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Phytoplankton Diversity of Various Lakes in Aurangabad City, (MS), India.

1. Yogita L. Padme 2. Kshama S. Khobragade
[1]Dept. of Environmental Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad- 431001, M.S., India . Email: padmeyogita@rediffmail.com
[2]S.B.E.S. College of Science, Aurangabad - (431001), M. S, India. Email: kshama.earth@gmail.com

ABSTRACT

Phytoplankton study provides a relevant and convenient point of focus for research on the mechanism of eutrophication and its adverse impact on an aquatic ecosystem. Algal flora constitutes a vital link in food chain whose productivity depended on the quality of water at a given time. The planktonic study is a very useful tool for the assessment of water quality in any type of reservoir which contributes to understand the basic nature and general economy of the lake. Aurangabad city, a district in Maharashtra State, is one amongst the fastest growing cities in Asia. Aurangabad is one of the cities from Marathwada region with historic significance where the oldest lakes like; Harsul Lake, Salim Ali Lake and Nehru Lake are placed. In present research work the diversity of phytoplankton, their distribution and abundance in Nehru Lake, Harsul Lake and Salim Ali Lake were studied. It is observed that, Bacillariophycea, Euglenophyceae and Dinophyceae were found maximum at all the three lakes. This indicates all the three lakes were polluted by organic pollution.

Keywords: Algae, Phytoplankton diversity, water body, abundance.

Introduction:

Phytoplankton converts solar radiant energy into biological energy through photosynthesis as primary production. It plays an important role in conditioning the microclimate, helps in regulating the atmospheric level of O_2 and CO_2, vital gases for life. Apart from primary production, phytoplankton plays an important role as food for herbivorous animals. Distribution of phytoplankton and their variation at different zones of a water body is known to be influenced by physico-chemical parameters of water. The phytoplankton communities are most sensitive to eutrophication. The nature of this response can be examined by comparing communities in disturbed and undisturbed lakes or by time series data on the changes in a body of water over a period of years during which nutrient input has increased. Studies on phytoplankton communities on eutrophic lakes show that a number of phytoplankton species is low as compared to oligotrophic waters. Investigations on Lake Wisconsin showed that in the eutrophic waters the population of the constituent species is considerably larger, resulting in higher levels of primary production as compared to oligotrophic waters (Shaprio, 1960).

A prior knowledge of the phytoplankton for any scientific utilization of resources is always helpful (Chaudhari *et. al.*, 2001). The planktonic study is a very useful tool for the assessment of water quality in any type of water body and contributes to understanding of the basic nature and general economy of the lake (Pawar *et. al.*, 2006). In these systems, phytoplankton is of great importance as a major source of organic carbon is located at the base (Gaikwad *et. al.*, 2004). The maintenance of healthy aquatic ecosystem is dependents on the abiotic properties of water and the biological diversity of the ecosystem (Harikrishnan *et. al.*, 1999).

Aurangabad city, a district in Maharashtra State, is one amongst the fastest growing cities in Asia. Aurangabad is one of the cities from Marathwada region with historic significance where the oldest lakes like; Harsul Lake, Salim Ali Lake and Nehru Lake are placed. In present research work the diversity of phytoplankton, their distribution and abundance in Nehru Lake, Harsul Lake and Salim Ali Lake were studied.

The Harsul Lake is located North-East of the Aurangabad city. It is 2 km away from Harsul jail. Catchment area of Harsul lake is 16054 Acers. It was constructed in 1954 and inaugurated on 5th June 1956. Water supply by Harsul Lake to Aurangabad city is about 1,00,0000 MCD. Salim ali lake supplied water under the ancient water supply scheme of *'Nahar-e-Ambari'*. Originally, the area of the pond was 54 acres. It reduced to 34 acres when it lost 20 acres in the construction of Aurangabad-Jalgaon road (Padme and Khobragade, 2019). Nehru Lake is situated in Nehru Udyan of N-8 CIDCO area, which is one of the oldest lakes in this historical city (Proposed Action plan for Industrial Cluster at Aurangabad, 2010).

Material and methods:

Collection of phytoplankton samples was made by sieving 25 litres of Harsul Lake Salim Ali Lake, and Nehru Lake, water from approximately 10 - 12 cm below the surface level passed through a 25 µm mesh net and the collected samples were transferred to 1litre capacity plastic bottles. The population of plankton accumulated in the container were then transferred to other bottle and immediately preserved with 2ml of 4% formalin and added Lugol's Iodine solution, labeled and then transferred to laboratory for further experimentation. Each sample was stirred smoothly just before microscope examination. One ml from agitated sample was transfer to a Sedge-wick Rafter counting cell with a wide mouth graduated pipette. The abundance of plankton was estimated by counting their presence per focus of the microscopic field. Plankton was identified by using Palmer, (1969), Prescott, (1969), Welch, (1980), Kodarkar et.al.(2006).

Results and Discussion:

Table no. 1 : Average population of phytoplankton at various sites

Sr. no.	Parameters	Harsul lake	Salim Ali lake	Nehru lake
1	Chlorophyceae			
	Spirogyra	33	40	38

	Chlorella	31	36	31
	Volvax	21	33	27
	Cosmarium	22	20	30
	Total	107	129	126
2	Bascillariophyceae			
	Diatomella	29	26	30
	Cyclotella	24	22	31
	Total	53	48	61
3	Cyanophyceae			
	Anabaena constricta	42	43	30
	Anacystis sp.	35	37	32
	Nostoc sp.	30	34	30
	Oscillatoria chlorine	28	31	29
	Total	135	145	121
4	Euglenophyceae			
	Euglena	4.	4	12
	Phacus	3	4	9
	Total	7	8	21
5	Dinophyceae			
	Cystodinium sp	1	2	10
	Kentosphaera	3	3	11
	Total	4	5	21

In present research work the following results were found :

- The Chlorophyceae was recorded at Harsul lake 26.74% followed by Bacillariophyceae 36.15%, Cynophyceae, 25%, Euglenophyceae 51% and Dinophyceae 50%. The result indicates that the population of phytoplankton at Harsul lake found in the order of Euglenophyceae > Dinophyceae > Bacillariophyceae > Chlorophyceae > Cynophyceae.
- At Salim Ali lakethe Chlorophyceae was recorded as 28.96 % followed by Bacillariophyceae 35.65% Cynophyceae 24.99%, Euglenophyceae 50% and Dinophyceae 50%. The result indicates that the population of phytoplankton at Salim Ali

lake found in the order of Euglenophyceae > Dinophyceae > Bacillariophyceae > Chlorophyceae > Cynophyceae.

- At Nehru lake the Chlorophyceae was recorded as 30.97% followed by Bacillariophyceae 33.54%, Cynophyceae 25%, Euglenophyceae 52% and Dinophyceae 51%. The result indicates that the population of phytoplankton at Nehru lake found in the order of Euglenophyceae > Dinophyceae > Bacillariophyceae > Chlorophyceae > Cynophyceae. The members of *Euglenophyceae* show tolerance to organic pollution and species belonging to this group can be used as biological indicators of organic pollution Palmer (1969).

Conclusion :

The present study indicated that the population of Euglenophyceae, Dinophyceae and Bacillariophycea,are found maximum at all bout Harsul Lake, Salim Ali Lake and Nehru Lake. The maximum population the these three planktons indicated that all the three lakes are organically polluted due to anthropogenic activites such as disposal of organic waste and domestic sewage. It may adversely affects on ecosystem of lakes. So it is nedded to avoid the direct dumping of organic waste as well as sewage into lake water and other conservation practices.

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