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DYNAMICS OF CHLOROPHYCEAE IN PHYTOPLANKTON OF ASHTI LAKE, DISTRICT WARDHA (MAHARASHTRA)

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ABSTRACT:

The status of the aquatic ecosystem is dependent on the abiotic properties of water and biological diversity of the ecosystem. Phytoplankton, the floating inconspicuous plant plays a major role in the food chain of aquatic ecosystem by biosynthesis of organic matter and thus act as the primary producer of food on which other life forms depend. This paper deals with Dynamics of Chlorophyceae in phytoplankton of Ashti lake, District Wardha. The samples were collected during the month December 2020 to November 2021. Chlorophyceae was the most dominant class of phytoplankton of Ashti lake, District Wardha. The class was represented by 18 genera. Maximum of Chlorophyceae population was observed during winter season 284.7 + 49.28 ind/lit, moderate in summer season 268.5 + 22.69 ind/lit. Microspora spp. And Spirogyra spp. Were other dominating genera, maximum population was observed during summer season.

Keywords: - Ashti lake, Phytoplankton, Chlorophyceae, Microspora.

INTRODUCTION :

Phytoplankton, the floating inconspicuous plant plays a major role in the food chain of aquatic ecosystem by biosynthesis of organic matter and thus act as the primary producer of food on which other life forms depend. Phytoplankton is the base of most of the lake food webs and fish production is linked to phytoplankton production (Ryder et.al. 1974). Moreover , number and species of phytoplankton serves to determine the quality of a water body. Evaluation of the potentiality of an aquatic ecosystem is nothing but the estimation of the rate of its primary production, where if involves the primary fixation and its subsequent transfer of higher tropic levels. It is well established fact that the pollution aquatic habitats is assessed by using algae as indicators (Patrick, 1973). Phytoplankton of fresh water bodies have been studied extensively in India (Bilgrami, 1989, Nandan and Patel, 1992, Trivedi and Khatavkar, 1996, Kumar, 1998, Khanna and Yadav, 2009). For fulfilling the water requirements of Ashti lake has the greater importance. So present study was carried out which comprises the data on phytoplankton variation of Chlorophyceae in Ashti lake.

MATERIAL AND METHODS :

The sampling were collecting once in month for a period of 1 year from December 2020 to November 2021 from the Ashti lake. The plankton net of mesh size
56.00 um. made up of bolting silk cloth swept through subsurface and samples were collected during 8.30am to 9.30am. 500ml, water sample was collected in a separate container and for immediate fixation, Lugols iodine solution was used in the field and later 4% formaldehyde was used for long term preservation. The Phytoplankton were concentrated and identified upto genera level using standard keys (Bellinger, 1992; Dhanpati, 2000; Kodarkar,1992;) For quantitative estimation, the counting was done by Haemocytometer method (Trivedi and Goel

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1984). Simple correlation was carried out for water parameters and phytoplankton diversity.

RESULTS AND DISCUSSION :

In the present investigation phytoplankton comprised of Chlorophyceae,Cyanophyceae, Bacillariophyceae and Euglenophyceae. Among the four groups, maximum number of species (18 species) belong to Chlorophyceae (Table-1& 2). It was dominant in winter followed by summer and least appearance in monsoon during the year 2020-2021.

During the year 2020-2021, Chlorophyceae was maximum during winter season 284.7 +49.28 ind/lit, moderate in summer season 268.5 + 22.69 ind/lit and least appearance during monsoon season 139.25 + 44.42 ind/lit.

Microsprora, Chlorella and Spirogyra was observed to be the consistent and dominant genera in chlorophyceae. It was also the phytoplankton with highest average density contributing 97.50 + 29.0, 92.25 + 34.2 and 91.25 + 25.5 of total phytoplankton.

In the present investigation, Chlorophyceae appeared as dominant group and represented by 18 species among which Microspora spp., Spirogyra spp., Micrasterias spp., Oedogonium spp., Pediastrum spp., Ulothrix spp., Vaucheria spp., Volvax spp., and Chlorella spp., were dominant. Maximum density of Chlorophyceae was observed during winter season and minimum during monsoon season. Jawale and Patil (2009) observed that member of Chlorophyceae were highest in November and lowest in May month at Manglur Dam. Venkateshwarlu (1969) reported the dominance of the Chlorophyceae group during winter (Nov-Dec) coincides with low temp and high dissolved oxygen content. Panda et al., (2001) have recorded minimum density of Chlorophyceae in March and maximum in may with low density in July, September and October and a very high density of Chlorophyceae in November, December and February. The results of present investigation are also in similar lines.

CORRELATION WITH WATER PARAMETERS :

Members of chlorophyceae were present in maximum number especially during summer months, when light and temperature conditions. Chlorophyceae showed positive correlation with temperature. Lund (1965) observed that chlorophyceae can grow in wide range of temperature i.e. 19 to 37oc (degree centigrade). In the present study the abundance of chlorophyceae was observed between the temperature range of 22 to 28oc (degree centigrade). While the density was comparatively lower at 30oc(degree centigrade) and above. Positive correlation was observed between chlorophyceae population and light penetration in Ashti lake with highest correlation value in case of Microspora spp. Venkateshwaralu et. al.(1990) reported high DO content as one of the reasons for dominance of chlorophyceae.

CONCLUSION:

Chlorophyceae were dominant among phytoplankton of Ashti lake, with Microspora showing high average density. The high abundance appeared to support the aquaculture observed in this lake. Microspora, chlorella, Spirogyra spp. were observed to be the consistent and dominant genera in chlorophyceae. Chlorophyceae showed positive correlation with temperature.

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Table-1 Monthly Phytoplankton variation of Chlorophyceae during year Dec-2020 – Nov2021

Sr. No.	Name of Species	Dec.-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Total	Ave
1	Chara spp.	23	20	18	17	13	21	14	4	1	2	14	21	168	1
2	Chlorella spp.	48	19	24	38	32	20	20	9	45	49	35	30	369	30
3	Chlorocloster spp.	25	30	30	28	14	9	10	13	36	40	19	17	271	22
4	Cladophora spp.	11	17	17	21	23	12	1	2	4	7	0	0	115	9.
5	Closterium spp.	3	0	7	16	12	0	2	9	15	20	7	0	91	7.
6	Cosmarium spp.	12	3	3	0	0	0	2	3	6	8	14	10	61	5.
7	Micrasterias spp.	4	12	4	7	0	0	1	1	0	9	7	0	45	3.
8	Microspora spp.	41	39	32	51	57	65	19	0	6	21	21	38	390	3
9	Nitella spp.	16	14	9	4	8	13	2	0	0	6	7	10	89	7.
10	Oedogonium spp.	7	4	10	12	9	15	0	2	3	0	2	8	72	
11	Pandorina spp.	2	3	2	2	0	5	3	5	2	5	1	1	31	2.
12	Pediastrum spp.	8	8	3	2	1	2	1	0	0	3	4	3	35	2.
13	Scenedesmus spp.	13	12	0	0	14	12	12	15	3	3	11	11	106	8.
14	Spirogyra spp.	51	61	29	37	42	35	25	4	5	7	28	41	365	30
15	Ulothrix spp.	9	2	1	3	0	0	3	3	1	3	8	4	37	3.
16	Vaucheria spp.	22	29	13	17	21	26	0	0	3	7	17	17	172	14
17	Volvax spp.	3	3	4	4	0	4	2	6	5	7	2	2	42	3
18	Zygnema spp.	43	48	23	27	33	41	16	5	2	9	25	39	311	25

Table:2 - Seasional Variations in Chlorophyceae during year Dec.-2020-21

Sr. No.	Name ofSpecies	MonsoonSeason	WinterSeaseon	SummerSeason	Total
1	Chara spp.	5.25 ± 5.17	19.50 ± 3.36	17.25 ± 2.86	42.00 ± 11.4
2	Chlorella spp.	30.75 ± 16.77	33.00 ± 10.42	28.50 ± 6.98	92.25 ± 34.2
3	Chlorocloster spp.	24.75 ± 13.37	22.75 ± 5.12	20.25 ± 8.95	67.75 ± 27.4
4	Cladophora spp.	3.50 ± 2.29	7.00 ± 7.31	18.25 ± 4.21	28.75 ± 13.8
5	Closterium spp.	11.50 ± 6.73	2.50 ± 2.87	8.75 ± 5.97	22.75 ± 15.6
6	Cosmarium spp.	4.75 ± 2.38	9.75 ± 4.15	0.75 ± 1.30	15.25 ± 7.8
7	Micrasterias spp.	2.75 ± 3.63	5.75 ± 4.38	2.75 ± 2.95	11.25 ± 11.0
8	Microspora spp.	11.50 ± 8.79	34.75 ± 8.01	51.25 ± 12.17	97.50 ± 29.0
9	Nitella spp.	2.00 ± 2.45	11.75 ± 3.49	8.50 ± 3.20	22.25 ± 9.1
10	Oedogonium spp.	1.25 ± 1.30	5.25 ± 2.38	11.50 ± 2.29	18.00 ± 6.0
11	Pandorina spp.	3.75 ± 1.30	1.75 ± 0.83	2.25 ± 1.79	7.75 ± 3.9
12	Pediastrum spp.	1.00 ± 1.22	5.75 ± 2.28	2.00 ± 0.71	8.75 ± 4.2
13	Scenedesmus spp.	8.25 ± 5.36	11.75 ± 0.83	6.50 ± 6.54	26.50 ± 12.7
14	Spirogyra spp.	10.25 ± 8.58	45.25 ± 12.21	35.75 ± 4.66	91.25 ± 25.5
15	Ulothrix spp.	2.50 ± 0.87	5.75 ± 2.86	1.00 ± 1.22	9.25 ± 5.0
16	Vaucheria spp.	2.50 ± 2.87	21.25 ± 4.95	19.25 ± 4.82	43.00 ± 12.6
17	Volvax spp.	5.00 ± 1.87	2.50 ± 0.50	3.00 ± 1.73	10.50 ± 4.1
18	Zygnema spp.	8.00 ± 5.24	38.75 ± 8.55	31.00 ± 6.78	77.75 ± 20.6

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