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NEW RECORDS OF PHYTOPLANKTON FROM LALMAI HILL AREAS OF CUMILLA, BANGLADESH. II. CYANOPHYCEAE

RAUF AHMED BHUIYAN, MD. ALMUJADDADE ALFASANE* AND MONIRUZZAMAN KHONDKER

Department of Botany, University of Dhaka, Dhaka 1000, Bangladesh

Key words: New records; Phytoplankton; Cyanophyceae; Cumilla; Bangladesh.

Abstract

A total of 10 taxa of blue-green algae have been included as new records for Bangladesh. These include *Anabaena spiroides* Klebahn, *Arthrospira platensis* fa. *granulata* Desikachary, *Cylindrospermopsis curvispora* M. Watanabe, *Gomphosphaeria fusca* Skuja, *G. nageliana* (Unger) Lemmermann, *G. rosea* (J.W.Snow) Lemmermann, *Lyngbya circumcreta* G.S. West, *Pseudanabaena minuta* Skuja, *Spirulina labyrinthiformis* (Menegh.) Gom**.** and *Xenococcus minumus* fa. *starmachii* Geitler. from some wetlands of Lalmai Hill areas in Cumilla district of Bangladesh.

Introduction

In Bangladesh, studies carried out on blue-green algal flora remain limited to certain selected areas and habitats (Islam, 1991). In a review, Islam (1991) mentioned the occurrence of 43 blue-green algal genera in Bangladesh of which 21 were recorded from the phytoplankton communities. From different wetland habitats blue-green algal flora of Madhabkunda waterfall and some areas of northern districts of Bangladesh have been reported by Aziz and Yasmin (1997), and Aziz and Tanbir (1999, 2003). Blue-green algae, growing in some habitats such as freshwater-, brackishwater- and acidic-lagoons and jute retting and shrimp culture ponds of Bangladesh have been reported (Islam and Irfanullah, 2000, 2001, 2003, 2005; Islam *et al.* 2002; Islam and Khondker, 2003). During the routine sampling of the phytoplankton in the study areas the present authors collected a large number of phytoplankton samples which on investigation revealed the occurrence of many taxa not yet recorded for different groups of algae. The present paper deals with the systematics of 10 taxa of Cyanophyceae which are new records for Bangladesh.

Materials and Methods

Phytoplankton samples were collected from different stations of three wetlands of Cumilla Sadar South Upazila (23°35'14.03"-23°43'64.46"N and 91°13'43.94"-91°15'39.90"E) in between October 2017 and September 2019 (Table1). At first an empty and properly dried plastic bottle (1L capacity) was taken and 5ml Lugol's solution was put onto the bottom of it with a glass pipette. Then the bottle was filled with well mixed collected sample water. The bottle was closed with the screwcap and for 48 hours it was kept quiet for sedimenting the plankton. Then the water from the above was withdrawn keeping the sedimented layer of plankton uninterrupted. The volume of the sedimented sample was measured properly and conserved in plastic vials. Three consecutive preparations were made from each of the sample in a Helber Bacteria Chamber (Thoma ruling single round cell, SV400, Hawksley, England) for compound microscopy. The samples were viewed under a 400-1000× magnification via an axiovision microscope attached with a camera. Photo-micrographs of interesting species in the samples were encountered and measurement of

*Corresponding author, E-mail: mujaddade@yahoo.com

cell/colony/filament size and their componental parts were recorded. The species were recognized with the help of published related literature from home and abroad.

Table 1. Description and some morphometric features of the sampling sites.

Station number	Name of the station	A (ha)	Zmax (m)
1	Large pond of BARD	1.5	3.4
2	Dutia Dighi	6.0	3.2
3	Horeshpur Jola	49	3.4

A=Area; Zmax=Maximum depth

Results and Discussion

In the present investigation 10 taxa of Cyanophyceae were identified from the pelagic plankton communities of three stations of different wetlands of Lalmai Hill areas of Cumilla. An illustrated account of these species is presented in this paper. In Bangladesh, studies carried out so far have reported 300 species of blue-green algae (Islam, 1991; Aziz and Yasmin, 1997; Aziz and Tanbir, 1999, 2003; Islam and Irfanullah, 2000, 2001, 2003, 2005; Islam *et al*., 2002; Islam and Khundker, 2003; Khondker *et al*., 2006; Ahmed, 2006).

Division: Cyanophyta; Class: Cyanophyceae;
Order: Nostocales; Family: Nostocaceae; Genus: Anabaena Bory

1. Anabaena spiroides Klebahn **(Fig. 1).**

(Desikachary, 1959, P. 395, Pl. 71, Fig. 9; Ling and Tyler 2000; Pl. 10; Fig. 2)

Trichome solitary, long, irregularly coiled. Vegetative cells round to elongate and 8.07 µm in diameter and heterocyst comparatively smaller than the vegetative cells and 7.27 µm in diameter.

Collection no.: Horeshpur Jola, Station No. 3, 29.10.2017

Order: Oscillatoriales; Family: Microcoleaceae; Genus: Arthrospira Stigenberger

2. Arthrospira platensis fa. **granulata** Desikachary **(Figs 2-3).**

(Desikachary, 1959, P.190, Pl. 35, Figs. 5-6)

Trichome light blue-greens, not constricted at the cross-wall, 6.5-7.5 µm broad, slightly less broad at the ends, more or less regularly spirally coiled. Spirals 19-32 µm, cells discoid, granulated.

Collection no.: Large Pond of BARD, Station No. 1, 9.11.2018

Order: Nostocales; Family: Aphanizomenonaceae;
Genus: Cylindrospermopsis Seenyya and Subba Raju

3. Cylindrospermopsis curvispora M. Watanabe **(Figs 4-5).**

(Yamagishi and Akiyama, 1995, P. 39, Fig. 20)

Trichome straight or coiled in a semicircular, circular or sigmoid form, slightly narrowed at the both ends, 5.81 µm wide, only coiled filaments were found. Heterocyst not found in the examined samples.

Collection no.: Horeshpur Jola, Station No. 3, 02.04.2019

Order: Chroococcales; Family: Gomphosphaeriaceae; Genus: Gomphosphaeria Kütz.

4. Gomphosphaeria fusca Skuja **(Fig. 6).**

(Starmach, 1966, P. 137, Fig. 160)

Cells are compactly arranged in the colony. Colony round or spherical. Colony 42.21 µm in length and 35.45 µm wide, individual cells more or less round in shape and around 6.76 µm in diameter.

Collection no.: Dutia Dighi, Station No. 2, 22.08.2017

5. **Gomphosphaeria nageliana** (Unger) Lemmermann **(Fig. 7).**

(Desikachary, 1959, P.149, Pl. 28, Fig. 16; Starmach, 1966, P. 140, Fig. 166)

Colony spherical, cells not compactly arranged, minute and ovoid. Free floating. Difficult to distinguish mucilaginous sheath. Colony up to 85 µm in diameter.

Collection no.: Horeshpur Jola, Station No. 3, 29.10.2017

6. Gomphosphaeria rosea (J.W. Snow) Lemmermann **(Fig. 8).**

(Starmach, 1966, P. 137, Fig. 164)

Colony big, spherical and cells are loosely arranged and blue-green. Cells remain in different plans. Colony 67.35 µm long and 58.29 µm wide.

Collection: Large pond of BARD, Station No.1, 14.03.2018

Order: Oscillatoriales; Family: Microcoleaceae; Genus: Lyngbya Agardh

7. Lyngbya circumcreta G.S. West **(Fig. 9-11).**

(Starmach, 1966, P. 235, Fig. 284)

Filament solitary, free floating, regularly spirally coiled. End cells rounded and attenuated. Cells 1.0-2.0 µm long and 1.8-2.0 µm wide.

Collection no.: Dutia Dighi, Station No. 2, 29.10.2017

Order: Pseudanabaenales; Family: Pseudanabaenaceae; Genus: Pseudanabaena Lauterborn

8. Pseudanabaena minuta Skuja **(Fig. 12-13).**

(Starmach, 1966, P. 450, Fig. 669)

Trichome single, uniformly broad and straight 40-90 µm long. Cell cylindrical to barrel shaped to spherical with moderately thick wall. Mucilaginous sheath thick and very diffluent. Cell 2- 2.5-3.5 µm wide.

Collection: Dutia Dighi, Station No. 2, 22.08.2017

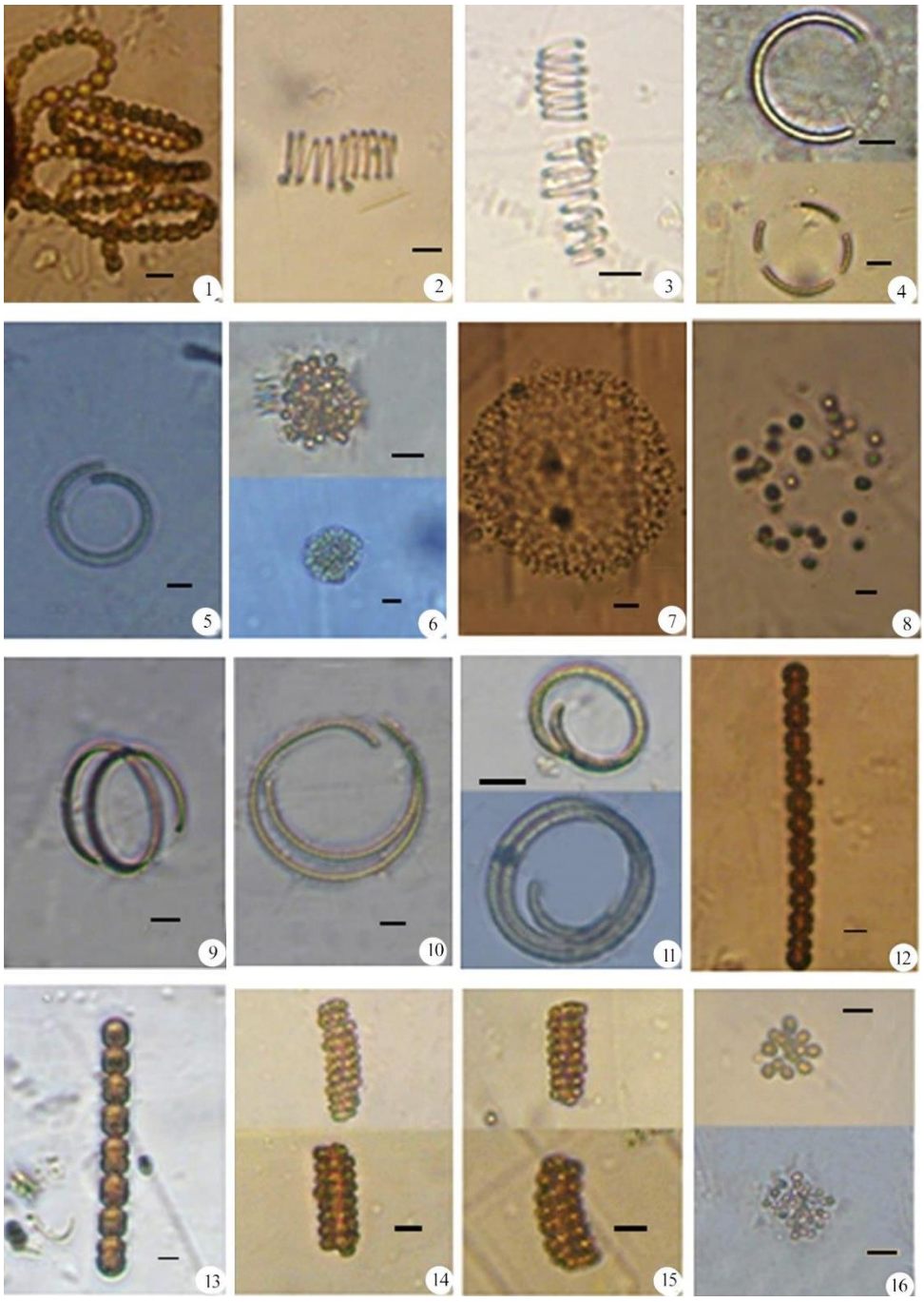
Order: Spirulinales; Family: Spirulinaceae; Genus: Spirulina Turpin *ex*. Gomont

9. Spirulina labyrinthiformis (Menegh.) Gom. **(Fig. 14-15).**

(Desikachary, 1959, P.194, Pl. 36, Fig. 11)

Trichome green to dark green, more compact thallus, moderately thick. Trichome 1 µm broad, Spirals 2-2.5 µm broad, irregularly but very densely spirally coiled and close to each other.

Collection no.: Large pond of BARD, Station No. 1, 13.12.2019



Figs. 1-16. 1. *Anabaena spiroides* Klebahn, 2-3. *Arthrospira platensis* fa. *granulata* Desikachary, 4-5. *Cylindrospermopsis curvispora* M. Watanabe, 6. *Gomphosphaeria fusca* Skuja, 7. *G. nageliana* (Unger) Lemmermann, 8. *G. rosea* (J.W. Snow) Lemmermann, 9-11. *Lyngbya circumcreta* G.S. West , 12-13. *Pseudanabaena minuta* Skuja, 14-15. *Spirulina labyrinthiformis* (Menegh.) Gom**.** 16. *Xenococcus minumus* fa. *starmachii* Geitler. (Scale= 10 µm)

Order: Chroococcales; Family: Xenococcaceae; Genus: Xenococcus Thuret

10. Xenococcus minumus fa. **starmachii** Geitler **(Fig. 16).**

(Starmach, 1966, P. 204, Fig. 255)

Thallus at first crustose flakes. Cells compactly arranged and of varying shapes and sizes. Size of colony varies as well. Colony 32.54 µm in diameter, individual cells 0.9-1.35 µm in diameter, 1.5 µm long.

Collection no.: Dutia Dighi, Station No. 2, 03.07.2019

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