

## SEASONAL VARIATION OF ALGAE IN A POLLUTED POND IN YAR HUSSAIN, DISTRICT MARDAN, NWFP

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### Abstract

Of the 23 genera and 49 species of algae identified from a polluted pond, Yar Hussain, District Mardan during 1979-1980, Cyanophyceae (30 spp.) were dominant followed by Bacillariophyceae (15 spp.), Chlorophyceae (3 spp.) and Euglenophyceae (one sp.). Frequency, constancy and ecological status of each species is presented.

### Introduction

Polluted ponds and effluent waters are specialized habitats in which plants of normal environment fail to grow. Preliminary reports on algae from various sewage effluents have been made (Ali *et. al.*, 1976, 1977, 1979). The present paper describes the distribution of algae in these polluted ponds artificially made after successive removal of soil by the farmers and collection of water from rain and refuse.

### Materials and Methods

Polluted pond in village Yar Hussain, District Mardan NWFP was selected for study. The area has tropical climate. Soil is alkaline and alluvial. The pond received enough rainwater during August and December 1979 while it was almost dry during June-July 1980 due to a rainless period. No angiospermic plant was found growing in or on the sides of the pond at any time of the year. Algae were collected from water, mud and floating objects from August, 1979 to July 1980. Twenty samples, taken at monthly interval were preserved in 3% formaline and microscopically examined. The frequency and constancy of each species was calculated after Phillips (1959).

### Results and Discussion

Of the 23 genera and 49 species identified (Table 1), Cyanophyceae (12 genera and 30 species) was dominant followed by Bacillariophyceae (7 genera and 15 species). Chlorophyceae and Euglenophyceae were the least represented. The dominating genus *Oscillatoria* (13 spp.) was followed by *Navicula* (5 spp.), *Aphanothece*, *Phormidium*, *Spirulina*, *Cymbella* and *Pinnularia* (each with 3 spp.).

Table 1. Seasonal occurrence and constancy of algal species during 1979-80 in polluted pond of Yar Hussain.

S.No.	Species	Jan	Feb	March	April	May	June	July	August	September	October	November	December	Constancy Value Class	Status	
CYANOPHYCEA																
1.	<i>Anabaena oryzae</i> Fritsch	-	-	5	-	5	-	-	-	-	-	-	-	16.50	I	R
2.	<i>Aphanizthece castagnei</i> (Breb.) Rauberh.	5	-	10	-	30	-	-	-	-	-	-	-	41.66	III	AS
3.	<i>A. microscopica</i> Nag.	-	5	5	-	-	-	-	-	-	5	5	5	25	II	IS
4.	<i>A. indulus</i> Richter	-	-	-	-	-	-	-	-	-	5	5	10	25	II	IS
5.	<i>Cirrococcus limneticus</i> Lemm.	-	10	-	-	-	-	-	-	5	-	-	-	25	II	IS
6.	<i>Dactylococcopsis replioides</i> Hansg.	-	-	-	5	-	5	-	5	5	-	-	-	25	II	IS
7.	<i>Lyngbya trancicola</i> Ghose	-	-	5	-	-	-	-	10	5	-	-	-	25	II	IS
8.	<i>Microcystis marginate</i> (Menegh.) Kutz.	-	-	-	-	-	-	-	-	5	-	-	-	8.25	I	R
9.	<i>Nostoc</i> sp.	-	-	-	-	-	-	-	-	-	10	-	-	8.25	I	R
10.	<i>Oscillatoria amphigranulata</i> Van Goor	-	-	5	-	-	5	-	-	-	-	-	-	16.50	I	R
11.	<i>O. agardhii</i> Gom.	-	-	-	-	-	-	10	-	5	-	-	-	16.50	I	R
12.	<i>O. angusta</i> (Bory) Gom.	-	-	-	-	-	-	-	-	-	5	-	-	8.25	I	R
13.	<i>O. animalis</i> Ag.	-	-	-	-	-	-	-	-	-	5	-	-	8.25	I	R
14.	<i>O. chalybea</i> (Martens) Gom.	30	35	55	55	70	65	85	-	-	10	10	50	83.33	V	D
15.	<i>O. formosa</i> Bory	-	-	-	-	-	5	90	-	-	30	10	10	41.66	III	AS
16.	<i>O. limnetica</i> Lemm.	10	-	15	-	-	5	-	-	-	-	5	25	41.66	III	AS
17.	<i>O. mougeotii</i> Kutz.	-	-	-	-	-	-	-	-	70	35	15	-	25	II	IS
18.	<i>O. nigra</i> Vauch.	-	-	-	-	-	-	-	10	-	-	-	-	8.25	I	R
19.	<i>O. obscura</i> Brühl & Biswas	-	-	-	-	-	-	-	-	5	-	-	-	8.25	I	R
20.	<i>O. okeni</i> Ag.	40	50	80	95	100	80	80	80	85	80	85	70	100	V	D
21.	<i>O. rubescens</i> D.C.	-	-	10	5	-	5	-	-	-	-	-	-	25	II	IS
22.	<i>O. subbrevis</i> Schindler	-	-	-	-	-	-	-	5	-	-	-	-	8.25	I	R
23.	<i>Phormidium anomalum</i> Rao, CB.	-	-	5	-	-	-	-	-	-	-	-	-	8.25	I	R

24.	<i>P. fragile</i> (Menegh.) Gom.	60	40	40	35	40	55	80	80	75	70	75	75	100	V	D
25.	<i>P. tenue</i> (Menegh.) Gom.	—	5	5	25	25	30	65	—	5	20	—	10	75	IV	SD
26.	<i>Plectonema notatum</i> Schmidle	—	—	—	—	—	5	—	5	—	—	—	—	—	I	R
27.	<i>Rhabdoderma irregulare</i> (Naumann) Geitler	—	10	15	—	30	—	10	—	—	20	20	30	58.33	III	AS
28.	<i>Spirulina labyrinthiformis</i> (Menegh.) Gom.	—	—	—	—	—	—	—	—	—	—	—	—	16.50	I	R
29.	<i>S. laxissima</i> West, G.S.	—	—	—	5	—	—	—	5	—	—	—	—	16.50	I	R
30.	<i>S. laxissima</i> var. <i>major</i> Desikachary	—	—	—	—	—	10	—	5	—	—	—	10	25	II	IS
31.	<i>S. major</i> Kutz.	—	—	5	—	—	—	—	—	—	5	—	—	8.25	I	R
32.	<i>Chlamydomonas snowii</i> Prinitz	—	5	—	—	—	—	—	—	—	—	—	—	8.25	I	R
33.	<i>Pediastrum integrum</i> Nag.	—	—	5	—	—	—	—	—	—	—	—	—	8.25	I	R
34.	<i>Selenastrum</i> Sp.	—	—	—	—	5	—	—	—	—	—	—	5	16.50	I	R
BACILLARIOPHYCEAE																
35.	<i>Cyclotella obovata</i> Bachmann	—	—	—	—	—	—	—	20	—	—	—	—	8.25	I	R
36.	<i>Cymbella</i> sp.	—	5	—	—	—	—	—	—	—	5	5	—	33.33	II	IS
37.	<i>C. amphicephala</i> Nag.	—	—	—	—	—	—	—	5	—	—	—	—	8.25	I	R
38.	<i>C. ventricosa</i> Kutz.	—	—	—	—	—	—	—	—	5	—	—	—	8.25	I	R
39.	<i>Frustulia rhomboides</i> (Ehrenb.) De Toni	—	—	—	—	—	—	—	—	10	—	—	—	8.25	I	R
40.	<i>Navicula angulica</i> Ralfs	—	—	—	5	—	—	—	—	—	—	—	—	8.25	I	R
41.	<i>N. confervacea</i> (Kotz.) Grun.	—	10	10	—	—	—	—	—	—	—	—	5	25	II	IS
42.	<i>N. exigua</i> (Gregory) Mueller	—	—	15	—	—	—	—	—	—	—	—	5	25	II	IS
43.	<i>N. salinarum</i> Grun.	—	5	—	—	—	—	—	—	—	—	—	5	16.50	I	R
44.	<i>Navicula</i> sp.	—	—	—	10	5	—	—	—	—	—	—	—	33.33	II	IS
45.	<i>Nedum iridis</i> (Ehrenb.) Pfister	—	—	—	—	—	—	—	5	—	5	—	—	16.50	I	R
46.	<i>Nitzschia amphibia</i> Grun.	70	60	70	40	55	50	5	5	—	35	70	45	100	V	D
47.	<i>N. angustata</i> var. <i>hinyarifi</i> Aojum & Hussain	15	95	50	35	20	25	—	—	—	15	35	40	75	IV	SD
48.	<i>N. palea</i> (Kutz.) Wm. Smith	10	25	35	60	45	5	—	—	—	—	5	15	75	IV	SD
49.	<i>Phumularia brunii</i> (Gruth.) Cleve	—	—	—	—	—	—	—	5	—	—	—	—	8.25	I	R

D = Dominant; SD = Sub-dominant; IS = Infrequent species; AS = Associated species; R = Rare

Algal frequency was highest during August, March and December due to abundant rains. During July the number declined presumably due to high temperature and drying of the pond due to rainless period. Rain water, beside providing more aquatic space, might have diluted the concentration of pollutants thereby allowing species which otherwise could not do well in the highly polluted waters.

*Euglena ehrenbergii*, *Nitzschia amphibia*, *Oscillatoria chlaybea*, *O. okeni*, *Phormidium fragile* were recorded throughout the year (Table 1). *Nitzschia angustata* var. *himayataii* was collected during October and June only while *Nitzschia palea* was not encountered from July through October. *Oscillatoria formosa* was present from August through December. *Phormidium tenue* was absent during June, August and November. *Cyclotella* appeared during the cold months while *Dactylococcopsis* was present in hot season only. The frequency of various species varied during hot and cold months (Table 1).

The presence of *Euglena* throughout the year could be due to its preference for the polluted water. Round (1966) and Kumar & Singh (1979) observed luxurious growth of *Euglena* in sewage disposal system. Many species recorded in the present study have been reported from similar environments by (Siddiqi & Faridi, (1964).

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