BIOGLOBIA Vol. 3 (2): 50 – 55, 2016 **ISSN: 2349-5626**

Morphotaxonomic study of the genus *Euglena* (Euglenineae) from freshwater fish ponds of Darbhanga, Bihar

S. K. BOSE AND A. N. KARGUPTA

P. G. Department of Botany, L. N. Mithila University, Darbhanga – 846004, India. sagardeep819@gmail.com

ABSTRACT

The present communication deals with morphotaxonomy of 8 taxa of the genus *Euglena* (Class Euglenineae; Family *Euglenaceae*) collected from fresh water fish ponds of Darbhanga during 2008-2009.

Keywords: *Morphotaxonomy, Euglena, Fish ponds, Darbhanga*

INTRODUCTION

Most of the members of *Euglenaceae*(Fritsch, 1935) are holophytic in nature. Euglena is one of the 12 genera of the family, which is unicellular, flagellate and mixotropic in nature. They are common bloom forming algae of freshwater habitats. Very often they mark their presence in salt water also.

The presence of pyrenoids (protein core surrounded by starch plates), an eye epot (stigma) and absence of cell wall are its characteristic features. The autotropic and heterotropic type of nutrition of the alga (a mixotropic form) depending upon the incidence of light, put it in a controversial status of plants and animals. This is one of the features which compelled Whittaker (1969) to revise the classification and advocated for a 5-kingdom concept.

While reviewing the work done on *Euglenaceae* in the past it was observed that the available data in the floristic account of this genus in India are mostly due to contributions of algologists from Maharashtra, Karnataka and Uttar Pradesh during 1960's and 1980's. Available reports also confirm that no sincere effort has been made to study the genus in eastern India barring a few references (Saha and Pandit, 1987; Santra *et al*., 1989).

.In view of our very knowledge about the alga, the present study was planned and a few members of the genus encountered during collection from freshwater bodies of Bihar are processed and identified which are described and illustrated in the present communication.

MATERIALS AND METHODS

Algal materials were collected from diverse types of water bodies in plastic vials. They were preserved in Lugol's Iodine solution. Glycerin (10%) was added in the vial to produce the material from desiccation. In the laboratory the materials are taken out, washed and put on slide after mounting for examination. Microphotographs using Nikon Camera and Camera Lucida diagrams were taken to illustrate the materials. Keen observation of the specimen and its description in semi-technical form was done and world monographs / regional monographs and standard literature were consulted for their identification up to the level of species.

RESULTS AND DISCUSSION

Description of Species

1. *Euglenatexta* (Dujardin) Hübner (John *et al.*, 2002, p. 156, pl. 34, f. J)

Text fig. No. 1, Text Photo No. 1, 2

Cells 38.8 to 41.6 µm wide, 37.8-40.6 µm long, ovoid to spherical; anterior end slightly narrowed with a small depression at apex, posterior end broadly rounded, pellicle strongly spirally striated, chloroplasts small, numerous, without pyrenoids; paramylon bodies small, numerous, oval; flagellum 1-3 times longer than cell; eye spot red, close to reservoir; swims rapidly and not showing euglenoid movement.

Collection No. SKB 146, November 2009, collected from a pond named Harahi, Darbhanga. This species is cosmopolitan in distribution. This has been found in peat bogs also.

2. *Euglenaspirogyra* Ehrenberg var. *fusca* G.A. Klebs (John *et al.*, 2002, p. 156, pl. 34, f. K) Text fig. No. 2, Text Photo No. 3, 4.

Cells 26-30 µm wide, 126-144 µm long, longitudinally flattened with nearly parallel sides, sometimes twisted or curved; anterior end rounded, posterior end with a sharp tail-piece; pellicle brownish and markedly patterned, with rows of various sized and shaped excrescences lying almost parallel; chloroplasts numerous, small, ovoid, without pyrenoids; paramylon bodies usually forming two large clusters along with numerous smaller bodies; flagellum upto one fifth cell length, sometimes longer or occasionally absent; eye spot dark red; euglenoid movement absent or very low; cysts unknown.

Collection No. SKB 150, November 2009, collected from a pond named Harahi. This species is cosmopolitan in distribution, common in swamps, puddles, ditches and in humic water.

3. *Euglenasplendens* P. A. Dangeard (John *et al.*, 2002, p. 156, pl. 36, f. K) Text fig. No. 3, Text Photo No. 5.

Cells 35 µm wide, 71 µm long, spindle-shaped to broadly spindle-shaped; anterior end rounded, posterior end narrowing to a short tail piece; pellicle striated, lying beneath are several small mucilage bodies; chloroplasts numerous, dissected and plate-like with arms lying parallel to striae, each with a double sheathed pyrenoid; paramylon bodies small, numerous, spherical or ellipsoidal; flagellum 1.5-2 times longer than cell; eye spot long, conspicuous; palmelloid stage observed, thick-walled cysts unknown.

Collection No. SKB 153, November 2009. Collected from a pond named Zilla School Pond. Also found in South India (Naidu and Vanamala, 1996).

4. *Euglenaproxima* P. A. Dangeard (John *et al.*, 2002, p. 155, pl. 35, f. B) Text fig. No. 4, Text Photo No. 6, 7.

Cells 14 µm wide, 47.6 µm long.Spindle-shaped; anterior end slightly bluntly truncate, posterior end tapering to a short, hyaline tail-piece; pellicle distinctly spirally striated; chloroplasts numerous, disc-shaped, without pyrenoids; paramylon bodies small, cylindrical or ellipsoidal, sometimes ring-like; flagellum about 1.5 times of cell length; division in palmelloid stage.

Collection No. SKB 153, November 2009. Collected from a pond of Zilla School campus. Apart from this area this species also reported from Maharashtra (Kamat, 1968a); Chhatisgarh (Ray and Sen, 1985).

5. *Euglenaspirogyra* Ehrenberg (John *et al.*, 2002, p. 156, pl. 34, f. L) Text fig. No. 5, Text Photo No. 8.

Cells 8.68 µm broad, 104.16 µm long, longitudinally spindle-shaped and sometimes flattened, with sides nearly parallel; anterior end bluntly rounded, posterior end extended into a distinctly bent tailpiece, pellicle yellowish in colour and sometimes bearing rows of shining granules or beads; chloroplast numerous, small, disc-shaped, lying close together, without pyrenoids; variable numbers of small, rectangular paramylon granules present, granules usually in (2-3) clusters, one lying anterior to nucleus and another posterior to nucleus; flagellum about one-tenth to one quarter cell length; eye spot bright, relatively large and prominent; euglenoid movement in form of squirming and markedly bending, or twists a little but does not shorten.

Collection No. SKB 158, December 2009. Collected from a pond named Mataranjan. From Ahmedabad (Kamat, 1962 f) this species is also reported.

6. *Euglenaanabaena* Mainx(John *et al.*, 2002, p. 150, pl. 35, f. O) Text fig. No. 6, Text Photo No. 9.

   Cells 4.2 µm wide, 22.4 µm long, spindle shaped; anterior end rounded and narrowing to a tail-piece; pellicle slightly striated; chloroplasts 4-14, large, plate-shaped with folded edges, each with a double sheathed pyrenoid; paramylon bodies small and few; palmelloid stage observed; euglenoid movements violent.

   Collection No. SKB 102, May 2009. Collected from Ganga Sagar Tank.Cosmopolitan in nature, found also in ponds and puddles.

7. *Euglenavariabilis* G. A. Klebs (John *et al.*, 2002, p. 158, pl. 35, f. C-E) Text fig. No. 7, Text Photo No. 10.

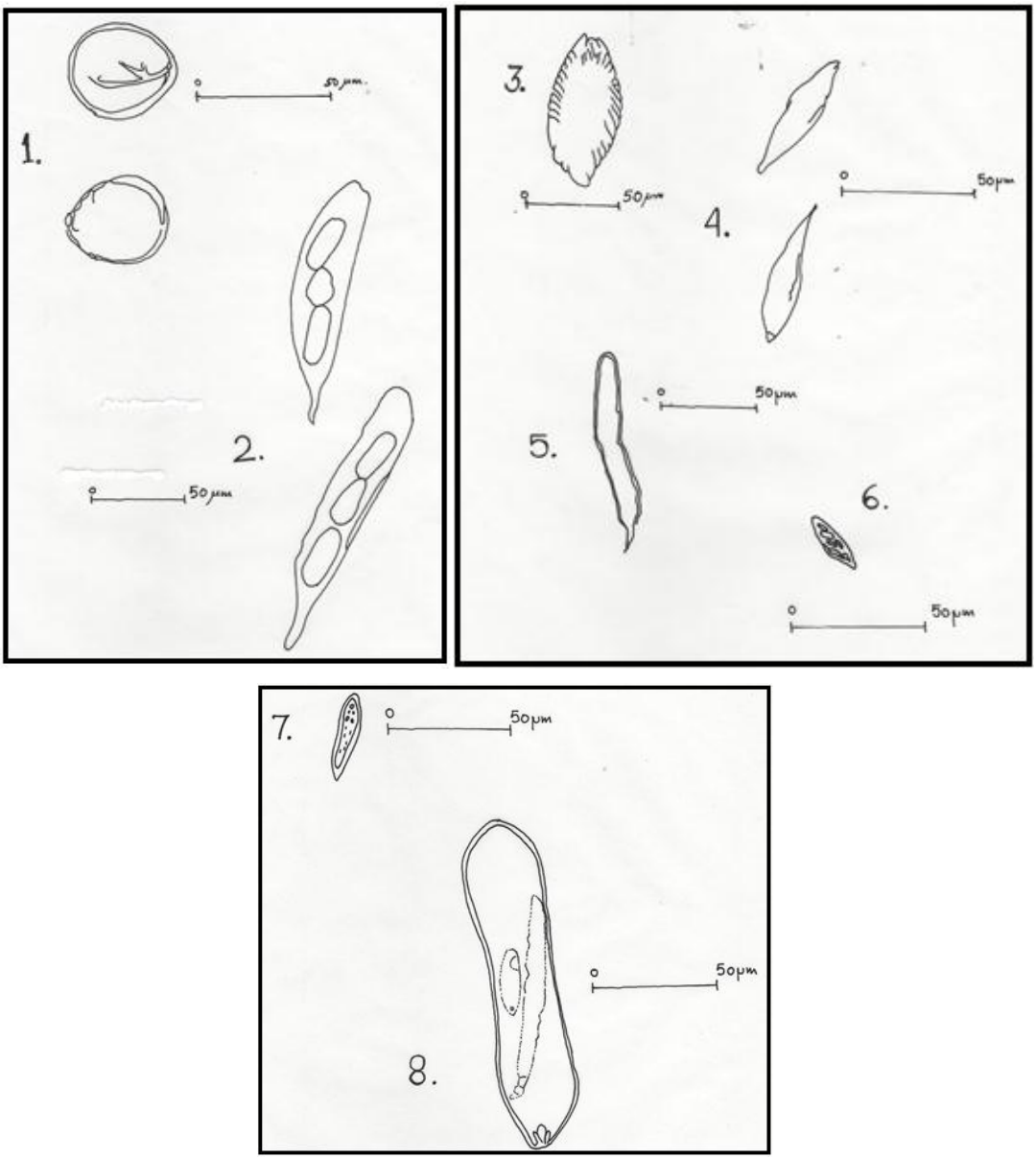
   Cells 8.4 µm wide, 30.8 µm long; shortly cylindrical to ovoid; anterior end broadly rounded; posterior end tapering to a blunt, short tail-piece, or sometimes slightly indented on side; pellicle very distinctly, spirally striated; chloroplasts numerous, disc shaped, without pyrenoids; paramylon bodies numerous, small, ellipsoidal or short and rod-shaped; eye spot large.

   Collection No. SKB 100, May 2009. Collected from the pond named Ganga Sagar. Cosmopolitan in nature.

8. *Euglenaobtuse* F. Schmitz (John *et al.*, 2002, p. 155, pl. 36, f. G) Text fig. No. 8, Text Photo No. 11.

   Cells 31.73 µm wide, 126 µm long, cylindrical and becoming pear-shaped towards both ends, with apices obtusely rounded; chloroplasts numerous, tightly packed, disc- or plate-shaped, polygonal, irregularly lobed at edges, each with a double sheathed pyrenoids; paramylon bodies small, rod shaped; flagellum not emergent; eye spot rounded; euglenoid movement always by creeping, possibly assisted by mucilage production.

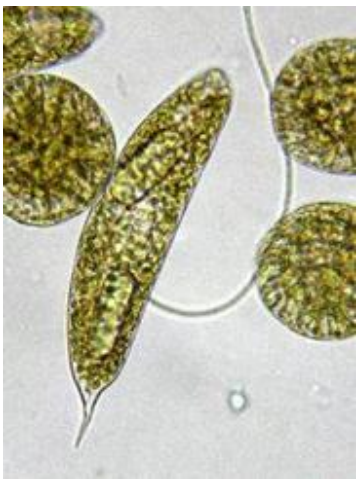
   Collection No. SKB 115, June 2009. Collected from a pond named Mandha. It is also cosmopolitan in nature.



Text fig. No. 1-8 Camera Lucida diagrams

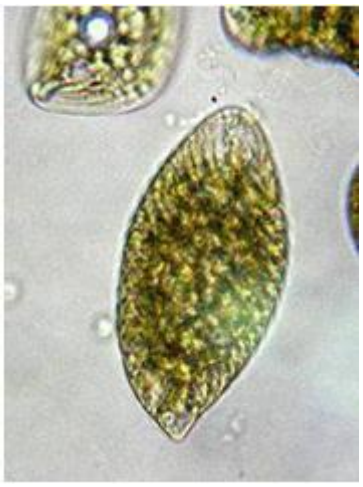
Text Photo No. 1

Text Photo No. 2



Text Photo No. 3

Text Photo No. 4

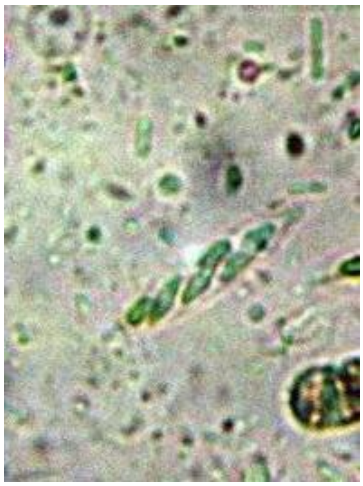


Text Photo No. 5

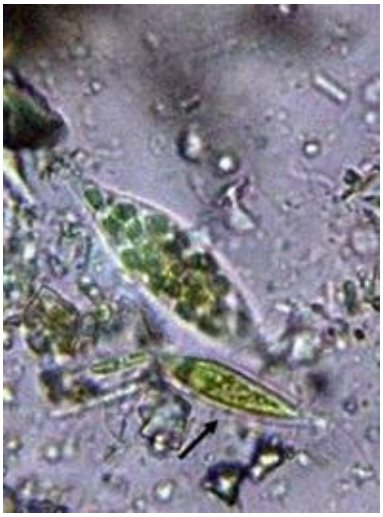
Text Photo No. 6

Text Photo No. 7

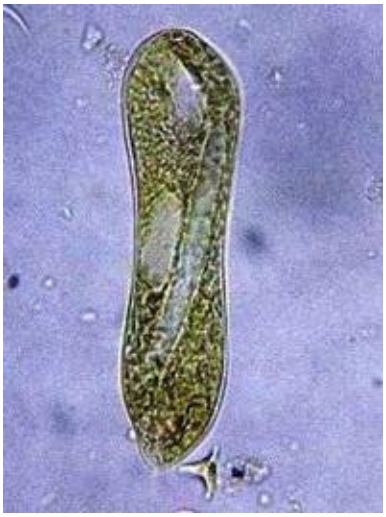
Text Photo No. 8



Text Photo No. 9



Text Photo No. 10



Text Photo No. 11

The occurrence of the genus was found both in acidic and alkaline water and it is indifferent of temperature of the habitat.

It appeared from the field records that it prefers to grow in summer and winter season of the year in tropical country like India. They also grow well in slow moving draining fed with sewage pollution. It is too early to comment on the role of the genus as indicator of pollution.

ACKNOWLEDGEMENTS

The authors are grateful to Professor and Head of the Department of Botany, Lalit Narayan Mithila University, Kameshwarnagar Darbhanga and Prof. J. P. Keshri of the Department of Botany, Burdwan University, Burdwan, for providing laboratory facilities, inspiration and advice from time to time.

REFERENCES

1. Ashtekar, P. V. 1982. Euglenophyceae of Aurangabad, Maharashtra. *Phykos*. 21:153-159.
2. Bhoge, O. N. and Ragothaman, G. 1986. Studies on the Euglenophyceae from Jalgaon region, Maharashatra. *Phykos*, 25:132-135.
3. Chaudhary, B. R. and Prasad, R. N. 1984. Euglenoid flora of Varanasi and its adjoining regions. *J. Sci. Res. B.H.U.* 34:135-140.
4. Fritsch, F. E. 1935. The Structure and Reproduction of Algae. Vol. 1. Cambridge University Press.
5. Hegde, G. R. and Bharathi, S. G. 1983. Freshwater algae near Bijapur district, Karnakata. *Phykos*. 27:4-7.
6. Hegde, G. R. and Bharathi, S. G. 1986. Ecological Studies in Ponds and Lakes of Dharwad-occurrence of Euglenoid blooms. *Phykos*. 25:62-67.
7. Hosmani, S. P. and Bharathi, S. G. 1983. Euglenineae of Polluted and Unpolluted Waters. *Phykos.* 22:130-135.
8. John, D. M., Whitton, B. A. and Brook, A. J. 2002. Phylum Euglenophyta in The Freshwater algal flora of the British Isles an introduction guide ot Freshwater and Terrestrial Algae, Publ. Cambridge University Press, New York: 144-179.
9. Kamat, N. D. 1961-62. The Euglenophyceae of Ahmedabad, India. *J. Bombay Univ.* 30:15-21.
10. Kamat, N. D. 1963. The algae of Kolhapur, India. *Hydrobiol*. 22(3-4):209-305.
11. Kamat, N. D. 1964. The Euglenophyceae of Bombay. *J. Biol. Sci.* 7(1):8-14.
12. Kamat, N. D. 1968. Algae of Alibag, Maharashtra. *J. Bombay Nat. Hist. Soc.* 65(1):88-104.
13. Kamat, N.D. 1975. Algae of Vidarbh, Maharashtra. *J. Bombay Nat. Hist. Soc.* 72(2):450-476.
14. Kamat, N. D. and Freitas, J. F. 1976. A Checklist of Euglenophyceae and Chlorophyceae of Nagpur, Maharashtra. *Phykos*. 15:121-125.
15. Kamat. N. D. 1962. The Euglenophyceae of Ahmedabad, India. J. Univ. Bombay 30:15-21.
16. Kamat. N. D. 1986. Algae of Shimla. *J. Bombay*. *Nat. Hist. Soc.* 65(1):271-277.
17. Naidu, K. and Vanamala, J. 1996. Studies on the freshwater Protozoa of South India III. Euglenoids 2. *Hydrobiologia* 27:232-236.
18. Pandey, U.. 1985. Euglenineae of sewage waters -1. *Phykos* 24:125-127.
19. Pandey, U. C. and Pandey, D. C. 1980. Freshwater Euglenineae from Allahabad. *J. Kanpur Univ. Res.* 1:247-251.
20. Roy, M. and Sen, N. 1985. Freshwater Algae of Chhatisgarh. *Phykos.* 24:76-79.
21. Saha, L. C. and Pandit, B. 1987. Pond and riverine algae of Bhagalpur. *Phykos*. 26:152-158.
22. Santra, S. C., Pal, U. C., Das, T. M., Sen, S., Saha, R., Dutta, S. and GhoshDostidar, P. 1989. Phytoplankton of Bhagirathi-Hooghly Estuary: An Illustrative Account. *Ind. Biol.* 21(1):1-27.
23. Somashekar, R. K. 1984. Algae in the effluent from Yeast manufacturing Plant. *Phykos*. 23:45-50.
24. Whittaker, R. H. 1969. New Concepts of Kingdoms of Organisms. *Science* 163:150-160.