

NEW RECORDS OF PHYTOPLANKTON FROM WASTEWATER LAGOONS OF PAGLA, BANGLADESH

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Abstract

Eight newly recorded phytoplankton belonging to the algal Order Volvocales, Chlorococcales, Penales and Cryptomonadales from Bangladesh have been described in the present paper. The taxa are *Collodictyon sparsavacuolatum* Skuja, *Tetrachloridium carteroides* (Pascher et Jha) Huber-Pest., *Chlamydomonas biciliata* Korsch., *Chlorogonium liostracum* Strehlow, *Asterarcys cubensis* Comas, *Nitzschia hybrida* Grun., *Rhodomonas lens* Pascher and Ruttner and *R. ovalis* Nygaard.

Introduction

Wastewater lagoons are characterized by its special limnological features predominantly having very high concentration of particulate matter, nitrogen, phosphorus and chlorophyll *a* with paucity of dissolved oxygen. In Dhaka city, Pagla Sewage Treatment Plant (PSTP) is one such lagoon which was investigated limnologically by Gani *et al.* (2011). From the planktonic flora of this lagoon, nine new reports of Euglenophyceae for Bangladesh have been made (Gani *et al.* 2012). A total of 34 phytoplankton samples were collected covering a period of one year from this lagoon (Gani *et al.* 2012). A further detail investigation on these samples was carried out to see the quality of phytoplankton other than the members of Euglenophyceae.

Materials and Methods

Gani *et al.* (2011) furnished detailed information on this lagoon together with the sampling procedures. Samples were collected by sieving 100 liter of sub-surface water through plankton net having a mesh aperture of 20 µm. The concentrated plankton sample in the bucket of the plankton net were taken in a screw capped glass vial and fixed with Lugol's solution. A definite volume of well mixed sample was mounted on a Helber Bacteria Counting Chamber and photomicrographed with the help of a Nikon Optiphot, UFX-11A microscope fitted with a Nikon FX-35WA camera, Japan. Taxonomic features of the interesting taxa were measured and recorded at the same time. The taxa were identified using Huber-Pestalozzi (1983, 1968, 1961), Hustedt (1930) and Iyengar and Desikachary (1981).

Results and Discussion

In the present study, a total of eight taxa belonging to Chlorophyta, Bacillariophyta and Cryptophyta were identified. The taxa are *Collodictyon sparsavacuolatum* Skuja, *Tetrachloridium carteroides* (Pascher et Jha) Huber-Pestalozzi, *Chlamydomonas biciliata* Korsch., *Chlorogonium liostracum* Strehlow, *Asterarcys cubensis* Comas, *Nitzschia hybrida* Grun., *Rhodomonas lens* Pascher et Ruttner and *R. ovalis* Nygaard and hitherto as new reports for Bangladesh.

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An illustrated account of the taxa together with their individual descriptions has been provided below.

**Division: Chlorophyta, Class: Chlorophyceae, Order: Volvocales,
Family: Polybepharidaceae, Genus: Collodictyon**

1. **Collodictyon sparsavacuolatum** Skuja (Fig. 1)
(Huber-Pestalozzi 1961, 29, 5: 20A)

Cells rarely metabolic, inverted egg to elliptic in shape, posterior end rounded, periplast smooth, delicate, colorless, cytoplasm hyaline with 103 vacuoles, $20 \times 15 \mu\text{m}$.

Distribution: Dhaka, Lagoon - 1, PSTP, 15 January 2010.

Genus: Tetrachloridium

2. **Tetrachloridium carteroides** (Pasch. *et* Jha) Huber-Pest. (Figs 2-3)
(Huber-Pestalozzi 1961, 30, 5: 21c)

Cells strongly metabolic, at rest broad, weakly ovoid, posterior rounded or slightly bent, anterior may be rounded or flat, cross section circular, periplast thin, flagella 4, nucleus at center, lied at vacuum, $15 \mu\text{m}$ in diameter.

Distribution: Dhaka, Lagoon - 2, PSTP, 30 December 2009.

Family: Chlamydomonadaceae, Genus: Chlamydomonas

3. **Chlamydomonas biciliata** Korsch. (Syn.: *Agloë biciliata* Pasch.) (Fig. 4)
(Huber-Pestalozzi 1961, 218, 44: 232)

Cells elliptical, 1.5 times longer than broad, both sides uniformly rounded, membrane delicate, papillae absent, flagella half of body length, pyrenoid single, axial, chloroplast H-shaped, $6 \times 4 \mu\text{m}$.

Notes: The material also fits with *C. microcystiae* Iyengar (Iyengar 1981) both in shape and size but not in the shape of chloroplast (cup shaped).

Distribution: Dhaka, Lagoon - 1, PSTP, 15 January 2010.

Genus: Chlorogonium

4. **Chlorogonium leiostracum** Strehlow (Fig. 5)
(Huber-Pestalozzi 1961, 476, 69: 655; Iyengar and Desikachary 1981, 214, 116: 4)

Cells solitary, short, spindle shaped, weakly convex, at median strongly convex back side, membrane delicate, flagella body length, pyrenoid at the middle of the cell $8 \times 4 \mu\text{m}$.

Distribution: Dhaka, Lagoon - 1, PSTP, 15 January 2010.

Order: Chlorococcales, Family: Coelastraceae, Genus: Asterarcys

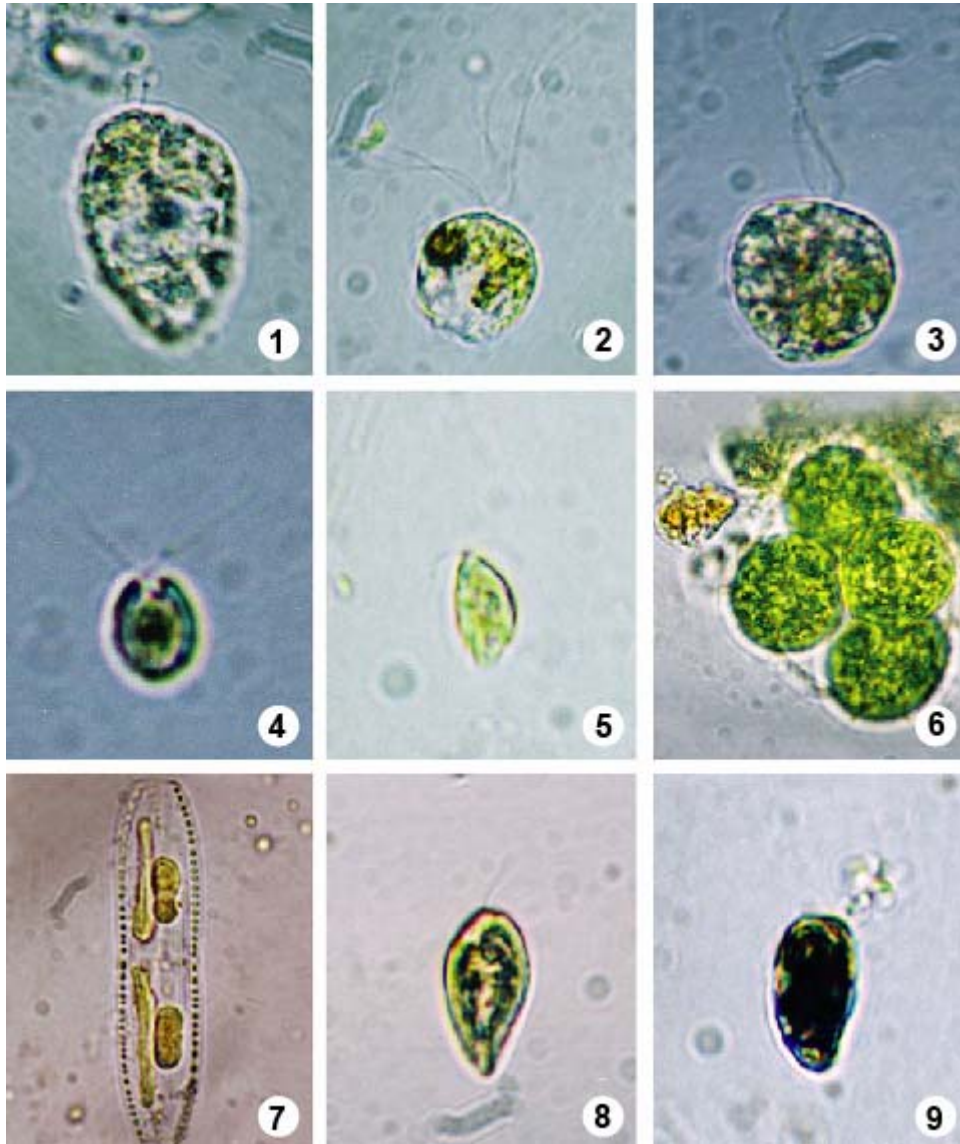
5. **Asterarcys cubensis** Comas (Fig. 6)
(Huber-Pestalozzi 1983, 718, 201: 3)

Coenobium more or less irregular, 4-8 celled, cells broadly ovate to irregular spheroid, rounded, often slightly rounded on the outside, flattened, between cells no gap or small gap

present, chloroplast single reticulate with single pyrenoid, colony 20 μm in diameter, cells 6 μm in diameter.

Grows in strongly eutrophicated water.

Distribution: Dhaka, Lagoon - 2, PSTP, 09 November 2009.



Figs 1-9. 1, *Collodictyon sparsavacuolatum* Skuja; 2-3, *Tetrachloridium carteroides* (Pasch. et Jha) Huber-Pest.; 4, *Chlamydomonas biciliata* Korsch.; 5, *Chlorogonium leiostracum* Strehlow; 6, *Asterarcys cubensis* Comas; 7, *Nitzschia hybrida* Grun.; 8, *Rhodomonas lens* Pascher et Ruttner; and 9, *R. ovalis* Nygaard.

**Division: Bacillariophyta, Class: Bacillariophyceae, Order: Pennales,
Family: Nitzschiaceae, Genus: Nitzschia**

6. **Nitzschia hybrida** Grun. (Fig. 7)
(Hustedt 1930, 406, f. 778)
Frustules flat plate like in girdle, pole flat, central area narrowed, kiel points 8 in 10 μm , 50 \times 11 μm .
Distribution: Dhaka, Lagoon - 2, PSTP, 15 May 2010.

**Division: Cryptophyta, Class: Cryptophyceae, Order: Cryptomonadales,
Family: Cryptomonadaceae, Genus: Rhodomonas**

7. **Rhodomonas lens** Pascher *et* Ruttner (Fig. 8)
(Huber-Pestalozzi 1968, 21, f. 7)
Cells in lateral view asymmetrical, broadly spindle shaped, more convex dorsally than ventrally, tapered front and rear, chromatophore darkened extends along the dorsal side, 20 \times 8 μm .
Distribution: Dhaka, Lagoon - 2, PSTP, 15 January 2010.
8. **Rhodomonas ovalis** Nygaard (Fig. 9)
(Huber-Pestalozzi 1968, 25, f. 11c)
Cells oval to elongated-ovoid-cylindric, 2 times more longer than broad, not flattened, ventral side somewhat flatter than dorsal, posterior end rounded, dorsal regularly oval, chromatophore single, reddish brown, 12 \times 6 μm .
Distribution: Dhaka, Lagoon - 2, PSTP, 25 March 2010.

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