

Algal diversity of Guruvayur Temple Pond, Thrissur District, Kerala**P. Tessy Paul and Anu P.K.**

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Abstract

The present study explores the algal diversity of Guruvayur Sree Krishna temple pond, Thrissur district, Kerala from March to May 2014. In Kerala, the temple ponds are used for bathing and washing and are having ritual and sacred values. During the present study forty one algal species coming under twenty genera were recorded from the Guruvayur Sree Krishna temple pond. Of these twenty belonging to Chlorophyceae (48.8%), eight under Euglenophyceae (19.5%), six each under Bacillariophyceae (14.6%) and Cyanophyceae (14.6%), and one belong to Dinophyceae (2.5%). In the Guruvayur temple pond the Chlorophycean members were more diverse followed of Euglenophycean members. *Scenedesmus* was the diverse genera with seven species followed by *Pediastrum* with five species and *Schroederia* and *Phacus* represented by three species each. Fifteen pollution tolerant algal species were identified from this pond during the period of study. The turbidity and conductivity were not within the permissible limits. The present study indicates that the Guruvayur temple pond studied from Thrissur district, Kerala was showing the signs of pollution.

Keywords : Temple pond, algae, phytoplankton, Guruvayur, Thrissur, Chlorophyceae, Euglenophyceae, Bacillariophyceae and Kerala

Introduction

Guruvayur is an important pilgrim centre of Thrissur district, Kerala and is one of the most important places of worship for Hindus of Kerala. It is often referred to as “Bhuloka Vaikunta”. Its main attraction is the Sree Krishna temple, which is considered as the Dwaraka of the South, located in the town of Guruvayur in Kerala, India. An investigation has been made into the algal diversity with physico-chemical parameters of the pond of the Sree Krishna temple, Guruvayur, Thrissur district, Kerala.

Materials and Methods

The water samples for the analysis of algal diversity and water quality were collected twice monthly from March to May 2014. The water quality parameters analyzed were temperature, turbidity,

conductivity, pH, acidity, alkalinity, total dissolved solids, total hardness, dissolved oxygen and chloride as per the standard instruments and methods (Trivedi and Goel, 1986; APHA, 1998). The collected algal samples were fixed in 4% formalin solution for further analysis. The algae were identified with the help of monographs and standard publications (Desikachary, 1959; Philipose, 1967; Prescott, 1982; Sarode and Kamat, 1984). The pollution tolerant algae found in the study area were analyzed according to Palmer (1969).

Results and Discussion

The results of physico-chemical parameters analyzed were given in Table 1. Water quality affects the abundance, species composition and stability of physiological conditions of the indigenous population of aquatic organisms (APHA, 1998). The turbidity and

Table - 1. Fluctuations of physico-chemical parameters

Sl. No	Parameters	Range	Mean \pm SD	Permissible limit (BIS, 1991)
1	Temperature °C	23.3 - 26.3	25.47 \pm 1.10	-
2	Turbidity NTU	7.9 - 26.3	16.35 \pm 6.20	2.5
3	Conductivity mho/cm	321 - 648	478.67 \pm 137.06	250
4	pH	6.4 - 7.4	6.83 \pm 0.42	6.5 - 8.5
5	Acidity mg/L	5 - 25	15.67 \pm 7.07	-
6	Alkalinity mg/L	25 - 121	89 \pm 35.94	200
7	TDS mg/L	208 - 460	362 \pm 98.16	500
8	Hardness mg/L	72 - 175	126.67 \pm 34.56	300
9	DO mg/L	3.2 - 3.6	3.33 \pm 0.16	-
10	Chloride mg/L	5.68 - 15.9	11.15 \pm 4.05	200

Table - 2. Diversity of algae in Sree Krishna temple pond, Guruvayur

Sl. No	Name of algal Species	March	April	May
	Class : Chlorophyceae			
1	<i>Scenedesmus acuminatus</i> (Lagerheim) Chodat	+	-	-
2	<i>Scenedesmus bijugatus</i> (Turpin) Kuetzing forma <i>parvus</i> (G.M. Smith) Philipose	+	-	-
3	<i>Scenedesmus bijugatus</i> (Turpin) Kuetzing var. <i>bicellaris</i> (Chodat) Philipose	-	+	-
4	<i>Scenedesmus bijugatus</i> (Turpin) Kuetzing forma <i>irregularis</i> Wille	+	-	-
5	<i>Scenedesmus bijugatus</i> (Turpin) Kuetzing var. <i>graevenitzii</i> (Bernard) Philipose	+	-	-
6	<i>Scenedesmus dimorphus</i> (Turpin) Kuetzing	+	-	-
7	<i>Scenedesmus quadricauda</i> (Turpin) Brebisson var. <i>bicaudatus</i> Hansgirg	+	-	-
8	<i>Pediastrum simplex</i> Meyen var. <i>duodenarium</i> (Bailey) Rabenhorst	+	-	-
12	<i>Pediastrum simplex</i> Meyen var. <i>simplex</i> Komarek	+	-	-
9	<i>Pediastrum ovatum</i> (Ehr.) A. Braun.	+	-	-
11	<i>Pediastrum simplex</i> Meyen	+	-	+
10	<i>Pediastrum tetras</i> (Ehr.) Ralfs var. <i>tetraodon</i> (Corda.) Hansgirg	-	+	-
13	<i>Tetraedron muticum</i> (A. Braun.) Hansgirg	-	+	-
14	<i>Schroederia indica</i> Philipose	+	-	+
15	<i>Schroederia setigera</i> (Schroeder) Lemmermann	-	-	+
16	<i>Schroederia planctonica</i> (Skuja) Philipose	-	+	-
17	<i>Oedogonium</i> sps	+	-	-
18	<i>Cosmarium maculatiforme</i> Schmidle	+	-	-
19	<i>Cosmarium manipurence</i> Bruhl et Biswas	+	-	-
20	<i>Protococcus viridis</i> Agardh	+	-	-
	Class: Bacillariophyceae			
21	<i>Melosira granulata</i> (Ehr.) Ralfs	+	+	+
22	<i>Cyclotella meneghiniana</i> Kuetz.	-	-	+

23	<i>Cyclotella striata</i> (Kuetz.) Grun.	+	+	-
24	<i>Synedra ulna</i> (Nitz.) Ehr.	+	-	-
25	<i>Gomphonema lanceolatum</i> Ehr.	-	-	+
26	<i>Nitzschia palea</i> (Kuetz.) W. Smith	-	+	-
	Class : Cyanophyceae			
27	<i>Chroococcus indicus</i> Zeller	+	-	-
28	<i>Chroococcus minimus</i> (Keissler) Lemm.	-	+	-
29	<i>Merismopedia minima</i> Beck	+	+	-
30	<i>Merismopedia punctata</i> Meyen	+	-	-
31	<i>Oscillatoria perornata</i> Skuja	-	+	+
32	<i>Oscillatoria princeps</i> Vaucher ex Gomont	+	+	-
	Class : Euglenophyceae			
33	<i>Euglena gracilis</i> Klebs	-	+	+
34	<i>Euglena proxima</i> Dangard	-	+	-
35	<i>Phacus orbicularis</i> Huebner	+	-	+
36	<i>Phacus pleuronectes</i> (Muell.) Dujardin	+	+	-
37	<i>Phacus pyrum</i> (Ehr.) Stein	+	-	-
38	<i>Lepocinclis fusiformis</i> (Carter) Lemmermann	-	+	+
39	<i>Lepocinclis ovum</i> Ehr. var. <i>major</i> (Haber-pestal) Conr.	-	+	+
40	<i>Trachelomonas volvocina</i> Ehr.	-	+	+
	Class : Dinophyceae			
41	<i>Peridinium cincta</i> var. <i>tuberosum</i> (Meunier) Lindermann	-	+	-

conductivity were not within the permissible limits (BIS, 1991).

During the present study 41 algal species under 20 genera were encountered in Sree Krishna temple pond, Guruvayur, Kerala (Table - 2). Of these twenty belonging to Chlorophyceae (48.8%), eight under Euglenophyceae (19.5%), six each under Bacillariophyceae (14.6%) and Cyanophyceae (14.6%), and one belong to Dinophyceae (2.5%). The Chlorophyceae formed the diverse group followed by Euglenophyceae (Fig.- 1).

Scenedesmus was the diverse genera with seven species in the Guruvayur temple pond followed by *Pediastrum* with five species and *Schroederia* and *Phacus*, represented by three species each. *Peridinium cincta* var. *tuberosum* (Meunier) Lindermann was the

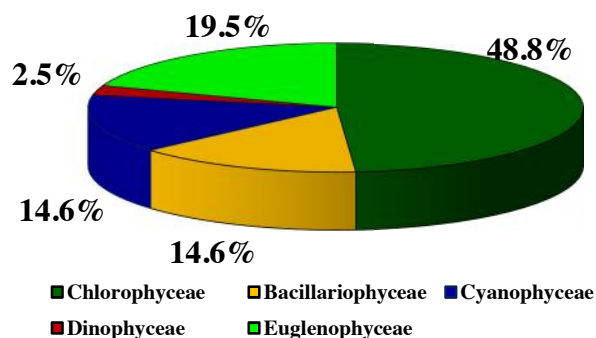


Fig. - 1. Algal diversity of Guruvayur temple pond

Dinophycean member and are found during April (Table - 2).

Arulmurugan *et al.* (2010) have studied 37 temple tanks in Thrissur and Palakkad districts of Kerala and reported 61 species of freshwater algae. Ajayan *et al.* (2013) reported 38 phytoplankton genera from

Ananthapura temple lake of Kasargod, Kerala. Baruah and Kakati (2012) described 45 species of phytoplankton from a Gopeswar temple pond of Assam and Shakila and Natarajan (2012) described 20 species of phytoplankton from the temple pond of Thiruporur, Chennai.

During the present investigation fifteen pollution tolerant algal species (Palmer, 1969) were identified from the Guruvayur temple pond. They are *Cyclotella meneghiniana* Kuetz., *Euglena gracilis* Klebs, *Euglena proxima* Dangard, *Lepocinclis ovum* (Ehr.), *Melosira granulata* (Ehr.) Ralfs, *Nitzschia palea* (Kuetz.) W. Smith, *Oscillatoria princeps* Vaucher ex Gomont, *Phacus pleuronectes* (Muell.) Dujardin, *Phacus pyrum* (Ehr.) Stein, *Scenedesmus acuminatus* (Lagerheim) Chodat, *Scenedesmus dimorphus* (Turpin) Kuetzing, *Scenedesmus quadricauda* (Turpin) Brebisson, *Synedra ulna* (Nitz.) Ehr., *Tetraedron muticum* (A. Braun.) Hansgirg and *Trachelomonas volvocina* Ehr.

The algal genera *Euglena*, *Scenedesmus*, *Navicula* and *Nitzschia* are found in organically polluted water (Trivedi and Goel, 1986). Presence of pollution tolerant algae like *Melosira*, *Oscillatoria*, *Pediastrum* and *Scenedesmus* has been considered as indicative of enriched waters, thus providing evidence of pollution of water (Tessy and Sreekumar, 2008). The pollution tolerant algal species found in the Guruvayur pond indicate the deteriorated nature of the water.

Conclusion

During the present investigation, 41 algal taxa belonging to 20 genera are recorded from the Guruvayur Sree Krishna temple pond and they come under Chlorophyceae, Bacillariophyceae, Cyanophyceae, Euglenophyceae and Dinophyceae. In the Guruvayur temple pond the Chlorophycean members were more diverse followed by Euglenophycean members.

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