

CYANOPHYCEAN DIVERSITY OF MOHAGAVAN LAKE, KARANJA (LAD), DIST. WASHIM (M.S.)

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ABSTRACT

An integrated study of Cyanophycean diversity of Mohagavan lakewas done for a period of July 2012 - September 2013.Mohagavan lake is man-made, rain fed and minor irrigation project in Godavari basin. The water samples were collected monthly, from four different spots of the lake. During the study period 15 species of Cyanophyceae were recorded.During the investigation, 3 different species of Arthrospira were recorded in which A. jeneri showed dominance, while A. massartii and A. platensis were moderate in population. Genera Cylindrospermopsis and Merismopedia punctata also showed dominance throughout the period of investigation. While, some species of Cyanophyceae showed very less population throughout the year such as Chroococcus disperses. Cyanophyceae was maximum during winter and minimum in monsoon season.

Keywords: *Cyanophyceae, Mohagavan Lake, Phytoplankton.*

Introduction

The phytoplankton is one of the imperative components of the aquatic ecosystem. Its growth depends on the availability of solar energy, macro and micronutrients as well as promoting organic substances in the water body.Among biotic communities phytoplankton constitutes the first stage in trophic level by virtue of their capacity to transducer environmental radiant energy into the biological energy through photosynthesis. Also referred to as primary productivity, the magnitude of photosynthetic energy fixation depends primarily on diversity and biomass of phytoplankton. The planktonic photosynthesis plays a key role in conditioning the microclimate (zone around an ecosystem) as it helps in regulating the atmospheric level of oxygen and carbon dioxide, two gases vital for life. Apart from primary production, phytoplankton's also playing an important role as food for herbivorous animals. They also are biological indicators of water quality in pollution studies. (Sakhare, V.B., 2007).Clean water supports a great diversity of organisms, whereas very few organisms able to survive in polluted water with one or

two dominant forms (Saladia, 1997). Diversity indicates the degree of complexity of community structure.The maintenance of healthy aquatic ecosystem is dependent on the biological diversity of the ecosystem and the abiotic properties of water (Harikrishnan, et.al, 1999).

Phytoplankton has long been used as indicators of water quality. Because of their short life cycles, planktonic organisms respond quickly to environmental changes and hence their standing crop and species composition indicate the quality of water (Mercado, 2003). The phytoplankton is consisting of micro and macroscopic suspended or free floating, non-motile or weekly motile unicellular, colonial or filamentous algae.The majority of phytoplankton is non-motile and are therefore at the mercy of water turbulence within the upper water mass.However, motile phytoplankton's like Chlamydomonas, Volvox, and members of dinoflagellates and chrysophytes etc. are unable to swim against the water current (Agrawal,S.C., 1999). It consist mainly five groups i.e. Cyanophyceae, Chlorophyceae, Bacillariophyceae, Euglenophyceae and Dinophyceae.

Cyanophyceae is a primitive group of algae. Members of the Cyanophyceae are commonly known as blue green algae. The name blue green algae is given because of the presence of a dominant pigment c-phycocyanin, the blue green pigment. In addition, other pigments like chlorophyll a (green), c-phycoerythrin (red), β -carotene and different xanthophylls are also present. The members of this class are the simplest living autotrophic prokaryotes. Members of Cyanophyceae are available in different habitats. Most of the species are fresh water (e.g., *Oscillatoria*, *Rivularia*), a few are marine (e.g., *Trichodesmium*, *Darmocarpa*), and some species of *Oscillatoria* and *Nostoc* are grown on terrestrial habitat

Hence, the present investigation was carried out to study the diversity of the Cyanophyceae in Mohagavan lake.

Materials and Methods

Mohagavan lake is situated near a village Mohagavan; It is located at 200 34' North latitude and 770 34' East longitude. Mohagavan lake is a man-made and rain fed lake. It is larger in size and irregular in shape and its limit is marked by boundary wall. The soil in the catchment area is red in colour. Mohagavan lake is the minor irrigation project in Godavari basin. The project is an earthen dam about 1200 meter in length and 14.77 meter in height.

For the present investigation, monthly water samples from four different spots were collected and mixed thoroughly. 1 liter of the water sample was collected in a glass bottle. 10 ml Lugol's iodine was added and allowed to stand for at least 24 hours to ensure complete sedimentation. The supernatant was taken out with the help of pipette. Further, the remaining sample was concentrated up to 10 ml for the phytoplankton counting by "Drop count method" (Adoni, 1985 and APHA, 1998). Phytoplankton identification up to genera and wherever possible up to species was done according to keys given by Edmondson (1959), APHA (1998) and

manual of the freshwater algae of Tamilnadu (Perumal and Anand, 2009).

Results and Discussion

During the present study 15 species of Cyanophyceae were recorded (Table - 1). The total Cyanophyceae count showed maximum (2896 Ind/l) population in January 2013 and minimum (71 Ind/l) in August 2013.

In the Mohagavan lake water 3 different species of *Arthrospira* were recorded in which *A. jenneri* (fig.4) showed dominance, while *A. massartii* (fig.5) and *A. platensis* (fig.3) were moderate in population. Genera *Cylindrospermopsis* (fig.8) and *Merismopedia punctata* (fig.9) also showed dominance at all sampling spots throughout the period of investigation. *Chroococcus* disperses (fig.6) observed rarely at some spot. *Microcystis* has 3 different species i.e. *M. flos-aquae* (fig.11), *M. Wessenbergii* (fig.13), *M. aeruginosa* (fig.12) showed a minimum population with regular presence. Vasisht and Sara (1979) have recorded that dominant and regular presence of *Microcystis* sp. as an indication of pollution and eutrophication of water body. The algae like *Microcystis aeruginosa* was used as the best single indicator of pollution and it was associated with the highest level of civic pollution (Nandan and Aher, 2005). *Oscillatoria* sp. (fig.14) was observed very less in number in Mohagavan lake. Gadag et al., (2005) observed that, the occurrence of *Oscillatoria* indicates pollutants of biological origin. Genus *Oscillatoria* has been found to be very tolerant to pollution and frequently grows in polluted water (Rai and Kumar, 1976).

During the period of investigation, Cyanophyceae was found to be the most dominant group of phytoplankton in Mohagavan lake. However, on analysing seasonal variance, Cyanophyceae was maximum during winter and minimum in monsoon. Kotadiya (2013), recorded maximum Cyanophyceae during winter

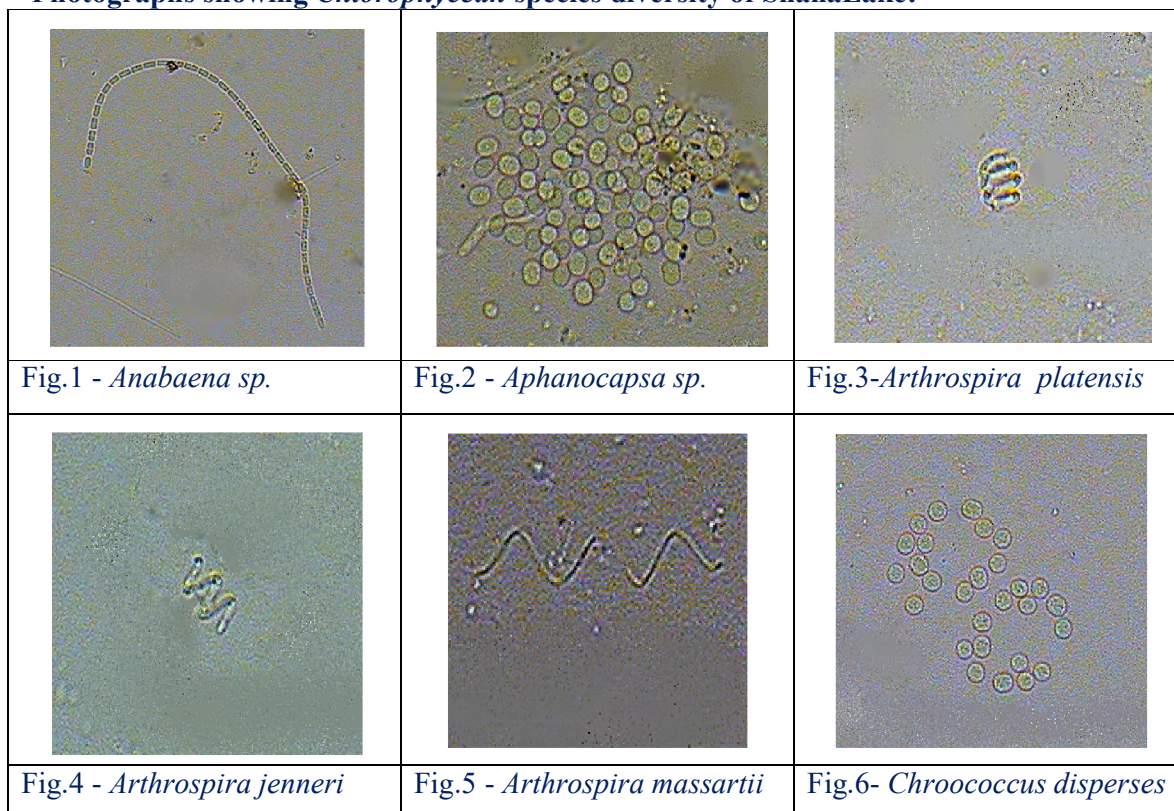
season while studying Ghuma lake, Ahmedabad. Whereas Thirugnanamoorthy and Selvaraju (2009) observed the density of Cyanophyceae was gradually decreased during winter and rainy seasons. Bloom of Cyanophycean algae in the lake is a clear sign of cultural eutrophication, which the result of addition of sewage effluents



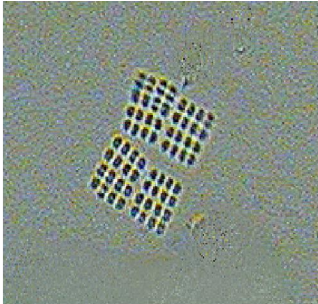
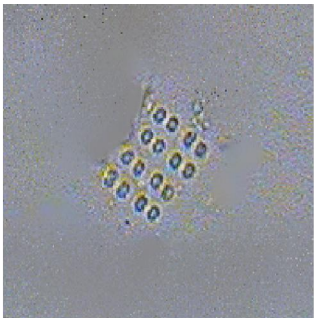
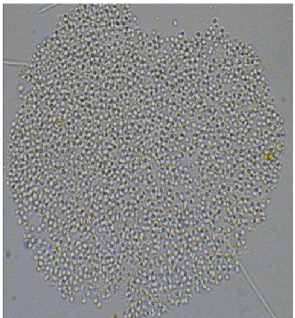
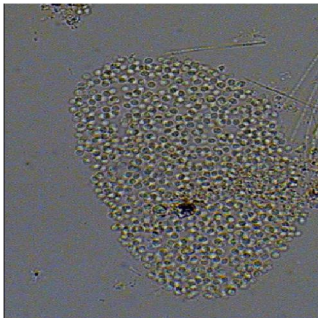
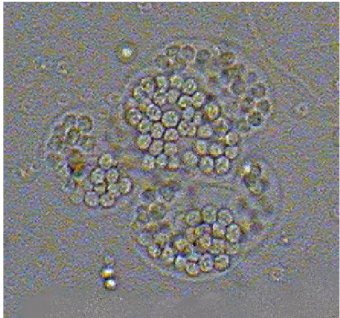

(Horne and Goldman, 1994). Rafter (1900) stated that the absence of a large number of blue, green algae is an indication of clean water. Our findings are well in agreement with those of above authors. The water quality of Mohagava lake is deteriorated day by day, hence the Mohagavan lake is progressing towards the Eutrophication.

Table - 1Cyanophycean diversity of Mohagavan Lake

Sr. No.	Species observed
1	<i>Anabaena sp.</i>
2	<i>Aphanocapsa sp.</i>
3	<i>Arthrospira platensis</i> (Nordst) Gomont
4	<i>Arthrospira jeneri</i> Stizenberger ex Gomont
5	<i>Arthrospira massartii</i> Kuffareth
6	<i>Chroococcus disperses</i> (Keissler) Lemm.
7	<i>Chroococcus minor</i> (Kutz) Nag.
8	<i>Chroococcus tenax</i>
9	<i>Cylindrospermopsis sp.</i>
10	<i>Merismopedia punctata</i> Meyen.
11	<i>Merismopedia convoluta</i> Breb.
12	<i>Microcystis flos-aquae</i>
13	<i>Microcystis aeruginosa</i> Kutz.
14	<i>Microcystis Wesenbergii</i>
15	<i>Oscillatoria sp.</i>

Photographs showing Chlorophycean species diversity of ShahaLake:



		
<p>Fig.7 -<i>Chroococcus tenax</i></p>	<p>Fig.8 - <i>Cylindrospermopsis sp.</i></p>	<p>Fig. 9 -<i>Merismopedia punctata</i></p>
		
<p>Fig.10 - <i>Merismopedia convoluta</i></p>	<p>Fig.11- <i>Microcystis flos-aquae</i></p>	<p>Fig.12 -<i>Microcystis aeruginosa</i></p>
		
<p>Fig.13 - <i>Microcystis Wesenbergii</i></p>	<p>Fig.14 - <i>Oscillatoria sp.</i></p>	

Acknowledgement

It's indeed regards to the Professor and Head, Laboratory of Botany,

S.G.B.A.University, Amravati for providing all facilities to carry out the research work.

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