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Cyanobacterial Diversity in Jawalban Dam: An Ecological Study

Chandrasekhar Gaikwad[1], Dr. Navnath Kashid[2]

[1]Research Student, Department of Botany, Baburaoji Adaskar Mahavidhyalaya, Kaij, Beed M. S., India

[2]Research Guide, Department of Botany, Baburaoji Adaskar Mahavidhyalaya, Kaij, Beed M. S., India

Abstract: ***This study investigates the diversity of cyanobacteria in Jawalban Dam, located in Kaij Tehsil, Beed District, Maharashtra. Over a two - year period, 40 taxa across 19 genera were identified, including abundant genera such as Phormidium, Oscillatoria, Nostoc, and others. The findings highlight the presence of pollution - tolerant cyanobacteria, indicating the reservoir's polluted status. The study emphasizes the ecological importance of understanding cyanobacterial diversity in freshwater habitats***

Keywords: Cyanobacteria, freshwater diversity, Jawalban Dam, ecological study

1. Introduction

Algae are a large and diverse group within the plant kingdom they are heterogeneous assemblage of autotrophs. Cyanobacteria are a large and diverse group of plant kingdom, resembling gram negative bacteria in cellular organization and green plants in oxygenic photosynthesis. They found in almost every terrestrial and aquatic habitat. Streams. Rivers, lakes and dams are fresh water habitats where Cyanobacteria grow luxuriantly and found in diverse form. Marathwada, a geographical region of Maharashtra, is rich in fresh water bodies. Except few reports (Ashtekar and Kamur, 1979, Kamble, 2008; Jadhav and Pawar, 2009; Talekar and Jadhav, 2009 and 2013; Yadav, 2010), rare attention has been paid towards Cyanobacterial diversity of fresh water habitats of Marathwada region. The purpose of this study is to analyze the diversity and ecological significance of cyanobacteria in Jawalban Dam, with a focus on identifying pollution - tolerant species

2. Materials and Methods

In order to understand the diversity of Cyanobacteria in Jawalban Dam and four sites of the reservoir were selected. The work was carried out for the period of two consecutive years, from October 2022 to August 2024, Cyanobacterial samples were collected monthly. The Phytoplanktons, floating and epiphytic forms of Cyanobacteria were collected in acid washed collection bottles. Collected samples were preserved in 4% Formalin for further taxonomic investigation. Fresh as well as preserved Cyanobacterial forms were observed thoroughly under research microscope and identified with the help of standard Literature on Cyanobacteria (Smith, 1950, Prescott 1951; Desikachary, 1959).

3. Results and Discussion

Cyanophyceae (Blue green algae):
The Cyanophycean algal taxa recorded were quite diverse. This class consists of taxa of Chlorococcales, Pleurocapsales and Nostocales. Various Cyanophycean genera recorded were Microcystis, Chroococcus, Aphanocapsa, Aphanothece, Synechocystis, Merismopedia, Chlorogloea, Myxosarcina, Arthrospira, Spirulina, Oscillatoria, Phormidium, Lyngbya, Microcoleus, Nostoc, Plectonema and Scytonema.

A total of 40 taxa fewer than 19 genera of Cyanobacteria were identified and recorded during the period of study (Table 1). These Cyanobacterial taxa belonged to order Chroococcales, Pleurocapsales and Nostocales (Table, 2) Unicellular, Colonial and filamentous Cyanobacterial forms were recorded throughout the period of investigation. On the basis of number of taxa, the abundant genera of Cyanobacteria were Phormidium, Oscillatoria, Nostoc, Chroococcus, Merismopedia. Aphanothece, Microcystis, Microcoleus, Lyngbya, Plectonema and Scytonema. Taxa of Gloencapsu Gloeothece, Aphanothece, Synechocystis, Chlorogloca, Arthrospira and Spirulina were also frequent. Similar kind of observations were recorded by Jadhav and Pawar (2009) and Talekar and Jadhav (2013). Mahadik and Jadhav (2014) also recorded abundance of Cyanobacteris in Ujani reservoir of Maharashtra. Kamble (2008) recorded dominance of Aphanothece, Phormidium, Plectonema and Spirulina in different water bodies of Marathwada region of Maharashtra.

During present study *Microcystis aeruginosa* was found commonly growing in Jawalban Dam, in association of other cyanobacterial and algal forms to develop algal bloom. It is reported as indicator of water pollution (Singh 1953). Pollution tolerant Cyanobacterial genera (Palmer 1969, 1980) found during present study were *Microcystis*, *Chroococcus*, *Mysasarcina*, *Arthrospira*, *Spirulina*, *Phormidium* and *Oscillatoris*. Nandan and Mahajan (2003) studied diversity of Cyanobacteria in polluted lakes of Jalgaon district of North Maharashtra.

Talekar and Jadhav (2009) also recorded pollution tolerant Cyanobacteria from Manjara river of Maharashtra. Hence it is concluded that, Cyanobacterial flora of Jawalban Dam is rich and it is found in diverse form. Presence of pollution tolerant Cyanobacteria indicates polluted status of water.

This study provides crucial insights into the diversity of cyanobacteria in freshwater ecosystems, contributing to ecological monitoring and pollution management strategies.

4. Conclusion

This study demonstrates the rich diversity of cyanobacteria in Jawalban Dam, highlighting the presence of pollution - tolerant species. These findings emphasize the ecological and environmental significance of monitoring freshwater habitats.

Table 1: Cyanobacterial algal diversity of Jawalban Dam

Sr. No.	Name
1	*Chloroglocamicrocestoides,*
2	*Synechocystisaquatilis,*
3	*Oscillatoriaacuta,*
4	*Phormidiummucosum,*
5	*Merismopediatenuissima,*
6	*Nostocmuscorum,*
7	*Oscillatoriaacuminata,*
8	*Merismopediaglauca,*
9	*Oscillatoriaanimalis,*
10	*Aphanocapsapulchra,*
11	*Chrococcus minor,*
12	*Microcystisaeruginosa,*
13	*Microcystisrobusta,*
14	*Gloeothecepalea,*
15	*Merismopediapunctata,*
16	*Arthrospiraplantesis*
17	*Oscillatoriaprinceps,*
18	*Aphanothecenidulans,*
19	*Spirulina major,*
20	*Spirulinalaxissima,*
21	*Phormidium corium,*
22	*Aphanothecesaxicola,*
23	*Phormidiumabronema,*
24	*Gloeocapsarupestris,*
25	*Phormidiumjenkelianum,*
26	*Lyngbyabirgei,*
27	*Phormidiumusterii,*
28	*Scytonemaschmidtii,*
29	*Nostocpunctiforme*
30	*Scytonemabahneri,*
31	*Nostoclinckia,*
32	*Microcoleusacutissimus,*
33	*Phormidiummolle,*
34	*Chrococcusminutus,*
35	*Lyngbyahieronymussi,*
36	*Plectonemanostocorum,*
37	*Microcoleussociatus,*
38	*Plectonemagracillimum,*
39	*Myxosarcinaburmensis,*
40	*Oscillatoriaquadripunctulata,*
41	*Phormidiumambigum,*
42	*Chrococcusturgidus,*

Table 2: Taxonomic categorization of Cyanobacteria encountered from Jawalban Dam reservoir.

S. No.	Order	Family	Genera	Taxa
1	Chroococcales	Chroococcaceae	08	14
		Entophysalidaceae	01	01
2	Pleurocapsales	Pleurocapsaceae	01	01
3	Nostocales	Oscillatoriaceae	06	19
		Nostocaceae	01	03
		Scytonemataceae	02	04
		Total	19	42

References

[1] Ashtekar P. V. and Kamat N. D. (1979). Filamentous Myxophyceae of Aurangabad district, Maharashtra. J. Bombay Natural History Soc.76 (1): 215 - 218.
[2] Desikachary, T. V. (1959). Cyanophyta. Monograph. Indian Council of Agricultural Research, New Delhi, pp.1 - 680.
[3] JadhavMilind and Pawar S. M. (2009). Cyanophycean biodiversity of Sharnapurlake of Aurangabad, Maharashtra. The Ecotech.1 (2): 150 - 151.
[4] Kamble S. M. (2008). Studies on the effect of bioactive compounds of algae on some fungi. Ph. D. Thesis. Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
[5] Mahadik B. B. and JadhavMilind J. (2014). A preliminary study study on algal biodiversity Ujani reservoir (M. S.) India. Biosci. Disc.5 (1): 123 - 125.
[6] Nandan S. N. and Mahajan, S. R. (2003). Cyanobacterial diversity in polluted lakes of Jalgaon district of North Maharashtra. Aquatic Environment and Toxicology. Ed. Arvindkumar, Daya publishing House, New Delhi, 28 - 62.
[7] Palmer C. M. (1969). A composite rating of algae tolerating organic pollution. J. Phycol.5: 78 - 82.
[8] Palmer C. M. (1980). Algae and water pollution. Castle House Publications Ltd., England, PP 123. Prescott C. W. (1951). Algae of the western great lakes area. Cranbrook Institute of Science, Michingan, pp 946.
[9] Singh R. N. (1953). Limnological relations of Indian inland waters with special reference to water blooms. Vern. Int Var. Rher. Anew Limnol: 12: 831 - 836.
[10] Smith G. M. (1950). The fresh water algae of the United States. Mchraw - Hill Book Company, New York, PP 719.
[11] Talekar, S. M. and Jadhav, Milind (2009). Cyanobacterial diversity in polluted water. Nat. J. Life Sci.6 (3): 361 - 362.
[12] Talekar Santosh and Milind Jadhav (2013). Cyanobacterial diversity of Dokewadi reservoir in Beed district of Maharashtra. Flora Fauna.19 (1): 345 - 346.
[13] Yadav S. G. (2010). Studies on taxonomy of algae of Beed district. Ph. D. Thesis, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.