Exploration of algal flora with reference to physico-chemical constituents of Kuruchi lake, Coimbatore district, TamilNadu.

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Abstract :In the present study, a preliminary investigation was carried out for two years from January 2015 to December 2017 to access the status of algal biodiversity of Kuruchi Lake, Coimbatore. A total of 77 algal species were documented in this lake belong to the class Cyanophyceae, Chlorophyceae, Bacillariophyceae and Euglenophyceae. Kuruchi Lake is an important freshwater body used for agriculture and fishing. The Lake is fed by rain and river Noyyal which is a tributary of River Cauvery.Physical parameters such as light intensity, pH, humidity, water temperature, atmospheric temperature was recorded at the spot. Chemical parameters like odour, appearance, Turbidity NTU, total dissolved solids, total hardness, calcium, chloride, magnesium, potassium, manganese, free ammonia, phosphate, silica, BOD were estimated by standard procedures.

Key words - Kuruchilake, algal biodiversity, Coimbatore, Nygaard's index, Shannon-Wiener index, algal culture.

I. INTRODUCTION

Knowledge about phytoplankton in lentic water bodies like ponds, lakes, wetlands and reservoir provides good information about the status of the water body. In this, Wetlands can be called as "Kidneys of nature" (Mitsch&Gosselink,2000)as these are the major feature of landscape in most parts of the world. Coimbatore is the Manchester of South India because of its major contribution of textiles and production of other main electrical gadgets. Because of this economic development there is a deterioration in the wetlands. According to the survey based report by PWD there are about 31 wetlands in and around the Coimbatore city. The following activities have caused threats to wetlands likely as urbanization, Anthropogenic activities, agricultural activities, pollution, aquaculture and introduced species (Neelakantan,2008). These major enemies to the wetlands not only a problem for the physical structure of the waterbody but also to the biological ecosystems. Wetlands contributes either directly or indirectly such as fibre, fuel, medicinal plants, roosting place for the migratory birds, flood control and regulate the ecosystem. In order to conserve any type of water especially fresh water body gains momentum. The best biological indicator of the eutrophicated or polluted water bodies are algae.

Algae constitute a major part of primary producers in aquatic ecosystem and are ubiquitous components of the biosphere (Raj et.al., 1981). They occur in a wide variety of habitats and play an important role in nature. Considerable amount of nutrients in the water body reflect its presence in phytoplankton. By knowing its status, the water bodies (especially fresh water) can be conserved. Exploration of unexplored area adds more value towards protection of that particular area.The phytoplankton diversity and seasonal oscillations were reported earlier by Sharma and Sarang, 2004. In this context, the algal flora was recorded for the two years with special reference to the physico-chemical parameters.

II. MATERIAL AND METHODS

Study area

Kurchi lake is the of the largest lakes which play an important role in intensive commercial fishing and irrigation purposes.It is situated in 10^0 58' 38' latitude and 76^0 55' 44'' longitutude' This lake is surrounded by Attupalam –palghat in North,Pollachi Road by east. Kuruchi town on the south and Kuniyamuthur by the west.The total catchment area of the lake is 4014 acres (6.272 Sq.miles) the water spread area is 334 acres (1.342Sq.km) length of the embankment is 2400.00m. The full tank level is 3.28 whereas the maximum water level of the lake is 3.83ft.Themaximium flood discharge of lake is 2403 cu secs. The capacity of lake is 60.00m.ft the lake has an Ayacut of Kuruchi lake of 452 Acres and it is 10.75 feet deep. On the shore, there is a temple and small shop for selling the fishes. Fishermen uses coracle for fishing (Figure 2.1).

Climatic parameters

Some of the parameters were measured on the spot; Temperature, light intensity and humidity were recorded using thermometer, lux meter and hygrometer. Depth was recorded using measured tape. Monthly average rainfall data was obtained from Meteorological Department.

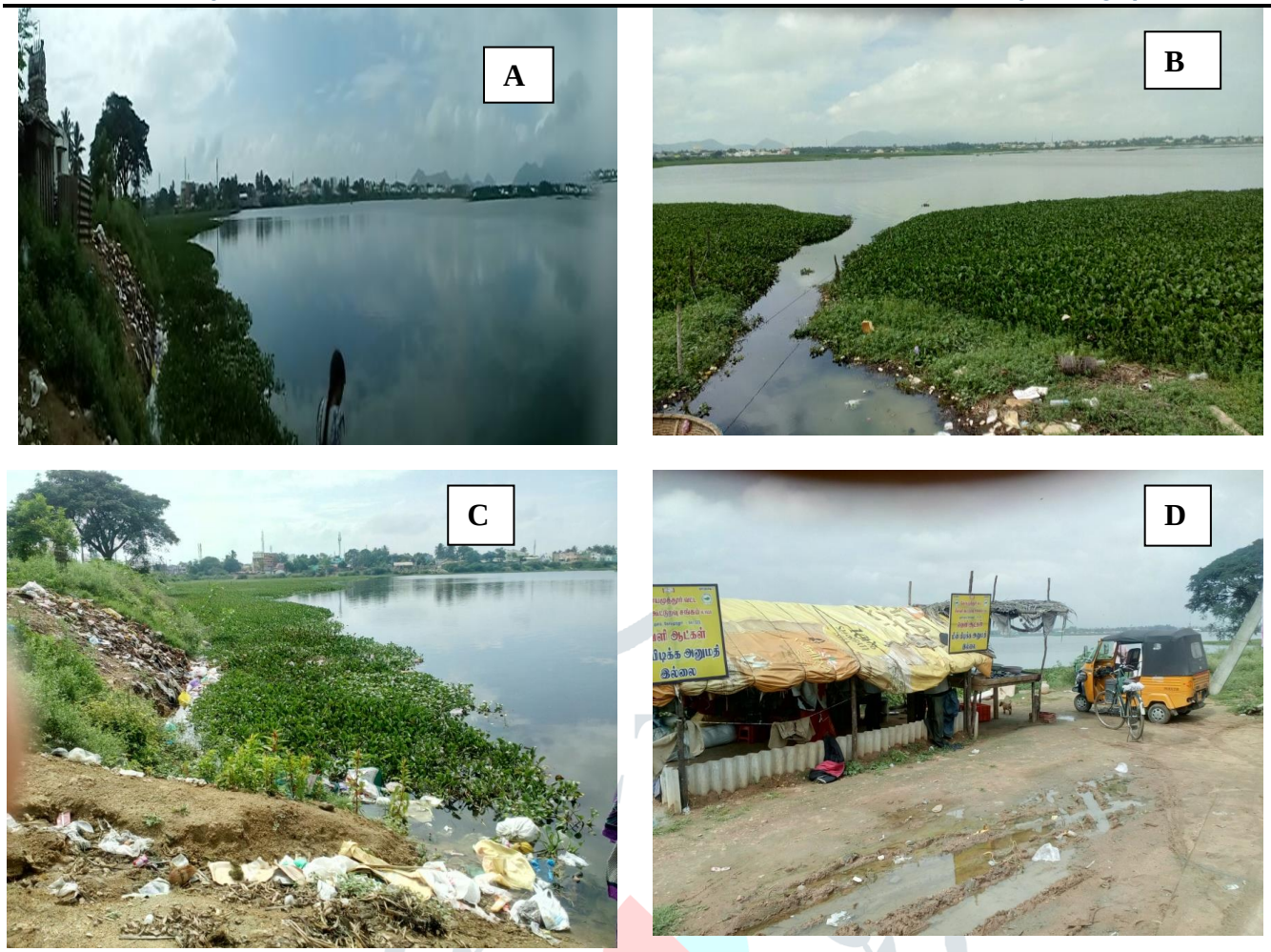

Figure 1- Study area - Kuruchi lake at various view.

- **A.** Temple side wall and a broad view of the lake.
- **B.** Inlet of water and coracle is tied by the local fishermen for fishing.
- **C.** Close view of the garbage dump mostly constitutes the plastic covers and floral waste from the temple.
- **D.** Local fish selling area and bill board showing that permitted people alone can do fishing.

Physico-chemical parameters

Physico-chemical parameters were observed using standard methods (APHA,1998). Appearance and Colour were determined by visual comparison method. Samples were collected in B.O.D bottle of 300 mL capacity. And the bottle was filled over flow and to prevent turbulence and formation of bubbles while filling. 1 mL of MnSO4 solution was added along with 1 mL of alkali-iodide-azide reagent. Stoppered carefully to exclude air bubbles and mixed by inverting bottle a few times. When the precipitates was settled to half the bottle volume, added 1 mL of concentrated H2SO4. Restoppered and mixed as before. Measured 20 mL and titrated with N/40 Sodium thiosulphate. Starch was used as indicator and end point was the disappearance of blue color. Note the titre value was noted down and calculated by the following formula, D.O as 'O' in mg/L = mL N/40 Sodium thiosulphate consumed. This is correlated with the water temperature. For calculating other chemical parameters water sample was collected separately. Turbidity was expressed as nephelometric turbidity units (NTU). Measurement of hydrogen ion concentration was made using pH meter. The conductance was measured directly with the help of a conductivity meter. Alkalinity total, total hardness and calcium were determined by titrimetric methods. Magnesium was determined by difference between total hardness as $CaCO_3$ and calcium hardness as $CaCO_3$.Sodium and potassium were estimated by flame photometry. Iron was calculated by ammonium thiocyanate method. Ammonia, nitrite and silica were determined spectrophotometrically, nitrate was estimated by UV-Visible method, Chloride by Argentometric method.Fluoride by Alizarin method and phosphateby colorimetric stannous chloride method. BOD and DO were calculated by titrimetrically.

Collection of samples

Monthly water samples were collected for the period of January 2015 to 2017 at 4 sampling stations ,inlet area, temple area, fishing area and outlet area respectively.Planktons were collected using plankton net. Filamentous algal colonies were picked up with help of forceps and algae found on the steps taken by scrapping it. Collected samples were preserved in 5% formalin to which was added Lugol's iodine at1% concentration for 24 hours and then the plankton were centrifuged to concentrate the algae in a smaller volume.Algae were identified using standard manuals. Individual cell counts were made in the sample using Haemocytometer. The tropic level of water of pond was analyzed with the help of Nygaard's index (Krishnamurthy, 1990). Floral diversity was calculated by Shannon- Wiener index (1949) group wise for the study period by the following formula,

$$H' = \sum \log pi \,.\log 2\, pi$$

Where, H' is the floral diversity index, S is the total individual number of species and n is the total individual number of all species and pi =S/n.

Species richness index (Menhinick,1964) was used to calculate the total number species and the total number of individuals (total biomass) but not relative abundance of the individual species. And calculated by the following formula,

$$D=S/\Sigma N.$$

Where, D=Diversity, S=total number of species and N=total number of individuals.

Nygaard's compound Quotient (Nygaard, 1969):

$$\text{Compound Quotient CQ} = \frac{\text{Bluegreenalgae+Diatoms+Chlrococcales+Euglenophyceae}}{\text{Desmids}}$$

Nygaard's compound Quotient (Nygaard, 1969) of 1-2.5 indicate a slightly eutrophic water; values of 3-5 indicate moderate eutrophic and values between 5and above 20 show that the pond is distinctly or much eutrophicated and somewhat contaminated. Values between about 20 and 43 finally indicate highly eutrophic water.

Boyd's diversity index (1981):

The diversity index of Boyd indicates the order pf pollution of a water body (in Sudeep and Shankar P.Hosmani, 2007). The main parameter in the index is the number of genera of phytoplankton in a water body and was calculated using the mathematical formula,

$$H = \frac{S-1}{\text{In } N}$$

Where, S is the number of genera of phytoplankton;
N is the total number of phytoplankton and
In is the Natural logarithm.

The resultant values indicate the pollution status of the water body under study. If the values obtained are >4 it indicates less pollution and clean water, values 3-2 indicate moderate pollution and values <1 indicate that water is heavily polluted.

III. RESULTS AND DISCUSSION

Monthly variation on physical and chemical characteristics during the study period was recorded.Variation in surface water temperature which ranges from27^0C-33^0C, atmospheric temperature ranges from a minimum of 31^0C to 39^0C, The humidity ranged from 54% to 88%,rainfall ranges from 5 mm to 124 mm,light intensity ranges from 5400 to 9700 lux, pH remain alkaline, as it is the most important ecological factor which controls the phytoplankton population (Sedamkar and Angadi, 2003).

Water appears to be blackish green to greenish throughout the period, odour remains to be algae smell and acceptable except in month of May it has no smell.Turbidity ranges from 3.2 to 3.8 NTU, electric conductivity ranges from a minimum of 76.7 to 98.0 mho/cm. Total hardness 152 to241 mg/L. calcium ranges from 38.0 - 40.0 mg/L, magnesium ranges from 5.0-12.2 mg/L and sodium ranges from 95.8-177.5 mg/L.Free ammonia ranges from 0.4-4.7 mg/L, nitrite ranges from 0.0-0.2 and nitrate ranges from 5.8 to 42.8, chloride ranges from a minimum of 142.7mg/L to a maximum of 149.5 mg/L, fluoride ranges from 0.1 to 0.5mg/Land silica 0.1 to 0.5 mg/L Increase in the number of diatom cells indicate the presence of fair amount of silica. BOD and D.O ranges from a minimum of 6.7- 7.3 mg/L and 4.7 to 6.7 mg/L which indicates the level of organic pollution in this lake. Increase in the values of total hardness,it may be due to high level of carbonated and bicarbonates in water. Chloride levels might be due to high degree of sewage discharge and human interferences (Arvindkumar, 1997). Increase levels of phosphate nitrates,might be due to mattress washing by detergents. Water bodies polluted by organic matter exhibit higher values of nitrate (Kodarkar, 1995). The major sources of phosphate of nitrate were domestic sewage, detergents and waste waters (Trivedy and Goel, 1984). No trace of heavy metals like lead, cadmium and nickel which were found absent in this temple tank. All the physico-chemical parameters are expressed in (figure 3.2a &figure 3.2b).

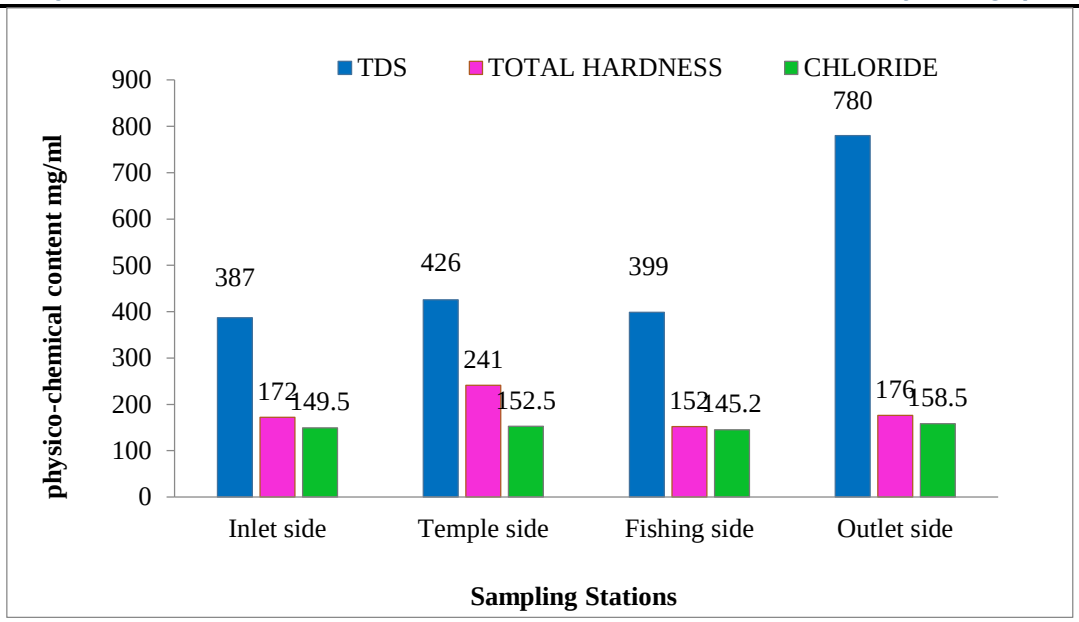

Figure 3.2a -Chemical parameters recorded during collection period

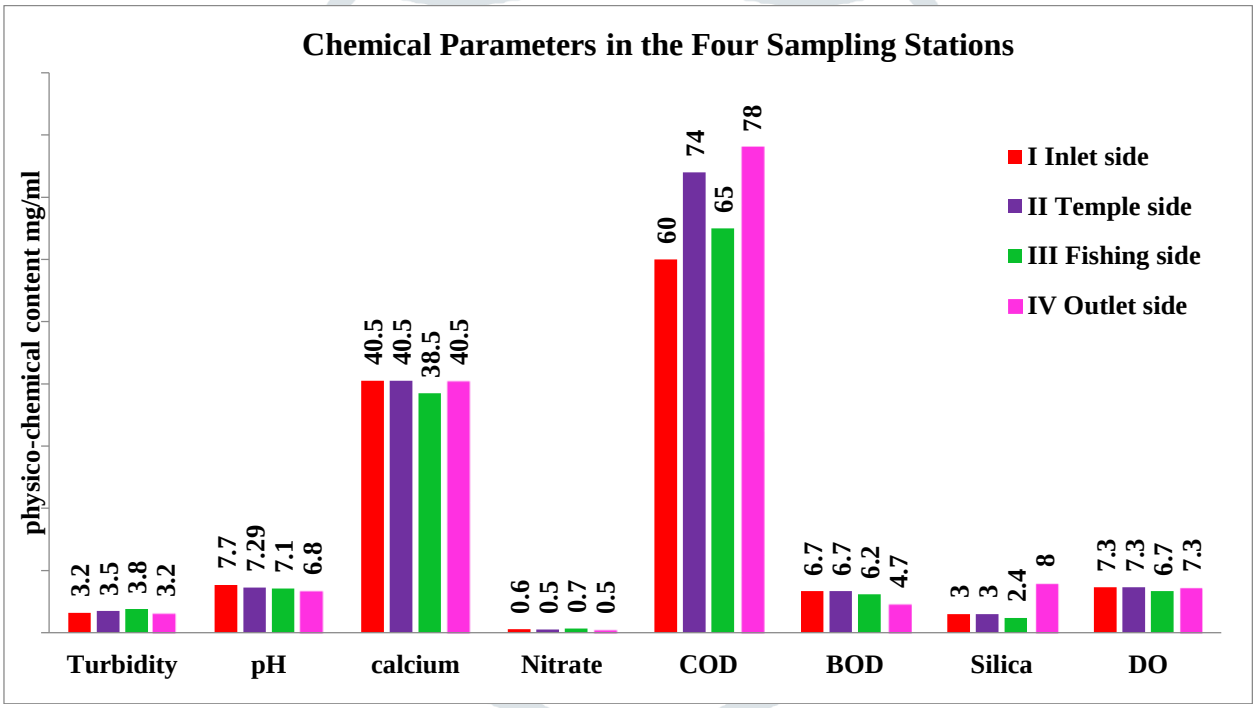

Figure 3.2b -Chemical parameters recorded during collection period

Table 3.1- LIST OF ALGAL SPECIES ENCOUNTERED SAMPLING STATIONS

S. No	Algae name	Monthly presence and absence of algal species																							
		January		February		March		April		may		June		July		August		September		October		November		December	
		I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
CYANOPHYCEAE																									
1	*Microcystisaereuginosa*Kutz	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	*Chrococcusturgidis*Nygaard	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	*C. minutus*Kutz	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	*Gleocapsa*sp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	*Gelothecerhodochlamys*Skuja	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

6	*Aphanocapsas*pNag	+	+	+	+	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7	*Apthanothecesp*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	+
8	*Merismopediaglauca*(Ehrenb)Nag	+	+	+	+	+	+	+	+	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+
9	*M.puncta* .Meyen	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10	*S.princeps.*West&West , G S	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
11	*Oscillatoriaprinceps*Vaucher(Orig)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12	*O.subbrevis*Schmidle (orig)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
13	*Lynbya sp.*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
14	*Anabenaarnoldii*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
CHLOROPHYCEAE																								
15	*Chlamydomonasspp*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
16	*Pandorinamorum*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
17	*Eudorinaspp*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
18	*Volvoxglobosa*	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
19	*C.humicola*(Nageli) Rabenhoret	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
20	*Micractiniumpusillum*(Fresenius)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
21	*Pediastrum simplex* Meyen	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
22	*P.ovatum*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
23	*Pediastrumintergratum* Naegeli	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
24	*P.duplex*Meyenvar .sub *granulatum*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
25	*P.tetras .var tetrahedron* (Ehr)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
26	*Tetrahedrongracile*(Reinsch) Hansgirg	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
27	*Closteridiumbengalicum*Turner.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
28	*Chlorella vulgaris* Beijerinck	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
29	*Dictyosphaeriumeheren bergianum* .Nageli	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
30	*Westellabotryoides*(W. West) de Wildeman	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
31	*Dimorphococccuslunatus*A Braun	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
32	*Ankistrodesmusfalcatus*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
33	*A.convolutus* .Corda	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
34	*Actinastrumhantschii*Lagerh	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
35	*Selenastrumgracile*Reinsch	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
36	*Kircheneriella*sppSchimdle	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
37	*Coelastrummicroporum*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-

38	*C.scabrum*(Reinsch)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
39	*Crucigenia fenestrate* (Schimdle)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
40	*C.tetrapedia*(Kirchner) Schimdle	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-
41	*Scenedesmusdimorphus* (Turpin) Kuetzing	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
42	*S.acuminatus*Lagerii	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
43	*S.incrassatulus* .Bohlin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
44	*S.bijugatus* .Turp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
45	*S.quadricuda* .(Turp) Breb	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
46	*S.protuberans* .Fritsch	+	+	-	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	*Spirogyra spp*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
48	*Mougeotiaspp*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
49	*C.lineatum .Ehr*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
50	*C.moniliferum*(Bory) .Ehr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
51	*Cosmariumundulatum Corda var. crenulatum (Nag.) Wittrock (c)*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-
52	*Cosmariumconspersum* var. *conspersum*f.dickieiCro asdale (r)	+	+	+	+	+	+	+	+	+	-	-	-	-	-	+	+	+	+	+	+	+	+	+
EUGLENOPHYCEAE																								
53	*Trachelomonasinterme dia* .Detl	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+
54	*Euglena acus* .Hurbner	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+
55	*Phacuscurvicauda* .Swir	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
56	*P.indicus* .Skvortzov	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
57	*P.longicuda*.Ehrenberg	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BACILLARIOPHYCEAE																								
58	*Melosiragranulata*(Ehr) Ralf	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
59	*Cyclotellameneghinian a* .Kurtz	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
60	*Fragillaria.intermedia*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
61	*Rhopaldiagibba*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
62	*Nitzschiaobtusa*.W . smith	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
63	*N.palea*(Kutz) W .smith	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
64	*Syndera ulna* (Nitzsch) .Ehr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
65	*Surirellaelegans* .Ehr	+	+	+	+	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+
66	*Amphora coffeaeformis*.AG	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
67	*Cymbellaamphicephala* .Naegeli	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-
68	*C.cymbiformis AG*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

69	*C.turgida* .(Greg) Celve	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70	*Pleurosigmaangulatum* W. Smith	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
71	*Naviculacryptocephala* Kuetz	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
72	*N.cincta*.Ehr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
73	*Nitzschiaobtusa*W.Smithvar.*scalpelliformis*Grun. (c)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+
74	*Anomoeoneis*	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+
75	*Gomphonemalanceolatum Ehr. (c)*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+
76	*G.sphaerophorum .Ehr*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+
77	*Pinnulariaviridis*(Nitzsch)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+

+ = Indicates the presence of the algal species
_ = Indicates the absence of the algal species

Table 3.2 - Nygaards phytoplankton quotients and water quality- criteria for indicating Oligotrophic/Eutrophic state

Sl.no	Index	Consolidated report during the study period of the sampling areas			
		Inlet side	Temple side	Fishing side	Outlet side
1	Myxophycean	84	38	183.5	60.4
2	Chlorophycean	23.5	77	34	6.4
3	Diatom	0.046	0.737	0.346	0.150
4	Euglenophyceae	0	0	0	0
5	Compound	107.8	122	219.8	67.4

The pH of surface water was alkaline throughout the period of study. There exists a closed relationship between pH and phytoplankton density. Various types of soaps, detergents, and other washable drugs might be helping to increase the alkalinity of water (Kadam, 1990).

A bloom of Microcystis aeruginosa formed during the most of the season, this may be due to the richness of the nutrients during this season.The excess amount of sodium and chloride contents reported from all the seasons induced the development of blue greens such as *Microcystis aeruginosa, Chroococcus turgidus, Merismopedia tenuissima*. Similar instance has been reported by Zafar (1964). Rana et al (1991) recorded high pH during the thick growth of Cyanophyceae, the same is noted in the present study. List of algal species encountered in the study given in table.2.Statistical analysis indicated positive significant correlation with individual species of algae belonging to Cyanophyceae, Chlorophyceae, Bacillariophyceae and Euglenophyceae. The diversity index of Boyd indicates the order of pollution of a water body, and in the present investigation the lake water is moderately polluted.

In the present study, a total of 77 species of algae were recorded, 14 species belong to Cyanophyceae, 29 to Chlorophyceae, 9 to Desmids, 5 to Euglenophyceae and 20 to Bacillariophyceae. As per heamocytometer cell count study, the maximum number was recorded in Cyanophyceae*Oscillatoria*sp. 222500/ml. Minimum cell number was recorded in *Rhopalodiagibba* 500/ml. Since the BOD and the essential nutrients are in appreciable amounts in the lake, it is very clear that this lake is undergoing eutrophication. As per the results of Nygaard's index indicating the trophic level of the water bodies the temple tank shows eutrophic state. This is because of the presence of desmids such as *Closterium sp., Cosmarium* sp. and *Staurastrum* sp. in the water body and several species of Cyanophyceae, Genera like *Chroococcus*sp., *Oscillatoria* sp., *Lynbya*sp., *Microcystis aereunginosa*, *Navicula* sp., *Synedra* sp., *Cyclotella,meneghiana*. And *Nitzschia* sp. were recorded as pollution indicators.The abundance and biodiversity of the algal forms indicate the eutrophic nature of the water body.

IV. CONCLUSION

Eutrophication generally leads to increase in algal population as there would be enrichment of nutrient in water and their enrichment could either be organic or inorganic enrichment. Improper maintenance of the lake must lead to this state. It is suggested that the culture studies of water bodyare very essential as it may result in the discovery of many new taxa in these water bodies.This study also suggeststhat the culture studies and maintenance these water bodies would be highly appreciated in the future.In this lake, there is a dense growth of hydrophytes due high organic matter contamination, if this situation continuous the lake would be a barren land in the mere future. So, proper maintenance and usage of the water body is very essential in this condition. Algae is the direct and natural indicator of this situation as many species reported during the study.

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