Chlorophycean DIVERSITY OF SHAHA LAKE, KARANJA (LAD), DIST. WASHIM (M.S.)

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ABSTRACT

An integrated study of Chlorophycean diversity of Shaha lake was done for a period of July 2012 - September 2013. Shaha 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 54 species of Chlorophyceae were recorded. During the investigation, Staurastrum chaetoceras, Scendesmus quadricauda, Closterium dianae was found to be dominant throughout the year. While, some species of Chlorophyceae showed very less population throughout the year such as Akistrodesmus, Tetraedron minimum, Pandorina, Microcystis, Kirchneriella, Quadrigula quaternata, Actinasrum gracillium, Microsterias rotate and Dimorphococus lunatus. Chlorophyceae was maximum during winter and minimum in monsoon season.

Key words: *Chlorophyceae*, Shaha 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 micro nutrients 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 micro climate (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). 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.* The *Chlorophyceae* is a large and diverse group of fresh water algae. They include members which are ecologically as well as scientifically important. *Chlorophyceae* includes a diverse assemblage of photosynthetic organisms commonly known as green algae. These can be unicellular, multicellular, coenocytic or colonial representatives. They are one of the pioneer species in aquatic food web. Hence, the present investigation was carried out to study the diversity of the *Chlorophyceae* in Shaha lake.

MATERIALS AND METHODS

Shaha lake is situated in the village Shaha, which is 8 km. away from Karanja town. It lies at 20^0-20' North latitude and 77^0-26' East longitude. Shaha lake is man-made, rain fed and perennial lake. The lake is roughly triangular in shape and its limit is marked by the boundary wall. Shaha lake is the minor irrigation project in Godavari basin. The project is an earthen dam about 1365.0 meter in length and 12.67 meter in height.

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) and online books of Freshwater algae.

RESULTS AND DISCUSSION

During the present study 54 species of *Chlorophyceae* were recorded (Table - 1). The total count showed, maximum *Chlorophyceae* (1613 Ind/l) in the month of January 2013, while minimum (263 Ind/l) in April 2013. During the investigation, *Staurastrum chaetoceras* was found to be dominant throughout the year, while *S. gracile* (fig.22) was found moderate in number. *Scendesmus quadricauda* showed dominance, while *S. dimorphus* (fig.21), *S. acutus, S. abundans* (fig.20) were found to be minimum in population. *Pediastrum simplex* (fig.18) was found to be dominant, while *P. duplex* (fig.17) were comparatively less in number trough out the period of investigation. *Closterium dianae* (fig.2) showed more population. During this study some species of *Chlorophyceae* showed very less population throughout the year such as *Akistrodesmus* (fig.1), *Tetraedron minimum* (fig.24), *Pandorina* (fig.16), *Microcystis, Kirchneriella, Quadrigula quaternata* (fig.19), *Actinasrum gracillium, Microsterias rotate* (fig.15) and *Dimorphococus lunatus.* In the Shaha lake 21 different species of *cosmarium* were recorded. According to Hosmani *et al*., (2002) genus *Cosmarium, Euastrum, Staurastrum* and *Closterium* are considered as *desmids* which indicate good quality of water and absence of *desmids* is an indication of heavy pollution of water. *Desmids* are generally more common and diverse in oligotrophic lakes and ponds (Gerrath, 1993). Mahajan (2011) also reported diversity of *desmids* at Jalgaon, North Maharashtra. Lohar and Korekar (2015) were studied, the diversity of *Chlorophyta* in freshwater lakes of Sangali (M.S.) and recorded 51 Chlorophytes.

However, on analysing seasonal variance, *Chlorophyceae* was maximum during winter and minimum in monsoon. Choubey (1991) reported peak period of *Chlorophyceae* in winter while studying Gandhisagar reservoir. Hazarika and Datta (1998) also reported maximum density of *Chlorophyceae* in winter and minimum in summer and rainy season. Kulshrestha and Joshi (1991) have reported maximum *Chlorophyceae* during winter. Our findings are well in agreement with those of above authors.

Table - 1 *Chlorophycean* diversity of Shaha Lake

Sr. No.	Species observed	Sr. No.	Species observed
1	***Actinastrum gracillium* GM Smith**	28	***Cosmarium pusillum* (Breb)Archer**
2	***Ankistrodesmus sp.***	29	***Cosmarium speciosum* Lund**
3	***Chlamydomonas sp.***	30	***Cosmarium subprotumidum* Nordst**
4	***Chlorella sp.***	31	***Cosmarium sp.***
5	***Closterium dianae* Ralfs ex Ehrenb**	32	***Crucigenia rectangularis***
6	***Closterium incurvum* Breb**	33	***Crucigenia tetrapedia* (Kirch)**
7	***Closterium kuetzingii* Breb**	34	***Dimorphococcus lunatus* A.Braun**
8	***Closterium lunula* (Mull**	35	***Euastrum spinulosum* Delp**
9	***Coelastrum microsporum* Naeg.**	36	***Kirchneriella contorta* (Schmidle) Bohlin**
10	***Coelastrum reticulatum* (Dang)**	37	***Kirchneriella lunaris* (Kirch)**
11	***Cosmarium alatum* Kirchn**	38	***Micrasterias rotata* Ralfs**
12	***Cosmarium amoenum* Breb.& Ralfs**	39	***Oedogonium sp.***
13	***Cosmarium apertum* Skuja**	40	***Pandorina morum* (Muller) Bory**
14	***Cosmarium bicrenatum* Nordst**	41	***Pediastrum duplex* Meyen**
15	***Cosmarium binum* Nordst**	42	***Pediastrum Simplex* Meyen**
16	***Cosmarium bioculatum* Breb ex Ralfs**	43	***Pediastrum tetras* (Ehrenb)Ralfs**
17	***Cosmarium corda* ex Ralfs**	44	***Quadrigula quaternata* (W.et Gs West)**
18	***Cosmarium cucurbitinum* (Biss)Lfitkem**	45	***Scendesmus abundans***
19	***Cosmarium hammeri var. homalodermum* Nordst**	46	***Scendesmus acutus* Meyen**
20	***Cosmarium impresslum* Elfv**	47	***Scendesmus dimorphus* Kutz**
21	***Cosmarium lundelli* Delp**	48	***Scendesmus quadricauda* (Turpin) Breb**
22	***Cosmarium medioglabrum* Turn**	49	***Schroederia sp.***
23	***Cosmarium nitidulum* De Not**	50	***Spirogyra sp.***
24	***Cosmarium obtusatum* Schmidle**	51	***Staurastrum chaetoceras***
25	***Cosmarium ovllatum* Turner**	52	***Staurastrum gracile* Ralfs**
26	***Cosmarium portianum* W.Archer**	53	***Staurastrum recurvatum* Turner**
27	***Cosmarium pseudogranatum* Nordst**	54	***Tetraedron minimum***

Photographs showing *Chlorophycean* species diversity of Shaha Lake:

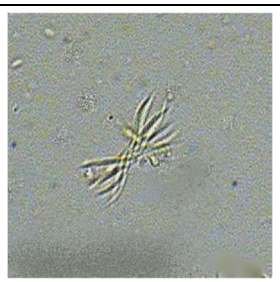


Fig.1 - *Ankistrodesmus sp.*	Fig.2 - *Closterium dianae*	Fig.3 - *Closterium kuetzingii*	Fig.4-*Coelastrum reticulatum*
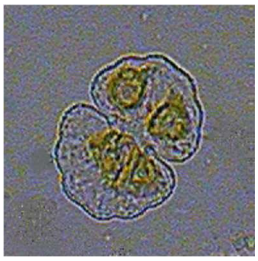	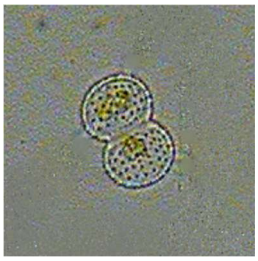	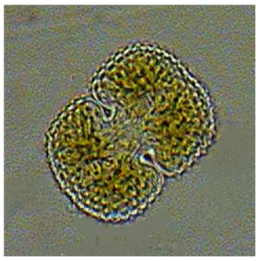	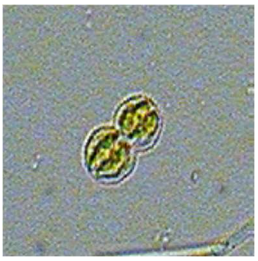
Fig.5 - *Cosmarium alatum*	Fig.6 - *Cosmarium amoenum*	Fig.7 - *Cosmarium binum*	Fig.8 -*Cosmarium cucurbitinum*
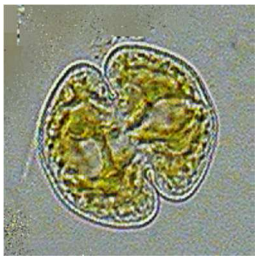	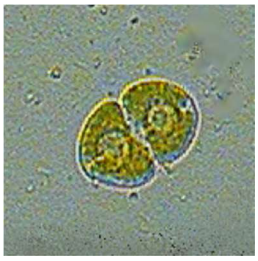	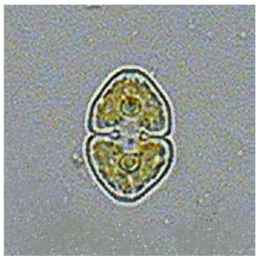	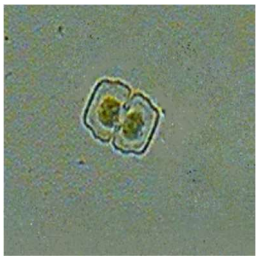
Fig.9 - *Cosmarium lundelli*	Fig.10 - *Cosmarium ovllatum*	Fig.11*Cosmarium pseudogranatum*	Fig.12 - *Cosmarium pusillum*
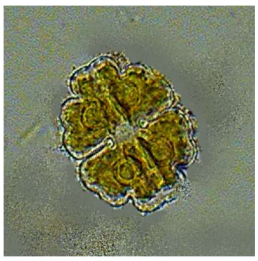		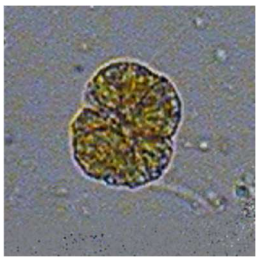	
Fig.13 - *Euastrum spinulosum*	Fig.14 - *Kirchneriella contorta*	Fig.15 - *Micrasterias rotata*	Fig.16- *Pandorina morum*
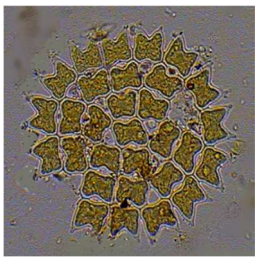	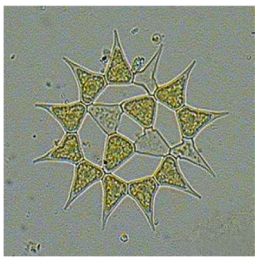		
Fig.17 - *Pediastrum duplex*	Fig.18 - *Pediastrum simplex*	Fig.19 - *Quadrigula quaternata*	Fig.20- *Scendesmus abundans*
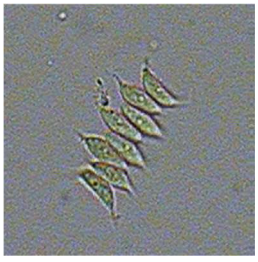	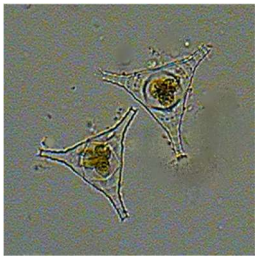	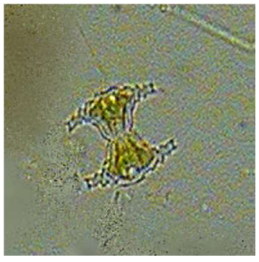	
Fig.21 - *Scendesmus dimorphus*	Fig.22 - *Staurastrum gracile*	Fig.23 - *Staurastrum recurvatum*	Fig.24 - *Tetraedron minimum*

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