



STUDIES ON CHLOROPHYCEAN DIVERSITY OF MALHARA POND OF BHADRAWATI, DIST- CHANDRAPUR (M.S.), INDIA.

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ABSTRACT:

The phytoplankton in aquatic ecosystems is an important biological indicator of the water quality. While phytoplankton are major primary producers and the basis of the food chain in open water, some species on the other hand can be harmful to human and other organisms by releasing toxic substances into the water. Phytoplankton plays an important role as primary producers in fresh water ecosystem. Phytoplankton are the primary producers, which form the base of an autotrophic food chain. They are of great importance as source of live food for zooplankton and fishes. The present paper describes the diversity of Chlorophyceae of Malhara pond, located near the Bhadrawati town of Chandrapur district. Qualitative and quantitative analysis of Chlorophyceae community was undertaken on monthly basis from October 2005 to September 2007. A total of 24 chlorophycean species were identified during the period of Oct. 2005 to Sep. 2006, while a total of 19 chlorophycean species were identified from Oct. 2006 to Sep 2007. In Malhara pond *Vorticella* sp. was dominant followed by *Volvox* sp., *Closterium chodatii*, *Netrium digitus*, *Euastrophis richteri* and *Pendiatrum tetras* and the present study demonstrated that the Chlorophyceae was maximum during the summer season and minimum during the monsoon season. The seasonal fluctuation of this group is discussed in the light of recent literature.

Key words- Malhara pond, Chlorophycean diversity, Seasonal variation.

INTRODUCTION:

Phytoplanktons are the autotrophic component of the plankton community. Since they obtain energy through the process of photosynthesis and must therefore live in the well-lit surface layer (termed the euphotic zone) of a water body. Phytoplanktons are the base of most of the lakes food web and fish





productions is linked to phytoplanktons production (Ryder *et al.*, 1974). The present investigation has been undertaken to study the qualitative and quantitative analysis of chlorophyceae community at the Malhara pond located near Bhadrawati town of Chandrapur district.

MATERIAL AND METHODS:

The Malhara pond is situated on the west side, four miles away from the town and it is located about 206 m. above the mean sea level and is at 79° 06' 48" E longitude and 20° 06'48" N latitude. The samples were collected in the morning hours between 8.30 to 10.30 a.m. 50 Lt. of water sample was filtrated through the plankton net made of bolting silk number 25 with mesh size 64 limes. The collected samples were allowed to settle down by adding Lugol's iodine. Normally, sedimentation requires 24 hrs. After which supernatant was removed and concentrate was made up to 50 ml depending the number of plankton and preserved in 5% formalin for further studies.

The quantitative study of chlorophyceae was done by Sedgwick – Rafter cell method, the concentrated sample was shaken and immediately one drop of sample was taken on a clear micro slide with the help of a standard dropper, the whole drop was then carefully covered with the cover glass and observed. Identification up to genera and whenever possible up to species level was classified according to keys given by Prescott (1954), Edmondson (1959), Sehgal (1983), Adoni (1985) and APHA (1985).

RESULT AND DISCUSSION:

Phytoplanktons are ecologically significant as they trap radiant energy of sunlight and convert it to chemical energy i.e. organic material. The role of phytoplanktons in managing bioenergetics, as bioindicators and as purifiers of polluted aquatic habitat is well known.





During the year 2005-06, 24 species were recorded among which *Vorticella* sp. (244 no./lit.) is dominant followed by *Volvox* sp. (193 no./lit.), *Coelastrum chodatii* (32 no./lit.), *Netrium digitus* (26 no./lit.), *Euastropsis richteri* (24 no./lit.), *Pediastrum tetras* (21 no./lit.), *Micrasterias pinnatifida* (19 no./lit.), *Closerium leibleimi* (17 no./lit.), *Chlamydomonas* sp. (16 no./lit.), *Goniochloris* sp. (15 no./lit.), *Ankistrodesmus* sp. (15 no./lit.), *Staurastrum* sp. (11 no./lit.) and *Pleurodiscus* sp. (11 no./lit.), *Chara* sp. (9 no./lit.), *Chlorococcum humicola* (8 no./lit.) and *Hydrodictyon* (8 no./lit.), *Cylindrospermum* sp. (7 no./lit.) and *Oedogonium* sp. (7 no./lit.) and *Chlorella* sp. (6 no./lit.) and *Nitella* sp. (6 no./lit.).

During the year 2006-07, 19 species were recorded among which *Volvox* sp. (159 no./lit.) is dominant followed by *Ankistrodesmus* sp. (163 no./lit.), *Vorticella* sp. (30 no./lit.), *Cosmarium granatum* (23 no./lit.), *Gloeocystis gigas* (20 no./lit.), *Microsterias pinnatifida* (14 no./lit.), *Staurastrum* sp. (14 no./lit.), *Pleurodiscus* sp. (14 no./lit.), *Netrium digitus* (13 no./lit.), *Spirogyra* sp. (12 no./lit.), *Oedogonium* sp. (11 no./lit.) and *Chara* sp. (11 no./lit.) *Chlorococcum humicola* (10 no./lit.), *Pediastrum tetras* (10 no./lit.), *Chlorella* sp. (10 no./lit.), *Troschiscia pachyderma* (8 no./lit.), *Hydrodictyon* sp. (8 no./lit.), *Chlamydomonas* sp. (7 no./lit.) and *Cylindrospermum* sp. (6 no./lit.).

Chlorophyceae was the most dominant group among all the planktons. The dominance of Chlorophyceae was also recorded by Sakhare and Joshi (2002) in Yeldari reservoir, Nanded district, Maharashtra and Jayabhaye *et al.*, (2007) in Parola dam, Hingoli district, Maharashtra. Somani and Pejawar (2003) reported 14 genera of Chlorophyceae in Masunda, Thane, Maharashtra. Kumawat and Jawale (2003) recorded 14 genera belonging to Chlorophyceae from a freshwater pond at Dharmapuri in Beed district, Maharashtra and 59 genera of phytoplankton from a fishpond at Anjale. Pawar *et al.*, (2006) reported 26 species of Chlorophyceae and observed *Ankistrodesmus falcatus* as





a dominant species in Chlorophyceae in Petwadas dam of Kandhar of Nanded district, Maharashtra. Tiwari and Chouhan (2006) reported 34 species of Chlorophyceae in Kitham lake, Agra, Uttar Pradesh. Waghmare and Mali (2007) reported 10 species of Chlorophyceae in a minor irrigation dam of Kalamnuri, District Hingoli, Maharashtra. Mukherjee *et al.*, (2010) reported 8 species of chlorophyceae in a polluted eutrophic lake, Ranchi. Anjayan, K.V. and Parameshwara Naik, T. (2011) reported 9 genera in lentic water bodies of Bhadrawati taluk, Shimoga District, Karnataka. Shinde *et al.*, (2012) recorded the 15 genera in Harsool-Savangi dam, Aurangabad, India.

Among the different species in Malhara pond *Vorticella* sp. was dominant followed by *Volvox* sp., *Closterium chodatii*, *Netrium digitus*, *Euastrophis richteri* and *Pendiatrum tetras*.

In the present investigation, Chlorophyceae was maximum during the summer season and minimum during the monsoon season. Reddy (1984) found a positive corelationship between temperature and green algae in Tungabhadra river, Karnataka. Kumawat and Jawale (2003) observed dominance of Chlorophyceae in the month of April. Khapekar and Deshpande (2007) reported similar observation during the assesement of Naik lake, Nagpur, Maharashtra. Factors such as high temperature, low nitrate and bright sunlight are favorable for the population of green algae (Rao, 1955).

Jayabhaye *et al.*, (2007) reported maximum Chloropyceae population during the summer and minimum during the rainy season in Parola dam, Hingoli, Maharashtra. Factors such as high temperature, low nitrate and a bright sunlight are favorable conditions for high population of green algae (Rodhe, 1948). In the present investigation, maximum Chlorophyceae during the summer is due to high temperature.





Table No. 1 : Monthly variation of Chlorophyceae diversity in Malhara Pond During 2005-06

Sr. No.	Components	Winter				Summer				Monsoon				Total
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1	<i>Ankistrodesmus sp.</i>	0	0	0	0	4	11	0	0	0	0	0	0	15
2	<i>Chara sp.</i>	1	1	1	6	0	0	0	0	0	0	0	0	9
3	<i>Chlamydomonas sp.</i>	6	4	1	5	0	0	0	0	0	0	0	0	16
4	<i>Chlorella sp.</i>	1	1	1	1	1	1	0	0	0	0	0	0	6
5	<i>Chlorococcum humicola sp.</i>	0	0	0	1	3	4	0	0	0	0	0	0	8
6	<i>Closterium leibleimi sp.</i>	0	0	2	4	6	5	0	0	0	0	0	0	17
7	<i>Coelastrum chodati</i>	6	6	2	1	1	5	0	0	0	0	0	11	32
8	<i>Cosmarium granatum</i>	1	3	2	5	5	5	0	0	0	0	0	0	21
9	<i>Cylindrospermum sp.</i>	1	1	1	4	0	0	0	0	0	0	0	0	7
10	<i>Euastropsis richteri</i>	6	4	6	1	2	5	0	0	0	0	0	0	24
11	<i>Glaeocystis gigas</i>	0	0	6	3	5	1	4	0	0	0	0	0	19
12	<i>Goniochloris sp.</i>	5	5	1	0	0	0	0	0	0	0	0	4	15
13	<i>Hydrodictyon sp.</i>	1	1	2	4	0	0	0	0	0	0	0	0	8
14	<i>Micrasterias pinnatifida</i>	1	1	2	4	5	6	0	0	0	0	0	0	19
15	<i>Netrium digitus</i>	6	7	2	4	4	3	0	0	0	0	0	0	26
16	<i>Nitella sp.</i>	1	4	1	0	0	0	0	0	0	0	0	0	6
17	<i>Oedogonium sp.</i>	1	1	2	3	0	0	0	0	0	0	0	0	7
18	<i>Pediastrum tetras</i>	1	1	17	1	1	0	0	0	0	0	0	0	21
19	<i>Pleurodiscus sp.</i>	1	3	0	0	0	0	0	0	0	0	0	7	125
20	<i>Spirogyra sp.</i>	0	0	0	3	6	5	0	0	0	0	0	0	





21	<i>Staurastrum sp.</i>	0	0	2	4	3	2	0	0	0	0	0	0	11
22	<i>Trochiscia pachyderma</i>	0	0	6	2	1	5	0	0	0	0	0	0	14
23	<i>Volvox sp.</i>	6	21	18	7	21	6	21	0	0	0	67	26	193
24	<i>Vorticella sp.</i>	6	1	3	5	6	0	51	72	52	48	0	0	244
	Total	51	65	78	68	74	64	76	72	52	48	67	48	763

Table No. 2 : Monthly variation of Chlorophyceae diversity in Malhara Pond During 2006-07

Sr. No.	Components	Winter				Summer				Monsoon				Total
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1	<i>Ankistrodesmus sp.</i>	0	0	0	0	12	11	3	68	47	22	0	0	163
2	<i>Chara sp.</i>	0	0	0	0	0	0	0	0	0	0	0	11	11
3	<i>Chlamydomonas sp.</i>	2	1	3	1	0	0	0	0	0	0	0	0	7
4	<i>Chlorella sp.</i>	1	1	1	1	1	1	1	1	1	1	0	0	10
5	<i>Chlorococcum humicola</i>	0	0	0	2	1	4	3	0	0	0	0	0	10
6	<i>Cosmarium granatum</i>	2	1	1	6	2	1	10	0	0	0	0	0	23
7	<i>Cylindrospermum sp.</i>	2	1	2	1	0	0	0	0	0	0	0	0	6
8	<i>Gloeocystis gigas</i>	0	0	6	3	1	4	6	0	0	0	0	0	20
9	<i>Hydrodictyon sp.</i>	3	1	3	1	0	0	0	0	0	0	0	0	8
10	<i>Micrasterias pinnatifida</i>	1	1	1	2	4	3	2	0	0	0	0	0	14
11	<i>Netrium digitus</i>	1	1	1	1	4	3	2	0	0	0	0	0	13
12	<i>Oedogonium sp.</i>	2	1	3	5	0	0	0	0	0	0	0	0	11
13	<i>Pediastrum tetras</i>	1	6	1	1	1	0	0	0	0	0	0	0	10
14	<i>Pleurodiscus species</i>	2	1	0	0	0	0	0	0	0	0	0	11	14
15	<i>Spirogyra sp.</i>	0	0	0	1	2	1	8	0	0	0	0	0	12
16	<i>Staurastrum sp.</i>	0	0	1	2	3	6	2	0	0	0	0	0	14





17	<i>Trochiscia pachyderma</i>	0	0	1	1	3	1	2	0	0	0	0	0	8
18	<i>Volvox sp.</i>	6	6	21	22	21	23	28	0	0	0	26	6	159
19	<i>Vorticella sp.</i>	10	1	4	3	12	0	0	0	0	0	0	0	30
Total		33	22	49	53	67	58	67	69	48	23	26	28	543

Table No. 3 : Seasonal variation of Chlorophyceae in Malhara Pond During year 2005-06

Sr. No.	Components	Winter		Summer		Monsoon	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Chlorophyceae	65.500	± 9.657	71.500	± 4.555	53.750	± 7.822
	Total	65.500	± 9.657	71.500	± 4.555	53.750	± 7.822

Table No. 4. :Seasonal variation of Chlorophyceae in Malhara Pond During year 2006-07

Sr. No.	Components	Winter		Summer		Monsoon	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Chlorophyceae	39.250	± 12.457	65.250	± 4.265	31.250	± 9.833
	Total	39.250	± 12.457	65.250	± 4.265	31.250	± 9.833





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