

RESEARCH ARTICLE

New Records of *Euglena acus* (O.F. Müll.) Ehr. and *Phacus acuminatus* (A. Stokes) Huber-Pestalozzi of Euglenineae from Hooghly District, West Bengal

Nilu Halder and Sankar Narayan Sinha*

Dept. of Botany, University of Kalyani, Kalyani-741235, West Bengal, India
sinhasn62@yahoo.co.in*, +91 9038371368

Abstract

Algal samples were collected from pond and canal waters of Hooghly district of West Bengal for characterization and identification. A total number of two Euglenophycean taxa namely *Euglena acus* (O.F. Müll.) Ehr. and *Phacus acuminatus* (A. Stokes) Huber-Pestalozzi belonging to the genera *Euglena* Ehr. and *Phacus* Durjardin respectively under the order Euglenales of Euglenineae from Hooghly district, West Bengal, India had been morpho-taxonomically described with ecological note and significance. Identification of various taxa was done following the authentic literatures. The physico-chemical parameters pertaining to algal growth in different water bodies were recorded. The temperature of the water bodies of Hooghly district varied between 25°C and 30°C which favors the growth of freshwater algae in these water bodies. Other physico-chemical parameters such as pH, DO, phosphate, nitrate, BOD and total hardness were found to be congenial for the luxuriant growth of both the algal genera. Based on morpho-taxonomic description, the present study indicates new records of two species namely *Euglena acus* (O.F. Müll.) Ehr. and *Phacus acuminatus* (A. Stokes) Huber-Pestalozzi belonging to the genera *Euglena* Ehr. and *Phacus* Durjardin respectively under the order Euglenales of Euglenineae from Hooghly district, West Bengal which are new records of the said district. Both the genera are most important single-celled, flagellated, bright green euglenoids. *Euglena* Ehr. is elongated and acicular with gradually pointed short tail whereas, *Phacus* Durjardin is oval-shaped with short bent, spine-like tail. Both *Euglena* and *Phacus* are planktonic in nature and are generally found in summer season.

Keywords: Euglenophycean, *Euglena acus*, *Phacus acuminatus*, Hooghly district, physico-chemical parameters.

Introduction

Members of Euglenophyceae are commonly found in fresh waters rich in organic materials and are one of the popularly recognized groups of flagellates that serve as powerful indicators of water quality (Hosmani, 2012). The important contributions to the field of algal taxonomy of Euglenineae in the succeeding decades include those of Suxena (1955) from Hyderabad, Kamat (1961, 62a, 63, 64, 68a, 75, 86), Kamat and Freitas (1976) from Nagpur, Pandey and Pandey (1980) from Allahabad, Patel and Waghodekar (1981) from Gujarat, Ashtekar (1982) from Aurangabad, Trivedi (1982) from Jaipur, Hegde and Bharathi (1983, 86), Hosmani and Bharati (1983) from Karnataka, Somashekar (1984a) from effluent of Yeast manufacturing plant, Chaudhary and Prasad (1984) from Varanasi, Khan (1985) from Sultanpur, Pandey (1985) from Bareilly, Bhoge and Ragothaman (1986b) from Jalgaon, Saha and Pandit (1987) from Bhagalpur and Santra *et al.* (1989) from West Bengal. Other noteworthy publications include those of Habib and Pandey (1990), Shaji and Patel (1991, 94), Gupta and Srivastava (1993a, 1993b, 1994, 1995), Patralekhii (1994), Gupta (1995), Shaji *et al.* (1995), Banerjee and Santra (2001), Nandan *et al.* (2004), Ratha *et al.* (2006) and Barinova *et al.* (2012).

Although a commendable works have been carried out by large number of workers on Euglenineae throughout the different parts of India, but scanty information is available from the state of West Bengal. Due to this reason, an attempt has been made to explore some Euglenophycean species of this state as well as from Hooghly district for future records.

Materials and methods

Sample collection: Algal samples were collected in sterilized glass containers from different places viz. pond waters at Chandannagore (22.87°N, 88.38°E) and Bandel (22.92°N, 88.37°E) as well as canal water of Khamargachi (22.99°N, 88.40°E) of Hooghly district (20°30'32"-23°1'20"N and 87°30'20"-80°30' 15"E) in West Bengal (Fig. 1) during 2010-2011.

Sample identification: Detailed study was made by examining the specimens under Olympus microscope (Model-CH20i) for description of species. Samples were preserved in 4% formalin. Identifications of different taxa were accomplished with the help of authentic literatures viz. Philipose (1982), Prescott (1982), Hegde and Bharathi (1983), Shaji and Patel (1991, 94), Ratha *et al.* (2006) and Hosmani (2008, 12).

Fig. 1. Map of study site.

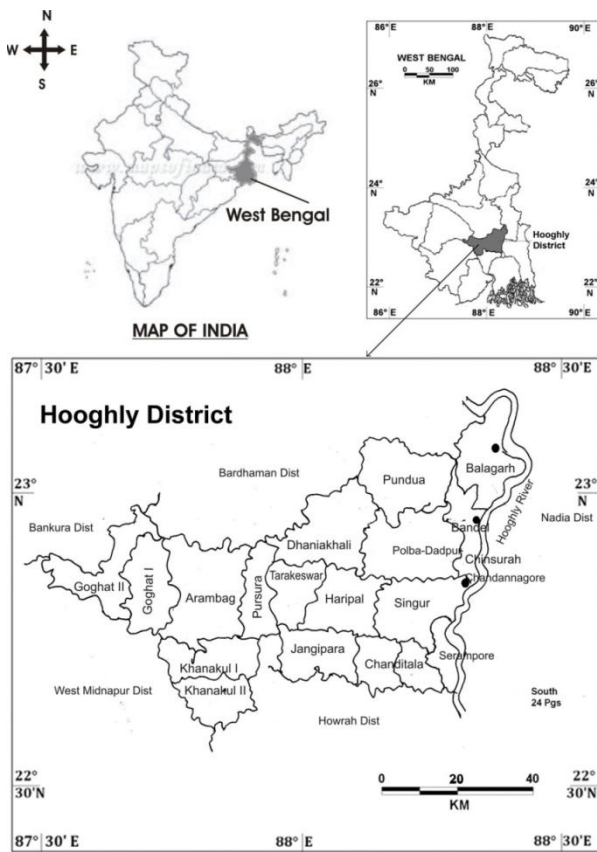
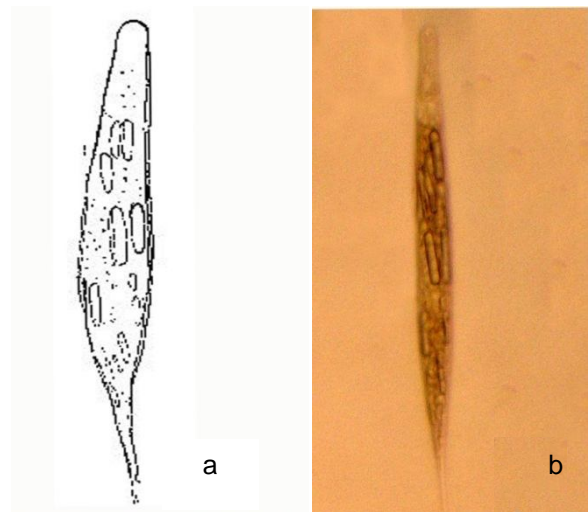


Fig. 2a and b. *Euglena acus*.



Genus: 1. *Euglena* Ehr.
Order: Euglenales
Family: Euglenaceae
Genus: 1. *Euglena* Ehr.

1. *Euglena acus* (O.F. Müll.) Ehr. in Abh. Königl. Akad. Wiss. Berlin 1830: 39.1830 (Figs. 2a and b).
Huber-Pestalozzi, Das phytoplankton des Süßwassers. 96. Fig. 75. 1955.
Vibrio acus O.F. Müll., Anim. Infus. 59. 1786.

Description: Cells sub-cylindrical to elongated or fusiform; 175.5-177.3 µm long and 10.9-12.8 µm broad; posterior end tapering and pointed with a short tail; pellicle firm, colorless without flexibility, no change of shape on stimulation; flagella one; chloroplast pale green, many, discoid; paramylon bodies 7-10, rod shaped; 4.87-7.31 µm long and 2.1-3.5 µm broad; nucleus one in each cell, eye spot red and ovoid.

Habitat: Pond water at Chandannagore and canal water at Khamargachi (Balagarh block).

Collection No.: 709, 1048.

Date: 01.10.10, 10.03.11

Ecological notes: Planktonic, free swimming; Pond water of Chandannagore: Water temperature; 25°C, pH; 7.6, NO₃-N; 0.3, PO₄; 0.20, DO; 7.6, BOD; 3.8, Total Hardness; 138.0.

Canal water of Khamargachi: Water temperature; 25.7°C, pH; 7.41, NO₃-N; 0.17, PO₄; 0.23, DO; 7.31, BOD; 3.13, Total Hardness; 98.0.

Significance: Algae belonging to this group act as primary producer and a component of aquatic food chain.

Genus: 2. *Phacus* Durjardin
Order: Euglenales
Family: Euglenaceae
Genus: 2. *Phacus* Durjardin

The pH and temperature of the water bodies were determined at the site immediately after collection with the help of portable pH meter (Model no. PP9046 Philips, India) and Zeal's (UK) mercury thermometers. The other ecological parameters such as nitrate-nitrogen, phosphate, dissolved oxygen, BOD and total hardness of water were determined following the standard methods of APHA (2005).

Results and discussion

A total number of two newly recorded Euglenophycean taxa namely *Euglena acus* (O.F. Müll.) Ehr. and *Phacus acuminatus* (A. Stokes) Huber-Pestalozzi belonging to the genera *Euglena* Ehr. and *Phacus* Durjardin respectively under the order Euglenales of Euglenineae from Hooghly district, West Bengal had been morpho-taxonomically described with ecological note and significance for the first time. Each currently accepted name had been provided with its author(s) name. All parameters except temperature and pH in ecological notes were indicated as mg/L.

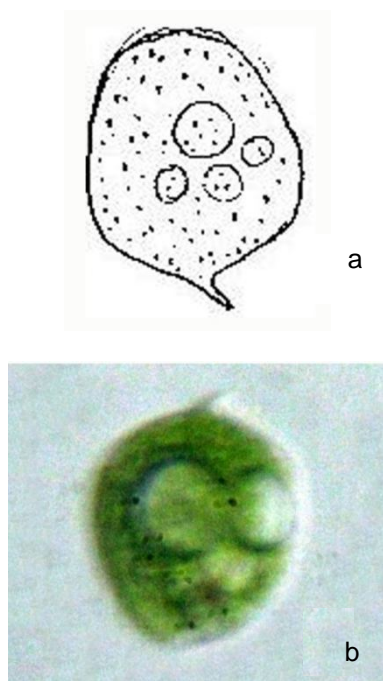
Morphotaxonomic description:

Key to genera:

1a. Cells fusiform or often elongate, metabolic, paramylon bodies of diverse shape and changing in shape when they move-1. *Euglena* Ehr.

1b. Cells compressed, rigid, never metabolic and not changing in shape when they move-2. *Phacus* Durjardin.

Fig. 3a and b. *Phacus acuminatus*.



1. *Phacus acuminatus* (A. Stokes) Hub.-Pest. in L. Thienem. (ed.), Die Binnengew.4: 192. 1955. (Figs. 3a and b).

Ratha, Jena and Adhikary in Algae 21(1): 61-73. Pl. 3. Fig. 3. 2006.

Phacus acuminata A. Stokes in Amer. Monthly Microscop. J. 6: 183.1885.

Description: Cells broadly oval to rounded; caudas short and situated at posterior end; cell 24.0-39.0 μm long and 16.0-24.0 μm broad; flattened, slightly broader at posterior portion than anterior part; posterior part with short slightly bent tail; periplast longitudinally striated; chloroplasts small, many, disc shaped; paramylon bodies 4 or several, rounded and ring like.

Habitat: Pond at Bandel and canal water at Khamargachi.

Collection No.: 1014, 1048

Date: 07.02.11, 10.03.11

Ecological notes: Planktonic, free swimming; Pond water of Bandel: Water temperature; 25°C, pH; 7.8, $\text{NO}_3\text{-N}$; 0.12, PO_4 ; 0.24, DO; 7.4, BOD; 4.0, Total Hardness; 124.0.

Canal water of Khamargachi: Water temperature; 25.7°C, pH; 7.41, $\text{NO}_3\text{-N}$; 0.17, PO_4 ; 0.23, DO; 7.31, BOD; 3.13, Total Hardness; 98.0.

Significance: Algae belonging to this group act as primary producer and a component of aquatic food chain.

Conclusion

The present study revealed the new report of the two species belonging to the two genera *Euglena* Ehr. and *Phacus* Durjardin.

These species had been described with systematic position, author citation, description, habitat, collection number along with dates, ecological note and significance for the first time from the district Hooghly of West Bengal, India that could be used to make a comprehensive floristic account of algal flora and preparation of algal data bases of the state as well as country.

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