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Seasonal Variation of Phytoplankton Diversity in Ghuma Lake, Ahmedabad

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Abstract: ***The present study was carried out on Ghuma lake of Ahmadabad. The phytoplankton were collected, counted and were identified by using the method suggested by APHA (1995) Prescott (1970) and FRESH WATER BIOLOGY (W. T. Edmondson-1959). The phytoplanktons were counted by using Sedgwick Rafter counting cell. Different class such as cyanophyceae, chlorophyceae, bacillariophyceae and euglenophyceae were identified during the study. Among all these classes the listed phytoplankton such as Oscillatoria Sp., Tetraedron Sp., Navicula sp., Nitzschia sp. and Euglena Sp. were recorded basillariophyceae as a dominant genera in Ghuma lake. The study was carried out monthly but was tabulated seasonally by using statistical method. From the listed data the quality of water was concluded.***

Keywords: Ghuma Lake, Ahmedabad, Phytoplankton.

I. INTRODUCTION

The Ghuma Lake of Ghuma village is located in the outskirts of the western part of Ahmedabad city. The Ghuma Lake is a natural lake and is located on the western part of Ghuma village. The sewage waste of Ghuma village is directly discharge into this Lake. The People of village also use this Lake to wash their cloths, take bath, sanitation, etc. The cattle of the villagers also take bath in this Lake. The Lake covers an area of 84479 m2. Peripheral area of the lake is 466.22 m. and depth is 21 feet.

II. MATERIALS AND METHODS

The standard method suggested in APHA used for assessing water quality includes collection, counting and identification of phytoplankton. Plankton net number 25 of mesh size 20 µm was used for collecting samples. 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. Plankton is preserved by using 4% formalin. The sample was allowed to settle for 24-48 hours and was further concentrated to approximately 30 ml by decanting. Sedgwick Rafter counting cell is used to count the plankton. 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. Formula to convert unit/ml of plankton into unit/liter is

$$n = \frac{(a \times 1000)\, c}{l}$$

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

III. RESULT AND DISCUSSION

Plankton has long been used as indicator of water quality. Because of their short life spans, plankton responds quickly to environmental changes. They flourish both in highly eutrophic waters while a few others are very sensitive to organic and/or chemical wastes. Some species have also been associated with noxious blooms sometimes creating offensive 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 Ghuma Lake 7 different genera of chlorophyceae class were recorded . In Ghuma Lake 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.

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From the Ghuma Lake 7 different genera of bacillariophycea were recorded. In Ghuma Lake 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.

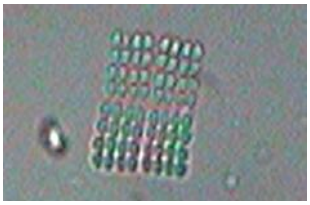
In the Lake 2 genera of euglenoids were recorded. The euglenoid recorded in the lake are *Euglena sp.* and *Phacus sp.* In Ghuma Lake the minimum units of euglenoids were recorded during summer season and maximum unit of euglenoids were recorded during summer season (Table I and Plate I).

TABLE I

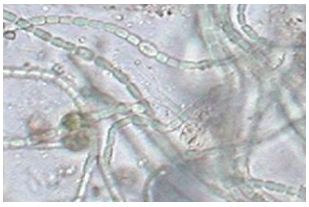
PHYTOPLANKTON		**SAMPLING SEASON**		
CLASS	**GENERA**	**MONSOON MEAN**	**WINTER MEAN**	**SUMMER MEAN**
CHLOROPHYCEAE				
	Closteriopsis Sp.	10	0	0
	Coelastrum Sp.	8	0	0
	Mugeotia sp.	0	14	8
	Pandorina Sp.	4	0	0
	Scenedesmus Sp.	0	0	2
	Spirogyra sp.	0	12	0
	Tetraedron Sp.	6	0	8
Total		**28**	**26**	**18**
% Contribution	**12%**			
CYANOPHYCEAE		**MONSOON MEAN**	**WINTER MEAN**	**SUMMER MEAN**
	Merismopedia Sp.	4	0	0
	Nostoc Sp.	0	4	0
	Oscillatoria Sp.	14	24	0
	Spirulina Sp.	6	0	0
Total		**24**	**28**	**00**
% Contribution	**8%**			
BACILLARIOPHYCEAE		**MONSOON MEAN**	**WINTER MEAN**	**SUMMER MEAN**
	Amphiplura 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**
% Contribution	**55%**			
EUGLENOPHYCEAE		**MONSOON MEAN**	**WINTER MEAN**	**SUMMER MEAN**
	Euglena sp.	4	2	2
	Euglena sp.	0	10	2
	Euglena sp.	12	42	66
	Phacus sp.	2	2	00
Total		**18**	**56**	**70**
% Contribution	**25%**			
TOTAL PHYTOPLANKTON COUNT/ ML		**158**	**154**	**296**
TOTAL PHYTOPLANKTON COUNT/ L		**94800**	**92400**	**177600**

Plate I Phtoplankton species

CYANOPHYCEAE



Merismopedia sp.



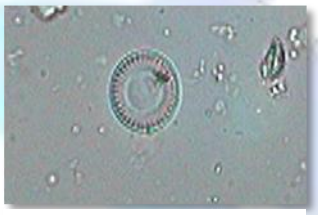
Nostoc sp.

Oscillatoria sp.

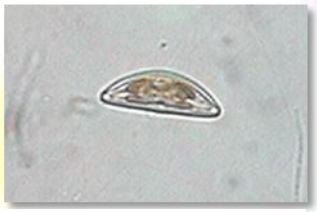
Spirulina sp.

BACILLARIOPHYCEAE

Amphiplura sp.



Cyclotella sp.



Cymbella sp.

Gomphonema sp.

Gyrosigma sp.

Naviculla sp.

Nitzschia sp.

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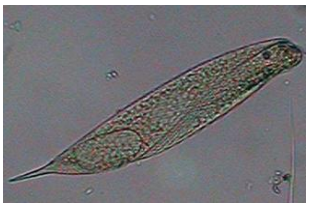
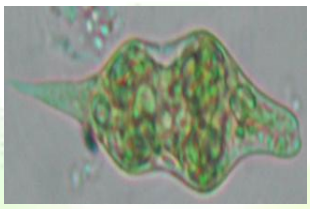
EUGLENOPHYCEAE	 *Euglena sp.*  *Euglena sp.*  *Euglena sp.*  *Phacus sp.*

IV. CONCLUSION

The total phytoplankton count/ml. is more in summer season and basillariophyceae is dominant. The total phytoplankton count/ml. is minimum in winterseason (154/ml) and maximum in summer season (296/ml). Oscillatoria sp. from cyanophyceae, Spirogyra sp. from chlorophyceae, Naviculla sp. from basillariophyceae and Euglena sp. from class euglenophyceae are found in more number during investigation period. This was proved by the above result as the amounts of cyanophyceae algae were found in Ghuma lake, which are indicator of pollution.

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