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Spatial distribution and Seasonal Diversity of Phytoplankton from Asolamendha Lake of Chandrapur District, Maharashtra (India).

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***Abstract**: Phytoplankton is an important component of aquatic flora and have key role to maintain productivity of any aquatic ecosystems. It also maintains equilibrium between biotic and abiotic component of the aquatic ecosystem. Asolamendha Lake is one of the major lake present in Chandrapur district in the eastern part of Maharashtra state of India. The present study was undertaken to study the seasonal population and diversity of phytoplankton from Asolamendha lake during June 2010 to May 2012. Total 28 species of phytoplankton belongs to Chlorophyceae , Bacillariophyceae, Myxophyceae and Euglenophyceae were identified from this lentic ecosystem among which Chlorophyceae is the dominant species in all.*

***Keywords :-** Diversity, Phytoplankton , Asolamendha, Chandrapur.*

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I. Introduction

Phytoplankton is the base of the reservoir food webs and fish production is linked to phytoplankton production. It serves as food for the fishes directly or indirectly. Some species have been associated with noxious bloom, sometime creating of offensive taste and odour or toxic condition.

Phytoplankton is representing the microscopic algal communities of open water as a major element (at primary level) in aquatic biota consisting of four major groups Chlorophyceae, Bacillariophyceae, Myxophyceae and Euglenophyceae.

Asolamendha lake (20°15'16" N and 79°49'18" E) is perennial lake and situated near Pathari village of District Chandrapur. This lake is useful for the fisheries and irrigation purpose. The present study was undertaken to investigate the phytoplankton diversity from the lake in different months and seasons during the period from June 2010 to May 2012 in order to assess the species composition and their distribution.

II. Material And Method

The phytoplnkon samples were collected once in a month from lake for period of two years during June 2010 to May 2012 in morning time. For obtaining phytoplankton 50 litre of water filtered through plankton net made by silk bloating cloth (200 meshes/cm). The filtered samples from different sites transfer and stored in glass stopper bottle. 10 ml Lugol's Iodine solution added to the each every sample. After centrifuging, samples were preserved in 4% formalin solution. Preserved samples were examined under binocular microscope and after proper identification, counted by using Sedge Wick- Rafter cell and Lacky's drop method (Adoni 1985, Philipose 1959).

III. Result and Discussion

During the study period of two years i.e. from June 2010 to May 2012, 28 species of Phytoplankton were indentified from the Asolamendha lake, among that 12 species of Chlorophyceae, 7 species of Myxophyceae, 5 species of Bacilariophyceae and 1 species of Euglenophyceae were reported .

In the present study, Chlorophyceae were dominant at all the three sites over all others groups which followed by members of Myxophyceae and Bacillariophyceae. Very least populationis of Euglenophyceae is observed during the study period. (Bhoyar V.V. and Tamloorkar H.L.2012, Chunne S.C. and Nasare P. N., 2018).

In the present investigation, Chlorophyceae acquire first position and to be dominating group in the phytoplankton population as 12 species have been reported. (Khanna and Bhutiani 2004, Bhoyar V.V. and Tamloorkar H.L., 2012)).

The Chorophyceae population was maximum in winter followed by summer and minimum in monsoon season (Shaikh and Bhosale, 2012). The most dominant species of Chorophyceae are *Spirogyra sp., Chara sp.,*

Oedogonium sp., Zygnema sp., and least count shown by *Ulothrix sp., Scenedesmus sp., Pediastrum sp., Volvox sp.* (Sumaiya K. and Singh N., 2017). *Spirogyra sp., Oedogonium sp.* and *Volvox sp.* are dominant throughout the study period in winter season (Summarwar S., 2012). Dominancy of Chorophyceae at all three stations might be due to high dissolved oxygen and fair amount of pH, alkalinity and total hardness (Bajpai and Agarkar,1997)

The Myxophyceae occupy second position reporting 7 species and population were maximum in summer season which followed by winter season and monsoon. It probably due to bright sunlight, high temperature and high transparency as these parameters enhances productivity of phytoplankton (Sumaiya K. and Singh N., 2017). The minimum population in monsoon season might be due to high turbidity and low transparency of water due to raining (Waghmare and Mali, 2007).

Anabaena sp. and *Mycrocystis sp*. are dominant species among the Myxophyceae group. Higher population of Myxophyceae in summer season is due to moderate temperature, alkaline pH, low water volume and bright sunlight which created favourable condition for better propagation of this group of phytoplankton. (Sree Latha and Rajlakshmi 2006, Altaf and Parveen 2013). Abundance of blue green algae is associated with high temperature, pH and low D.O. in the present observation. (Kadam *et al.,* 2014, Dhimdhime *et al*.2012).

Bacillariophyceae occupy third position reporting 5 species and population was very high in summer followed by winter season and minimum in monsoon (Summarwar 2012). Bacillariophyceae were present in maximum number especially during summer month, resulting in bloom formation. Climatic condition as maximum light and temperature is responsible for their high growth (Dhimdhime *et. al*. 2012, Telkhade *et. al.* 2013). The presence of high density of Bacilariophyceae in summer months i.e. February to May in the lake is not only due to increased temperature and light but other factors like stagnation of water, high percentage of phosphate and nitrates are also responsible (Pailwan 2005, Pandey *et. al.* 1993). Minimum population might be due to cloudy weather, low transparency & high turbidity due to heavy flood. (Rajgopal *et al*., 2010). Among Bacillariophyceae *Navicula sp.* and *Diatom sp.* were found dominant (Nasare P.N 2018, Gupte Archana 2017 and Altaf and Parveen 2013).

In the present study, Euglenophyceae formed the least represented group of phytoplankton as compare to the entire phytoplanktonic group, less appearance of Euglenophyceae group indicating the fair quality of water of Asolamendha Lake. Euglenophyceae population was maximum in winter and minimum in summer season, it may be due low dissolve oxygen (Kumar, 1990). Euglenophyceae are found commonly in small water bodies having rich organic matter and high water temperature, phosphate, nitrate, low dissolved oxygen and carbon dioxide as it supports the growth of euglenoid (Hedge and Sujatha 1997, Tijare 2013). Only *Euglena sp*. was reported from this group. (Bhoyar and Tamloorkar 2012, Fule *et al*., 2012).

IV. Conclusion

Seasonal abundance and diversity of phytoplankton groups at all sites in Asolamendha lake observed in the sequence of Chlorophyceae > Myxophyceae > Bacillariophyceae > Euglenophyceae. Highest density and diversity of Chlorophyceae and low numbers of Myxophyceae and Bacilariophyceae members and very least appearance of Euglenophyceae indicates oligotrophic condition of lake and pollution free water.

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"Photographs of Phytoplankton"

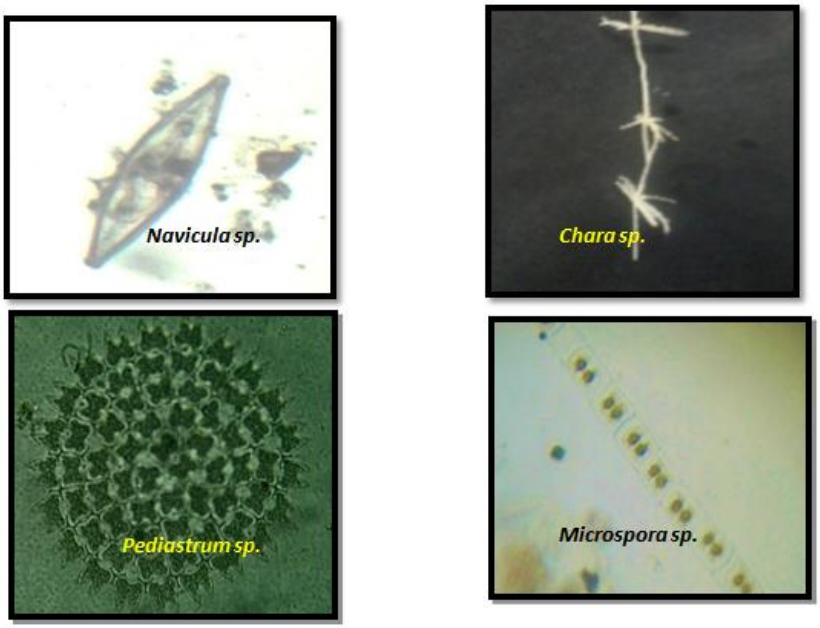

Table 1: Seasonal diversity of Phytoplankton from Asolamendha Lake during year 2010-11.

S.N.	Name of species	Site 1			Site 2			Site 3		
		Mon	Win	Sum	Mon	Win	Sum	Mon	Win	Sum
A)	**Myxophyceae**									
1	*Anabaena sp.*	26	19	57	35	34	65	20	18	47
2	*Chlorocouls sp.*	30	28	36	35	30	46	22	23	25
3	*Microscystis sp.*	23	28	46	23	29	56	19	30	42
4	*Nostoc sp.*	10	4	28	18	10	28	12	13	25
5	*Oscillatoria sp.*	26	19	31	24	23	33	21	16	27
6	*Scytonema sp.*	16	16	30	26	25	31	17	11	29
7	*Stigonema sp.*	10	14	23	16	20	28	8	12	16
B	**Bacillariophyceae**									
1	*Diatoma sp.*	32	44	48	35	46	56	27	34	40
2	*Mastagloea sp.*	17	31	36	23	35	44	11	20	32
3	*Navicula sp.*	27	40	51	33	45	55	23	35	46
4	*Nitzischia sp.*	11	28	23	26	36	42	13	28	29
5	*Pinnularia sp.*	23	24	30	26	31	31	23	25	23
C	**Chlorophyceae**									
1	*Chara sp.*	38	94	29	42	86	23	34	70	28
2	*Chlorella sp.*	14	69	29	15	60	26	17	52	27
3	*Cladophora sp.*	11	32	18	15	34	23	7	24	13
4	*Cosmarium sp.*	12	25	17	15	31	22	9	20	18
5	*Microspora sp.*	14	35	0	18	44	4	18	20	5
6	*Oedogonium sp.*	36	100	16	28	84	13	22	76	15
7	*Pedistrum sp.*	0	33	0	4	30	4	6	26	5
8	*Scenedesmus sp.*	4	12	5	8	22	8	8	11	8
9	*Spirogyra sp.*	34	128	42	43	114	49	29	111	44
10	*Ulothrix sp.*	0	20	9	6	29	16	5	12	6
11	*Volvox sp.*	3	30	10	12	39	17	4	21	6
12	*Zygnema sp.*	41	53	31	39	58	35	31	46	29
D	**Euglenophyceae**									
1	*Euglena sp.*	0	21	0	2	25	2	3	14	1

Table 2: Seasonal diversity of Phytoplankton from Asolamendha Lake during year 2011-12.

S.N.	Name of species	Site 1			Site 2			Site 3		
		Mon	Win	Sum	Mon	Win	Sum	Mon	Win	Sum
A)	**Myxophyceae**									
1	*Anabaena sp.*	15	16	51	33	40	61	22	14	37
2	*Chlorocouls sp.*	25	22	39	32	33	44	26	33	22
3	*Microscystis sp.*	25	30	40	27	37	55	19	26	38
4	*Nostoc sp.*	9	16	23	22	17	28	17	18	23

5	*Oscillatoria sp.*	18	21	23	24	23	39	22	20	28
6	*Scytonema sp.*	14	12	23	30	32	35	20	17	29
7	*Stigonema sp.*	17	21	20	20	29	37	12	17	16
B	**Bacillariophyceae**									
1	*Diatoma sp.*	29	34	37	35	45	52	19	37	39
2	*Mastagloea sp.*	21	35	35	27	39	47	19	26	31
3	*Navicula sp.*	24	44	44	39	47	59	26	37	42
4	*Nitzischia sp.*	9	33	19	31	40	50	15	34	31
5	*Pinnularia sp.*	22	20	31	36	38	34	23	26	26
C	**Chlorophyceae**									
1	*Chara sp.*	37	79	33	42	53	32	28	51	31
2	*Chlorella sp.*	13	58	28	19	75	36	23	54	35
3	*Cladophora sp.*	14	40	16	19	33	27	15	29	15
4	*Cosmarium sp.*	13	35	20	15	27	21	14	17	22
5	*Microspora sp.*	12	36	4	17	46	7	18	21	5
6	*Oedogonium sp.*	25	80	23	32	85	35	22	62	16
7	*Pedistrum sp.*	8	27	5	10	32	9	9	25	9
8	*Scenedesmus sp.*	8	13	3	11	17	6	6	10	6
9	*Spirogyra sp.*	25	135	42	40	121	57	20	82	44
10	*Ulothrix sp.*	7	14	8	11	20	15	5	6	5
11	*Volvox sp.*	4	30	10	8	31	12	4	13	6
12	*Zygnema sp.*	25	54	36	36	61	43	18	38	29
D	**Euglenophyceae**									
1	*Euglena sp.*	2	18	3	5	30	4	3	10	2

Mon = Monsoon , **Win** = Winter , **Sum** = Summer

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