



PHYTOPLANKTON DIVERSITY OF NANDGAON AND ARWAT LAKES OF CHANDRAPUR DISTRICT MAHARASHTRA, INDIA

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Abstract

The paper reports results of comparative analysis of phytoplankton diversity assessment between two lakes, Nandgaon and Arwat lake of Chandrapur district, [M.S.] India. Both the lakes have different entity from each other with respect to inflow source, depth, vegetation and surroundings. The present investigation carried out to study phytoplankton diversity from the period February 2016 to January 2017. Result shows both the lake has floristic similarities and differences. Total 74 species of phytoplanktons were recorded during study period. In Nandgaon lake 43 species of phytoplankton's and Arwat Lake 31 species of phytoplankton's were reported. Chlorophyceae was found to be dominant group.

Keywords: Research paper, Phytoplankton, Biodiversity, Nandgaon - Arwat Lake, Chandrapur District, Maharashtra, India.

Introduction:

Phytoplanktons are the groups of microscopic plants which are minute and able to spend their whole life floating on water is called planktons. The phytoplankton diversity and density is controlled by water quality and other biotic communities in a water body, (Reid and Wood, 1976). Phytoplankton functions as the primary producers in the aquatic biotopes. Hence, the quality and quantity of phytoplankton population bear much influence on the production potential of an aquatic ecosystem. Plankton is one of the most important foods for zooplankton, fishes and many other aquatic organisms. Thus the

phytoplankton's constitute bulk of primary producers and are the base of food chain in every water body, (Belkhode, 2016). Phytoplanktons are the most sensitive floating communities which is being the first target of water pollution, thus any undesirable changes in aquatic ecosystem affects diversity as well as biomass of plankton community, (Summarwar, 2012).

Indian researchers reported the several studies on the phytoplankton distribution with availability of light (Singh & Sharma, 2012), Physical, Chemical and biological qualities (Zafar, 1967, Munawar, 1974) in freshwater lakes. Generally, in Indian Lakes, phytoplankton density peaks found in post monsoon and summer (Gopal & Zutshi, 1998). Several workers studied phytoplankton diversity in the state and found Chlorophyceae is dominant class. In Maharashtra several researchers reported 22 to 65 species of phytoplankton from different Lake. Almost all the workers found maximum diversity of phytoplankton during winter, moderate in summer and minimum in monsoon.

Study Area:

Chandrapur district is located between Latitude 19°27'1N and Longitude 78°10'9E occupies an area of 11,443 km² which constitutes 3.72 percent of the total area of the state. Arwat lake is a perennial water body which has been formed due to the inflow of Irai river in mines pit, which spreads over 9.95 hectares area. The main source of water is Irai river and surface drainage. Arwat lake is 5 km away from

Chandrapur and is situated South–West part of the Chandrapur district, Maharashtra.

Nandgaon lake is a perennial water body since British time. The main source of water is rain and surface drainage. This is spread over 29.4 hectares area. Nandgaon Lake is 19 km away from Chandrapur and is situated South–West part of the Chandrapur district, Maharashtra, India. Villagers are using water from both the lakes for domestic, irrigation as well as for fishing purpose.

Materials and Methods:

The water samples for phytoplankton assessment were collected from both the lakes once in a month between 8 a.m. to 10 a.m. at regular interval from February 2016 to January 2017. The water samples were collected by filtering 50 litres of water is filtered through phytoplankton net of 20 μ mesh size made up of bolting silk. The filtrate was preserved in 4 % formaldehyde solution. Samples were examined under Coslab trinocular microscope with inbuilt CCD camera. And identified using standard literature, Trivedi and Goel, (1960), Prescott (1982) & John D.M. et al. (2005) and then confirmed from electronic databases Algaebase & Protist information server. As well as help were taken from expert of this area.

Result & Discussion:

During the present investigation, total 74 species of phytoplankton were identified from both the lakes. Nandgaon lake has 43 species while Arwat lake has 31 species as shown in table no.1. Phytoplankton classified into four groups namely Chlorophyceae (47species) > Bacillariophyceae (12 species) > Cyanophyceae (10 species) > Euglenophyceae (5 species). Chlorophyceae was found dominant in both the lakes. Similar results were reported by various workers Khanna & Singh (2000), Sakhare & Joshi (2002), Telkhade et al. (2009), Nasare et al. (2009), Shaikh et al. (2012), Chauhan & Lanjewar (2016), Mahajan & Harney (2016), Belkhode & Sitre (2016). Phytoplankton diversity of the two lakes Nandgaon & Arwat Lake are listed below.

Sr.No.	Genera/Species	Nandgaon	Arwat
A	Chlorophyceae		
I	<i>Ankiodesmus</i>	–	+

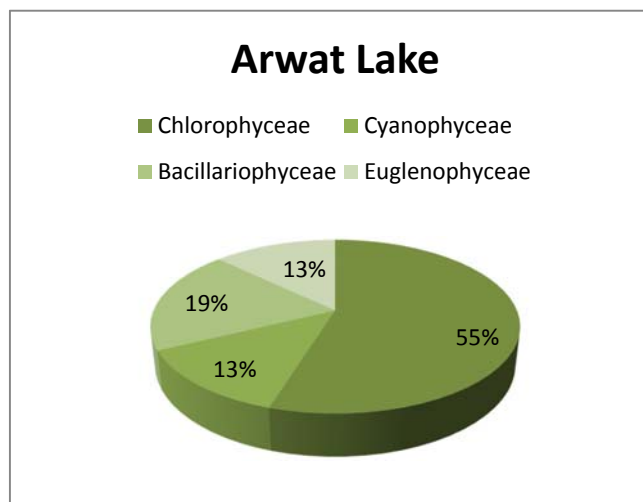
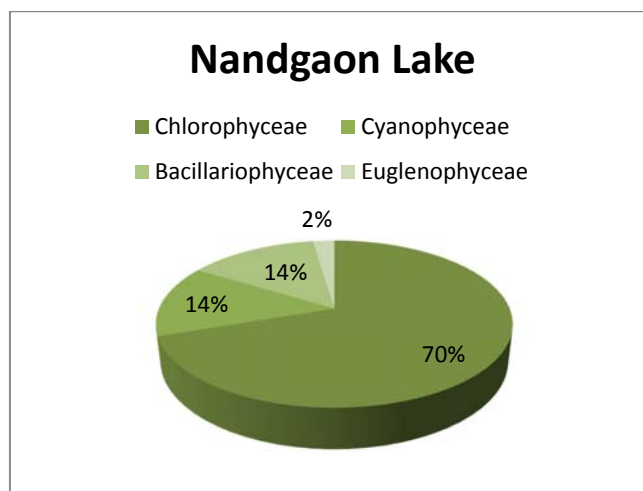
	<i>fusiformis</i>		
2	<i>Chlamydomonas sp.</i>	+	+
3	<i>Chlorella vulgaris</i>	+	+
4	<i>Cladophora glomarata</i>	+	–
5	<i>Coelastrium sphaericum</i>	+	+
6	<i>Cosmarium angulosum</i>	+	–
7	<i>Cosmarium blyttii</i>	+	–
8	<i>Cosmarium divergent</i>	+	–
9	<i>Cosmarium granatum</i>	+	–
10	<i>Cosmarium hammeri</i>	–	+
11	<i>Cosmarium laeve</i>	+	+
12	<i>Cosmarium meneghinii</i>	+	–
13	<i>Cosmarium moniliforme</i>	+	–
14	<i>Cosmarium portianum</i>	+	–
15	<i>Cosmarium quadrifarium</i>	+	–
16	<i>Cosmarium regnellii</i>	+	–
17	<i>Cosmarium subcumis</i>	+	–
18	<i>Cosmarium subspeciosum</i>	–	+
19	<i>Cosmarium subtumidum</i>	+	–
20	<i>Cosmarium vexatum</i>	+	–
21	<i>Crucigeninia tetrapedia</i>	+	–
22	<i>Hydrodictyon sp.</i>	+	+
23	<i>Merismopedia punctuata</i>	–	+
24	<i>Monarphidium contortum</i>	+	+
25	<i>Oedogonium sp.</i>	+	–
26	<i>Oscillatoria princeps</i>	–	+
27	<i>Oscillatoria sp.</i>	–	+
28	<i>Pediastrum boryanum</i>	+	–
29	<i>Scendesmus arcuratus</i>	+	–

30	<i>Scendesmus bijuga</i>	-	+
31	<i>Scendesmus quadricauda</i>	-	+
32	<i>Sphaerocystis schroeteri</i>	+	+
33	<i>Spirogyra sp.</i>	+	+
34	<i>Staurastrum avicula</i>	+	-
35	<i>Staurastrum hirsutum</i>	+	-
36	<i>Staurastrum margaritaceum</i>	+	-
37	<i>Staurastrum punctulatum</i>	+	-
38	<i>Willea rectangularis</i>	-	+
39	<i>Zygnema sp.</i>	+	-
		30	17
B	Cyanophyceae		
40	<i>Anabaena sp.</i>	+	+
41	<i>Anabaenopsis sp.</i>	+	-
42	<i>Calothrix sp.</i>	+	-
43	<i>Coelospermious sp.</i>	+	-
44	<i>Microcystis aeruginosa</i>	+	-
45	<i>Merismopedia punctata</i>	+	+
46	<i>Spirulina major</i>	-	+
47	<i>Spirulina subsalsa</i>	-	+
		6	4
C	Bacillariophyceae		
48	<i>Bacillaria paradoxa</i>	+	-
49	<i>Cymbella affinis</i>	+	-
50	<i>Gyrosigma kutzingi</i>	-	+
51	<i>Gyrosigma sp.</i>	-	+
52	<i>Naviculla sp.</i>	+	+
53	<i>Pinnularia sp.</i>	-	+
54	<i>Rhopaldia gibba</i>	+	+
55	<i>Synedra acus</i>	+	-
56	<i>Synedra sp.</i>	+	+
		6	6
D	Euglenophyceae		
57	<i>Euglena caudata</i>	-	+
58	<i>Euglena sp.</i>	+	-
59	<i>Euglena sp.</i>	-	+
60	<i>Phacus ankylonoton</i>	-	+
61	<i>Trachelomonas sp.</i>	-	+

		1	4
	Total Species	43	31

Table No. 1: Phytoplankton diversity of the two lakes Nandgaon & Arwat Lake

Sr.No.	Family	Nandgaon	Arwat	Total
1	Chlorophyceae	30	17	47
2	Cyanophyceae	6	4	10
3	Bacillariophyceae	6	6	12
4	Euglenophyceae	1	4	5
	Total Species	43	31	74



Conclusion:

Result shows that both the lake has floristic similarities and differences. Total 74 species of phytoplankton were recorded during study period. In Nandgaon lake 43 species and in Arwat Lake 31 species reported. Chlorophyceae was to be found dominant group in both the lakes, but Nandgaon lake has rich floristic diversity as compare to Arwat lake, shows Nandgaon lakes has wide range of physicochemical & Trace elements which are essential for metabolic process in phytoplankton.

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