

RESEARCH ARTICLE

Diversity of Phytoplankton In Relation to Physico-Chemical Characteristic of Nav-Talav, Bhandara (M.S.)

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Manuscript details:	ABSTRACT
<p>Date of publication 18.10.2014</p> <p>Available online on http://www.ijlsci.in</p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Thakur PP, Dudhat IN, Kalbande SG and Dongre VR (2014) Diversity of Phytoplankton In Relation to Physico-Chemical Characteristic of Nav-Talav, Bhandara (M.S.), <i>Int. J. of Life Sciences</i>, Special Issue, A2: 175-178.</p> <p>Acknowledgement: We are thankful to the principal of J. M. Patel College, for encouraging and providing laboratory facilities to conduct this work.</p> <p>Copyright: © Author(s), This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>The present study deals with study of diversity of Phytoplankton in relation to physico-chemical characteristics of 'Nav - Talav', Bhandara (M.S.) India, during the period of one year 2013 - 2014. Nav - Talav is located at Bhandara - Tumsar Road. It is perennial lake receives water from rain. The water level remains more or less constant except the level decreases slightly in the summer season. In this Talav, the Phytoplanktons are abundant. The water spread area is 27 hect.and water is used not only for the agriculture activity but also for fishery activities. There are 30 species of Phytoplanktons are observed and identified the study. These identified Phytoplanktons belongs to various families like Bacillariophyceae, Chlorophyceae, Cyanophyceae. It was concluded that the dominant species are spirogyra, Euglenopolymorpha, Anabena and Spirulina.</p> <p>Key words : <i>Abundant, dominant, perennial, phytoplankton and nav-talav.</i></p> <p>INTRODUCTION</p> <p>The distribution and variability of the principle plant nutrients in lake, largely determine the biomass and productivity of Phytoplankton. They are natural inhabitants of water and serve as the basis of food chain within the ecosystem. They are also involved in the water pollution in a number of significant ways (Latha and Rajlakshmi, 2006). Water is a vital resource used for various activities such as drinking, irrigation, fish production, industrial cooling, power generation and many others. (Sathe <i>et al.</i>, 2001). Fresh water is perhaps the most vulnerable habitats and is more likely to be changed by the activities of man. This essential resource is becoming increasingly scarce in many parts of the world due to severe impairment of water quality (Nefeesa and Narayana, 2006). The increasing anthropogenic influences in recent years in and around aquatic systems and their catchment areas have contributed to a large extent to a large extent to deterioration of water quality and dwindling of water bodies leading to their accelerated eutrophication.</p> <p>The planktonic study is a very useful tool for assessment of water quality in any type of water body and also contributes to understanding of the basic nature and general economy of the lake (Pawar <i>et al.</i>, 2006). Unplanned urbanization rapid industrialization and indiscriminate use of artificial chemicals in agriculture are causing heavy varied pollution in aquatic environments leading deterioration of water quality and depletion of aquatic biota (Yeole and Patil, 2005).</p>

Talav are the shallow bodies of standing waters with slight wave action and may be naturally created or manmade. Nav Talav was chosen for the study where several Phytoplankton species occur and fishing also carried out regularly. This Talav is situated in Bhandara District on Bhandara – Tumsar Road. The area spread of this Talav is 27 hect. For present investigation two sites were selected, viz sites. A and site B. These are opposite to each other. The production of Phytoplankton is directly correlated with phosphate, silicates as well as nitrogen (Borse *et al.*, 2000). These three elements are essential for the bloom of Phytoplankton. The Phytoplankton and zooplankton are always inversely proportional in an aquatic environment because the zooplankton feed on the phytoplankton. Thus density of phytoplankton is directly correlated with fishery potentiality of an aquatic ecosystem. In the present study main focus has been on the species composition of phytoplankton of Nav-Talav of Bhandara District.

MATERIALS AND METHODS

Collection of Phytoplankton samples were made by using a half meter bottling nylon net 21, mesh size 0.069 mm from two sites (A and B) during fish catching. The abiotic factors such as pH, free carbon dioxide, dissolved oxygen, total alkalinity and chlorides were analyzed following standard methods (APHA 2010)

The samples were allowed to settle by adding Lugol's iodine, centrifuged and the concentrate was made up to 20ml with 4% formalin for quantitative estimation of Phytoplankton.

RESULT AND DISCUSSION

Distribution of Phytoplankton and their variation at different zones of a water body is known to be influenced by the physico-chemical parameters of water (Yeragi *et al.*, 2003).

Regular sampling of water was made from the different regions of this pond. The physico-chemical parameters like pH, temperature, dissolved oxygen, free CO₂, alkalinity hardness, chlorides. TDS were recorded. Temperature varied from 27^o-35^o maximum temperature was recorded during summer at both sites. pH shows neutral to alkaline nature (7.0 – 8.3). DO was varied from 6.4 to 14.2 mg/L., it was maximum during summer season at both stations. Free CO₂ varied from (6.50 – 18 mg/L.) it was maximum during winter. The hardness varied from (250 – 380) mg/L and chlorides varied from (16 - 80) mg. /L control Phytoplankton diversity and density.

In the present study, the species composition of Phytoplankton revealed total number of 30 species from two sites site B showed less abundance of species class Bacillariophyceae (8 Sp.) Chlorophyceae (15 Sp.). Cyanophyceae (7 sp.). Blue green show dominance at site 1 during summer.

Table 1: Physico-chemical parameters from two sites of Nav - Talav during 2013 - 2014.

Parameters	Site 'A'			Site 'B'		
	Summer	Monsoon	Winter	Summer	Monsoon	Winter
Temp.	33 – 35 ^o	29 – 31 ^o	27 – 28 ^o	33 – 35 ^o	29 – 31 ^o	27 – 28 ^o
pH	7.5 – 8.3	7.1 – 8	7.5 – 8.2	7.5 – 8.3	7 – 8	7.4 – 8.2
DO	6.4	2.2	14.2	6.4	2.1	14.2
CO ₂	6.50- 6.55	9.24	17.62	6.50	9.80	18
Alkalinity	212 – 214	120 – 125	170 – 175	212 – 214	121 – 124	170 – 175
Hardness	370 – 380	250 – 255	295	380	250-255	295
Chlorides	80 - 75	16 – 20	20 – 30	80 – 75	16 – 21	20 – 31
Nitrites	80 – 90	20 – 25	70 - 75	81 – 95	20 – 25	70 – 76
TDS	2000 – 2050	900 – 910	1420 – 1450	2100 – 2200	900 – 970	1420 - 1450

Table 2: Phytoplankton diversity and abundance

Sr. No.	Taxa	A	B
	Bacillariophyceae		
1	Coscinodiscus SPS	++	++
2	R. setigera	++	++
3	FragillariaCapurnia	++	+
4	Naviculagracilis	+	+
5	Navicularadiosa	+	+
6	Fragilariarumpens	+	+
7	Cymbellamarathwadensis	++	++
8	Naviculadelicatula	++	+
	Chlorophyceae		
9	Ankistrodesmusfalcatus	+	+
10	Chlamydomonas conferta	++	+
11	Chlorella congla - merata	+	+
12	Chlorella valgoris	+	+
13	Chladophora	+	+
14	Closteriumlinneticum	+	+
15	Cosmariumcontractum	+	+
16	Oedogonium patulum	++	++
17	Pediastrum Duplex	+	+
18	Pediastrum simplex	++	++
19	Scendesmus armadas	+	+
20	Spirogyra	++	++
21	Zygnema species	++	+
22	Spirogyra	++	++
23	Chara	++	++
	Cyanophyceae		
24	Anabaena constricta	++	++
25	Nostoc	++	++
26	Oscillatoria tenuis	+	+
27	Lyngbya	+	-
28	Merismopedia minima	+	+
29	Phormidiumdimorphum	+	+
30	Phormidiumtennvespirulina	+	+
++ More abundant; + Abundant; - Rare			

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