

**NEW RECORDS OF PHYTOPLANKTON FOR BANGLADESH.
7. PHACUS SPP.**

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Abstract

Thirteen species of *Phacus* hitherto not reported from Bangladesh have been described and illustrated. Freshwater ponds at southern districts of Pirojpur and Barisal revealed the presence of the species.

Introduction

Phacus is one of the largest genus among euglenoids, represented by 130 species (Huber-Pestalozzi 1955). From the Southeastern United States alone, the genus is represented by the occurrence of 63 species (Dillard 2000). In Bangladesh, so far 39 species have been recorded (Islam and Khatun 1966, Islam *et al.* 1991 and Islam and Alfasane 2002). *Phacus* is a common phytoplankton in most of the aquatic habitats of Bangladesh. Its flat, heart shaped and almost rigid cells are relatively easier to study compared to the metabolic cells of *Euglena*. Abundant cells of *Phacus* in the phytoplankton samples collected from some pond ecosystems of two southern districts drew attention of the present researchers to identify them up to species level. This has led to the final identification of 13 species of *Phacus* and are being added to the list of taxa of *Phacus* so far recorded. The samples were collected from different pond ecosystems of Mathbaria of Pirojpur district and Bakerganj of Barisal district between 2004 and 2006. New reports of phytoplankton for Bangladesh from the same locality have been published elsewhere (Khondker *et al.* 2006, 2007; 2008).

Materials and Methods

Concentrated samples of plankton preserved in Lugol's solution were used for the present study. The sampling was carried out from four permanent stations of Bakerganj and Mathbaria each in between 2004 and 2006. Details of the sampling procedure and descriptions of the sites have been published in Khondker *et al.* (2006).

Results and Discussions

An illustrated account of 13 species of *Phacus* together with their detailed description of taxonomic features is given and discussed.

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Division: Euglenophyta; Class: Euglenophyceae; Order: Euglenales
Family: Euglenaceae

1. **Phacus acuminatus** var. **granulata** (Roll) H.-P. [Syn.: *Phacus granulata* Roll, (Figs. 6-7)
P. acuminata ssp. *granulata* Pochm.]
 (Huber-Pestalozzi 1955, 195, 38: 232)
 Cells ovoid, posterior slightly broader, ends with a sharp, weakly bent, short caudus. Cells anterior gradually narrowed to an almost blunt or slightly notched end. Chloroplasts parietal, many, adjacent to cell walls. Cells 28-30 μm long, 18-20 μm broad. Caudus 3-4 μm long. Paramylum body single, ring like, located almost centrally, 8 μm broad. Flagellum coiled, 10-15 μm long.
 Mathbaria, Station No. 1, 03.05.2004.

2. **Phacus cylindraceus** Popova (Fig. 1)
 (Yamagishi and Kanetsuna 1990, 2, 1: 10)
 Cells cylindrical, anterior obliquely truncated, posterior gradually narrowed to a conical end. Paramylum large, centered, cylindrical. Cells 24 μm long, 7 μm broad. Paramylum 10 μm long, 6.5 μm broad.
 Mathbaria, Station No. 6, 30.08.2004.

3. **Phacus ehippion** Pochm. [Syn.: *Phacus longicauda* var. *torta* Lemm. in Fritsch and Rich] (Fig. 2)
 (Huber-Pestalozzi 1955, 224, 50: 308)
 Cells saddle like bent, underside torted, broader side pear shaped. Posterior end bears a sharply pointed caudus, anterior end slightly narrowed to blunt but notched end. Paramylon single but centrally located. Cells with caudus 71 μm long, 35.6 μm broad. Caudus c. 8 μm long.
 Bakerganj, Station No. 5, 29.03.2004.

4. **Phacus granum** Drez. [Syn.: *P. oscillans* Klebs var. *curta* Skv] (Figs. 3-5)
 (Huber-Pestalozzi 1955, 185, 35: 206)
 Cells nearly cylindrical, end tapered. Posterior gradually narrowed to a short pointed caudus or blunt end. Paramylum single, almost centrally located, laterally depressed orbicular, 5 μm long, 3 μm broad. Cells 13-21 μm long, 5.5-9.0 μm broad. Chloroplast parietal plates, many, adjacent to the cell wall. Flagellum not seen.
 Bakerganj, Station No. 1, 01.11.2004; Station No. 3, 29.11.2004; Mathbaria, Station No. 6, 30.08.2004.

5. **Phacus hameli** Allorge *et* Lefèvre (Figs. 8-9)
 (Huber-Pestalozzi 1955, 197, 39: 241; Yamagishi and Kanetsuna 1990, 43, 1: 7-8)
 Cells elliptical to elongated ovoid, anterior end gradually narrowed to a rounded end, posterior also narrowed and ends in a short but pointed caudus. Paramylum one to two, circular plates, dissimilar in size. Periplast bears longitudinal striations. Cells 66-69 μm long, 30-31 μm broad, paramylon larger one 20 μm long, 15-17 μm broad, smaller one 12 μm long and 10 μm broad. Caudae 8-10 μm long, slightly angled. Flagellum not seen.

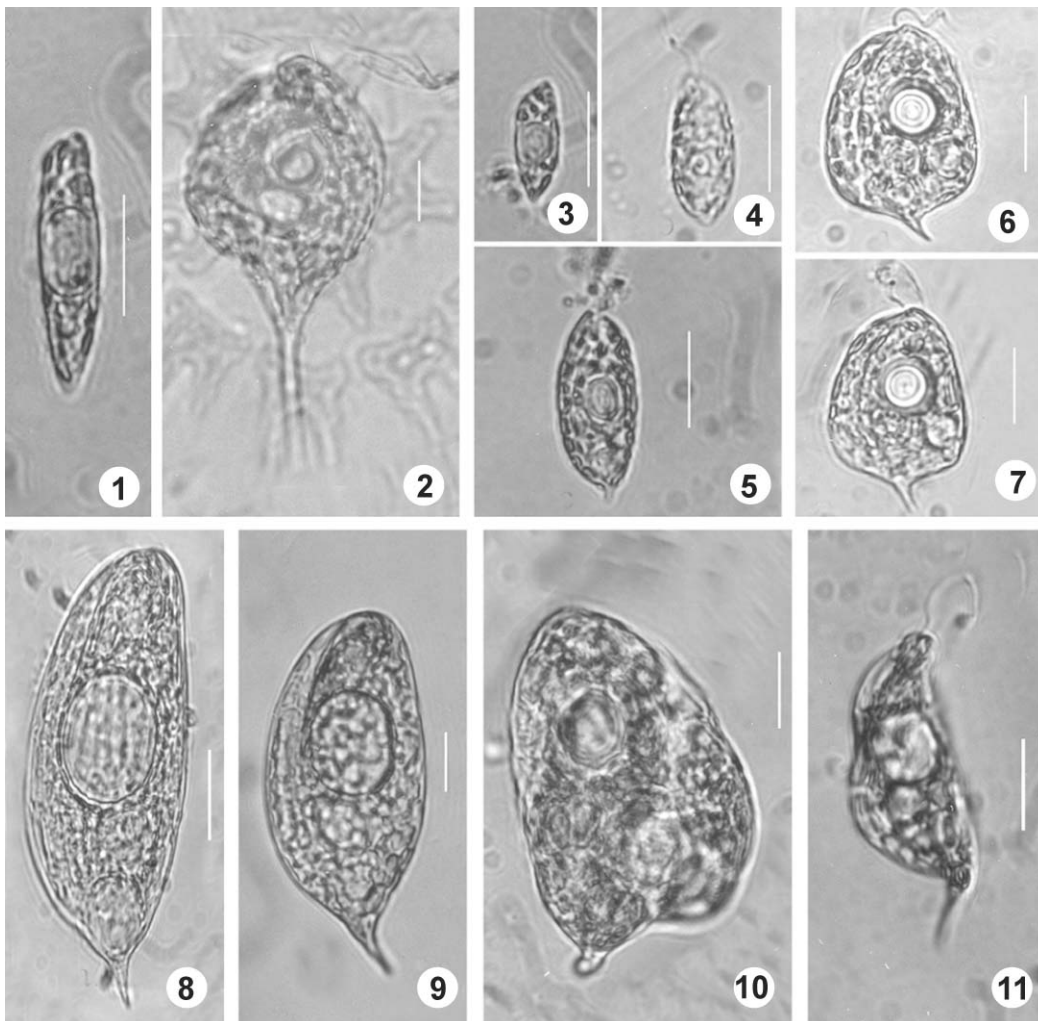
Notes: The present specimen is larger in dimension than the type reported from Hungary, Indonesia and Papua New Guinea (Huber-Pestalozzi 1955, Yamagishi and Kanetsuna 1990).
Bakerganj, Station No. 5, 29.03.2004.

6. **Phacus inflatus** var. **pterophora** Skuja
(Huber-Pestalozzi 1955, 550, 112: 1118)

(Fig. 10)

Cells asymmetric, constituted by two halves, one is longer other one is broader. Periplast longitudinally striated. Caudus short, bent. Paramylum single, discoid. Cells with caudal part 45-50 μm long, 29-31 μm broad. Caudae 8-10 μm long. Paramylon 7 μm broad, 8 μm long.

Bakerganj, Station No. 5, 29.03.2004; Mathbaria, Station No. 3, 22.11.04.

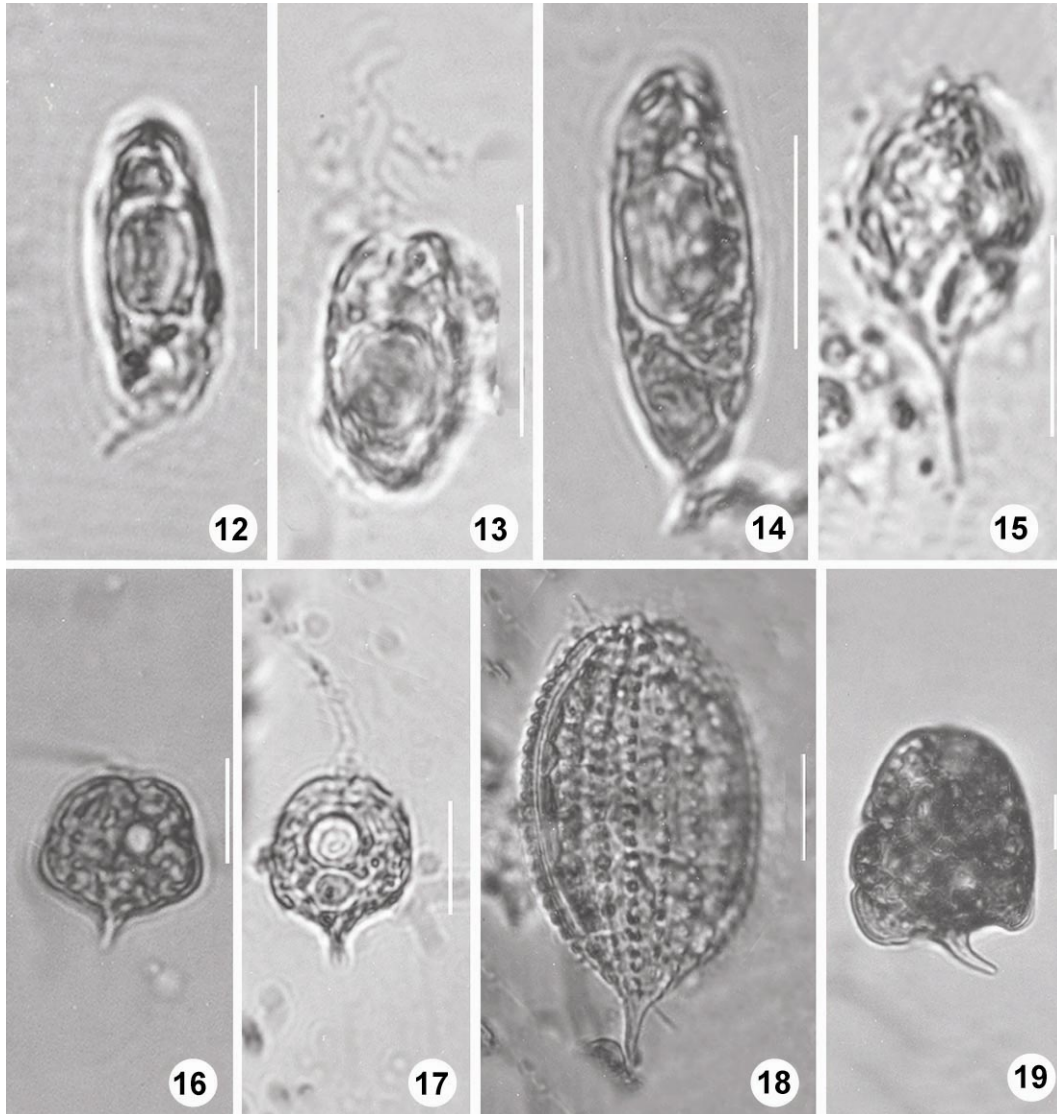


Figs. 1-11: 1. *Phacus cylindraceus*, 2. *P. ehippion*, 3-5. *P. granum*, 6-7. *P. acuminatus* var. *granulata*, 8-9. *P. hameli*, 10. *P. inflatus* var. *pterophora*, 11. *P. raciborskii*. (Bar=10 μm).

7. **Phacus nannos** Pochm. (Figs. 12-13)
(Huber-Pestalozzi 1955, 183, 34: 197).
Cells elongated ovoid, anterior very little depressed or not at all, posterior rounded. Paramylon single, large, centrally located, short rods. Cells 14 μm long, 6.0-7.5 μm broad. Paramylon 5-8 μm long, 3-8 μm broad. Flagellum 12 μm long.
Mathbaria, Station No. 6, 21.08.2004; Bakerganj, Station No. 3, 09.08.2004.
8. **Phacus polytrophos** Pochm. [Syn.: *Phacus oscillans* Playfair in Swirenko] (Fig. 14)
(Huber-Pestalozzi 1955, 187, 36: 208)
Cells elongated ovoid, anterior end somewhat rounded, posterior end conical. Paramylon single centrally located, short rod, large. Cells 23 μm long, 8 μm broad. Paramylon 12 μm long, 5 μm broad.
Mathbaria, Station No. 4, 13.09.2004.
9. **Phacus pseudonordstedtii** Pochm. var. **minuscula** (Conr.) H.-P. [Syn.: *Phacus pyrum* E. Stein var. *nordstedtii* (Lemm.) Defl. fa. *minuscula* Conr., *Phacus minusculus* Pochm.] (Fig. 15)
(Huber-Pestalozzi 1955, 230, 50: 320).
Cells ovoid with long caudus, twisted. Anterior end rounded, posterior part bears a sharp caudus. Periplast spirally striated. Cells with caudus 22-24 μm long, 12-13 μm broad. Caudal part c. 10 μm long.
Mathbaria, Station No. 2, 16.08.2004, 30.08.2004.
10. **Phacus raciborskii** Drez. (Fig. 11)
(Huber-Pestalozzi 1955, 153, 31: 161)
Cells always twisted with two wings, saddle like. Posterior end abruptly produced into a short, bent, acuminate caudus. Pelicule longitudinally striated. Paramylon one or two, discoid. Flagellum about $\frac{1}{2}$ - $\frac{2}{3}$ body length. Cells 34 μm long, 13 μm broad. Caudus c. 8 μm long, paramylon 5-10 μm in diameter.
Bakerganj, Station No. 3, 01.11.2004.
11. **Phacus schroeteri** Huber-Pestalozzi (Figs. 16-17)
(Huber-Pestalozzi 1955, 208, 44: 270)
Cells quadrate to roundish, anterior end flat, posterior end abruptly narrowed to a sharp caudus. Paramylon single, big, centrally located. Flagellum somewhat body length. Cells 19.0-22.9 μm long, 14.0-20.3 μm broad. Flagellum 12.7-20.0 μm long, paramylon 5 μm in diameter.
Bakerganj, Station No. 2, 04.10.2004, Station No. 1, 11.07.2005.
12. **Phacus suecicus** var. **oidion** Poch. [Syn.: *Phacus hispidula* in Lefèvre] (Fig. 18)
(Huber-Pestalozzi 1955, 237, 55: 338A)
Cells ovoid to broadly ellipsoid, anterior truncately rounded, with an apical notch, posterior abruptly narrowed to a straight or slightly bent acuminate caudus. Cells 45 μm long, 23 μm broad. periplast strongly warty. Six to ten warts per 10 μm distance longitudinally. Longitudinal rows differs by 2-3 μm from each other. Caudal part 5-8 μm long.
Mathbaria, Station No. 1, 19.07.2004.

13. **Phacus undulatus** (Skv.) Pochm. [Syn.: *Phacus pleuronectus* var. *insecta* Koczwara, *P. orbicularis* var. *undulata* Skv., *P. anacoelus* Stkes var. *undulata* Skv. in Skvortzow, *P. anacoelus* var. *subundulata* Skv. in Skvortzow] (Fig. 19)

(Huber-Pestalozzi 1955, 214, 47: 287)



Figs. 12-19: 12-13. *P. nanos*, 14. *P. polytrophos*, 15. *P. pseudonordstedtii* var. *minuscula*, 16-17. *P. schroeteri*, 18. *P. suecicus* var. *oidion*, 19. *P. undulatus* (Bars =10 μ m).

Cells oval or somewhat rectangular, anterior broadly rounded, posterior flat with a bent, strong, short, pointed caudus. Depression like groove present on either side of the caudus. Cell margin undulated. Chloroplasts many, discoid, round. Cells 53.3 μ m long, 38.1 μ m broad. Caudus 12 μ m long.

Mathbaria, Station No. 1, 09.11.04.

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