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ANALYSIS OF PRIMARY PRODUCTIVITY OF PHYTOPLANKTONIC COMMUNITY STRUCTURE OF A WETLAND

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ABSTRACT

Present work deals with the morphometrics, water and soil chemistry and productivity of Kawar Wetland with special reference to nutrient status. Studies were done during the period 2017-18.

Altogether 37 species of phytoplankton were recorded from the water of Kawar lake of four major group i.e. 8 species belong to Myxophyceae were recorded between 20 u/l to 200 u/l. 14 species belong to Chlorophyceae were recorded between 10 u/l to 280 u/l., 14 species belong to Bacillariophyceae were recorded between 40 u/l to 232 u/l, 1 specie belongs to Euglenophyceae was recorded between 0 u/l to 1.59 u/l.

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INTRODUCTION

Freshwater phytoplankton includes the photosynthetic as gross representing Myxophyceae, Chlorophyceae and Bacillariophyceae as a base of trophic level in the aquatic ecosystem and is directly related with fish production. Because of their short life cycles phytoplankers respond to quickly to environmental changes and hence their standing crop and species composition are more likely to indicate the quality of water masses in which they are found. Phytoplankton can also be used as biotic indicators of trophic status and pollution of water (Kaushal, 1979; Verma and Dutta Munshi, 1987). Phytoplankton are the Microscopic unicellular colonial or filamentous organisms, which contain photosynthetic pigment chlorophyll, phytoplankton areprimary producer as through the process of photosynthesis they produce food and release oxygen which other organisms utilize. The density and variation of phytoplankton is essential to understand the basic nature of ecology and economy of freshwater body, characterized by quantitative and qualitative fluctuation in the phytoplankton population. A number of workers like Prescot (1939), Chakrabarty et,al, (1959), Jana (1979), Verma and Dutta Munshi (1987), Goel et.al. (1988), Pandey et.al. (1994), Nandan and Jain (2002) have investigated the structure distribution and other aspect of plankton ecology.

The phytoplankton composition are controlled by change in existing environmental conditions light and temperature are major factor which influence the algal growth a number of investigator have reported the effect of temperature and light on the density and diversity of the phytoplankton important among them are Haque et.al. (1990). Phytoplankton also requires some essential nutrients viz. Nitrogen and phosphorous as the limiting nutrient for growth.

There are several workers on the relationship between phytoplankton and zooplankton. Jana (1979), Khan and Siddiqui (1979), Kundangar and Zutshi (1985) have reported inverse relationship on tropical pond of India. During the present investigation Kawar lake monthly and seasonal distribution of different groups of phytoplankton have been studied qualitatively and qualitative.

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MATERIALS AND METHODS

The phytoplankton sample were collected during morning hour's between 8 A.M. to 11 A.M. Samples were collected from the sub-surface water through a plankton net made up bolting silk, cloth (no. 25) having a mesh size of 0.03 to 0.04 mm. The lower end of the cone of the plankton net was fitted to a glass tube of 50 ml. capacity.

RESULTS AND DISCUSSION

Altogether 37 species of Phytoplankton were recorded from Kawar lake of four same major groups, i.e. Chlorophyceae, Bacillariophyceae, Myxophyceae and Euglenophyceae. 14 species belong to Chlorophyceae, 14 species belong to Bacillariophyceae, 8 belong to Myxophyceae and 1 species belongs to Euglenophyceae.

The qualitative order of Phytoplankton of Kawar lake was as follows :
Chlorophyceae > Bacillariophyceae >Myxophyceae>Euglenophyceae

Monthly values of Myxophyceaewas recorded between 20u/l to 200u/l in a year. Maximum density was recorded during summer and minimum during winter.

Chlorophyceae 14 species were recorded 10 u/l to 210u/l in a year. It was dominant group with Bacillariophyceae.

Bacillariophyceae 14 species were recorded 50 u/l to 220u/l in a year.

Euglenophyceae was recorded 1 specie. Density of Kawar lake of Euglenophyceae was found lowest and absent in several month.

Phytoplankton are the primary biotic components of food chain in an aquatic ecosystem. Its density is primarry controlled by basin morphometry, climatic cycle, water exchange rate. Davis (1955) pointed out that a number of physical, chemical and biological factors acting simultaneously, must be taken to consideration while understanding the fluctuation of Phytoplankton population. Two peaks of Phytoplankton were observed, one during summer and another during just after monsoon. According to Subramanyan (1959),"the biological year or the trend towards an increase in plankton production in the tropics begins with the monsoon. With the onset of monsoon, allochthonous nutrients are brought to the wetlands through water-shed run-oft which in turn shoots the production of Phytoplankton. High density of Phytoplankton has been observed by several workers during summer (Rai, 1980; Bhowmick and Singh, 1985; Baruah, 1995; Mandal, 2002; Kumar, 2003).

In Kawar lake Bacilliariophyceae and Chlorophyceae both dominated the Phytoplankton population and followed by Myxophyceae and Euglenophyceae.

Present study indicated that the Phytoplankton abundance in the waterbodies might have been favoured by the south-west monsoon inflow of rain water (Verma, 1981).

Table 1: Standing stock (u/l) and percentage composition (%) of Phytoplankton community of Kawar lake during January to December 2011.

	Myxophyceae		Chlorophyceae		Bacillariophyceae		Euglenophycae	
Months	u/l	%	u/l	%	u/l	%	u/l	%
JAN.	32	26.89	34	28.57	52	44.83	2	1.72
FEB.	40	27.21	46	31.29	60	41.10	2	1.37
MAR.	80	29.96	84	31.46	100	37.59	4	1.50
APR.	112	28.28	112	28.28	168	42.86	4	1.02
MAY.	170	30.25	184	32.74	200	36.36	0	-
JUN.	200	32.31	189	30.53	240	38.16	1	0.16
JUL.	62	31.96	60	30.26	70	36.65	1	0.52
AUG.	42	33.87	40	32.26	40	32.79	2	1.64
SEP.	30	31.25	30	31.25	32	34.06	2	2.13
OCT.	20	32.25	10	16.13	30	48.39	2	3.23
NOV.	34	27.20	30	24.00	60	49.18	0	-
DEC.	42	25.61	40	24.39	80	50.00	0	-

Table 2 : Phytoplankton recorded of Kawar Wetlands, Begusarai.

Groups	Kawar lake
Chlorophyceae	1. *Volvox aureus,* Ehrenberg 2. *Closteriopsissp.* 3. *Pedisastrumbryadiatum(Turpin)* Meneghini 4. *Pedisastrumboryanum var. longicornutum* Gutwin 5. *Ankistrodesmusfalcalus(Corda)* Ralfs. 6. *Closteridiumsp.* 7. *Scendesmusquadricauda(Turpin)* Breb. 8. *Cosmariumtsp.* 9. *Spirogyra longata(Vauch.)* Kuetzing 10. *Spirogyrasp.* 11. *Chlorellasp.* 12. *Microsporasp.* 13. *Zygnemasp.* 14. *Mougeotia quadrata,* Randhjawa
Myxophyceae	1. *Nostoc linckia (Roth),* Bornet 2. *Anabaena variablilis,* Kutzing 3. *Cylindrospermummuscicola,* Kutzing 4. *Cylindrospermum indicum,* Rao 5. *Lyngbya major,* Kutzing 6. *PhorrnidiumS p.* 7. *Spirulina major,* Kutzing 8. *Osicillatoriasp.*
Bacillariophyceae	1. *Synedra ulna, (Niag.)* Chr. 2. *Fragilaria intermedia,* Grun 3. *Nitzschia(Grun) var subtilis* Grun. 4. *Nitzschia palea,* Kuetzing 5. *Pinnularia gibbet,* Ehrenberg 6. *Pinnulariaviridis,* Nitz. 7. *Caloneissp.* 8. *Stauroneissp.* 9. *Navicularadiosa,* Kuetz 10. *Cymbellasp.* 11. *Gomphonemaradiosa,* Ehr. 12. *Melosiraambigua(Grun.)* Mull. 13. *Melosiragranulata(Ehrenberg)* Ralfs 14. *Cyclotella sp.*
Euglenophyceae	1. *Euglena acus,* Ehrenbe

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