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A Comparative Study on Phytoplankton Diversity in River Tamiraparani and a Man-Made Fresh Water Body

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Abstract

A comparative study on Phytoplankton diversity between River Tamiraparani (Vannarpettai site) and a man made freshwater body was carried out. River Tamiraparani is a perennial river in Tirunelveli District, Tamilnadu. It is the irreplaceable source of freshwater for Tirunelveli district and neighbouring districts. The man made freshwater body is situated in a village namely Tharapuram, Tirunelveli District. It is the main source of water for domestic use and irrigation. The study has been carried out on identification and comparison of the fresh water Phytoplankton in two different kinds of water bodies. The field trip was carried during January 2012 to June 2012 in the two selected sites. The identification of Phytoplankton was done by standard and reputed manuals. The Phytoplankton composition was constituted by members of Bacillariophyceae, Chlorophyceae, Cyanophyceae and Euglenophyceae. Phytoplankton diversity was quantified by Shannon Wiener index.

Keywords: Phytoplankton, Bacillariophyceae, Chlorophyceae, Cyanophyceae, Euglenophyceae

1. Introduction

India has 3.1 million ha of reservoir area. India is having prosperous sources of inland, water-bodies in the form of rivers, lakes and reservoirs etc. Based on the trophic nature, the water-bodies are classified into Oligotrophic, Mesotrophic and Eutrophic. Oligotrophic water-body has less nutrients, mesotrophic medium nutrients and high nutrients are in eutrophic. It plays a dynamic role in the aquatic life. Freshwater bodies have copiousness of Algae. Algae represent a large diverse group including autotrophic, unicellular and multicelluar organisms. It's ranging in size, from the microscopic to large sea weeds of great length. Almost all algae are photosynthetic eukaryotic organisms, it have a membrane enclosed nucleus and membrane-bound chloroplasts. Algae are the foremost producers of food chain. Algal diversity has been studied by many workers in India [2], [3], [8], [9], [11]. The paper is predominantly about comparison of phytoplankton diversity between River Tamiraparani and a man-made reservoir. River Tamiraparani is a perennial river in Tirunelveli District, Tamilnadu. It emerges out from the Peak Pothigai hills. It altitude is 1725 meters above mean sea level. It is the inimitable source of freshwater for Tirunelveli and neighbouring districts. The man-made freshwater body is established in a village namely, Tharapuram, Tirunelveli district. It is the main source of water for domestic use and irrigation. The study has been carried out on identification and comparison of freshwater phytoplankton in above mentioned water bodies. The identification of phytoplankton was done by standard and reputed manuals. The phytoplankton composition was constituted by members of Bacillariophyceae, Chlorophyceae, Cyanophyceae and Euglenophyceae. Phytoplankton diversity was quantified by Shannon wiener index.

2. Materials and Methods

2.1 Study Area

The Phytoplankton was observed at River Tamiraparani (Site I) and Man made Reservoir (Site II). The samples were collected during January 2012 to June 2012.

2.2 Mode of Collection

The collections of samples were made at an interval of a month from the two sampling sites as mentioned. The sam-

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ples were collected by the Planktonic net and preserved in 4% formalin.

2.3 Identification

The collected samples were observed with help of light microscope and the identification was carried out by using well known manuals like Mahendra Perumal & Anand [11] and other related research articles, such as [3–5], [7], etc.

3. Results and Discussion

Table 1: List of phytoplankton in site 1 and site 2

Sl no	Phytoplankton	Site 1	Site 2
1	*Amphora sp*	+	-
2	*Amphora sp1*	+	-
3	*Anabaena sp*	+	+
4	*Ankistrodesmusfalcatus*	+	-
5	*Choroococcustenax*	+	-
6	*Choroococcus sp*	-	+
7	*Choroococcus sp1*	-	+
8	*Closterium sp*	+	-
9	*Coelastrum sp*	+	+
10	*Cosmariummoniliforme*	+	-
11	*Cosmarium sp*	+	+
12	*Cosmarium sp1*	-	+
13	*Cosmarium sp2*	-	+
14	*Cosmarium sp3*	-	+
15	*Cymbellagracilis*	+	+
16	*Cymbellaturgidula*	+	-
17	*Cymbella sp*	+	+
18	*Desmidium sp*	+	-
19	*Euglena obtuso-caudata*	+	-
20	*Euglena sp*	+	+
21	*Euglena sp1*	-	+
22	*Fragilariaconstruens*	+	-
23	*Fragilariafonticola*	+	+
24	*Fragilariavirescens*	-	+
25	*Gloeocapsanigrescens*	+	+
26	*Gloeocystis major*	-	+
27	*Gomphonema sp*	-	+
28	*Naviculacincta*	+	+
29	*Naviculacuspidata*	+	+
30	*Naviculaproducta*	+	+
31	*Navicula sp*	-	+
32	*Navicula sp1*	-	+
33	*Navicula sp2*	-	+
34	*Neidium sp*	-	+
35	*Nitzschia sp*	+	+
36	*Nitzschia sp1*	-	+
37	*Nitzschia sp2*	-	+
38	*Oscillatoriaacuminata*	+	-
39	*Oscillatoriaobtusa*	+	-
40	*Oscillatoriarubescens*	+	-
41	*Oscillatoria sp*	+	+
42	*Oscillatoria sp1*	+	+
43	*Oscillatoria sp2*	+	+
44	*Oscillatoria sp3*	+	+
45	*Pediastrum duplex*	+	+
46	*Pediastrum simplex*	+	+
47	*Pediastrum tetras*	+	+
48	*Pediastrum sp*	-	+
49	*Phacusagilis*	-	+
50	*Phacusindicus*	+	-
51	*Phacuslongicauda*	+	-
52	*Phacus sp*	+	+
53	*Phormidiummucosum*	+	-
54	*Pinnularia sp*	-	+
55	*Pleurosigmadelicatulum*	+	-
56	*Pleurosigma sp*	-	+
57	*Pleurosigma sp1*	-	+
58	*Pleurosigma sp2*	-	+
59	*Quadrigulaquaternalia*	+	-
60	*Scenedesmusacutus*	+	+
61	*Scenesdesmusbijugatus*	-	+
62	*Scenedesmusdimorphus*	+	+
63	*Scenedesmusquadricauda*	+	+
64	*Scenedesmuslenticulatusvar. australis*	+	+
65	*Spirogyra parvispora*	-	+
66	*Spirogyra sp*	+	+
67	*Stauronesis sp*	+	+

Table 2: Species diversity of phytoplankton

	(Shannon–wiener)	
Month	**Site 1**	**Site 2**
January	2.65	2.87
February	2.77	2.95
March	2.98	3.14
April	3.08	3.16

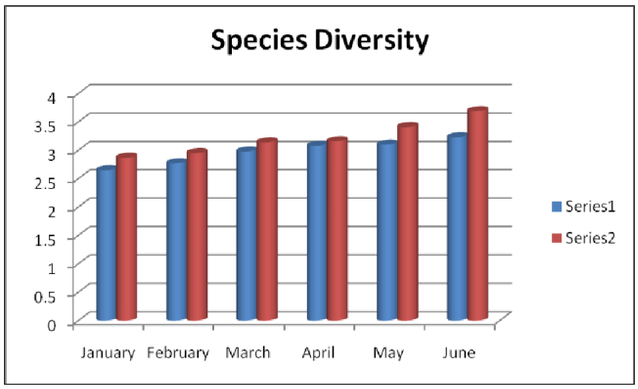

Figure 1. Species diversity

May	3.10	3.41
June	3.23	3.69

4. Discussion

Altogether 27 genera with 67 species of algae were recorded in both sites. Cyanophyceae were represented by 5 genera and 13 species, Chlorophyceae 10 genera and 22 species, Bacillariophyceae 10 genera and 25 species, Euglenophyceae 2 genera and 7 species (Table 1). Among these *Navicula, Oscillatoria, Nitzschia, Pediastrum, Scenedesmus* are commonly found in site 1. *Navicula, Pleurosigma, Cosmarium, Scenedesmus, Pediastrum, Oscillatoria, Fragilaria, Pinnularia* are commonly found in site 2.

The Phytoplankton is quantified by Shannon-wiener index. In all the six months, the species diversity is rich in site 2 than site 1 (Table 2). It is due to more mixing of organic matters and also decreases in water level of site 2. So the physico-chemical quality of water is changed in site 2 when compared to site 1 and rich in nutrients, which supports multifarious and affluence of Phytoplankton (Figure 1). As a result, the Man made reservoir is found to be eutrophic than the River Tamiraparani during the study period.

5. Conclusion

The present study reports 27 genera with 67 species of Cyanophceae, Chlorophyceae, Bacillariophyceae, Euglenophyceae. Man made reservoir is a lentic type of habitat. It gets optimum sunlight, temperature, nutrients. So it supports affluence of Microalgae than River Tamiraparani.

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