

## NEW RECORDS OF PHYTOPLANKTON FROM WETLANDS OF LALMAI HILL AREAS OF CUMILLA: CHLOROPHYCEAE

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

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

*Key words:* New records, Phytoplankton, Chlorophyceae, Bangladesh

### Abstract

Phytoplankton samples were collected from different wetlands of Lalmai Hill areas of Cumilla from October 2017 to September 2019. A total of 168 samples of phytoplankton were collected from which 352 species of Phytoplankton were identified where 40 species were found as new records for Bangladesh. The present paper includes 14 taxa of Chlorophyceae as new records for Bangladesh. These include eight species from *Scenedesmus*, two species from *Tetrastrum* and *Crucigenia mucronata* (G.M. Smith) Komárek, *Euastrum denticulatum* var. *quadriferium* F. Gay ex Willi Krieger, *Keratococcus suecicus* Hind. and *Pediastrum duplex* var. *asperum* (A. Braun) Hansgirg.

### Introduction

Chlorophyceae comprises a large number of species which are mostly aquatic and found to be most common in existence in samples of phytoplankton. They have a wide range of habits; they may be unicellular to multicellular and may form colonies of rather definite shape. All of them have a characteristic in common that they are unable to multiply via vegetative cell division. In Bangladesh, Islam and Khatun (1966) first reported some species of Chlorococcales belonging to Chlorophyceae from some polluted waters of Dhaka city. Later on, Islam and Begum (1970) performed another voluminous work on this order from Dhaka district. Few more research works carried out in the later period have also added to the new reports for this group (Islam 1969, Islam and Alfasane 2001a,b, 2002, Islam and Aziz 1977, 1979, 1987, Islam and Begum 1970, Islam and Khatun 1966, Islam and Zaman 1975) and the total number of species so far reported is about 2000 (Ahmed *et al.*, 2009). In the present study, 14 taxa of Chlorophyceae have been newly recorded for Bangladesh. The taxa were encountered in the plankton samples collected from three different wetland ecosystems of Lalmai Hill areas of Cumilla in between 2017 and 2019.

### Materials and Methods

Phytoplankton samples were collected from seven stations of three different 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 (Table 1). Sedimentation technique was followed for the collection of phytoplankton population (Wetzel and Linkens 1979). At first an empty and properly dried plastic bottle (1 L capacity) was taken and 5 ml 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 screw cap and kept standing for 48 hrs in a darkened cupboard for the sedimentation of the planktonic organisms. Then the water from the above was taken out keeping the sedimented layer of plankton undisturbed. The volume of the sedimented sample was measured properly and preserved in labeled plastic vials.

\*Author for correspondence: <bhuiyanarauf@gmail.com>.

Three consecutive preparations were made from each of the sample in a Helber Microplankton Chamber (Thoma ruling single round cell, SV 400, Hawksley, England) for compound microscopy. The samples were viewed under a 400-1000× magnification via a research microscope (Zeiss, Axio, Lab. A1, attached with Zeiss Axiocam ERc 5s, Germany). Photo-micrographs of interesting species in the samples were taken and measurement of cell/colony/filament size and other taxonomic components were recorded. The species were identified with the help of published related literatures from home and abroad later on.

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

Station No.	Name	A (ha)	Zmax (m)
1	BARD pond	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

### Taxonomic enumeration

A total of 14 taxa of the Class Chlorophyceae with illustrated accounts are presented in the paper. The species are arranged alphabetically under the genera with literature sources of identification within parenthesis below each.

**Division: Chlorophyta; Class: Chlorophyceae; Order: Sphaeropleales  
Family: Scenedesmaceae; Genus: Crucigenia Morren**

1. **Crucigenia mucronata** (G.M.Smith) Komárek **(Fig. 1)**  
(Yamagishi and Akiyama 1995)

Colony of four sub-spherical cells arranged in opposite pairs about a large square space bounded by flat inner walls of cells. Usually 4-16 celled colony. Colony 18.21 µm in diameter. Individual cell 8.81 µm long and 6.97 µm wide.

Dutia dighi, Station 4, Collection date 16.09.2019

**Order: Desmidiales; Family: Desmidiaceae; Genus: Euastrum Ehr. ex Ralfs**

2. **Euastrum denticulatum** var. **quadriferium** F. Gay *ex* Willi Krieger **(Fig. 16)**  
(Ling and Tyler 2000)

A medium sized species which sinus between polar and basal lobes narrower. Semi cells are unequal and one is slightly larger than the other. Margins of the semi-cells more nearly parallel in outline, with upper lateral angles of basal lobes bi-granulates. Cell up to 30.94 µm long and 9.06 µm wide; isthmus 6.87 µm wide.

BARD Pond, Station 2, Collection date 18.06.2019

**Family: Coccomyxaceae; Genus: Keratococcus** Pascher**3. Keratococcus suecicus** Hind. (Figs 2-3)

(Huber-Pestalozzi 1983, P. 623, Pl. 174, f. 3)

Cell solitary, bright green with pointed tip and thin wall. Slightly sigmoid and lunate and irregularly bent. Both tip may or may not sharply pointed. Cells usually 40-70  $\mu\text{m}$  long and 2.5-4  $\mu\text{m}$  broad.

Horeshpur Jola, Station 7, Collection date 29.10.2017

**Family: Hydrodictyaceae; Genus: Pediastrum** Meyen**4. Pediastrum duplex** var. **asperum** (A.Braun) Hansgirg (Fig. 4)

(Huber-Pestalozzi 1983, P. 300, Pl. 90, f. 3)

Colony 8-128 celled, up to 92  $\mu\text{m}$  in diameter. Cell wall smooth with small perforations. Peripheral cell quadrate, outer face extended in to 2 tapering, blunt tipped processes. Inner cells separated by lens shaped interstices. Vegetative cells cell 17  $\mu\text{m}$  long and 14  $\mu\text{m}$  wide.

BARD Pond, Station 1, Collection date 15.07.2018

**Family: Scenedesmaceae; Genus: Scenedesmus** Meyen**5. Scenedesmus apiculatus** var. **apiculatus** West & GS West (Fig. 5)

(Huber-Pestalozzi 1983, P 857, Pl. 231, f. 7)

Colony four celled. Tip of the cell pointed with small spines. Cell slightly with pointed apices. Individual cell 28.45-31.15  $\mu\text{m}$  long and 19.88  $\mu\text{m}$  wide.

BARD Pond, Station 1, Collection date 17.02.2019.

**6. Scenedesmus acutus** var. **globosus** Hortob. (Fig. 6)

(Huber-Pestalozzi 1983, P 840, Pl. 228, f. 2)

Cell fusiform without any setae. No. of cell usually 4 and two remain opposite direction of the rest. Cell 21.72  $\mu\text{m}$  long and 11.48  $\mu\text{m}$  wide.

BARD Pond, Station 2, Collection date 18.02.2018

**7. Scenedesmus bernardii** G. M. Smith (Fig. 7)

(Ling and Tyler 2000)

Colony of 4-8 fusiform cells with long setae arranged in a single or alternate series. Outer cells lunate to fusiform with a pointed tip. Cell wall smooth. Individual cell 65.16  $\mu\text{m}$  long and 11.68  $\mu\text{m}$  wide.

Horeshpur Jola, Station 7, Collection date 16.09.2018

**8. Scenedesmus bicaudatus** var. **brevicaudatus** Hortob. (Fig. 8)

(Huber-Pestalozzi 1983, P. 889-892)

Coenobia 2-4-(8) celled, middle cells usually bigger than the peripheral cells. Peripheral cells slightly bent and have single long acute spines. Middle cells ovoid to spindle shaped, poles rounded, with small papillate like dents. Individual cell 19.45-23.57  $\mu\text{m}$  long and 6.25-7.79  $\mu\text{m}$  wide.

Horeshpur Jola, Station 7, Collection date 17.12.2018

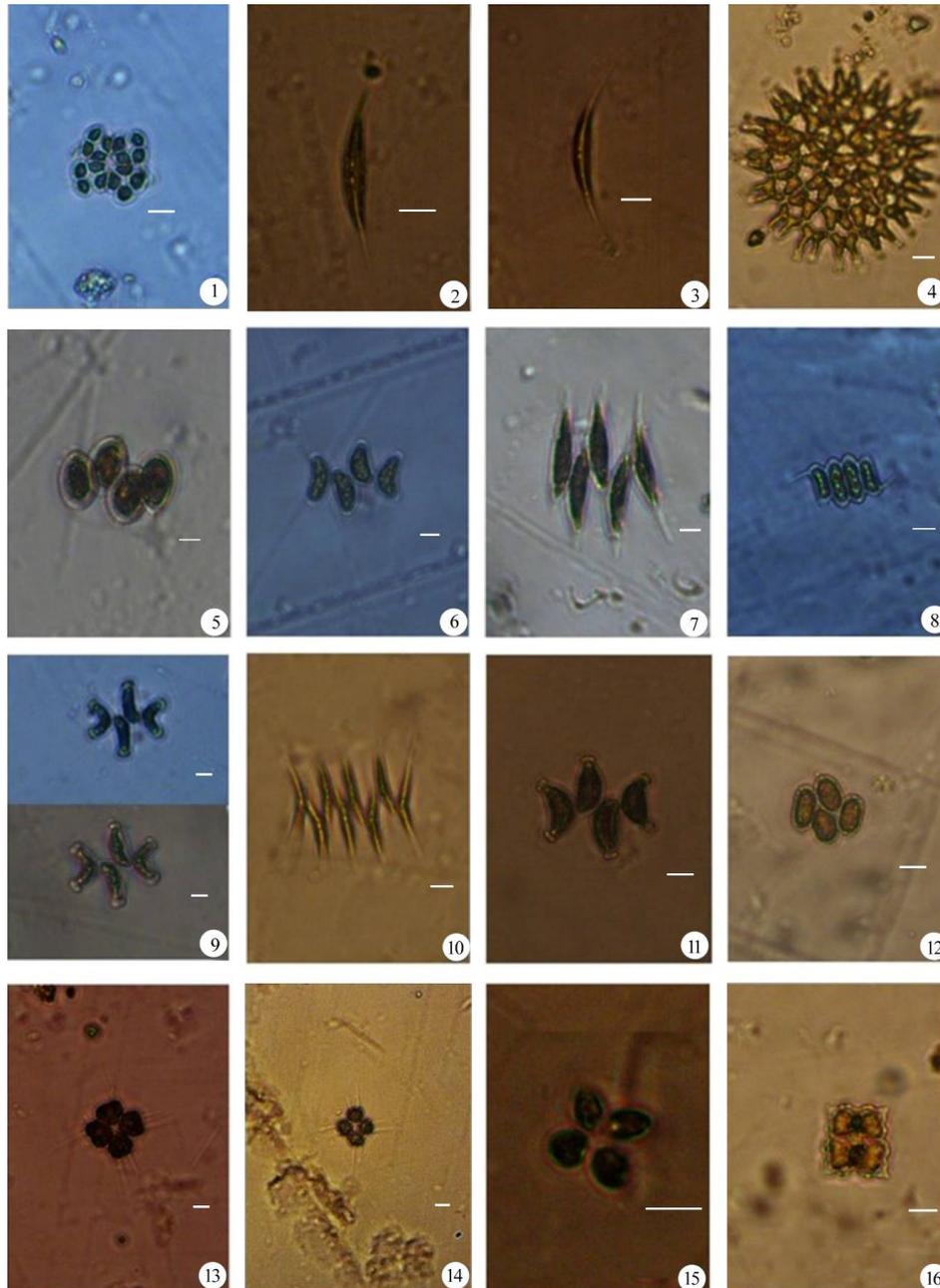


Fig. 1. *Crucigenia mucronata*, 2-3. *Keratococcus suecicus* Hind. 4. *Pediastrum duplex* var. *asperum*, 5. *Scenedesmus apiculatus* var. *apiculatus*, 6. *S. acutus* var. *globosus*, 7. *S. bernardii*, 8. *S. bicaudatus* var. *brevicaudatus*, 9. *S. indicus*, 10. *S. javanensis*, 11. *S. producto-capitatus*, 12. *S. verrucosus*, 13-14. *Tetrastrum heteracanthum*, 15. *T. triangulare* and 16. *Euastrum denticulatum* var. *qudriferum* (Bar= 10  $\mu$ m).

- 9. *Scenedesmus indicus* Philipose (Fig. 9)**  
(Huber-Pestalozzi 1983, P. 833, Pl. 226, f. 9)  
Coenobia 2-4-(8) celled, linear and slightly bent. Cell spindle shaped, curved to tapered at the tip. No papilla or dent were observed. Individual cell 23.57  $\mu\text{m}$  long and 9.02  $\mu\text{m}$  wide.  
Horeshpur Jola, Station 7, Collection date 12.08.2018
- 10. *Scenedesmus javanensis* Chodat (Fig. 10)**  
(Yamagishi and Akiyama 1995; Bourrelly 1972)  
Colony of 4-8 fusiform cells with long setae arranged in a single or alternate series. Terminal cells remarkably lunate with or without a bent in the middle. Individual cell 52.87  $\mu\text{m}$  long with setae and 5.74  $\mu\text{m}$  wide.  
Dutia Dighi, Station 4, Collection date 24.06.2018
- 11. *Scenedesmus producto-capitatus* Schmula (Fig. 11)**  
(Huber-Pestalozzi 1983, P. 864)  
Colony 2-4-(8) celled, lunate to lanceolate. No spines but with a curved apex. Free wall of cells smooth. Individual cell 29.30  $\mu\text{m}$  long and 12.91  $\mu\text{m}$  wide.  
Horeshpur Jola, Station 5, Collection date 19.08.2019
- 12. *Scenedesmus verrucosus* Y.V. Roll (Fig. 12)**  
(Huber-Pestalozzi 1983, P. 862, Pl. 233, f. 3)  
Flat coenobium 4-8 ovoid to ellipsoid cells. Cells are mostly verrucose. Cell wall smooth or granulated. Cell 22.95  $\mu\text{m}$  long and 11.89  $\mu\text{m}$  wide.  
BARD Pond, Station 1, Collection date 17.08.2019

**Family: Scenedesmaceae; Genus: *Tetrastrum* Chodat**

- 13. *Tetrastrum heteracanthum* (Nordst.) Chodat (Figs 13-14)**  
(Huber-Pestalozzi 1983, P. 768, Pl. 214, f. 2)  
Colony of 4 quadrately arranged cells. Cells slightly concave on outer walls. Two unequal setae arise from the two sides of the free face of the cells. Colony 59.22  $\mu\text{m}$  long and 54.30  $\mu\text{m}$  broad; longer spine 17  $\mu\text{m}$  long.  
Dutia dighi, Station 4, Collection date 18.02.2018
- 14. *Tetrastrum triangulare* (Chodat) Kom. (Fig. 15)**  
(Huber-Pestalozzi 1983, P. 767, Pl. 213, f. 3)  
Colony of 4 quadrately arranged unequal cells. Cells slightly curved on outer walls, seta absent. Colony 20.59  $\mu\text{m}$  in diameter.  
Horeshpur Jola, Station 6, Collection date 14.07.2019

**Acknowledgement**

The authors thankfully acknowledge the Bangabandhu Fellowship of Science and Technology Trust, Bangladesh for granting the scholarship to carry out of this Ph.D. research work.

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(Manuscript received on 8 January, 2024; revised on 19 February, 2025)