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SEASONAL DISTRIBUTION OF CHLOROPHYCEAE IN KAYAMKULAM BACK WATER

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ABSTRACT

A study on seasonal distribution of Chlorophyceae on Kayamkulam Back water reveals that ten forms of green algae species were recorded among them chodatella species, Monostroma species and Pediastrum species were the dominant forms during post monsoon. The peek value of Chlorophycea was reported in July and November just after the rainy season. Pedistrum and Chodatella species were also prominent and there abundance can be attributed to the leaching of nutrients along with the rain water in the lake. Analysis further reveals the Phytoplankton fluctuations on long-term trends. We conclude that global Phytoplankton concentration has declined over the past century; this decline will lead to be considered in future studies of marine ecosystems, geochemical cycling, ocean circulation and fisheries.

INTRODUCTION

Phytoplankton forms the prime component in the trophic cycle of marine and estuarine ecosystem and is mainly influenced by the environmental factors. They are an integral part of the aquatic food chain culminating in the production of fishes. They are also reliable indicators of the increased gradients and fluctuations of the biotic and abiotic factors. In order to asses the productive nature of the ecosystem the dynamic features of the plankton is very essential. The trend in limnology is to study the quality of phytoplankton and its seasonal variations as affected by physico-chemical factors. The quality of waters reflect the phytoplankton community because the density (i.e. abundance) and composition of plankton populations both respond to environmental stress and can, in turn, cause environmental stress. The species composition and population density of phytoplankton are sensitive to environmental changes, and continual documentation of phytoplankton population dynamics can provide an invaluable record of water quality, can signal if radical changes occur within an estuarine system, and can offer clues to the causes of changes when they do occur.

The present study deals with the seasonal distribution of chlorophyceae in Kayamkulam estuary.

MATERIALS AND METHODS

The Kayamkulam backwater with an area of 1652 ha is a typical estuary (lat 9°09 and 9°15' N long 76°02 and 76°28' E) located on the western part of Kayamkulam Town, lying parallel to the Lakshadweep sea. Pampa and Achancovil rivers flow into the lake through the Karipuzha canal and Karthikapally canal which link the backwater with these rivers. The lakes have been exposed to much anthropogenic influences in the recent past. NTPC had constructed a power plant on the lake side. The area for the plant had been made available by reclaiming the kayal farm area. The exhaust water from thermal plant is being pumped into the lake. Recently the natural "pozhi" has been opened permanently for the construction of the fish landing centre. Besides, the lake had been dredged for the water way between Trivandrum and Cochin. Investigations were made seasonally for two years from selected seven stations via., Ayiramthengu (I), Ayiramthengu Mangrove (II), Valiyazikka(III), Kochiyude Jetty (IV), Keerikkadu jetty(V), Kallikkadu (VI), Choolatheruvu (VII) as shown in the plate I. Samples were collected by filtering 100 liters of water with plankton net of bolting silk having a mesh size of 56 microns. Collections from the seven stations were made between 8 to 10 am. One ml sample was pipette from the preserved sample to a Sedge Wick Rafter counting cell for identification up to genus level as per observations made by Prescott (1962) and Sarma and Khan (1980).

RESULT AND DISCUSSION

A total of 10 species of Chlorophyceae (green algae) were identified from the selected stations comprising of Actinastrum, Botryococcus, Chodatella, Microspora, Monostroma, Pediastrum, Raphidonema, Ulothrix, Ankistrodesmus and Chlorella (Table 1-7). Density of Chlorophyceae was highest in station VII (70.99% in first year and 70.32% in second year of October) followed by station V (69.99% in first year and 71.67% in second year during the month of November). Chlorophyceae showed decreasing trend during the pre-monsoon season in all the stations (Fig 1& 2). Pediastrum species showed the highest density in station II during November and July (17.80%), station III during October (14%), station IV during July (36.61% and 39.90%), station V during November (17.84% and 17.93%), station VI during September (13.30% and 22%), station VII during September (7.14% and 7.13%) in first and second year respectively. Only in station I Raphidonema species showed the highest density during the month of September (14%) followed by Chodatella (12%) during the month of July in both the year. The least represented member of Chlorophyceae was Botryoccus species in stations I, II, V, VI, VII. Ankistrodesmus species in station III and Actinastrum species in station IV.

Dominance of species changed with season also. Among the identified Chlorophyceae, Chodatella species, Monostroma species and Pediastrum species were the dominant forms during post monsoon. Patil (1987) documented the presence of pediastrum species during the post monsoon season in Nethravathi- Gurpur estuary. Chlorophyceae was the dominant group in the monsoon and post monsoon season. The peak value of Chlorophyceae was reported in July and November just after the rainy seasons. Pedistrum and Chodatella species were also prominent and their abundance can be attributed to the leaching of nutrients along with the rainwater in the lake. The occurrence of Chlorophyceae

Table 1: Monthly and seasonal percentage variations of Chlorophyceae at station- I

Chlorophyceae		Feb	Mar	April	May	Total	June	July	Aug	Sep	Total	Oct	Nov	Dec	Jan	Total
Actinastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	2.67	1.57	0.00	0.00	**4.24**	0.14	0.00	0.00	0.00	**0.14**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	2.63	1.65	0.00	0.00	**4.28**	0.25	0.00	0.00	0.00	**0.25**
Botryococcus	**2008-09**	0.00	0.00	0.24	0.00	**0.24**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	1.18	0.00	**1.18**
	2009-10	0.00	0.00	0.14	0.00	**0.14**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	1.08	0.00	**1.08**
Chodatella	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	1.65	12.00	3.65	0.00	**17.30**	0.00	0.30	0.00	0.00	**0.30**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	1.58	12.60	3.68	0.00	**17.86**	0.00	0.27	0.00	0.00	**0.27**
Microspora	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	6.93	4.73	0.00	0.00	**11.66**	3.35	0.00	0.00	0.63	**3.98**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	6.82	4.82	0.00	0.00	**11.64**	3.56	0.00	0.00	0.93	**4.49**
Monostroma	**2008-09**	0.56	0.00	0.00	0.00	**0.56**	4.78	7.35	4.35	0.00	**16.48**	0.00	0.00	0.53	0.00	**0.53**
	2009-10	0.53	0.00	0.00	0.00	**0.53**	4.75	7.43	4.32	0.00	**16.50**	0.00	0.00	0.83	0.00	**0.83**
Pediastrum	**2008-09**	0.00	0.00	0.00	0.27	**0.27**	0.00	8.36	3.69	0.00	**12.05**	1.09	0.00	0.53	0.00	**1.62**
	2009-10	0.00	0.00	0.00	0.27	**0.27**	0.00	8.38	3.72	0.00	**12.10**	1.90	0.00	0.64	0.00	**2.54**
Raphidonema	**2008-09**	0.00	0.25	0.00	0.00	**0.25**	0.00	0.00	0.00	14.00	**14.00**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.13	0.00	0.00	**0.13**	0.00	0.00	0.00	14.00	**14.00**	0.00	0.00	0.00	0.00	**0.00**
Ulothrix	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	3.68	6.28	0.00	0.00	**9.96**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	3.79	6.33	0.00	0.00	**10.12**	0.00	0.00	0.00	0.00	**0.00**
Total	**2008-09**	**0.56**	**0.25**	**0.24**	**0.27**	**1.32**	**19.71**	**40.29**	**11.69**	**14.00**	**85.69**	**4.58**	**0.30**	**2.24**	**0.63**	**7.75**
	2009-10	**0.53**	**0.13**	**0.14**	**0.27**	**1.07**	**19.57**	**41.21**	**11.72**	**14.00**	**86.50**	**5.71**	**0.27**	**2.55**	**0.93**	**9.46**

Table 2: Monthly and seasonal percentage variations of Chlorophyceae at station- II

Chlorophyceae		Feb	Mar	April	May	Total	June	July	Aug	Sep	Total	Oct	Nov	Dec	Jan	Total
Actinastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	1.28	0.45	0.00	0.00	**1.73**	0.00	0.00	3.18	0.00	**3.18**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	2.63	1.57	0.00	0.00	**4.20**	0.14	0.00	0.00	0.00	**0.14**
Ankistrodesmus	**2008-09**	0.00	0.60	0.00	0.00	**0.60**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.35	0.00	0.00	**0.35**
	2009-10	0.00	0.82	0.00	0.00	**0.82**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.39	0.00	0.00	**0.39**
Botryococcus	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	2.29	0.00	**2.29**
	2009-10	0.00	0.00	0.14	0.00	**0.14**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	1.08	0.00	**1.08**
Chodatella	**2008-09**	0.00	0.00	0.00	0.16	**0.16**	0.00	2.48	1.69	0.00	**4.17**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	1.58	12.0	3.65	0.00	**17.2**	0.00	0.30	0.00	0.00	**0.30**
Chlorella	**2008-09**	0.00	0.00	0.35	0.00	**0.35**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.89	1.19	0.00	**2.08**
	2009-10	0.00	0.00	0.36	0.00	**0.36**	0.00	0.00	0.00	0.00	**0.00**	0.00	1.25	1.25	0.00	**2.50**
Microspora	**2008-09**	0.00	0.78	0.00	0.00	**0.78**	1.20	1.69	0.00	0.00	**2.89**	7.14	1.48	0.78	5.26	**14.66**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	6.82	4.73	0.00	0.00	**11.5**	3.35	0.00	0.00	0.53	**3.88**
Monostroma	**2008-09**	0.58	0.00	0.40	0.35	**1.33**	0.00	1.68	2.09	0.00	**3.77**	0.00	0.00	2.86	3.58	**6.44**
	2009-10	0.53	0.00	0.00	0.00	**0.53**	4.75	7.35	4.32	0.00	**16.4**	0.00	0.00	0.53	0.00	**0.53**
Pediastrum	**2008-09**	0.00	0.00	0.90	0.00	**0.90**	0.70	1.75	1.26	0.00	**3.71**	5.36	17.80	1.79	4.18	**29.13**
	2009-10	0.00	0.00	0.00	0.27	**0.27**	0.00	8.36	3.69	0.00	**12.0**	1.09	0.00	0.53	0.00	**1.62**
Raphidonema	**2008-09**	0.00	0.00	0.40	0.00	**0.40**	0.00	0.00	0.00	6.00	**6.00**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.13	0.00	0.00	**0.13**	0.00	0.00	0.00	14.1	**14.1**	0.00	0.00	0.00	0.00	**0.00**
Ulothrix	**2008-09**	0.00	0.98	0.00	0.00	**0.98**	3.48	2.35	0.00	0.00	**5.83**	3.48	0.00	2.49	6.89	**12.86**
	2009-10	0.00	0.00	0.00	0.00	0.00	3.68	6.28	0.00	0.00	9.96	0.00	0.00	0.00	0.00	0.00
Total	**2008-09**	**0.58**	**2.36**	**2.05**	**0.51**	**5.50**	**6.66**	**10.4**	**5.04**	**6.00**	**28.1**	**15.98**	**20.52**	**14.58**	**19.91**	**70.99**
	2009-10	**0.53**	**0.95**	**0.50**	**0.27**	**2.25**	**19.4**	**40.2**	**11.6**	**14.1**	**85.5**	**4.58**	**1.94**	**3.39**	**0.53**	**10.44**

Table 3: Monthly and seasonal percentage variations of Chlorophyceae at station- III

Chlorophyceae		Feb	Mar	April	May	Total	June	July	Aug	Sep	Total	Oct	Nov	Dec	Jan	Total
Actinastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	2.73	1.68	0.00	0.00	**4.41**	0.00	0.00	0.00	9.00	**9.00**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	2.72	1.69	0.00	0.00	**4.41**	0.00	0.00	0.00	0.00	**0.00**
Ankistrodesmus	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.85	0.00	0.00	0.00	**0.85**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**
Botryococcus	**2008-09**	0.00	1.01	0.00	0.00	**1.01**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	5.02	0.00	**5.02**
	2009-10	0.00	0.98	0.00	0.00	**0.98**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	5.02	0.00	**5.02**
Chodatella	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	1.68	2.53	0.00	**4.21**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	0.00	1.70	2.53	0.00	**4.23**	0.00	0.00	0.00	0.00	**0.00**
Microspora	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	2.52	1.68	0.00	0.00	**4.20**	15.20	1.05	1.67	0.00	**17.92**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	2.52	1.70	0.00	0.00	**4.22**	15.30	1.08	1.67	0.00	**18.05**
Monostroma	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.83	5.26	0.00	**6.09**	0.00	0.00	8.85	0.00	**8.85**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	0.00	0.83	5.26	0.00	**6.09**	0.00	0.00	8.84	0.00	**8.84**
Pediastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	3.60	3.79	2.94	0.00	**10.33**	11.39	1.89	2.85	0.52	**16.65**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	3.60	3.79	2.94	0.00	**10.33**	11.40	1.89	2.86	0.52	**16.67**
Raphidonema	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	5.92	**5.92**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	5.92	**5.92**	0.00	0.00	0.00	0.00	**0.00**
Ulothrix	**2008-09**	0.00	1.45	0.00	0.00	**1.45**	3.15	3.15	0.00	0.00	**6.30**	4.01	0.83	1.65	0.00	**6.49**
	2009-10	0.00	1.44	0.00	0.00	**1.44**	3.15	3.15	0.00	0.00	**6.30**	4.02	0.83	1.65	0.00	**6.50**
Total	**2008-09**	**0.00**	**2.46**	**0.00**	**0.00**	**2.46**	**12.00**	**12.81**	**10.73**	**5.92**	**41.46**	**30.60**	**3.77**	**20.04**	**9.52**	**63.93**
	2009-10	**0.85**	**2.42**	**0.00**	**0.00**	**3.27**	**11.99**	**12.86**	**10.73**	**5.92**	**41.50**	**30.72**	**3.80**	**20.04**	**0.52**	**55.08**

Table 4: Monthly and seasonal percentage variations of Chlorophyceae at station- IV

Chlorophyceae		Feb	Mar	April	May	Total	June	July	Aug	Sep	Total	Oct	Nov	Dec	Jan	Total
Actinastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	1.45	0.00	0.00	**1.45**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	0.00	1.53	0.00	0.00	**1.53**	0.00	0.00	0.00	0.00	**0.00**
Ankistrodesmus	**2008-09**	0.48	0.99	0.00	0.00	**0.99**	1.66	0.00	0.00	0.00	**1.66**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.53	1.25	0.00	0.00	**1.25**	1.73	0.00	0.00	0.00	**1.73**	0.00	0.00	0.00	0.00	**0.00**
Chodatella	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	1.96	7.89	4.85	0.00	**14.70**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	2.15	7.83	4.92	0.00	**14.90**	0.00	0.00	0.00	0.00	**0.00**
Chlorella	**2008-09**	1.55	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	3.91	**3.91**	0.00	0.48	0.00	0.99	**1.47**
	2009-10	1.66	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	3.91	**3.91**	0.00	0.61	0.00	1.25	**1.86**
Microspora	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	4.39	0.00	0.00	**4.39**	4.40	0.00	0.00	1.45	**5.85**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	0.00	4.49	0.00	0.00	**4.49**	4.38	0.00	0.00	1.63	**6.01**
Monostroma	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	1.96	8.78	5.86	0.49	**17.09**	0.00	0.00	1.96	1.45	**3.41**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	2.12	8.79	5.68	0.49	**17.08**	0.00	0.00	2.13	1.25	**3.38**
Pediastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	4.39	10.25	8.78	0.00	**23.42**	2.50	0.00	1.78	2.98	**7.26**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	4.56	10.30	8.86	0.00	**23.72**	2.45	0.00	1.84	2.84	**7.13**
Ulothrix	**2008-09**	0.49	1.45	0.00	0.00	**1.45**	3.91	6.85	0.00	0.00	**10.76**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.56	1.48	0.00	0.00	**1.48**	4.13	6.96	0.00	0.00	**11.09**	0.00	0.00	0.00	0.00	**0.00**
Total	**2008-09**	**2.52**	**2.44**	**0.00**	**0.00**	**2.44**	**13.88**	**39.61**	**19.49**	**4.40**	**77.38**	**6.90**	**0.48**	**3.74**	**6.87**	**17.99**
	2009-10	**2.75**	**2.73**	**0.00**	**0.00**	**2.73**	**14.69**	**39.90**	**19.46**	**4.40**	**78.45**	**6.83**	**0.61**	**3.97**	**6.97**	**18.38**

Table 5: Monthly and seasonal percentage variations of Chlorophyceae at station- V

Chlorophyceae		Feb	Mar	April	May	Total	June	July	Aug	Sep	Total	Oct	Nov	Dec	Jan	Total
Actinastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	1.27	0.45	0.00	0.00	**1.72**	0.00	0.00	3.18	0.00	**3.18**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	1.28	0.48	0.00	0.00	**1.76**	0.00	0.00	3.13	0.00	**3.13**
Ankistrodesmus	**2008-09**	0.00	0.80	0.00	0.00	**0.80**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.35	0.00	0.00	**0.35**
	2009-10	0.00	0.82	0.00	0.00	**0.82**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.44	0.00	0.00	**0.44**
Botryococcus	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	2.29	0.00	**2.29**
	2009-10	0.00	0.50	0.00	0.00	**0.50**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	2.30	0.00	**2.30**
Chodatella	**2008-09**	0.00	0.00	0.00	0.16	**0.16**	0.00	2.45	1.90	0.00	**4.35**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.17	**0.17**	0.00	2.43	1.26	0.00	**3.69**	0.00	0.00	0.00	0.00	**0.00**
Chlorella	**2008-09**	0.00	0.00	0.45	0.00	**0.45**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.89	1.19	0.00	**2.08**
	2009-10	0.00	0.00	0.34	0.00	**0.34**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.95	1.19	0.00	**2.14**
Microspora	**2008-09**	0.00	0.79	0.00	0.00	**0.79**	1.30	1.69	0.00	0.00	**2.99**	7.15	1.45	0.78	4.25	**13.63**
	2009-10	0.00	0.85	0.00	0.00	**0.85**	1.35	1.71	0.00	0.00	**3.06**	7.14	1.48	0.78	5.26	**14.66**
Monostroma	**2008-09**	0.55	0.00	0.50	0.35	**1.40**	0.00	1.68	2.10	0.00	**3.78**	0.00	0.00	2.45	3.58	**6.03**
	2009-10	0.59	0.00	0.45	0.34	**1.38**	0.00	1.69	2.08	0.00	**3.77**	0.00	0.00	2.86	3.63	**6.49**
Pediastrum	**2008-09**	0.00	0.00	1.01	0.00	**1.01**	0.60	1.75	1.35	0.00	**3.70**	5.36	17.84	1.79	4.58	**29.57**
	2009-10	0.00	0.00	0.90	0.00	**0.90**	0.68	1.83	1.26	0.00	**3.77**	5.49	17.93	1.89	4.18	**29.49**
Raphidonema	**2008-09**	0.00	0.00	0.50	0.00	**0.50**	0.00	0.00	0.00	6.10	**6.10**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.50	0.00	**0.50**	0.00	0.00	0.00	6.12	**6.12**	0.00	0.00	0.00	0.00	**0.00**
Ulothrix	**2008-09**	0.00	0.98	0.00	0.00	**0.98**	2.99	2.36	0.00	0.00	**5.35**	3.48	0.00	2.49	6.89	**12.86**
	2009-10	0.00	1.24	0.30	0.00	**1.54**	2.88	2.56	0.00	0.00	**5.44**	3.57	0.00	2.52	6.93	**13.02**
Total	**2008-09**	**0.55**	**2.57**	**2.46**	**0.51**	**6.09**	**6.16**	**10.38**	**5.35**	**6.10**	**27.99**	**15.99**	**20.53**	**14.17**	**19.30**	**69.99**
	2009-10	**0.59**	**3.41**	**2.49**	**0.51**	**7.00**	**6.19**	**10.70**	**4.60**	**6.12**	**27.61**	**16.20**	**20.80**	**14.67**	**20.00**	**71.67**

Table 6: Monthly and seasonal percentage variations of Chlorophyceae at station- VI

Chlorophyceae		Feb	Mar	April	May	Total	June	July	Aug	Sep	Total	Oct	Nov	Dec	Jan	Total
Actinastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	1.26	0.44	0.00	0.00	**1.73**	0.00	0.00	2.78	0.00	**2.78**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	1.24	0.42	0.00	0.00	**1.66**	0.00	0.00	2.15	0.00	**2.15**
Ankistrodesmus	**2008-09**	0.00	0.30	0.00	0.00	**0.30**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.35	0.00	0.00	**0.35**
	2009-10	0.00	0.50	0.00	0.00	**0.50**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.34	0.00	0.00	**0.34**
Botryococcus	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	3.05	0.00	**3.05**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	2.25	0.00	**2.25**
Chodatella	**2008-09**	0.00	0.00	0.00	0.14	**0.14**	0.00	2.45	1.55	0.00	**4.00**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.15	**0.15**	0.00	2.45	1.68	0.00	**4.13**	0.00	0.00	0.00	0.00	**0.00**
Chlorella	**2008-09**	0.00	0.00	0.34	0.00	**0.34**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.66	1.19	0.00	**1.85**
	2009-10	0.00	0.00	0.34	0.00	**0.34**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.88	1.18	0.00	**2.06**
Microspora	**2008-09**	0.00	0.57	0.00	0.00	**0.57**	0.90	1.66	0.00	0.00	**2.56**	6.14	1.45	0.56	4.25	**12.40**
	2009-10	0.00	0.62	0.00	0.00	**0.62**	1.10	1.65	0.00	0.00	**2.75**	6.14	1.45	0.78	4.25	**12.62**
Monostroma	**2008-09**	0.00	0.00	0.30	0.30	**0.60**	0.00	1.66	2.05	0.00	**3.71**	0.00	0.00	3.00	2.05	**5.05**
	2009-10	0.59	0.00	0.20	0.34	**0.54**	0.00	1.64	2.05	0.00	**3.69**	0.00	0.00	2.55	2.45	**5.00**
Pediastrum	**2008-09**	0.00	0.00	0.80	0.00	**0.80**	0.60	1.74	1.25	0.00	**3.59**	4.38	13.30	1.69	3.25	**22.57**
	2009-10	0.00	0.00	0.70	0.00	**0.70**	0.60	1.73	1.25	0.00	**3.58**	4.35	16.22	1.45	4.15	**26.17**
Raphidonema	**2008-09**	0.00	0.00	0.30	0.00	**0.30**	0.00	0.00	0.00	5.99	**5.99**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.30	0.00	**0.30**	0.00	0.00	0.00	5.99	**5.99**	0.00	0.00	0.00	0.00	**0.00**
Ulothrix	**2008-09**	0.00	0.97	0.00	0.00	**0.97**	2.48	2.34	0.00	0.00	**4.82**	2.48	0.00	2.45	6.02	**10.95**
	2009-10	0.00	0.88	0.00	0.00	**0.88**	2.45	2.33	0.00	0.00	**4.78**	2.45	0.00	2.15	6.89	**11.49**
Total	**2008-09**	**0.55**	**1.84**	**1.74**	**0.44**	**4.02**	**5.24**	**10.30**	**4.85**	**5.99**	**26.40**	**13.00**	**15.70**	**14.70**	**15.60**	**59.00**
	2009-10	**1.14**	**4.31**	**4.34**	**1.08**	**9.73**	**12.47**	**23.39**	**11.45**	**17.97**	**65.30**	**32.80**	**46.67**	**28.77**	**44.66**	**152.85**

Table 7: Monthly and seasonal percentage variations of Chlorophyceae at station- VII

Chlorophyceae	year	Feb	Mar	April	May	Total	June	July	Aug	Sep	Total	Oct	Nov	Dec	Jan	Total
Actinastrum	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	1.28	0.45	0.00	0.00	**1.73**	0.00	0.00	3.18	0.00	**3.18**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	1.25	0.46	0.00	0.00	**1.71**	0.00	0.00	3.18	0.00	**3.18**
Ankistrodesmus	**2008-09**	0.00	0.60	0.00	0.00	**0.60**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.35	0.00	0.00	**0.35**
	2009-10	0.00	0.70	0.00	0.00	**0.70**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.35	0.00	0.00	**0.35**
Botryococcus	**2008-09**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	2.29	0.00	**2.29**
	2009-10	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	2.29	0.00	**2.29**
Chodatella	**2008-09**	0.00	0.00	0.00	0.16	**0.16**	0.00	2.48	1.70	0.00	**4.18**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.00	0.17	**0.17**	0.00	2.49	1.68	0.00	**4.17**	0.00	0.00	0.00	0.00	**0.00**
Chlorella	**2008-09**	0.00	0.00	0.35	0.00	**0.35**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.89	1.19	0.00	**2.08**
	2009-10	0.00	0.00	0.35	0.00	**0.35**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.88	1.19	0.00	**2.07**
Microspora	**2008-09**	0.00	0.78	0.00	0.00	**0.78**	1.20	1.69	0.00	0.00	**2.89**	7.14	1.48	0.78	5.26	**14.66**
	2009-10	0.00	0.77	0.00	0.00	**0.77**	1.30	1.69	0.00	0.00	**2.99**	7.14	1.45	0.78	4.55	**13.92**
Monostroma	**2008-09**	0.58	0.00	0.40	0.35	**1.33**	0.00	1.68	2.10	0.00	**3.78**	0.00	0.00	2.86	3.58	**6.44**
	2009-10	0.49	0.00	0.40	0.36	**1.25**	0.00	1.68	2.08	0.00	**3.76**	0.00	0.00	2.86	3.58	**6.44**
Pediastrum	**2008-09**	0.00	0.00	0.90	0.00	**0.90**	0.70	1.75	1.30	0.00	**3.75**	5.36	17.80	1.79	4.18	**29.13**
	2009-10	0.00	0.00	0.90	0.00	**0.90**	0.70	1.75	1.27	0.00	**3.72**	5.39	17.84	1.79	4.19	**29.21**
Raphidonema	**2008-09**	0.00	0.00	0.40	0.00	**0.40**	0.00	0.00	0.00	6.00	**6.00**	0.00	0.00	0.00	0.00	**0.00**
	2009-10	0.00	0.00	0.40	0.00	**0.40**	0.00	0.00	0.00	6.01	**6.01**	0.00	0.00	0.00	0.00	**0.00**
Ulothrix	**2008-09**	0.00	0.98	0.00	0.00	**0.98**	3.48	2.35	0.00	0.00	**5.83**	3.48	0.00	2.49	6.89	**12.86**
	2009-10	0.00	0.99	0.00	0.00	**0.99**	3.45	2.34	0.00	0.00	**5.79**	3.48	0.00	2.49	6.89	**12.86**
Total	**2008-09**	**0.58**	**2.36**	**2.05**	**0.51**	**5.50**	**6.66**	**10.40**	**5.10**	**6.00**	**28.16**	**15.98**	**20.52**	**14.58**	**19.91**	**70.99**
	2009-10	**0.49**	**2.46**	**2.05**	**0.53**	**5.53**	**6.70**	**10.41**	**5.03**	**6.01**	**28.15**	**16.01**	**20.52**	**14.58**	**19.21**	**70.32**

Figure 1: Seasonal distribution of Chlorophceae in first year

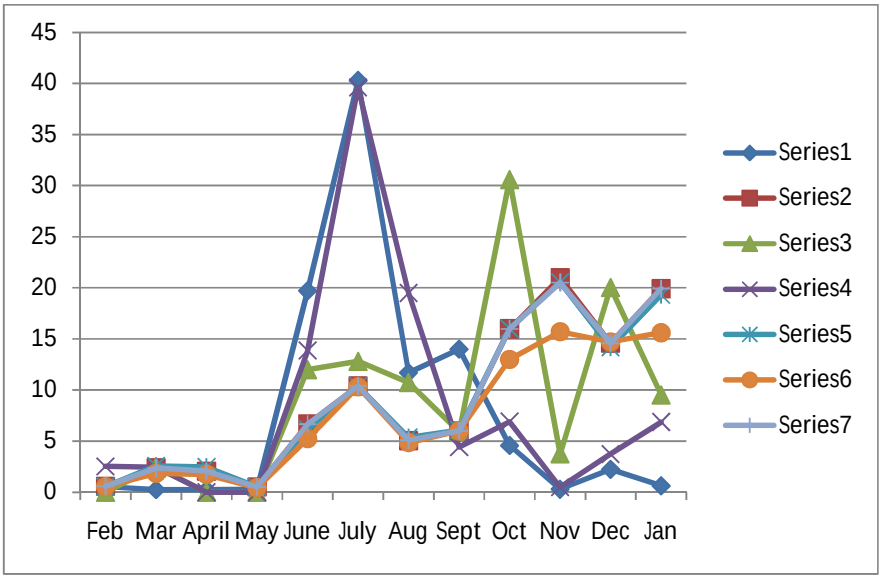
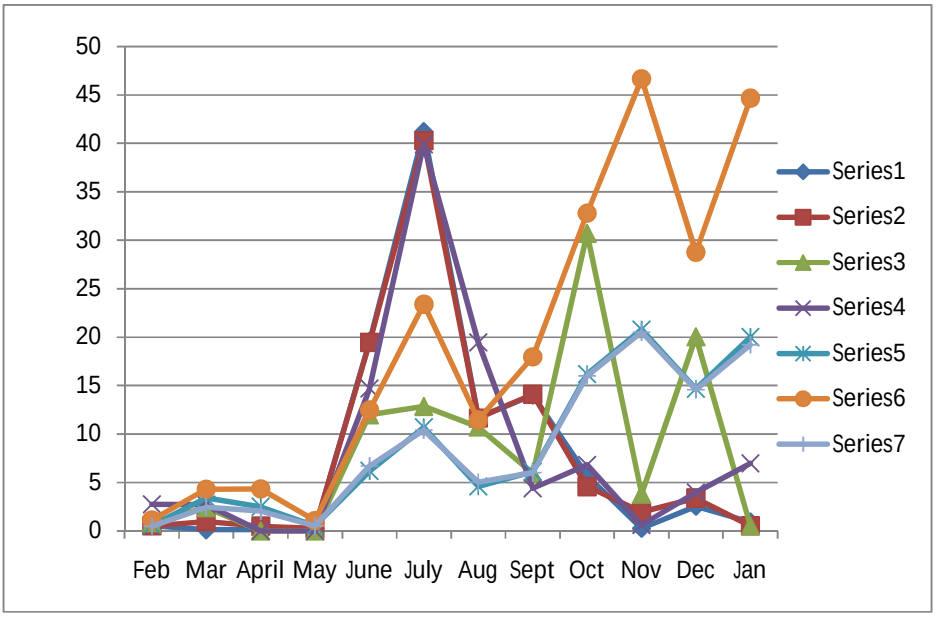


Figure 2: Seasonal distribution of Chlorophceae in second year



In the phytoplankton collection had earlier been reported by Shetty et al (1961) in Hooghl-Matlah estuary and by Patnaik and Shanker (1976) in Chilka Lake. Various authors like Shetty et al (1961), Devassy and Bhattathiri (1974) Joseph and Pillai (1975) and Patnaik and Sarkar (1976) had reported higher numbers of green algae during the monsoon season in different estuaries of India. Most of the phytoplankton survives under a wide range of environmental conditions, but their growth and density depends on a number of physical, environmental and biological factors. Swar and Fernando, (1980), Hutchinson (1967) had cited numerous studies on the role of temperature in regulating the birth rate, longevity and other population characteristic of plankton. Studies on the variation and distribution of phytoplankton and factors affecting the production of chlorophyll were studied by (Qasim and Reddy, 1967). Analyses further reveal the phytoplankton fluctuations on long-term trends. These fluctuations are strongly correlated with basin-scale climate indices, whereas long-term declining trends are related physico-chemical changes. We conclude that global phytoplankton concentration has declined over the past century; this decline will need to be considered in future studies of marine ecosystems, geochemical cycling, ocean circulation and fisheries.

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