	0	0
Total		4	6	0
Clasocera				
	Alona sp.	0	0	6
	Ceriodaphnia sp.	16	28	32
Total		16	28	38
Copepoda				
	Cyclops sp.	10	10	2
	Dicyclops sp.	0	10	0
	Diaptomus sp.	2	12	0
	Eucyclops sp.	4	8	0
	Trapocyclops sp.	4	12	6
Total		20	52	8
Rotifera				
	Branchionus sp.	56	4	14
	Platyias sp.	2	18	4
Total		58	22	18
Total Zooplankton count/Ml		98	108	64
Total Zooplankton count/L		58800	648000	38400
Total Plankton Count/ML		256	262	360
Total Plankton count/L		153600	157200	216000

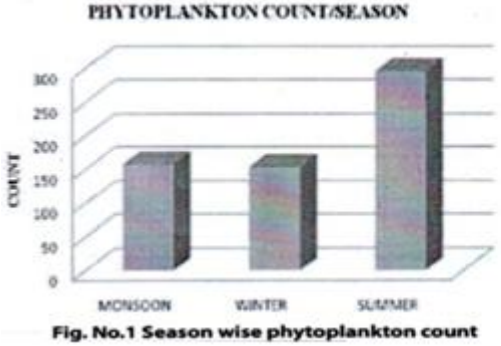

Fig. No.1 Season wise phytoplankton count

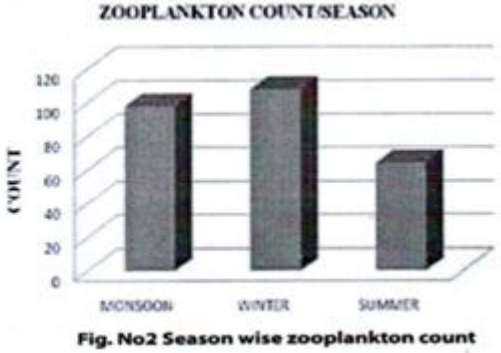

Fig. No2 Season wise zooplankton count

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