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Phytoplankton diversity and distribution in Yelahanka lake, Bangalore, Karnataka, India

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Abstract
In the present study, provide quantitative information on the seasonal variation of phytoplankton at Yelahanka lake, Bangalore. The result revealed that there are four groups viz., Chlorophyceae, Bacillariophyceae, Cyanophyceae and Euglenophyceae. Chlorophyceae shows its dominance followed by Bacillariophyceae, Cynophyceae and Euglenophyceae.

Keywords: lake, yelahanka, phytoplankton season

Introduction

Water is an important and essential substance in protoplasm and in the basis of life. It has been responsible for evolving life in our planet. It represents the great circulation system of the earth, being it as the sap of plants, the blood stream of animals, and rainfalls on the surface of the lands of rivers flowing to the sea. Many lower organisms live in direct contact with water, in higher animals the cells are in contact with the intercellular fluid containing water. It serves as transport medium for nutrients hormones and enzymes inside the body.

Aquatic ecosystem is depends on the abiotic properties of water and the biological diversity of the ecosystem (Harikrishna *et al*., 1999) [1]. The planktonic study is very useful tool for the assessment of water quality in any type of water body and also contributes to understanding of the basic nature and general economy of the lake (Pawar *et al*., 2006) [2]. Diversity, distribution, abundance and variation in the biotic factors provide information of energy turnover in the aquatic system (Forsberg, 1982) [3]. In these systems phytoplanktons is of great importance as a major source of organic carbon located at the base (Gaikwad *et al*., 2004) [4].

Their sensitivity and large variations in species composition and often a reflection of significant alteration in ambient condition within an ecosystem (Devassy and Goes, 1988, 1989) [5]. Hence for any scientific utilization of water resources plankton study is of primary interest. It has been recognized that seasonal changes, composition and production of benthic algae are affected by water chemistry and sediment structure. Algae, mostly autotrophic organisms, receive most of their nutrition from dissolved chemicals in water. Thus, many authors believe that they should be good indicators of the conditions prevailing in the aquatic environment and algae are widely used as bioindicators to monitor eutrophication, pollution and water quality (Round, 1984) [6].

Materials and Methods

During present study phytoplankton sampling were carried out monthly basis for the period of one year Jan. 2015 to Dec. 2015 of Yelahanka Lake Bangalore, Karnataka. The geographical coordination is 12°44.94°N Latitude and 77°32.263E Longitude. Plankton net (mesh size 25 um) was swept on surface water (Secchi's disc transparency zone) and plankton were collected through the net and easily transferred into separate plastic bottle/container. 100 liters of surface water was sieved through plankton net to obtain planktons. These were fixed and preserved in 4% formalin. The formalin fixed plankton samples were centrifuged at 1500-2000 rpm for 10-12 min. The phytoplankton were settled at bottom, diluted to a desirable concentration in such a way that they could be easily counted individually, under compound binocular microscope and phytoplankton were measured and multiplied with the dilution factors. Phytoplankton species identification was done with the help of standard references by Smith (1950) [7]. The quantitative analysis of. Phytoplankton organisms were carried out using Sedgwick-Rafter plankton counting cell.

Results and Discussion

Table 1: Monthly variation in Phytoplankton's (organisms / liter) at Yelahanka Lake (January-Dec. 2015)

Class	Phytoplankton	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chloro phyceae	Chlocella sp.	1	6	9	12	14	1	0	0	1	0	3	0
	Hydrodicton sp.	2	7	11	13	15	0	0	1	2	4	0	8
	Chalmydo monos sp.	1	0	8	12	16	1	0	1	0	5	6	0
	Cladophora sp.	1	11	14	22	0	0	0	0	6	8	2	4
	Closterium sp.	1	6	13	17	24	0	1	1	0	1	6	10
	Pediastrum duplex	3	11	11	25	16	0	0	0	0	4	0	12

	Pediastrum simplex	2	13	18	11	16	1	0	0	0	4	0	12
	Pediastrum sp.	1	0	1	8	17	0	0	0	0	2	6	0
	Ulothrix zonata	7	11	19	22	16	1	1	1	0	0	6	12
	Valvox sp.	8	8	4	11	12	1	0	0	1	0	8	10
Bacillariophyceae	Diatom sp.	33	40	58	73	90	16	15	19	32	38	25	21
	Navicula subtilis	9	10	18	34	20	7	4	1	5	11	15	10
	Navicula accomda	11	13	19	23	29	4	2	2	0	3	7	14
	Navicula sp.	15	18	24	33	37	16	14	18	10	11	25	21
	Pinnularia sp.	1	0	8	17	26	0	0	0	0	0	1	10
Cyanophyceae	Anabena sp.	2	4	5	0	12	1	1	1	0	3	5	0
	Anabena beckii	18	25	31	28	36	8	12	14	6	10	19	17
	Microcystic sp.	6	14	18	31	10	0	0	0	1	2	6	10
	Nostoc sp.	14	20	25	20	16	0	0	0	0	1	7	12
	Spiralina sp.	0	10	13	12	16	1	0	1	0	2	0	8
Euglenophyceae	Euglena acus	2	5	7	10	17	0	0	0	0	1	4	0
	Euglena granulate	1	6	10	16	28	1	0	0	0	0	2	6
	Euglena sp.	1	2	10	17	24	0	0	0	2	2	3	6

In the present study, phytoplankton were studied under four groups viz., Chlorophyceae, Bacillariophyceae, Cynophyceae and Euglenophyceae. Chlorophyceae showed its dominance followed by Bacillariophyceae, Cynophyceae and Euglenophyceae. Similar results have been reported by Hassan *et al*. (2010) [8].

Diversity Phytoplankton

Detailed microscopic examination of phytoplanktons has been carried out under compound microscope revealed that there were 4 groups consisting of 23 genera of phytoplanktons in the sample scanned throughout the study period Jan. 201 to Dec. 2015. The orderwise phytoplankton recorded as follows:

1. Chlorophyceae 10 Genera
2. Bacillariophyceae 05 Genera
3. Cyanophyceae 05 Genera
4. Euglenophyceae 03 Genera

The chlorophyceae known as green algae are deep green colour. Chlorophyceae represented by 10 species and showed dominance during summer season followed by winter season. Similar results have been reported by Hassan *et al*. (2010) [8]; Laskar and Gupta (2009) [9]; recorded dominance during summer season followed by winter season.

Bacillariophyceae are also known as diatoms. Bacillariophyceae has been reported 5 species and shows dominance during summer, followed by winter and monsoon season. Similar, results have been reported by Hassan *et al*. (2010) [8]; Laskar and Gupta (2009) [9]; Keshre *et al*. (2008) [10] recorded dominance during summer season followed by winter and monsoon season.

Cyanophyceae: These are known as Cyanobacteria, constitute largest group of photosynthetic prokaryotes. Cyanophyceae represents 5 species and shows maximum density during summer season and minimum during winter. Similar results have been reported by Nandan and Mayar (2007) [11], observed the seasonal fluctuation of Cyanophyceae, greatly in summer season.

Euglenophyceae: The large assemblage of unicellular organisms resembled one another in the possession of one or more flagella as an organ of locomotion. Euglenophyceae represents 3 species and shows its dominance during summer and winter season and minimum in monsoon. Similar results have been reported by Hassan *et al*. (2010) [8], Laskar and Gupta (2009) [9].

Conclusion

The present work will provide future strategies for development and biodiversity conservation of Yelahanka lake.

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