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RESEARCH ARTICLE

UTILIZATION OF ALGAE AS POLLUTION INDICATORS OF WATER QUALITY AT NAGAPUR AND CHANDAPUR DAMS NEAR PARLI. V. TOWN DIST. BEED MAHARASHTRA, INDIA

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ABSTRACT

The algae were used to assess the water quality of Nagapur and Chandapur dams. The pollution indicator genera and species of algae from each of three (3) stations of both dams were recorded, this was done with the help of palmer's index of pollution indicator species of algae. For knowing the quality of water samples the total score of station were recorded greater than 15 indicator species were found which helped to know the high degree of organic pollution of dam. The genera observed at different stations of both dams, were 18 and 21 out of the 34 pollution indexed species of palmer. The 18 genera were recorded at Nagapur dam and 21 genera at Chandapur dam.

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INTRODUCTION

In Marathwada region there are many dams on different rivers, but very less attention has been paid to presence of algae in water and water pollution. In the present investigation the pollution status of Nagapur and Chandapur dams near Parli Vaijnath in Beed district of Marathwada region in Maharashtra State were checked with the help of palmer's pollution indicator algae (Planktons) presence or absence in the dam water. Nagapur dam is located near village Nagapur which is away 13 Kms from Parli in west direction, this dam was constructed in the year 1963. The dam was constructed on the Wan river. The water from this dam is supplied to parli city and near villages. The Chandapur dam is situated near village Chandapur. It is 5 kms away from Parli V. in east direction. This dam was constructed in the year 1969. The dam was constructed on the Chandapur or Dhobi ghat river. The water from this dam is supplied to 12 near villages near dam. Both the dams are of earthen type. The Chandapur dam and Nagapur dams are located near parli which is in the region of 18^o51' 0" North latitude and 76^o27' 0" east longitudes.

MATERIAL AND METHODS

The water samples were collected for physicochemical analysis from 3 stations of Nagapur and Chandapur dams; for one year (January 2008 to December 2008). The water samples were collected in the acid washed five-liter plastic containers, at early morning 8.00 to 11.00 am in

the first week of every month. Separate samples were collected for DO in 250 ml. BOD bottles. The physicochemical variations of dam water like DO, Temperature, pH and conductivity were recorded. DO was fixed at the stations itself and further analyzed in the laboratory, water and air temperatures were recorded with thermometer; pH was examined with the help of universal indicator and checked by using digital pH meter in laboratory. The conductivity was recorded with the help of digital conductivity meter. The standard methods for water analysis were followed according to APHA (1998).

The algal samples were collected every month from two dam's 6 different sampling stations. For one year from Jan. 2008 to Dec. 2008 Algal samples were collected with the help of plankton net No.25. The quantitative analysis was done with the help of Sedgwick's rafter cell. The subsurface water was sieved through plankton net and was transferred to 200-ml plastic containers for preservation in 4% formalin solution. After further taxonomic investigations' the pollution tolerant genera and species were recorded from six (6), stations of two dams. The assessment of each station of dam was done with the help of palmer's pollution tolerant indexed species, palmer (1969).

RESULTS AND DISCUSSION

According to the guidelines provided by palmer (1969) the algae are the most pollution tolerant individuals. Thus with the help of this pollution indexed species assessment of the quality of any water body is possible. The palmer's indexed algae were recorded from all stations of both

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dams. (Table 1 & 2). 18 algal genera were recorded at different sites of Nagapur dam and 21 genera were

with its dominance, this finding correlates with Rai and Kumar (1976).

Table 1. Pollution Indicator genera / Tolerant general from three stations of Nagapur dam and Chandapur dam Near Parli-V. in order of decreasing emphasis; palmer (1969).

Genus	Group	Total Conc.	NG			CH		
			1	2	3	1	2	3
Euglena	E	120	+	-	-	+	+	-
Oscillatoria	B	150	+	+	-	+	+	-
Scenedesmus	G	112	+	+	+	+	-	+
Chlorella	G	109	+	+	+	+	+	+
Nitzschia	D	104	+	-	+	+	-	-
Navicula	D	95	-	-	+	+	-	+
Stigeclonium	G	-	-	-	-	-	-	-
Synedra	D	80	+	+	+	+	+	+
Phacus	E	-	-	-	-	+	+	+
Phormidium	B	75	-	-	+	+	-	+
Melosira	D	-	-	-	-	-	-	-
Gomphonema	D	62	+	-	+	-	-	-
Cyclotella	D	-	-	-	-	-	-	-
Microcystis	B	50	-	-	+	+	-	-
Spirogyra	G	42	-	+	+	+	+	-
Anabaena	A	40	+	+	+	+	+	+
Pediastrum	G	35	+	+	+	+	+	+
Trachelomonas	E	-	-	-	-	+	-	-
Fragilaria	D	-	-	-	-	-	-	-
Ulothrix	G	-	-	+	-	+	-	-
Surivella	D	30	+	-	-	+	-	-
Lyngbya	B	-	-	-	-	-	-	-
Spirulina	B	29	+	+	+	+	+	+
Cymbella	D	25	+	-	+	+	-	-
Coelastrum	G	24	+	+	+	+	+	+
Cladophora	G	-	-	-	-	-	-	-
Hantzschia	D	-	-	-	-	-	-	-
Achinathes	D	22	-	+	+	+	-	-
Pinnularia	D	-	-	-	-	-	-	-
Cocconeis	D	-	-	-	-	-	-	-
Cosmarium	G	18	+	+	+	+	+	+
Gonium	G	-	-	-	-	-	-	-
Stauroneis	D	-	-	-	-	-	-	-
Crucigenia	G	-	-	-	-	-	-	-

recorded from Nagapur dam 6 species of *Chlorophyceae* / green algae, 5 species of *Cyanophyceae* / blue green algae, 6 species of *Bacillariophyceae*/diatoms and 1 species of *Euglenophyceae* i.e. euglena were recorded. Out of 21 genera recorded from Chandapur 7 species of *Chlorophyceae*/ green algae, 5 species of *Cyanophyceae* / blue green algae 6 species of *Bacillariophyceae*/ diatoms and 3 species of *Euglenophyceae* i.e. euglena were recorded (Table 2).

The total score of each station was greater than 15 indicating probable high degree of organic pollution. The degree of organic pollution was observed to increase at Nagapur from station NG₁ to NG₃ and at Chandapur from station CH₃ to CH₁. At Nagapur dam the station NG₃ and at Chandapur dam station CH₁ was found to be highly organically polluted as compared to station NG₁ and NG₂ at Nagapur and CH₂ and CH₃ at Chandapur dams due to more anthropogenic activities (Table 1). Palmer (1969) has showed, the algal genera *Euglena*, *Oscillatoria*, *scenedesmus*, *Navicula*, *Nitzschia* are found in organically polluted waters reported by Goel et.al (1986); More and Nandan (2000); Nandan and Aher (2005). Similar genera were recorded in the present investigation. The present species list mentioned above except *oscillatoria* correlates findings of Bhowmik et. al (1993). The algae like *microcystis* was used as the best single indicator of pollution and it was associated with highest degree of civic pollution Singh (1953). In the present investigation blooms of *microcystis* were recorded. In the present study the dominance of *oscillatoria* was found at both dams

The degree of organic pollution was observed to be increased at Chandapur dam and was confirmed by using palmer's index. The abundance of *Navicula*, *oscillatoria*

Table2. Pollution index of algal genera (Palmer 1969) at 3 different station of Nagapur and Chandapur dams.

S. NO	Group/Genera	Palmer's pollution index						
		Nagapur Dam			Chandapur Dam			
		NG 1	NG 2	NG 3	CH 1	CH 2	CH 3	
I]	Chlorophyceae							
	Scenedesmus	4	2	5	6	-	2	
	Chlorella	3	2	4	3	3	2	
	Spirogyra	3	2	2	2	2	2	
	Pediastrum	3	2	2	3	2	2	
	Ulothrix	2	1	-	2	-	-	
	Clostridium	1	1	1	1	-	1	
	Cosmarium	1	1	1	1	-	-	
	II]	Cyanophyceae						
		Oscillatoria	4	4	-	5	3	4
Phormidium		2	2	2	2	1	2	
Microcystis		1	-	-	1	-	-	
Anabaena		1	-	-	1	1	1	
Spirulina		1	1	-	1	1	1	
III]	Diatoms							
	Nitzschia	3	1	2	3	3	3	
	Navicula	1	1	1	1	1	-	
	Gomphonema	1	1	-	-	1	-	
	Surivella	1	1	1	-	1	-	
	Cymbella	2	-	2	2	-	2	
	Achinathes	1	1	2	1	1	1	
	IV	Euglenophyceae						
Euglena		1	1	-	1	2	1	
Pachus		-	-	-	2	2	2	
Trachelomonas		-	-	-	1	1	1	
Total score.		36	24	25	39	25	27	

and euglena was recorded maximum at stations NG at Nagapur and CH₁ at Chandapur respectively.

Conclusion

From the present study it can be concluded that both the dams show the presence of pollution indicator species and are organically are in polluted condition and need rehabilitations.

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