

Some Euglenophycean Algae from Biratnagar, Nepal

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Abstract

A total 19 euglenophycean taxa (*Euglena* 4, *Phacus* 8, *Trachelomonas* 5, *Lepocinclis* 2) has been reported from ponds, pools and ditches of Biratnagar in the present communication. Among these, nine taxa viz., *Euglena sanguinea* Ehrenberg, *E. tripteris* (Dujardin) Klebs, *Phacus birgei* Prescott, *P. helikoides* Pochmann, *P. pleuronectes* (Mueller) Dujardin, *P. spirogyra* Drezepolski var. *maxima* Prescott, *Trachelomonas armata* (Ehrenberg) Stein var. *steinii* Lemmermann, *T. similis* Stokes and *Lepocinclis ovum* (Ehrenberg) Lemmermann are being reported for the first time from Nepal.

Keywords: Algae, Euglenophyceae, *Phacus*, Biratnagar, Nepal.

Introduction

The euglenophycean flora of Nepal is poorly studied as no sufficient literature available. Hirano (1963), Hickel (1973a,b) and Ishida (1986) have described few taxa while studying other groups of algae. Sahay et al. (1953) have reported ten taxa (*Phacus* 4, *Trachelomonas* 5, *Lepocinclis* 1) from Chandranigahpur and Hetauda. Das and Verma (1996) have also collected three taxa from Budhi Khola, Tandi and Khageri Tal, Tikauli, Chitwan. Similarly, Habib (1997) has identified eight taxa of *Euglena* from Mahendranagar, Kanchanpur along with other algae. The major contribution on the euglenophycean flora of Nepal was made by Ioriya (1988) who has recorded 25 taxa (*Euglena* 8, *Phacus* 6, *Trachelomonas* 10, *Petalomonas* 1) from Kathmandu valley. Thus, a total 56 euglenophycean taxa has been recorded from this country.

Biratnagar is an industrial city located at Lat. 26°20'N and Long. 87°16'E in the terai plain of eastern Nepal at an elevation of 72

m amsl. It has a tropical monsoonic climate with 41°/4°C max./min. temperature and 1730.2 mm average annual rainfall. The hot and humid climate and slightly polluted lentic habitats influence the luxuriant growth of euglenoids in this area. Since there has been no report on euglenophycean algae from eastern Nepal, an attempt was made to describe the algae.

Materials and methods

Samples were collected from ponds, pools and ditches during 9-11am with the help of plankton net (mesh size 0.5mm) and preserved in 4% formalin. For examination, both fresh and preserved samples of each collection were pipetted separately to the glass slides, covered with cover slips and observed thoroughly under microscope. Illustrations of all the taxa studied were made with the help of camera lucida or by free hand drawings. All the collections are deposited in the herbarium of the Botany Department, P.G. Campus, Biratnagar.

Taxonomic description

Division: Euglenophyta

Class: Euglenophyceae

Order: Euglenales

Family: Euglenaceae

Genus: *Euglena* Ehrenberg 1838

1. *Euglena acus* Ehrenberg (Fig. 1)

Fritsch, F.E. 1935, P.726, Figs. a-b; Prescott, G.W. 1951, P.390, Pl. 85, Fig. 28; Tiffany, L.H. and M.E. Britton 1952, P. 321, Pl. 87, Fig. 1003; Ioriya, T. 1988, P. 32, Fig. 6.

Cells elongated, spindle shaped, 140-180 µm long, 10-13 µm broad, anterior end narrowed and truncate, posterior end long, fine tapering point; chloroplast numerous, disc like; paramylon bodies several, long rods.

Collection No. and Date: B-51, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: A shallow pool at Dillibazar and Swayambhu, Kathmandu (Hirano, 1963; Ioriya, 1988).

2. *Euglena oxyuris* Schmarida (Fig. 2)

Fritsch, F.E. 1935, P. 726, Fig. 293h; Tiffany, L.H. and M.E. Britton 1952, P. 318, Pl. 87, Fig. 1010.

Cells elongate-cylindric and twisted, 160 µm long, 22 µm broad, anterior end round with slight indentation at opening of canal, posterior end taper to short tail piece; periplast with prominent striation; chloroplast numerous, disc like; nucleus centrally located; paramylon bodies 2, anular elongated rings on either side of nucleus.

Collection No. and Date: B-54, 19-08-2007.

Locality: Malaya roadside ditches near P.G. Campus.

Distribution: *E. oxyuris* var. *charkowiensis* has been reported from Khaste lake, Kaski (Hickel, 1973a)

3. *Euglena sanguinea* Ehrenberg (Fig. 11)

Fritsch, F.E. 1935, P. 727, Fig. 240h; Prescott, G.W. 1951, P. 394, Pl. 86, Figs. 1-2; Tiffany, L.H. and M.E. Britton 1952, P. 317, Pl. 87, Fig. 1013.

Cells ovoid, pyriform to sub-cylindric, 24-33 µm broad, 55-120 µm long, anterior end narrow rounded, posterior end taper to a short blunt tail piece; periplast spirally striated; paramylon bodies numerous ovoid grains; hematochrome granules present.

Collection No. and Date: B-60, 25-08-2007.

Locality: Pitchara pond.

Distribution: New record for Nepal.

4. *Euglena tripteris* (Dujardin) Klebs (Figs. 12, 15)

Prescott, G.W. 1951, P. 394, Pl. 86, Figs. 4-6; Tiffany, L.H. and M.E. Britton 1952, P. 318, Pl. 87, Fig. 1014.

Cells rigid, elongate cylindric and twisted, 70-80 µm long, 8-15 µm broad, anterior end broadly rounded, posterior end taper to form sharp tip; chloroplast numerous, disc shaped; paramylon bodies 2, thick rods on either side of centrally located nucleus.

Collection No. and Date: B-51, 19-08-2007

Locality: Roadside ditches at Navintol

Distribution: New record for Nepal.

Genus: *Phacus* Dujardin 1841.

5. *Phacus birgei* Prescott (Fig. 4)

Prescott, G.W. 1951, P. 398, Pl. 87, Fig. 11.

Cells broadly ovoid, 70-80 μm long, 50-60 μm broad, anterior end broadly round, posterior end produce long, tapering, oblique caudus; periplast very finely striated, margin of the cell sharply notched with 4 small indentations on either side; paramylon bodies one large and numerous small circular plates.

Collection No. and Date: B-55, 20-08-2007.

Locality: Pond at P.G. Campus.

Distribution: New record for Nepal.

6. *Phacus curvicauda* Swirenko (Fig. 17)

Prescott, G.W. 1951, P. 399, Pl. 88, Fig. 21; Ioriya, T. 1988, P. 35, Fig. 21.

Cells orbiculare to broadly ovoid, 28-35 μm long, 24, 26 μm broad, anterior end rounded, posterior end broadly rounded with a short curved caudus; periplast longitudinally striated; paramylon body 1 or 2 circular disc.

Collection No. and Date: B-62, 25-08-2007.

Locality: Pitchara pond.

Distribution: Ponds at Pashupatinath, Swayambhu and near Royal Palace (Ioriya, 1988).

7. *Phacus helikoides* Pochmann (Figs. 8, 13)

Prescott, G.W. 1951, P. 400, P. 87, Fig. 9.

Cells fusiform, twisted throughout the entire length, 70-110 μm long, 32-45 μm broad, anterior end briefly narrow and bilobed, posterior end taper to form spirally twisted, long, straight caudus; periplast

longitudinally striated; paramylon body one large circular body.

Collection No. and Date: B-52, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: New record for Nepal.

8. *Phacus longicauda* (Ehrenberg) Dujardin (Fig. 10)

Fritsch, F.E. 1935, P. 726, Fig. 239j; Prescott, G.W. 1951, P. 400, Pl. 87, Fig. 1; Tiffany, L.H. and M.E. Britton 1952, P. 323, Pl. 88, Fig. 1022; Ioriya, T. 1988, P. 35, Fig. 24.

Cells ovoid, flat, 85-170 μm long, 45-70 μm broad, anterior end broadly rounded, posteriorly taper gradually to form a long straight and sharply pointed caudus; periplast longitudinally striated; paramylon body 1, large circular plate.

Collection No. and Date: B-53, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: A pond at Kathmandu (Ioriya, 1988); Fish pond at Hetauda (Sahay *et al.*, 1993).

9. *Phacus pleuronectes* (Muell.) Dujardin (Fig. 16)

Prescott, G.W. 1951, P. 402, Pl. 88, Fig. 16; Tiffany, L.H. and M.E. Britton 1952, P. 323, Pl. 88, Fig. 1019.

Cells broadly ovoid, 40-80 μm long, 28-50 μm broad, slightly twisted, posterior caudus short stout and obliquely turned; periplast longitudinally striated; paramylon body 1, ring like disc.

Collection No. and Date: B-61, 25-08-2007.

Locality: Roadside ditches at Pitchara.

Distribution: New record for Nepal.

10. *Phacus pseudoswirenkoi* Prescott (Fig. 5)

Prescott, G.W. 1951, P. 402, Pl 85, Fig. 26; Pl. 87, Fig. 2; Pl. 88, Fig. 14.

Cells orbicular, 41 μm long, 30 μm broad, posterior caudus short, sharp and curved, anterior end broadly rounded; periplast longitudinally striated, with medianly located lateral notch on the right side; paramylon body single, large circular disc.

Collection No. and Date: B-63, 25-08-2007.

Locality: Pitchara pond.

Distribution: Kara river, Hetauda (Sahay *et al.*, 1993)

11. *Phacus spirogyra* Drezepolski var. *maxima* Prescott (Fig. 3)

Prescott, G.W. 1951, P. 403, Pl. 87, Figs. 4-6.

Cells ovoid to somewhat oblong, 80-115 μm long, 40-45 μm broad, anteriorly rounded with a prominent median protrusion, abruptly narrowed posteriorly into a long caudus; periplast longitudinally striated with spiral row of granules; paramylon bodies 2, large elongated rings.

Collection No. and Date: B-52, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: New record for Nepal.

12. *Phacus suecicus* Lemmermann (Fig. 6)

Prescott, G.W. 1951, P. 403, Pl. 88, Figs. 2-3.

Cells broadly ellipsoid or ovate, 42 μm long, 25 μm broad, anterior end truncate with a prominent median papilla, posterior end produce slightly deflected sharp caudus;

periplast longitudinally striated with row of sharp granules; chloroplast numerous, circular discs; paramylon bodies 2, lateral land peripheral plates.

Collection No. and Date: B-70, 01-09-2007.

Locality: Pitchara pond.

Distribution: *P. suecicus* var. *inermius* has been reported from a pond at Dillibazar, Kathmandu (Hirano, 1963).

Genus: *Trachelomonas* Ehrenberg 1835.

13. *Trachelomonas armata* (Ehrenberg) Stein var. *longispina* (Playf.) Deflandre (Fig. 19)

Prescott, G.W. 1951, P. 411, Pl. 83, Fig. 27.

Test broadly ovate, 40-43 μm long, 30 μm diameter, with spines; flagellum aperture without collar but with a circle of erect spines at the margin; spines short in anterior region but stout, both short and long in posterior region.

Collection No. and Date: B-62, 25-08-2007.

Locality: Pitchara pond.

Distribution: Kara river, Hetauda (Sahay *et al.*, 1993).

14. *Trachelomonas armata* (Ehrenberg) Stein var. *steinii* Lemm. (Fig. 20)

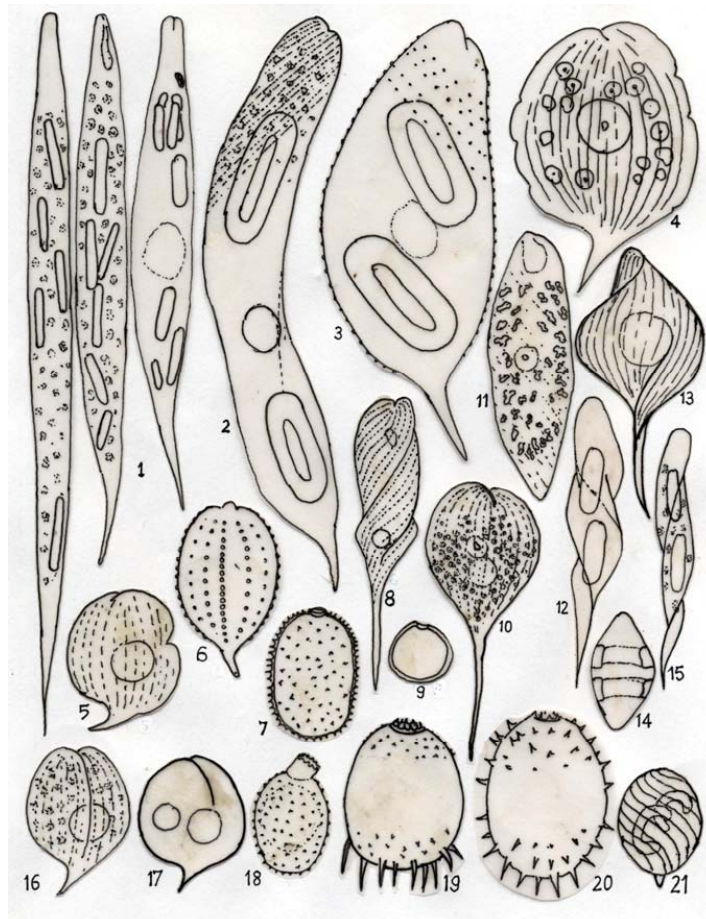
Prescott, G.W. 1951, P. 411, Pl. 83, Fig. 26.

Test broadly ovate, 40 μm long, 30 μm diameter; flagellum aperture without collar but with circle of erect spines; wall spiny; spines stout and sparsely distributed in anterior and posterior region.

Collection No. and Date: B-53, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: New record for Nepal.



Explanation of figures

Fig. 1: *Euglena acus* Ehr. (x850), Fig. 2: *Euglena oxyuris* Schm. (x950), Fig. 3: *Phacus spirogyra* Drez. var. *maxima* Prescott (x950), Fig. 4: *Phacus birgei* Prescott (x750), Fig. 5: *Phacus pseudowirenkoi* Prescott (x945), Fig. 6: *Phacus suecicus* Lemm. (x900), Fig. 7: *Trachelomonas hispida* (Perty) Stein (x950), Figs. 8 & 13: *Phacus helicoides* Pochmann (x750), Fig. 9: *Trachelomonas volvocina* Ehr. (x900), Fig. 10: *Phacus longicauda* (Ehr.) Duj. (x500), Fig. 11: *Euglena sanguinea* Ehr. (x750), Figs. 12 & 15: *Euglena tripteris* (Duj.) Klebs (x880), Fig. 13: *Phacus helicoides* Pochmann (x750), Fig. 14: *Lepocinclis fusiformis* (Carter) Lemm. (x600), Fig. 16: *Phacus pleuronectes* (Muell.) Duj. (x500), Fig. 17: *Phacus Curvicauda* Swir. (x750), Fig. 18: *Trachelomonas similis* Strok, Fig. 20: *Trachelomonas armata* (Ehr.) Stein var. *steinii* Lemm. (x1100)

15. *Trachelomonas hispida* (Perty) Stein (Fig. 7)

Prescott, G.W. 1951, P. 414, Pl. 83, Fig. 35; Tiffany, L.H. and M.E. Britton 1952, P. 327, Pl. 88, Fig. 1027; Ioriya, T. 1988, P. 33, Fig. 11.

Test ovoid to oblong, 31 μm long, 21 μm diameter, thickly covered with short spines, collar slightly raised.

Collection No. and Date: B-56, 22-08-2007.

Locality: Pond at Mahendra Morang Campus.

Distribution: Taudaha lake, Kathmandu (Hickel, 1973b); Pool at Balaju, Kathmandu (Ioriya, 1988).

16. *Trachelomonas similes* Stokes (Fig. 18)

Prescott, G.W. 1951, P. 417, Pl. 84, Fig. 12; Pl. 85, Figs. 10, 13; Tiffany, L.H. and M.E. Britton 1952, P. 327, Pl. 88, Fig. 1031.

Test oblong-ellipsoid, 26-35 μm long, 14-19 μm diameter; wall roughened by irregular shaped granulations, flagellum aperture in a curved collar bearing irregular teeth.

Collection No. and Date: B-53, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: New record for Nepal.

17. *Trachelomonas volvocina* Ehrenberg (Fig. 9)

Prescott, G.W. 1951, P. 419, Pl. 83, Fig. 1; Tiffany, L.H. and M.E. Britton 1952, P. 326, Pl. 88, Fig. 1026; Ioriya, T. 1988, P. 33, Fig. 9.

Test globose, 14-16 μm in diameter, flagellum aperture without a collar, wall smooth, yellowish.

Collection No. and Date: B-56, 22-08-2007.

Locality: Pond at Mahendra Morang Campus.

Distribution: Rupa, Phewa, Begnas and Khaste lakes, Kaski (Hickel, 1973a).

Genus: *Lepocinclis* Perty 1849

18. *Lepocinclis fusiformis* (Carter) Lemmermann (Fig. 14)

Prescott, G.W. 1951, P. 406, Pl. 89, Figs. 1-4.

Cells broadly fusiforms, 30 μm long, 16 μm broad; Periplast spirally striated; paramylon bodies 2, circular incomplete rings.

Collection No. and Date: B-52, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: A fish pond at Hedauda (Sahay *et al.*, 1993).

19. *Lepocinclis ovum* (Ehrenberg) Lemmermann (Fig. 21)

Prescott, G.W. 1951, P. 407, Pl. 89, Figs. 5-6; Tiffany, L.H. and M.E. Britton 1952, P. 322, Pl. 88, Fig. 1025.

Cells broadly ovate with short, blunt caudus, 30 μm long, 21 μm broad, rounded both anteriorly and posteriorly; periplast spirally striated; paramylon bodies 2, circular incomplete rings.

Collection No. and Date: B-52, 19-08-2007.

Locality: Roadside ditches at Navintol.

Distribution: New record for Nepal.

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