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Seasonal Variation of Phytoplankton Diversityin the Fresh Water Body of Atpadi Lake, Maharashtra

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Abstract:*Studies on monthly variations of phytoplanktons in a freash water body of Atpadi lake Atpadi, Maharashtra were carried out from Feb. 2018 to Jan. 2020. The phytoplanktons in this aquatic body were represented by Bacillariophyceae, Chlorophyceae, Euglenophyceae and Cyanophyceae. The values of percentage composition of each group of phytoplankton indicated that Chlorophyceae (30.43%) formed largest group of phytoplankons followed by Bacillariophyceae (26.08%), Cyanophyceae (26.08%) and Euglenophyceae (17.39%). Maximum density of phytoplankton was reported during summer and minimum during monsoon season.*

Keywords:Phytoplankton, Bacillariophyceae, Chlorophyceae, Euglenophyceae, Cyanophyceae, etc.

I. INTRODUCTION

As a community of primary producers in aquatic ecosystems, the study of phytoplankton is essential to evaluate the feasibility of pisciculture in any fresh water body. Several species of phytoplankton play great role in early detection and monitoring of pollution. Atpadi Lake is located in eastern part of Sangli district between 17° 40' to 74° 91'. The maximum width of the lake is 1000 m north to south while 2300 m east to west. The maximum depth is about 5 m at the centre of the lake and the basin slope is gentle. The depth of the water around edges of the lake is less.The lake water is used for irrigation, drinking, domestic and industrial use.

The lake water is also used for many anthropogenic activities like washing, pisciculture, etc. The lake is mush influenced by human activities. Many hydrobiological investigations have been carried out on the lakes and tanks of this region (Kamat 1965, Goel et al.1988, Goel and Chavan 1991 and Bhosale et al. 1994).

The reports on the studies of the water bodies in the rural areas are meagre. As there is lack of baseline data on phytoplankton communities in the Atpadi lake, present investigation has been carried out to determine the species composition and seasonal variation in the phytoplankton of this lake.

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II. Materials And Methods

The plankton samples were collected fortnightly from four sampling stations of the lake by filtering hundred litres of surface water through plankton net made up of bolting silk No. 125. The concentrated samples were preserved with 4% formalin and 1 ml Lugol's iodine solution. Identification of planktons was made following Fritch (1944), Adoni et al. (1985) and Cox (1996). Counting of phytoplanktons was done by Lacky's drop (Lacky 1938) count method.

III. Result and Discussion

Phytoplankton species observed in the Atpadi lake are recorded in table No. 1. The phytoplankton population was mainly represented by Bacillariophyceae, Chlorophyceae, and Cyanophyceae with low representation by Euglenophyceae. A total number of 21 species of Chlorophyceae were identified. Chlorophyceae was dominated by species of *Pediastrum, Ankistrodesmus, Scenedesmus, Cosmarium, Closterium* and *Chlorella.*

Pediastrum tetras was most abundant. Other species such as *Oocystis crassa, Zygnema sp.* and *Oedogonium* occurred in moderate numbers The Chlorophyceae comprised about 36.84% of total phytoplankton. Maximum population of Chlorophyceae was observed in the month of April, and minimum in October during both years of investigation. The considerable decline in chlorophycean population was observed during rainy months.

Table 1: Phytoplankton species recorded during Feb. 2018 to Jan. 2020 in Atpadi Lake.

Chlorophyceae	Cyanophyceae	Bacillariophyceae	Euglenophyceae
1. Ankistrodesmus spiralis	*1. Anacystis cyanea*	*1. Amphoraovalis*	*1. Euglena cherenbergiia*
2. Ankistrodesmus Falcatus	*2. MicrocystisAeruginosa*	*2. Amphoraventa*	*2. Trachelomonas ispida*
3. Chlamydomonascingulata	*3. CoccochlorisStagnina*	*3. Naviculo radiosa*	*3. Euglena acus*
4. Chlorella vulgaris	*4. OscillatoriaChlorina*	*4.Mastogloiadanseii*	*4. Phacus quinuemarginatus*
5. Closterium setaceum	*5. Phormidiumautumnata*	*5.Fragilaria copucine*	*5. Phacus suecica*
6. Closterium sp.	*6. Oscillatoriaabusura*	*6. Melosira ambiqua*	
7. Coconeisplacentula	*7. Microcrosisgerminata*	*7. Nitzschia sps*	
8. Elakatothrix viridis	*8. Oscillatoriatenuis*	*8. Synedra ulna,*	
9. Kirchnerielia obesa	*9. Anabaenaspherica*	*9. Cocconeishypotheca*	
10. Pediastrum tetras	*10. Anabaena.constricta.*	*10. Navicula mutica*	
11. Pediastrum duplex	*11. Aphinizomenonflos-aquae*	*11. Gomphonema sp.*	
12. Kirchnerieliamicroscopica	*12. Chroococcusvarianus*	*12. Melosiragranulate*	

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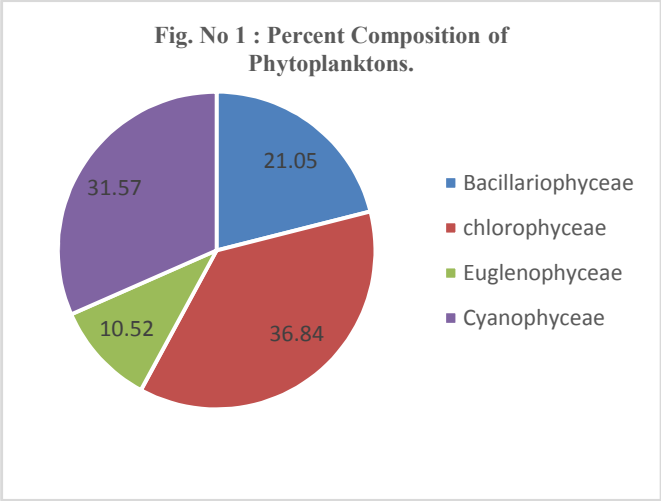
13. Ulothrix sp.	*13. Chroococcusminor*		
14. Zygnema sp.	*14. Spirulina major*		
15. Oedogonium sp.	*15. Spirulina laxa*		
16. Spirogyra sp.	*16. Merismopediaconvoluta*		
17. Coelastrum sp.	*17. Phormidium sp.*		
18. Oocystis crassa	*18. Lyngbya sp.*		
19. Scedesmus bijuga			
20. Scedesmus dimorphus			
21. Cosmarium tenue			

Eighteen species of Cyanophyceae were identified. The dominating species were *Microcystis aeruginosa* followed by *Oscillatoria abusura, O. amphibia* and *O. phormosa.* The genus Anabaena was represented by *A. spherica* and *A. constricta.* Considerable population of *Aphinizomenon-flos-aquae* was observed. The genus *Spirulina* was represented by *major* and *laxa*. Other members of Cyanophyceae such as *Chrococcus, Merismopedia, Phormidium, Lyngbya* and *Gleotricha* were observed in moderate numbers. The Cyanophyceae comprised about 31.57% of total phytoplankton. The blue green algae started increase in in numbers in early summer and attained peak at the end of summer. It was minimum during rainy season.

A total number of 12 genera of Bacillariophyceae were recorded. The species of *Synedra, Amphora, Cocconeis, Navicula, Gomphonema* and *Melosira* were preponderant in Atpadi lake. The Bacillariophyceae comprised about 21% of total phytoplankton and showed maximum in monsoon and minimum in summer. The Euglenophyceae contributed to 10.52% of the total phytoplankton during the period of investigation. It was represented by Euglena, *Phacus* and *Trachelomonas.* The minimum population of Euglenophyceae was observed during summer season.



The seasonal trend in total phytoplankton density was reported as summer > winter > monsoon. The summer maxima and monsoon minima can be attributed to effect of temperature on plankton production and dilution of lake water in rainy season. Blooming of phytoplankton in summer season has been reported by Sreenivasan et al. (1974) and Aurumugon & Furtado (1980) in some tropical lakes. Bhardwajaya (1940) also pointed out temperature and light as the factors responsible for higher phytoplankton population. Mustafa and Zubair (1997) encountered minimum number of phytoplankton in monsoon months. These observations go in agreement with these findings. Besides temperature, high pH during summers may be another factor responsible for summer maxima of total phytoplankton density. Verma et al.

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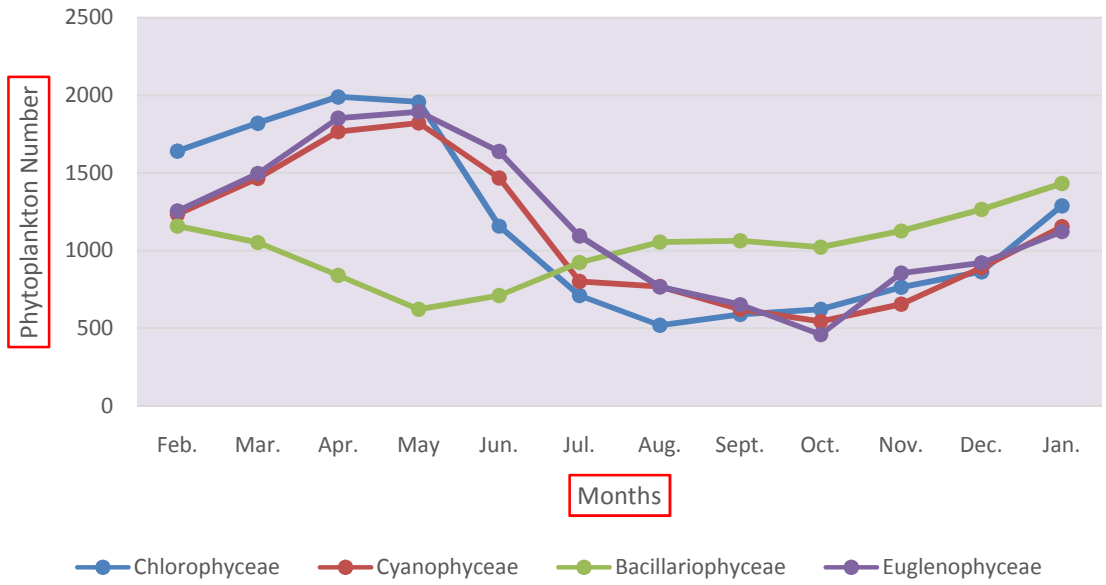
(2001) has reported phytoplankton density in different seasons in order of summer > winter > monsoon, which supports these findings.

The Chlorophceae population in Atpadi Lake showed definite seasonal trend with summer maxima and winter minima. Tripathi and Pandey (1990) reported similar results during summer. In the present investigation it was observed that high temperature and pH are favourable for rapid development of Chlorophyceae.

Fig. 2 : Monthly variation in phytoplankton density in Atpadi Lake



The Cyanophyceae constituted important part of phytoplanktons in Atpadi Lake. It showed summer maxima and winter minima. Mustafa and Zubair (1997) has reported high population density in summer and low in monsoon. Bacillariophyceae constituted major part of phytoplankton andencountered with high species diversity. Maximum diversity of Bacillariophyceae was observed in winter and minimum in during summer. Philipose (1960) mentioned that the diatoms are usually abundant in alkaline water and this lake has alkaline water. The Euglenophyceae though found in low numbers showed marked periodicity and abrupt disappearance. Maximum population density of Euglenophyceae was observed during monsoon and minimum during summer season. Vyas and Kumar (1968) observed that euglenoids shoe their presence during monsoon season. Higher Euglenophyceae population during summer and winter is observed in present study, and it can be attributed to high carbon dioxide content and low Dissolved Oxygen which favoured an abundance of Euglenophyceae.

REFERENCES

[1] Adoni A.D., Joshi G., Ghosh K., Chaurasia S. K., Vaishya, Yadav M., and Verma H.G. 1985 workbook on limnology, Pratibha publishers, Sagar India.

[2] Arumughan A.T. and Furtado J.I.,1980, Physico- Chemistry, desertification and nutrient budget of a low land eutrophicated Nalayasian Reservoir and its limnological implication, Hydrobiologia. 70: 11-24.

[3] Bharadwaja Y, 1940. Some aspects of the study of myxophyceae. Pro. 27th Indian Science Congress, Madras p. 168.

[4] Bhosle L.J, Sabale A.B. and Mulik N.G., 1994. Survey and status reports on some wetlands of Maharashtra. Final report submitted to Shivaji University, Kolhapur. India. 60 p.

[5] Cox E. J. 1996. Identification of freshwater diatoms from live material, Chapman and Hall. London.

[6] Fritch F.E., 1944. The present-day classification of algae. bot. Rev., 10.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
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[7] Goel P.K., Kulkarni A. Y. and khatavkar S.D. 1988. Species diversity in phytoplankton communities in fresh water bodies in South Western Maharashtra. Geobios. 15: 150- 156.
[8] Goyal P.K. and Chavan V.R., 1991. Studies on the limnology of a polluted fresh water tank. Aquatic Sciences in India (Gopal B and Asthana V. eds). pp.65-75
[9] Kamat M.D. 1965, Ecological notes on Kolhapur. J. Biol. Sci., 8: 47-54.
[10] Kulshrestha S.K. and Johari M., 1991, Epiphyte community of lower lake of Bhopal in relation to sewage pollution. Aquatic Sciences in India (Gopal B. & Asthana V., eds.) pp. 65-75
[11] Lacky J.B. 1938. The manipulation and counting of river plankton and changes in some organisms due to formalin preservations, U.S. Public Health reports, 53:2080-2093.
[12] Mustafa S. and Zubair Ahmed 1997, Environmental factors and planktonic communities of Baigul and Nanaksagar reservoirs, Nainital. J. Bombay Natural History Society., 182: 13-21.
[13] Palmer C.M. 1969. Composite rating of algae tolerating organic pollution. British Phycology Bulletin, 5:78-92.
[14] Philpose M.T., 1960. Freshwater phytoplankton of Inland fisheries proc. Symp. Algology., 279-291.
[15] Srinivasan, Sounda Raj R. and Franklin, T. 1974. Diurnal and seasonal changes in a productive shallow tropical pond. Phycos, 80-103.
[16] Tripathi A.K. and Pandey S.N., 1990. Water pollution. Ashish Publishing House.
[17] Verma M.C., Singh S.N. and Thakur, P. 2001. Ecology of perennial wetland: An overview of limnobiotic status. J. Env. Poll. 8(1):53-59.
[18] Zafar A.R. 1967. On the ecology of algae in certain fish ponds of Hyderabad, India III. The periodicity. Hydrobiologia. 30: 96-112.