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A Study on Occurrence of Two Rarest Coccoidal Cyanobacteria from India

Sudip Chatterjee

Department of Botany; Syamsundar College (Affiliated to The University of Burdwan); Shyamsundar; Burdwan, West Bengal; India.

ABSTRACT

Two species of one of the rare form of Cyanobacteria viz. *Chlorogloeafritschii* & *Chlorogloeamicrocystoides* was reported. The report is very significant from the point of impact that these two species being reported for the first time from this part of the world and they were obtained from very unusual condition of occurrence. This investigation is an addition to the existing knowledge about the occurrence and diversity of cyanobacteria in the said region.

Key Words: First report, Rarest Cyanobacteria, *Chlogloea*, Isolated and established, West Bengal, India

INTRODUCTION

The occurrence of two rare forms of coccoid cyanobacteria from this part of India is certainly an important addition to the existing knowledge about the available cyanobacterial diversity of the region. The cyanobacterial diversity has long been thought to be restricted within very few genera. The concept of eutrophication is also emerging as the region is heavily industrialized and only one or two types of species are abundantly obtained in almost every part of the concerned district.

The reported alga belongs to the Chroococcales order which is believed to be one of the oldest and diversified forms surviving on earth.

The Present taxon is represented by only 19 spp. Worldwide (Komárek (1992). The finding is very interesting to the author in the context of it's general occurrence is restricted to the saline habitats and sometime as lithophytes (particularly endo-lithophytes). In this present investigation the habitat is certainly different from that of usual occurrence.

MATERIALS & METHODS

The specimens were collected from different locations of the Burdwan district from soil samples. Some materials were cultivated in culture and others were preserved in 5% formalin. For culture the specimens were inoculated in slants using medium [Modified BG-11 without N_2-source (Stanier *et al*. 1971)] solidified by using 3% agar. The pH of the medium was recorded 7.5, without using any buffer solution. The slants were then kept in the aseptic cultural condition for obtaining optimum growth, under the illumination of two standard PHILIPS tube lights (IS-2418) of 40-Watt capacity for 8 hrs**:** 4 hrs in normal shady condition**:** 12 hrs of dark intervals. Temperature was maintained 27^0C throughout. The growth was observed under light microscope (Olympus GB model) after a regular interval of two weeks for the complete understanding of its life cycle pattern. Camera Lucida drawings were made from both nature and cultured specimens. Microphotography was done using Zeiss Microscope.

RESULT & DISCUSSION

I. CHLOROGLOEA Wille 1900

[Wille, N. (1900) - AlgologischeNotizen I-VI. *Nyt.Magazin for Naturvidenskaberne* 38(1): 1-27; Geitler, L. 1932 – *Cyanophyceae. In*: Rabenhorst, L. (ed.) Kryptogamenflora von Deutschland, Österreich und der Schweiz. 14, p.306; Desikachary, T.V. 1959 - *Cyanophyta*. p.162; Starmach, K. 1966 – *Cyanophyta - sinice [Cyanophyta – blue-green algae]. Flora slodkow.Polski 2*. p.155; Castenholz, R.W., Ripka, R. &Herdman, M. 2001 - *In*: Boone, D.R. &Castenholz, R.W. (ed.), *Bergey's Manualof Systematic Bacteriology.*2nd ed., p.592; Komárek, J. 2003 – 3. Coccoid and Colonial Cy-

Corresponding Author:
Sudip Chatterjee, Department of Botany; Syamsundar College (Affiliated to The University of Burdwan); Shyamsundar; Burdwan, West Bengal; India; Mob: 9475482265; E-mail: scsscbwn@gmail.com

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anobacteria.*In*: Wehr, J.D. & Sheath, R.G. (ed.) *Freshwater Algae of North America*: *Ecology and Classification.* p.96; Komárek, J. &Hauer, T. 2004: CyanoDB.cz - On-line database of cyanobacterial genera. - Guiry, M.D. &Guiry, G.M. 2017. *AlgaeBase*.World-wide electronic publication, National University of Ireland, Galway. http://www.algaebase.org;]

Description:

Many spherical or ellipsoidal or polygonal cells loosely arranged to form a gelatinous mass. Sheath if present, very thin and watery. Cells are yellowish-green to dark blue-green in colour with granular or homogenous content.

Taxonomic Position: Cyanophyceae, Chroococcales, Entophysalidaceae.

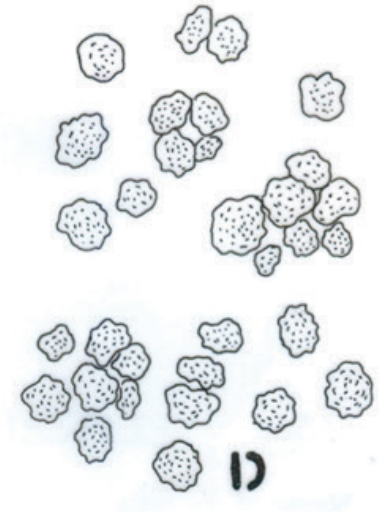
Key to the species:

1. Average diameter of individual cell is 1.68 µm……..
(2) *C.microcystoides*

1. Average diameter of individual cell is 6 µm…….....
(1) *C.fritschii*

1. Chlorogloeafritschii Mitra

[Desikachary 1959, p.163, Pl. - 31, fig. – 1 - 16]



Camera Lucida Drawing of
***Chlorogloeafritschii* Mitra**

Gelatinous, dull green thallus made up of many loosely arranged cells. Cells spherical to hemispherical in outline, margin of the cells are wavy, cells yellowish-green in colour with granular content, 3 µm - 5 µm in diameter. Some cells are 1.4 µm – 1.8 µm in diameter.

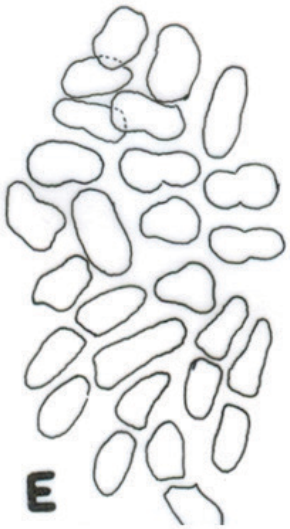
Habitat – The sample was obtained as thin green film on the surface of water in a pond at Golapbag area [Sample No. SC – 02 (pH 7 & Temperature 31°C) dated 26/10/2002]; from Police line in a sewage canal near the market as isolated algal mass [Sample No. SC – 10 (pH 6.5 & Temperature 23°C) dated 28/11/2002] and from a sewage canal in almost similar state in Baburbag [Sample No. SC – 45 (pH 6.5 & Temperature 20°C) dated 12/12/2002].

Earlier reports from India: Allahabad (Mitra 1950, 1951); Cochin (Joseph and Sarma 2004).

Taxonomic note: This taxon is presently considered as *Chlorogloeopsisfritschii* (A.K. Mitra) A.K. Mitra& D.C. Pandey 1967(Guiry and Guiry 2012).

2. Chlorogloeamicrocystoides Geitler 1925

[Geitler 1932, p.310, fig. - 155; Desikachary 1959, p.163, Pl. - 19, fig. - 8; Starmach 1966, p.155, fig. - 191; Whitton 2001, *In* John *et al* (ed.), p.39]



Camera Lucida Drawing of
***Chlorogloeamicrocystoides* Geitler 1925**

Very small colonies of blue-green colour with watery sheath, cells irregularly arranged within the colony. Cells ellipsoidal to polygonal in outline. Cells 1.58 µm – 1.70 µm broad and 3.2 µm – 3.6 µm long, blue-green in colour.

Habitat – Sample obtained from the undersurface of an irrigation canal as algal lump of at Gangpur [Sample No. SC – 62 (pH 7.5 & Temperature 20°C) dated 12/12/2002].

Earlier reports from India: Assam (Biswas 1936); Tuwa (Thomas and Gonzalves 1965d).

DISCUSSION

As evident from the above mentioned result part both the genera are very first report of it's kind from the said region. The earlier reports are from different parts of India and also dated very long back. Thus workers, concerned with the diversity study of cyanobacteria will be immensely enriched with the obtained result. The knowledge about occurrence

and diversity of the said group, in the said region is very limited till date. The present investigation thus will thus be first of its kind for the concerned region.

CONCLUSION

The obtained result and literature review by the author suggested that the place of investigation is environmentally very much conducive for the luxuriant growth of cyanobacteria. The chance of many rarest taxa occurring in the said region is very high. The author thus encouraged to explore the region further critically to unearth other taxa of the said group for contributing to the existing knowledge for the said group from the said region.

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REFERENCES

1. Biswas, K.(1930) Contribution to the knowledge of freshwater algae of Manipur, Assam. *J. Bombay Nat. Hist. Soc.* 34: 189 – 192.
2. Desikachary T.V. 1959. *Cyanophyta*: Indian Council of Agricultural Research, New Delhi, 686 pp.
3. Gonsalves, E. A. and Kamat, N. D. (1960) New species of Cyanophyceae from Mysore State. *J. Bombay nat. Hist. Soc.,* 57, 2: 454-456.
4. Guiry, M.D. and Guiry, G.M. (2012) *AlgaeBase*. World-wide electronic publication, National University of Ireland, Galway. http://www.algaebase.org
5. Hindák F. 1977. *Studies on the Chlorococcal algae/ Chlorophyceae*:VEDA. Publishing House of the Slovak Academy of Sceence, Bratislava, 186 pp.
6. Komárek, J. &Anagnostides, K. 1986. Modern approach to the classification system of cyanophytes.2 .Chroococcales.*Arch. Hydrobiol.Suppl*. 73, *Algological Studies* 43: 157 – 226.
7. Komárek, J. (2003). Coccoid and colonial cyanobacteria. In: *Freshwater Algae of North America. Ecology and Classification*. (Wehr, J.D. & Sheath, R.G. Eds), pp. 59-116. Amsterdam Boston London New York Oxford Paris San Diego San Fransisco Singapore Sydney Tokyo: Academic Press.
8. Komárek J. &Hauer T. 2004. CyanoDB.cz - On-line database of cyanobacterial genera. - http://www.cyanodb.cz/
9. LukavskyJ,Cepak V. Komarek J. Kasparkova M. Takacova M. 1992. Catalog of Algal and Cyanobacterial Strains of Culture Collection of Autotrophic Organisms at Trebon. *Archiv Fur Hydrobiologie,* :59-112.
10. Samad L.K. and Adhikary S.P. 2008.Diversity of Micro-algae and Cyanobacteria on Building Facades and Monuments in India. *Algae* 23(2): 91-114.
11. Setchell, W.A. & Gardner, N.L. (1924). New marine algae from the Gulf of California.*Proceeding of the California Academy of Science, Series 4* 12: 695-949, 77 plates.
12. Stanier R.Y., Kunisawa R., Mandel M. & Cohen-Bazire G., 1971.Purification and properties of unicellular blue-green algae (Order Chroococcales). *Bacteriological Review* 35: 171-205.