



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2017; 3(1): 174-176
www.allresearchjournal.com
Received: 23-11-2016
Accepted: 24-12-2016

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Limnological profile of Sonvad project dam of Dhule district of Maharashtra, India

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Abstract

India is rich in its aquatic resources, both fresh water and marine. In Maharashtra very few workers have paid attention on Limnological aspects of algae from lotic and lentic water habitats. Limnological profile of Sonvad project dam was carried out by studying algal and physico-chemical analysis of water. Samples were collected at monthly interval during Feb.2010 to Jan.2011 for one year and analyzed nineteen Physico-chemical parameters related to water from three stations of Sonvad project dam of Dhule. The quantitative and qualitative study of four groups of algae viz. Cyanophyceae, Chlorophyceae, Bacillariophyceae and Euglenineae was made. An attempt was made to find out the relationship of algal communities and Physico-chemical parameters of dam.

Keywords: Limnology, Dam, physico-chemical parameters, Dhule

1. Introduction

In Maharashtra Gunale and Balakrishnana (1981) [4] had used algae as biomonitors of eutrophication in study of Pavana, Mula and Mutha rivers flowing through Pune city. Jagdale *et.al.* (1987) studied pollution of Godavari River at Nanded. Bodas (1991) [2] made hydrobiological and taxonomical studies of some lotic and lentic waters in all around Nasik. Though considerable contributions have been made on limnological aspects of river but very few workers had paid attention on limnological study of dams in Maharashtra. Therefore the present work was undertaken for Limnological Profile of Sonvad Project Dam of Dhule District of Maharashtra

2. Materials and Methods

The Sonvad Project Dam is situated near village of Dongargaon of Dhule district. Two stations of Sonvad Project Dam and one station of Bhat river were selected for the purpose of collecting the algal and water samples at monthly interval and water samples at monthly interval for one year.

The quantitative and qualitative study of 4 groups of algae viz. Bacillariophyceae, Cyanophyceae, Chlorophyceae and Euglenineae was made. Identification of algal taxa was made with the help of standard monographs (Desikachary, 1959; Randhawa, 1959; Prescott and Vinyard, 1965; Philopose, 1967; Sarode and Kamat, 1984) [3, 13, 12, 11, 14]. The population density of 4 groups of algae was estimated according to the method given by Whitton (1969) [16]. Water samples were analyzed by standard methods given by APHA (1975) [1] for determining physico-chemical analysis.

3. Result and Discussions

The minimum and maximum values of physico-chemical parameters of 3 stations of dam are shown in Table-1. The range and average population of 4 groups of algae for 3 stations of dam are shown in Table-2. Algal periodicity of 4 groups of algae showed continuous picture throughout the investigation. The population of 4 groups of algae from 3 stations of study area is shown in Plate-1.

Water temperature played an important role in controlling the growth and abundance of algal flora (Nazneen, 1980) [10]. This view was agreed in present study.

Munawar (1970) [9] reported that higher concentration of carbonate and total alkalinity favoured the growth of blue-green algae as agreed with views of Hosmani and Bharati (1980) [7]. In present study similar trend was observed. The population of euglenoids was less and it was not varied in significance at all 3 stations. This might be due to lower concentration of organic matter in dam as agreed with Hosmani and Bharati (1975) [6]. Free CO₂ was recorded at

all station 3 as it was agreed with earlier views (Gonzalves and Joshi, 1946; Zafar, 1964) [5, 17]. In comparison of 4 groups of algae the population of green and blue-green was greater than other groups of algae in present study. The population of Cyanophyceae is maximum up to 39% and it was dominant in abundance as compared to those of other groups.

Table 1: Physico-Chemical Parameters At 3 Stations Of Sonvad Project Dam During February-2010 To January 2011.

Sr. No.	Physico-Chemical Parameters	Stations		
		SDS - I	SDS -II	SDS -III
1	Water temperature	19.5 -29.0°C	22.5 -30.0°C	24.5 – 29.0°C
2	PH	7.95 -8.91	7.72 – 8.97	7.69 – 8.84
3	Dissolved Oxygen	3.22 – 6.85	3.62 – 7.25	4.03 – 6.85
4	Free CO ₂	15.4 – 19.9	17.6 – 46.2	8.8 – 52.8
5	Total Alkalinity	130 – 315	135 – 305	200 – 555
6	Carbonate	40 – 90	30 -110	Absent
7	Bicarbonate	60 – 275	45 – 195	200 – 555
8	Sulphate	1.6 – 2.4	1.6 – 4.2	1.6 – 2.4
9	Phosphate	0.01 – 0.14	0.01 – 0.14	0.01 – 0.01
10	Nitrate	0.05 – 0.11	0.06 – 0.12	0.07 – 0.12
11	Hardness	78 – 114	82 – 112	86 – 130
12	Chloride	42.6 – 115.02	57.12 – 102.54	61.06 – 97.98
13	Magnesium	0.47 – 24.88	1.94 – 16.58	5.84 – 20.97
14	Magnesium Hardness	1.96 – 101.98	7.96 – 67.99	23.96 – 85.98
15	Calcium	8.81 – 39.27	11.22 – 35.27	11.22 – 36.07
16	Calcium Hardness	22.01 – 98.04	28.01 – 98.04	28.01 – 90.04
17	Total Solids	100 – 1010	200 – 1200	200 – 1700
18	Total Dissolved Solids	100 – 990	50 – 600	100 – 940
19	Total suspended solids	100 – 900	100 – 800	100 - 1000

All parameters are expressed in mg/l except pH and water temperature.
 SDS1 - Sonvad Dam Station I, SDS2 - Sonvad Dam Station II,
 SDS3 - Sonvad Dam Station III

Table 2: The Range And Average Population Of 4 Groups Of Algae From 3 Stations Of Sonvad Project Dam During February-2010 To January 2011.

Algal Groups		Stations		
		SDS - I	SDS -II	SDS - III
Cyanophyceae	Range	20-125	22-77.5	17.5-95
	Average	56.25	44.79	44.16
	Total Population	675	537.5	530
Chlorophyceae	Range	32.5-87.5	27.5-60	25-50
	Average	52.7	39.37	36.87
	Total Population	632.5	472.5	442.5
Bacillariophyceae	Range	2.5-10	5-42.5	7.5-55
	Average	23.75	22.08	29.16
	Total Population	285	265	350
Euglenineae	Range	5-17.5	7.5-17.5	7.5-22.5
	Average	11.87	12.5	14.16
	Total Population	142.5	150	170

All figures are in cell no/mlx10⁴.

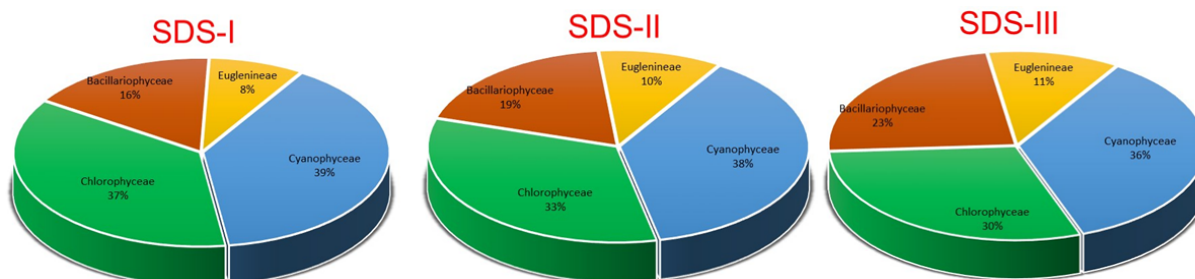


Plate 1: Population of Four groups of algae from three stations of Sonvad Project Dam. (February 2010 to January 2011)

4. Acknowledgement

We are thankful to Principal Dr. P. N. Patil, Principal Mr. C. V. Patil and Principal Dr. R. R. Ahire for providing facilities for the present investigation.

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