Phytoplanktonic Community of Aarey Lake, Mumbai

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Abstract : Limnological investigations were carried out during June, 2012 to May, 2013 in Aarey Lake. Fluctuations were noted in air and water temperature, transparency, dissolved oxygen, pH, alkalinity, phosphates, Nitrates, Chlorides total solids, conductivity and total plankton. The water body sustains heavy phytoplankton biomass throughout the year except for the rainy season. The phytoplankton population was dominated by Bacillariophytes despite eutrophication occurring in the lake.

Keywords: Aarey Lake, Phytoplankton, Zooplankton.

Introduction

Water is one of the most important compounds that profoundly influence life. It is widely believed that life itself originated in some quiet corner of the primordial oceans in the remote part. Water is aptly called the " Liquid of life" or the " Elixir of life" or the "Universal solvent" from the point of view of plant life every substance is dependent on water. Water which is regarded as the soul of nature, its pollution will mainly affect entire biotic community. Pollution of lakes first affects its physico-chemical quality and then systematically destroys the microbial and plankton communities. Thus, unbalancing the delicate microbial food web which in turn affect the food chain of ecosystem.

The study was conducted from June, 2012 to May, 2013 in Aarey Lake situated at Aarey Colony, Lat. 19.1612 ° N and Long. 72.8716°E in Mumbai, Maharashtra. Phytoplankton, being the primary producer, forms the lowest trophic level in the food chain of fresh water ecosystem and plays a key role in pisciculture. Moreover, number and species of phytoplankton Serves to determine the quality of a water body. With this in view, present work was undertaken which deals with phytoplanktonic community of Aarey Lake.

Material and method

Limnological investigations were carried out during June, 2012 to May, 2013. Selected physico-chemical parameters of water (temperature, transparency, salinity, dissolved oxygen and pH) were estimated using standard analytical methods (APHA, 1995). Fortnightly samples were taken from the surface from two different stations during early morning hours or late evening hours of the day, using a plankton net made up of bolten silk with a mesh of 100µm. The phytoplankton samples were preserved in Lugol's iodine. The zooplankton samples were preserved in 5% formalin. Identification was done with the help of key given by Prescott (1969), Adoni (1985), Edmondson (1965), APHA-AWWA-WPCF (1975), Chapman and Chapman (1975), Round(1975), Needham and Needham (1978).

Results and Discussion

Results are presented as average of two stations. Trend of phytoplankton standing crop and different phytoplankton groups over the study period are depicted. Period of occurrence and degree of maximum of various phytoplanktons are shown in Table 1.

Phytoplankton community comprised of algal groups; Bacillariophyta and Chlorophyta represented by total 22 genera. Somani and Pejaver (2003) reported 14 genera of Chlorophyceae, in the lake Masunda, Thane, Maharashtra. Cyanophyta was represented by the highest numbers of genera (10), whereas other two algal groups were represented by 6 genera each (Table 1). The phytoplankton standing crop (average of 2 stations) ranged from 15786.665x 10^3/1 (early April) to 15711.65x10^3 /1 (late May). The standing crop showed a marked increasing trend from March to May followed by decline by June.

During early months of study, when the temperature was moderate to some extent, blue green algae and green algae dominated, while as the summer advanced and temperature increased the diatoms became dominant and replaced the two other algal groups. Saad and Abbas (1985) also observed the highest number of diatoms during the period of highest temperatures in the Nile. Thus, the peaks of Cyanophyta and Chlorophyta were recorded during early period of study and that of Bacillariophyta during late summer presenting a clear succession among algal groups.

A comparison of the highest population size of the planktonic algal groups reveals that Bacillariophyta (95.40%) were the most dominant alga to be followed by Cyanophyta (45.94%) and Chlorophyta (28.47%). Although blue greens from the conspicious part of the phytoplankton community in most of the eutropical waters (Wetzel, 1975). During

present study, despite of the fact that present tropical tank is highly eutrophic, cyanophytes are placed only second.

Among Bacillariophyta, *Coscinodiscus, Gomphonema* and *Nitzschia*; among Cyanophyta, *Microcystis* and *Synechoeystics* and among Chlorphyta, *Closeterium* and *Scenedesimus* showed their occurrence throughout the study period. The maximum dominant genera (as ascertained on the basis of their highest numbers and as such prescribed by Cisneros *et al*., 1979) belonged to Bacillariophyta as out of total 6 genera, 5 enjoyed a dominant status; 3 of Cyanophyta and 2 of Chlorophyta were dominant. The phytoplankton peak which coincides with highest of Bacillariophyta was found to be dominated by *Nitzschia*, linking diatom bloom with phytoplankton population maxima. Details pertaining to occurrence and abundance of different are summarised in Table 1. The occurrence of *Microcystis,* the toxin producing blue green (Harris and James, 1974) in blooms, is a significant feature of tropical waters (Wetzel, 1975). In the present study also this alga appeared as a dominant taxon during most part of the study.

Table no: 1
Monthly variations of phytoplankton during the period of June 2012 – May 2013

Sr. No.	Phytoplankton Genera	Jun,12	Jul	Aug	Sept	Oct	Nov	Dec	Jan, 13	Feb	Mar	April	May	Mean
	CYANOPHYTA													
1	*Anabaena*	10	5	0	15	20	5	10	0	15	20	15	25	11.7
2	*Aphanocapsa*	0	0	5	5	10	0	0	5	10	5	0	15	4.6
3	*Merismopedia*	5	15	15	5	20	15	5	5	0	10	15	25	11.3
4	*Microcystis*	25	35	30	15	35	20	25	15	10	25	35	55	27.1
5	*Oscillatoria*	10	15	10	5	15	25	20	15	35	30	35	25	20
6	*Spirulina*	0	5	0	0	0	5	10	0	0	5	15	10	4.2
	Total	**50**	**75**	**60**	**45**	**100**	**70**	**70**	**40**	**70**	**95**	**115**	**155**	**78.8**
	CHLOROPHYTA													
1	*Scenedesmus*	5	20	15	15	25	10	15	35	30	15	10	25	18.3
2	*Pediastrum*	35	55	45	35	25	60	65	45	50	65	15	35	44.2
3	*Ankistrodesmus*	5	10	0	0	15	20	0	5	15	10	5	15	8.3
4	*Closterium*	0	0	0	5	0	15	5	10	0	0	5	5	3.8
	Total	**45**	**85**	**60**	**55**	**65**	**105**	**85**	**95**	**95**	**90**	**35**	**80**	**74.6**
	BACILLARIOPHYTA													
1	*Navicula*	15	25	20	5	15	30	35	20	15	35	45	30	24.2
2	*Nitzschia*	20	30	25	10	35	20	15	5	10	5	15	25	17.9
3	*Fragillaria*	5	10	15	10	15	20	25	35	10	5	15	25	15.8
4	*Gomphonema*	0	15	0	0	0	5	15	0	0	5	10	5	5
5	*Melosira*	15	25	25	20	15	5	5	15	10	5	5	15	13.3
	Total	**55**	**105**	**85**	**45**	**80**	**80**	**95**	**75**	**45**	**55**	**90**	**100**	**76.3**

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