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The sate of Algal Presence in two ponds of Gaya

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Abstract
Phytoplankton's are the foundation of the aquatic food web, the primary producers, feeding everything from microscopic, animal-like zooplankton to multi-ton whales. Small fish and invertebrates also graze on the plant-like organisms, and then those smaller animals are eaten by bigger ones. The present study has taken into consideration about their extent of presence in two ponds of Gaya and their impact on the limnetic life has been elaborated.

Introduction:

Derived from the Greek words *phyto* (plant) and *plankton* (made to wander or drift), phytoplankton are microscopic organisms that live in watery environments, both salty and fresh.The myriad of minute suspended organisms phytoplanktons; including diatoms, filamentous green algae and blue green algae regulates the limnetic life, as they carry on photosynthesis in water. The abundance, distribution and diversity of phytoplanktons are influenced by several physio-chemical characteristics of water. Phytoplankton growth depends on the availability of carbon dioxide, sunlight, and nutrients. Phytoplankton, like land plants, require nutrients such as nitrate, phosphate, silicate, and calcium at various levels depending on the species. Some phytoplankton can fix nitrogen and can grow in areas where nitrate concentrations are low. They also require trace amounts of iron which limits phytoplankton growth in large areas of the ocean because iron concentrations are very low. Other factors influence phytoplankton growth rates, including water temperature and salinity, water depth, wind, and what kinds of predators are grazing on them.

Materials & Method:

Phytoplankton, which are the microscopic, free floating autotrophs (Hensen, 1887) were collected by filtering 50 litres of water through a phytoplanktonic net and were preserved in 4%formaline solution(APHA[1], 1985).

Phytoplanktonic net was manually designed; a filter in conical shape was made with standard silk bolting cloth no 22 having 75 meshes / linear centimeter. The diameter of top metal ring was 36 cms.at the bottom of which graduated vial was tied firmly (Bilgrami *et*[2]*. al.*; 1985).

The sample was subjected to centrifugation with the help of a centrifuge (Remi type R-24) at 3000 R.P.M. for 20 minutes. Supernatant fluid was decanted and the concentrate was thoroughly mixed and was transferred to a clean grease free microscopic slide and covered with a coverslip.

The count was done by Lackey's Drop Method (Lackey[3], 1938) as mentioned in APHA (1985)[1] and modified by Saxena[4] (1987).

The formula for calculation of Phytoplankton units, L is mentioned below :-

Phytoplankton Unit, $L^{-1} = \frac{n \times c}{V} \times 1000$

n = no. of phytoplankton in 0.1 ml concentrate

c = total volume of concentrate in ml

v = total volume of water filtered through net in litre

Identification of the Phytoplankton was done upto genera level with the help of standard keys and books by Palmer[5] (1980), Prescott (1951a[6], b[7]), Smith (1950[8]), APHA[1] (1985).

Results

Results have been presented in the Table-1, which is as under:

State of Algal presence of Jindapur Pond (J.P.) during the year 1994

Chlorophyceae	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	State of occurrence in a year
Ankistrodesmus	+	+	+	+	+	-	+	+	+	+	+	+	11
Botriococcus	+	+	+	+	+	+	+	+	+	+	+	+	12
Casteria	+	+	+	+	+	+	+	+	+	+	+	+	12
Chlamydomonas	+	+	-	-	-	-	-	-	-	-	-	-	02
Cosmerium	+	+	+	+	+	-	+	+	+	+	-	+	09
Draparnaldia	+	-	-	-	-	-	-	-	-	-	-	-	01
Gonium	+	+	+	+	+	+	+	+	+	+	+	+	12
Lepocinclis	+	+	+	+	+	-	+	+	+	+	-	+	10
Palmela	+	+	-	-	-	-	-	+	-	-	-	-	03
Sphaerocystis	+	+	+	+	+	-	+	+	+	+	+	+	11
Spirogyra	+	+	+	+	+	+	+	+	+	+	+	+	12
Tetraspora	+	+	+	+	+	-	+	+	+	+	-	+	10
Ulothrix	+	+	+	-	-	-	-	+	+	-	-	-	05
Zygnema													
Total Genera in Month	14	13	11	10	10	05	10	12	11	09	07	10	

Table-2
State of Algal presence in Baitarni Pond (B.P.) during the year 1994

Chlorophyceae	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	State of occurrence in a year
Actinastrum	+	+	-	+	+	-	-	-	-	-	+	+	06
Ankistrodesmus	+	+	+	+	+	+	-	+	+	+	-	-	09
	+	+	+	+	+	+	-	+	+	-	-	+	09
Carteria	+	+	+	+	+	-	+	+	+	+	+	+	11
Chlamydomonas	+	+	+	+	+	+	+	+	+	+	-	+	12
	+	+	+	+	+	+	+	+	+	-	-	-	09
Cladophora	+	+	+	+	+	+	+	+	-	-	+	+	09
Closterium	+	+	+	+	+	+	+	+	+	+	-	+	12
Coelastrum	+	+	+	+	+	-	+	+	-	-	+	+	08
Cosmerium	+	+	+	+	+	+	+	+	+	+	+	+	12
Dioctyosphaerium	+	+	+	+	+	-	+	+	+	+	+	+	11
	+	+	-	-	-	+	+	+	+	+	+	+	12
Draparnaldiopsis	+	+	+	+	+	-	+	+	+	+	-	+	08
	+	+	+	+	+	+	+	-	+	+	-	-	11
Eudorina	+	+	+	+	+	+	-	+	+	+	+	+	09
Gonium	+	+	+	+	+	-	+	+	+	+	+	+	11
Hydrodictyon	+	+	+	+	+	+	+	+	+	+	+	+	11
Oedogonium	+	+	+	-	-	+	-	+	+	-	-	-	12
Pediastrum	+	+	-	+	+	-	-	+	+	+	+	+	06
Pondorina	+	+	+	+	+	+	+	+	+	-	-	+	09
Scenedesmus	+	+	+	+	+	+	+	+	+	+	-	-	10
Selenastrun	+	-	-	-	-	-	-	-	-	-	-	+	10
Spirogyra	+	+	+	-	-	+	+	-	+	-	-	+	02
Tetraspora	+	+	+	-	-	-	+	+	+	+	+	+	07
Ulothrix													09
Vaucheria													
Volvox													
Zygnema													
Total Genera in Month	25	24	21	20	20	16	20	22	21	18	14	20	

Discussion

Phytoplanktons, the dominant aquatic life forms which comprise of green algae, blue green algae, diatoms and euglenoides are the base on which the limnetic life depends. Planktonic abundance, distribution and diversity are influenced by several factors such as physical (light and

temperature) and chemical (dissolved oxygen, nutrients etc.). In order to understand the diversity of planktonic dynamics only two biologicaly active sites were identified (L_1&L_2) out of four sampling sites which were previously used for physic-chemical analysis; these two sites showed significant fluctuations.

Regarding overall distribution of chlorophycean algae, the minimum presence was recorded in November at 24.137% whereas the maximum one was observed in August to the tune of 50.00%, the annual average remained 36.1244%.

Ratio of number of species of chlorophycean in water medium provide an indication of trophic status (Thunmark[7], 1945). Chlorophycean quotient which is based on Thunmark's concept.

Chlorophyceandominance in lentic waters of Dharwad has been reported by Hedge[8] (1985), Zafar[9] (1967), Rao[10] (1975), Munawar[11] (1974).Chlorophycean dominance has been attributed to eutrophic situation of ponds/lakes (Rice[12], 1938; Singh[13], 1960; Zutshi[14], 1975[15], 1976; Gonzalves and Joshi[16], 1946, Gahotri et al.[17] 1980; and Saiefy*et al.*,[18] 1986).The ability of chlorophycean algae to withstand against the pollution load has been sounded by Palmer[19] (1969) and Jha*et al*.[20] (1989). An alkaline medium has also been favoured for optimal growth of Chlorophyceae (Philipose[21]; 1959[22], 1960; Munawar[23], 1970; Saha[24], 1985).

Temperature may be regarded as an important factor in the periodicity of Chlorophyceae. Tressler and Domogalla[25] (1931), have observed its maximum growth during warmer month of the year. Zafar[9] (1967) and Munawar[11] (1974) reported the first maxima of Chlorophyceae occurred during summer and second commenced often on onset of monsoon and persisted till early winter months, when temperature fluctuated, between 16^o and 28^o C. In our observations a real maxim has been witnessed by the monsoon month of August but all warmer months have shown a fairly good presence except for June, which may be either due to excessive heat or other physic-chemical features which may adversely affect due to it.

Hutchinson (1967[26], b) opined that algal members of Chlorophyceae prefer eutrophic waters as suggested earlier also having salt concentration. Rao[27] (1975) also reported that Volvocales prefer eutrophic water having high salt contents. Iyengar[28] (1940) and Jayanagourder[29] (1964) observed that chlorophycean population increased during monsoon season.

References:

1. Bilgrami et al (1985) :- Ecology of river Ganges. Impact of human activities and conservation of aquatic biota (Patna to Farakka).Final Tech. Repot.D.O. Env; New Delhi.
2. APHA (1985) (AWWA, WPCF) :- Standard methods for examination of water and waste water 16th Ed. American Public Health Association American Water Works Association. Water Pollution Control Federation, Washington D.C.
3. J.B. Lackley (1938) :- The manipulation and counting of river plankton and changes in some organisms due to formation preservation. Public Health Repts. 53 : 2080-2093.
4. M.M. Saxena (1987) :- Environmental Analysis, Water, Soil aand Air, Agro Botanical Publishers, India. 1-3, 4-14.
5. C.M. Palmer (1980) :- Algae and Water Pollution. Castle House Publications Ltd. 1-119.

6. G.W. Prescott (1951a) :- Algae of Western Great Lakes area, exclusive of desmids and diatoms. Cranback Inst. Sci, Bloomfields Hills, Minch. Bull No.31: 946P.
7. G.W. Prescott (1951b) :- Lake types and algal distribution. In Algae of the Western Great Lakes area.Carn brock Inst. Sci. Bloomfield Hills. Mich. Bull No. 31P : 13-33.
8. G.M. Smith (1950) :- The freshwater algal of the United States Ed 2 Mc Graw Hill, New York : 719.
9. G.R. Hedge (1985) :- On the succession of algal in a temple tank at Dharwal Karnataka, India, Geobios 12 (6) : 261-263.
10. A.R. Zafar (1967) :- On the ecology of algae in certain fish ponds of Hyderabad, India, III. Periodicity Hydrobiologic 30(1) : 96-112.
11. V.S. Rao (1975) :- An ecological study of three freshwater ponds of Hyderabad, India III. The phytoplankton (Volvocales, Chlorococalies and Desmids).Hydrobiologia47 : 319-337).
12. M. Munawar (1974) :- Phytoplankton biomass, species composition and Primary production at a near share and a mild lake station of lake Ontario during IFGYL, Proc. 15th Conf. Great Lakes Res : 629-652.
13. C.H. Rice (1938) :- Studies on the Phytoplankton of river Thames I & II Ann. Bot. 2 : 539-581.
14. V.P. Singh (1960) :- Phytoplankton ecology of the inland waters of Uttar Pradesh Proc. Symp. Algal.ICAR. New Delhi 1959 : 243.
15. D.P. Zutshi (1975) :- Association of macrophytic vegetation of Kashmir Lakes. Vegetation – 30 : 61-66.
16. D.P. Zutshi (1976) :- Phytoplankton Productivity algal dynamics and trophic status of Lake Mergozzo (Northern Italy) Mem. Ist. Ital. Idrobiol33 : 221-256.
17. E.A. Gonzalves and D.B. Joshi (1946) :- Freshwater algae near Bombay, 1. The seasonal succession of the algae in a tank at Bandra.J. Bomb. Nat Hist. Soc. 6 (1) 154-176.
18. O.D. Gahotary et al. (1980) :- Ecological Studies of an average fed pond including seasonal fluctuations of the Plantaktonic Component.
19. T. Saiefy (1986) :- Hydrobiology and Periodicity of Phytoplankton in the sewage fed Moti Pond Bhopal, India. Geobias13 : 199-203.
20. C.M. Palmer (1969) :-A compositing rating of algae tolerating organic pollution, Jour Phycology. 5 : 78-82.
21. T.N. Jhaet. al. (1989) :-SchizomerialeibleniiKuetzing as an indicator of water quality Biojournal Vol. 1 No. 1 : 113-116.
22. M.P. Philipose (1959) :- Chlorococales, ICAR, New Delhi.
23. M.T. Philipose (1960) :- Fresh water Phytoplankton of inland fisheries, Proc. Symp. Algal. ICAR, New Delhi : 272-291.
24. M. Munawar (1970) :- Limnological Studies on Freshwater Ponds of Hyderabad, India (Part II & III). The biocenose distribution and seasonal abundance of unicellular and colonial phytoplankton in polluted and unpolluted environments, Hydrogiologia– 36 : 105-128.
25. L.C. Saha (1985) :- Factors affecting phytoplankton Productivity and density in the river Ganges, Bhagalpur Geobios, 12 : 63-65.

26. W.L. Tressler and B.P. Domogella (1931) :- LimnologicalStudies of Lake Wingra Trans Wis. Acad. Sci. Arts. Lett.26 : 331-351.
27. G.E. Hutchinson (1967b) :- Introduction to lake Biology and the limnoplankton A. Treatise on Limnology, Vol. 2. John Wiley & Sons. Inc. New York : 1115 pp.
28. V.S. Rao (1975) :- An ecological study of three freshwater ponds of Hyderabad, India, II. The environment Hydrobiologia30 : 351-372.
29. M.O.P. Iyengar (1940) :- On the algal flora of some muddy rain water pod & proc. Ind. Sci. Cong. 27th Part II. 128.
30. I. Jayangourder (1964) :- A biological study of Nugikaria lake in Dharwar Mysore State, South India, Hydrobiologia (23) : 515-532.