

Vol 5 Issue 6 Dec 2015

ISSN No :2231-5063

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# International Multidisciplinary Research Journal

## *Golden Research Thoughts*

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**RNI MAHMUL/2011/38595**

**ISSN No.2231-5063**

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## BIODIVERSITY OF MICROALGAE FROM SHIVALAY POND OF SAPTASHRUNGI GARH AT NASHIK DISTRICT

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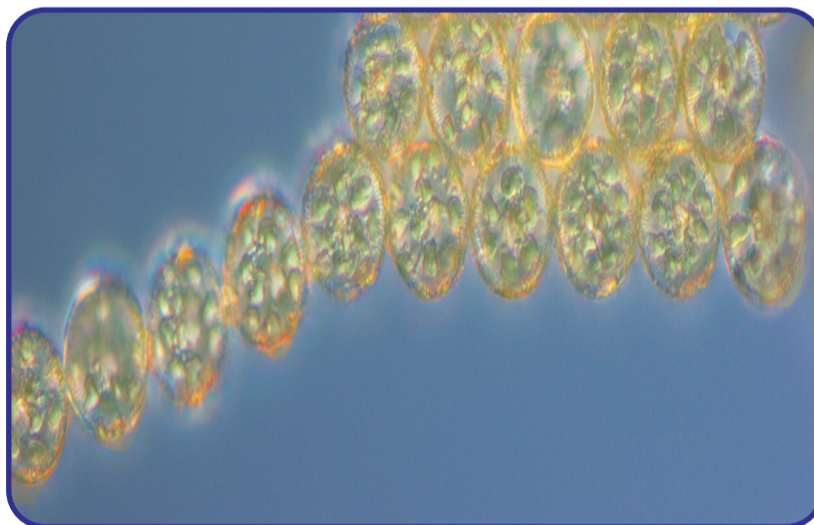
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### ABSTRACT

Saptashrunji Garh is a place of pilgrimage situated in the seven hill of Sahyadri. There are about 108 water reservoirs on the hill, known as Kundas. Periodic samples were collected from the Shivalaya ponds situated on the mountain near Shiva's temple, widely used for bathing before darshan during 2014-2015. Extensive and rapid growth of algae has been recorded in these ponds. Devotees are using this water for bath and believe that diseases get cured. In all total 40 different types of Cyanophycean, Chlorophycean, Bacillariophycean and

Pheophycean algae were recorded in this pond ecosystem. The presence of *Microcystis*, *Oscillatoria*, *Chlorella* and *Pediastrum* sps. *Navicula* and *Synendra* indicates that the water is polluted. Also dominance of Chlorophycea over cyanophycea has been observed clearly.

**KEYWORDS** :Biodiversity, Saptashrunjigarh, Microalgae.



### INTRODUCTION

Since ancient period places of pilgrimage remain attraction of Indian people. They become tourist places in modern era. The water reservoirs around the place are usually used for water supply and bathing. There are many stories found about bathing at pilgrimage place. Centre point remains curing of disease. Saptashrunjigarh is a

place of pilgrimage situated on seven hills between sahyadri and satpura. This area was known as Dandakaranya in ancient India. This area is rich in flora and fauna. Phytoplankton (microscopic algae) is a diverse group of unicellular, colonial or filamentous forms having photosynthesis capacity due to presence of chlorophyll pigment. Phytoplankton responds quickly to environmental changes so used as indicators of water quality.

Primary production and limnology of tropical lake has been studied Hussainy, (1967). Many other limnologist such as Ganpati, and Sreenivasan (1970), Nasar and Munshi (1975), Pandey, and Singh (1978), Verma et al (2011), Zutshi and Vass (1977) made similar type of studies in different lakes

of India.

#### **MATERIAL AND METHODS**

Water and Algal samples from described site of the Shivalay pond were collected during the period June 2014 to May 2015. Samples were analyzed for physico-chemical parameters like water temperature which was tested using Celsius thermometer at the sampling sites at the surface and bottom of the water. pH was measured using pH meter in the field itself, while samples for dissolved oxygen were fixed on the spot by Winkler's reagent and further estimated in the laboratory. Biological oxygen demand was also calculated by incubating the water samples in BOD incubator for three days and determining DO again the difference between the two values gave the Biological oxygen demand of the samples. Analysis of physicochemical parameters has been done according to the methods described by APHA (1988) and as per Workbook on Limnology. A liter of water sample was collected every month separately for the qualitative and quantitative estimation of phytoplankton study. The samples were observed fresh by preparing wet mounts within 48 hrs. Then the samples were further preserved in Lugol's solution and 4% formaldehyde solution separately for detailed study Chlorophycean algae were stained with iodine and mounted in glycerine. The collected algal forms were observed under microscope, and identified them by referring to the standard literature on algae (Desikacharya, 1959; Fritch 1935, Prescott, 1951; Randhawa, 1959; Sarode and Kamat, 1984; Smith, 1920).

#### **RESULTS AND DISCUSSION**

The physicochemical parameters of the Shivalay pond have been recorded in table 1. Basically there are variations in the values as per change in seasons. As per season presence or absence of particular algae have been depicted in Table 2. Presence and absence of alga varies as per season and change in physicochemical indices. More number of algae (31) have been observed during monsoon season probably due to presence of ambient nutrient content of the pond comparatively winter and summer have less no of algae but with huge population. This is abundance of nutrient and favorable conditions for the growth of algae. Highest nitrate and phosphate content was observed during summer where as it was lowest during winter. It is due to source of water for the pond is only rain water and precipitation starts during summer. If the members of Cyanophycean algae are observed they are more in number during summer and monsoon. The pond becomes oligotrophic during summer. From the present observation it is difficult to point out any single factor responsible for the fluctuation in abundance of plankton. The solubility of oxygen in water increased by lowering the temperature Reid (1961) that is solubility of oxygen in water was known to be affected inversely by the rise in temperature.

The total number of phytoplankton was low in late summer and monsoon months. This may be attributed to the reason that during summer high water temperature, turbidity, fluctuating water level and low nutrient concentration along with consumption of phytoplankton by zooplankton and fishes etc. resulted in the reduction of phytoplankton population. Low planktonic counts during the monsoon period seems to be due to wavy action of currents, increased turbidity and influx of rain water which acts as limiting factors for plankton population, Das and Adhikari (2012)

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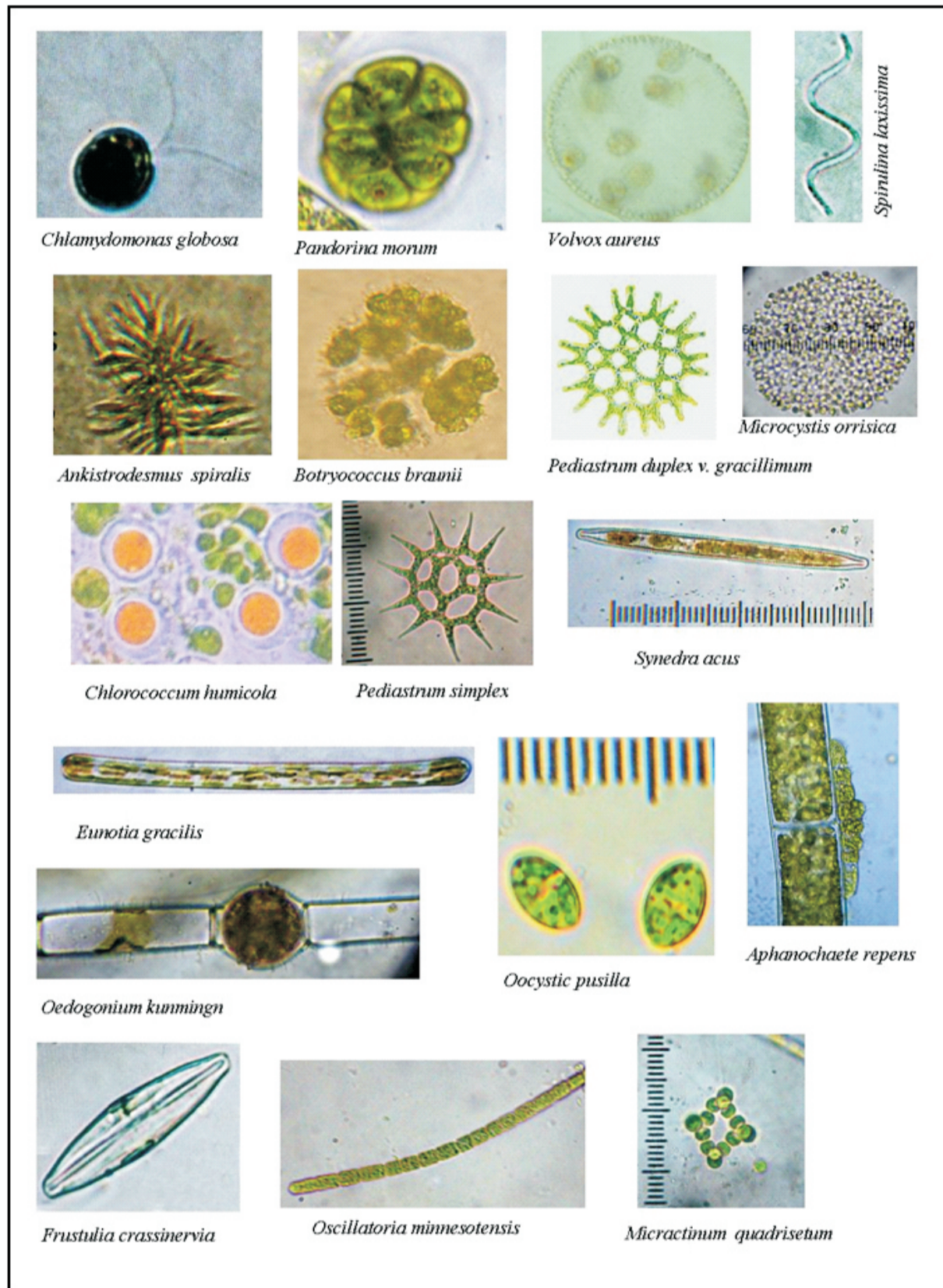
Table 1: Average physicochemical parameters of Shivalay Pond of 2014-15

Parameters /Month	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Nitrates	7.12	6.56	5.45	4.1	3.7	3.6	5.7	8.1	10.2	10.5	11.3	10.3
Phosphate	9.45	7.85	6.3	7.4	4.3	7.2	7.3	8.2	9.67	14.23	15.76	11.73
B.O. D.	1.4	0.93	0.86	0.89	1.1	1.2	1.2	1.7	1.6	2.1	1.9	1.8
pH	7.1	7.4	7.5	7.35	7.78	7.87	7.4	7.38	7.29	7.36	7.43	7.29
D.O	7.8	7.9	7.2	7.4	8.0	7.3	6.8	6.5	6.3	5.8	5.7	5.6
Temp	24.3	22.5	22.9	26.5	27.1	22.8	21.8	20.4	18.6	22.3	24.4	27.5

Table 2: Seasonal variations of algal diversity in Shivalay Pond during 2014-15

Sr. No.	Name of Algae	Monsoon	Winter	Summer
1	<i>Achnanthes marginulata</i>	-	+	+
2	<i>Ankistrodesmus spiralis</i>	+	+	+
3	<i>Aphanochaete repens</i>	+	-	+
4	<i>Botryococcus braunii</i>	+	+	+
5	<i>Carteria sp</i>	+	-	+
6	<i>Chlamdomonas globosa</i>	+	+	+
7	<i>Chlorella vulgaris</i>	+	+	-
8	<i>Chlorococcum humicola</i>	+	+	+
9	<i>Chrococcus cohaerens</i>	-	+	-
10	<i>Closterium parvulum</i>	+	-	+
11	<i>Cosmarium contractum</i>	+	-	-
12	<i>Cymbella chandolensi</i>	-	-	+
13	<i>Euglena gracilis</i>	+	-	-
14	<i>Euglena polymorpha</i>	+	+	-
15	<i>Eunotia gracilis</i>	-	+	-
16	<i>Frustulia crassinervia</i>	+	+	+
17	<i>Hydrodictyon reticulatum</i>	+	+	+
18	<i>Lyngbya sp</i>	+	-	-
19	<i>Micractinum quadrisetum</i>	+	+	-
20	<i>Microcystis orrisica</i>	+	+	+
21	<i>Microcystis sp</i>	+	+	+
22	<i>Mougetia recurva</i>	-	+	-
23	<i>Navicula cincta</i>	+	+	+
24	<i>Oedogonium kunmingn</i>	+	+	+
25	<i>Oocystic pusilla</i>	+	+	+
26	<i>Oscillatoria minnesotensis</i>	+	+	-
27	<i>Pandorina monum</i>	+	+	+
28	<i>Pediastrum boryanum</i>	+	-	+
29	<i>Pediastrum duplex v. gracillimum</i>	-	+	+
30	<i>Pediastrum ovatum</i>	+	+	+
31	<i>Pediastrum simplex</i>	+	+	+
32	<i>Pithophora varia</i>	+	-	-
33	<i>Schroederia indica</i>	-	+	-
34	<i>Spirulina laxissima</i>	+	+	+
35	<i>Staurastrum tetracerum</i>	+	-	-
36	<i>Stiegeoclonium nanum</i>	+	+	+
37	<i>Synchococcus sp.</i>	-	-	+
38	<i>Synedra acus</i>	-	+	+
39	<i>Uronema terrestris</i>	+	-	-
40	<i>Volvox aureus</i>	+	+	+

Photoplate 1 Microphotographs of Microalgae found at Shivalay pond during 2014-2015



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