

## Cyanophycean algae from Kagdi Dam of district Banswara Rajasthan, India

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### Abstract

The oldest photoautotrophs, Cyanophyceae, also known as Cyanobacteria, are found almost everywhere in the world's biomes on Earth. They play several crucial ecological roles in the habitats they colonize in addition to being essential in producing the majority of the world's net oxygen. The majority cyanophycean species exhibit extensive physiological and morphological adaptation to their respective biotopes. The Present study is a part of survey conducted on fresh water algal flora of Kagdi Dam Banswara. The collections of algal samples were carried out during the month of April-August 2020-21 from different areas located in upstream and downstream of the Kagdi Dam. Samples were examined under microscope and identified in the laboratory of P.G. Department of Botany, S.G.G. Government College Banswara. The study revealed the presence of 5 different species of algae belonging to Cyanophyceae, the species are *Synechocystis sauvageau*, *Lyngbya birgei*, *Oscillatoria lutea*, *Nostoc ellipsosporum* and *Anabaena sp.*

**Key words :** Cyanophycean algae, Kagdi dam Banswara.

Main object of present work is to explore algal diversity of Banswara district of South Rajasthan. The work on the diversity of algae in South Rajasthan is very less. The present work deals with the systematic and ecological study of Cyanophyceae which forms major part of planktonic algae. The work on Cyanophyceae were carried out from different region of India by many workers like Brüehl and Biswas, Gonzalves and Joshi, Biswas, Mitra, Gupta, Bharati, Philipose,

Hortobadyi, Patel, Patel and Isabella, Kant and Anand, Pandey *et al.*

*Study area :*

Kagdi Dam is an important part of the Mahi Bajaj Sagar Project located around 3 Kms. from the main city in eastern limits of district Banswara on Ratlam Road. This is one of the most beautiful places to visit in Rajasthan. Kagdi Dam is situated in the

extreme eastern part of Banswara city (23° 11" to 26° 56" North latitude and 73° 58" to 74° 47" East longitude). The temperature ranges from 4° to 45°C with average annual rainfall 1000 mm. The district is divided into five tehsils namely 1. Banswara 2. Bagidora 3. Garhi 4. Ghatol 5. Kushalgarh. It is an earthen dam and is constructed on the Mahi River backwater in Banswara Tehsil. Mahi River is a natural boundary between Rajasthan and Madhya Pradesh. The Kagdi dam is surrounded by rolling hills of Aravali ranges. *Mahi Dam* and *Gammon Bridge* is the main attraction and tourist spot of the district.

The sample collection site was selected from six different points, covering whole study area Kagdi Dam. The samples were collected from these points in different seasons and at monthly intervals. The samples were brought to the laboratory for further investigation<sup>3</sup> and fresh materials were examined as much as possible. Few samples were centrifuged or cultured for their identification enumeration. The identification done by standard methods and keys. For the preparation of the manuscript relevant literature<sup>1-20</sup> has been consulted.

*Taxonomic enumerations :*

*Synechocystis Sauvageau, 1892 :*

Desikachary, 1959, P. 144, Pl. 25, Fig. 9 Unicellular thallus, cells spherical, pale blue green, single or in twos, 4.8-6.5µ in diameter. Habitat - Planktonic in all area and forms a part of algal bloom, July and August 2021.

*Lyngbya birgei* Smith :

Gomont, 1892, P. 91-264, Pl. 7; Smith,

1950, P. 577, Fig. 492.

Straight filaments that are infrequently coiled and float freely; sheath 20-25 µm in width; colorless; trichomes 18-23 µm in length; extremities rounded; not attenuated; not capitate; sheath firm. 2-2.5 µm long cells, 22-25 µm broad hormogonia, and 5-7 celled. Habitat – Found in static water upto 3-5 feet freely floating. It is often only noticed when the water levels drop it is exposed, April 2021.

*Oscillatoria lutea* C. Agardh, nom. inval. 1824:

Prescott, 1962, P. 489, Pl. 109, Figs. 2-4; Desikachary, 1959, P. 230, Pl. 39, Figs. 6-7.

The thallus is light blue-green in color and has trichomes that are light blue-purple when they're dried. The thallus is straight and flexible, not torulose; it's 6-11µ wide; the apex is slightly attenuated and subcapitate; the cells are straight and 4 - 11µ long; the contents of the cells are pellucid and granular when the specimen is dried; the septa are usually not granulated; the apical cell is convex and has a noticeable thickened outer wall (Desikachary, 1959).

Habitat - Planktonic in all area and forms a part of algal bloom, July and August 2019.

*Nostoc ellipsosporum :*

Desikachary, 1959, P. 383, Pl. 69, Fig. 5. The thallus is gelatinous, irregularly shaped, and blue-green in color. The filaments are flexuous and loosely entangled, and the trichomes are constricted at the cross walls. The cells are cylindrical, measuring 5-7.5 µm in diameter and 7-9.8 µm long. The heterocysts

are subspherical or oblong, measuring 8-9.2  $\mu$  in diameter and 10-12.5  $\mu$  long. The akinets are ellipsoidal, measuring 6-7.5  $\mu$  in diameter and 10- 12.8  $\mu$  long, with a smooth, hyaline outer wall.

Habitat - form a major part of green algal bloom after rainy season, near way to temple, July, August 2021.

*Anabaena* Sp.:

Desikachary, 1959, P. 405, Pl. 77, Fig. 6. The thallus is blue-green in color; the trichomes are single, constricted at the cross walls, and

slightly attenuated at the ends; the end cell is conical and has a rounded apex; the cells are quadrate or cylindric, with a diameter of 3.5–5.6  $\mu$  and a length of 3.5–6.8  $\mu$ ; the heterocysts are single, intercalary, cylindric or slightly ellipsoid with rounded end walls, measuring 5.2–6.5  $\mu$  in diameter and 7–7.5  $\mu$  long; the akinetes are single or two cylindric, measuring 5-5.5  $\mu$  diameter, and are 10–12.5  $\mu$  long; the outer wall is smooth and brown.

Habitat- Widespread in study area in slowly running water and small ditches. June 2021.

Table-1. Seasonal richness of algal species.

S. No.	Name of species	Summer season	Rainy season	Winter season
1	<i>Synechocystis sauvageau</i>	0	2	1
2	<i>Lyngbya birgei</i> Smith	1	3	2
3	<i>Oscillatoria lutea.</i>	4	4	4
4	<i>Nostoc ellipsosporum</i>	3	4	3
5	<i>Anabaena</i> Sp.	2	2	1
6	Total	10	15	11

(4 = Most abundant, 3 = More Abundant, 2 = Abundant, 1 = Rare, 0 = Absent)

Table-2. Thallus organization of observed algal species

S. No.	Thallus organisations	Number of species
1	Unicellular Non-motile	1
2	Multicellular, unbranched filamentous	4

A check list of algal species sampled in the present study is presented in Table-1. The present study included algal taxa consisted of 5 genera with one species each, belonging to Cyanophyceae. Throughout the study period blue algae like *Oscillatoria* and *Nostoc* occurred abundantly and frequently. The

present study also shows seasonal richness in monsoon followed by winter due to variation in temperature and light intensity (Table-2). All species were prokaryotic in cellular organization but variation of thallus from unicellular to unbranched filamentous forms were observed.

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