

# MORPHOTAXONOMY OF FRESH WATER CHLOROPHYCEAN ALGAE (DESMIDS) FROM SIDDHARTH NAGAR, U.P., INDIA

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## ABSTRACT

The taxonomic study of green algae (Desmids) of district Siddharth Nagar, Uttar Pradesh, India reveals the presence of ten taxa belonging to family Desmidiaceae of the Class Chlorophyceae. The Tal Kunda pond of Siddharth Nagar district showing rich algal diversity. The present paper deals only desmidiacean taxa. These desmids taxa (*Euastrum ceylanicum*, *E. spinulosum*, *Cosmarium quadrum*, *C. awadhense*, *Staurastrum gracile*, *S. sexangulare*, *Micrasterias zeylanica*, *M. foliacea*, *Pleurotaenium ehrenbergii* and *Desmidium swartzii*) though known from other localities of India are recorded from district Siddharth Nagar, Eastern Uttar Pradesh for the first time.

**Key words:** Chlorophyceae, fresh water, Desmids.

## INTRODUCTION

Recent global surveys have revealed that scientists today have little knowledge of the aquatic flora and fauna of tropical countries through out the world. Eastern part (Siddharth Nagar) of Uttar Pradesh, India has not been explored so far for its algal resources and no work has been done on the algae of this area. Algal desmids of different regions of worlds have been studied by Prescott and Scott (1945, 1952), Prescott (1957), Brook (2001), Dingley (2001, 2002), Coesel (2002). Morphotaxonomy of fresh water desmids of different parts of India was done by Prasad and Mehrotra (1977 a, b), Prasad and Misra (1984 a, b, 1985 a, b, 1992), Prasad *et al.* (1980, 1984), Misra *et al.* (2001, 2002 a, b, c, 2003). District Siddharth Nagar is situated in the eastern region of Tarai belt in Uttar Pradesh, India. Siddharth Nagar is surrounded by Basti (South), Balrampur (West), Gorakhpur, Maharaj Ganj

(East) and Nepal (North). According to Statistical Diary of U.P. Government (2000), total coverage area of the district is 2956.0 sq km rainfall is 1376 mm, and maximum temperature 43.4°C and minimum 5.2°C. The district Siddharth Nagar is geographical located between longitude 82° 25' - 83° 17' E, latitude 26° 55' - 27° 3' N.

## MATERIALS AND METHODS

Algal samples were collected with the help of planktonic mesh net in one liter bottle and presented in 4% formalin. Desmids algae were stained with iodine and mounted in glycerin. Detailed studies were made under Nikon Labophot microscope E- II with camera attachment. Twenty samples were collected from Tal Kunda pond on 22 March 2003. The samples are deposited in the herbarium of Phycology Laboratory, Department of Botany, University of Lucknow, India.

### Morpho-Taxonomic Descriptions

Class - Chlorophyceae

Order - Conjugales

Family - Desmidiaceae

Genus - *Euastrum* Eher.

*Euastrum ceylanicum* (West and West) Krieg (fig. 7)

Scott, A.M. and G.W. Prescott. 1961. p. 24, pl. 11 figs. 3-5.

Cells longer than broad, constricted sinus, semi cells three lobed, isthmus linear lateral wall with short spines, long cells 36  $\mu\text{m}$ , lat. cells 29-31  $\mu\text{m}$ , isthmus 8-9  $\mu\text{m}$ .

*Euastrum spinulosum* Delp. (figs. 1, 6)

Prasad, B.N. and P.K. Misra. 1992. p. 136, pl. 19, fig. 10.

Cell small, slightly longer than broad, deeply constricted, sinus narrow and linear, semi cell 5 lobed, lateral lobed rounded and furnished with 5-6 small and acute spines, polar lobed small, broadly truncate with a shallow median notch and angle furnished with 3 small and acute spines, cell wall granulate within the polar and lateral lobes, each semicell with a rounded, central protuberance consisting of two rows or relatively larger granules. Long cell 45-50  $\mu\text{m}$ , lat. cell 40-45  $\mu\text{m}$ , lat. isthmus 10  $\mu\text{m}$ .

Genus - *Cosmarium* Corda ex Ralf

*Cosmarium quadrum* Lund. (fig. 5)

Prasad, B.N. and P.K. Misra. 1992. p. 178, pl. 23, figs. 1, 2.

Cell rather small, quadrate nearly as long as broad, deeply constricted sinus narrowly linear with dilated, extremities, semicell sub-rectangular, basal and apical angle rounded, side convex, apex slightly retuse, cell wall granulate with single chloroplast, long cells 34-37  $\mu\text{m}$ , lat. cells 35-38  $\mu\text{m}$ , lat. isthmus 8-9.5  $\mu\text{m}$ .

*Cosmarium awadhense* Prasad et Mehrotra (fig. 3)

Prasad, B.N. and P.K. Misra. 1992. p. 153, pl. 21, fig. 17.

Cells slightly longer than broad, constricted deep, sinus narrowly linear, semicell sub-semicircular, side with crenation, apex truncate with more or less straight margin, cell wall smooth, each semicell with single chloroplast. Long cell 50  $\mu\text{m}$ , lat. cell 40  $\mu\text{m}$ .

Genus-*Staurastrum* Mayen

*Staurastrum gracile* Ralfs (figs. 2, 4)

Prasad, B.N. and P.K. Misra. 1992. p. 196, pl. 25, figs. 7-11.

Cell of medium size, about 2.2 times longer than broad width (excluding the process), depressed, constriction shallow with an acute notch, semicells some what broadening towards the slightly convex apex, apices showing undulate margins and relatively shorter and emerginate processes tipped with 2-3 concentric row of dentations, top view triangular with dentations within the lateral margins. Long cell 35  $\mu\text{m}$ , lat. cell 35-40  $\mu\text{m}$ .

*Staurastrum sexangulare* Lund (fig. 9)

Scott, A.M. and G.W. Prescott. 1961. p. 107, pl. 46, fig. 34

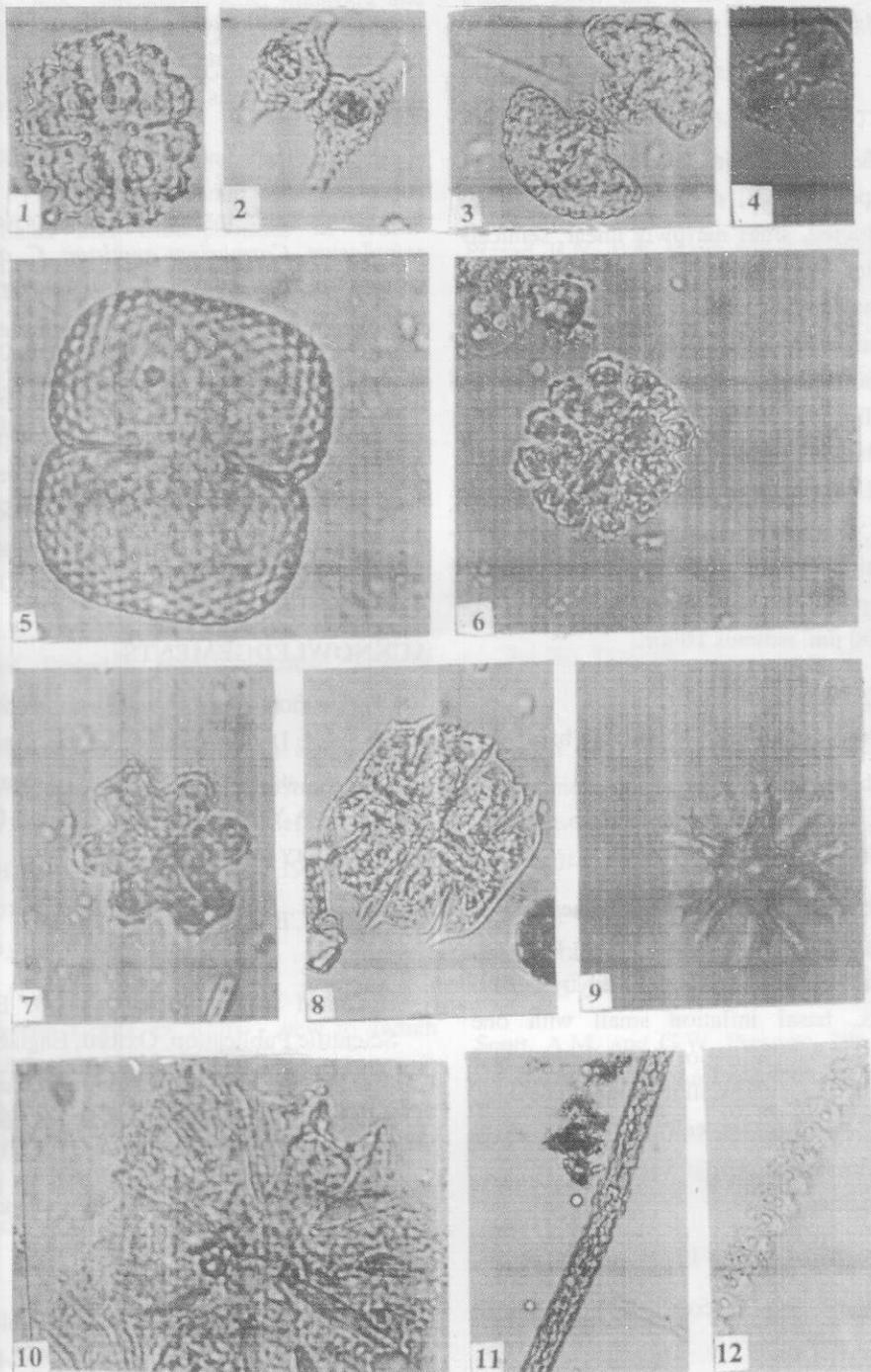
Cells longer than broad, median constriction deep in top view, cells with 5 radiate process, long cells 31.4  $\mu\text{m}$ , lat. Cell with process 70  $\mu\text{m}$ , isthmus 12  $\mu\text{m}$ .

Genus- *Micrasterias* Ag.

*Micrasterias zeylanica* Fritsch (fig. 8)

Prasad, B.N. and P.K. Misra. 1992. p. 147, pl. 20, fig. 5.

Cell rather small, almost as long as broad, deeply constricted sinus narrowly linear and slightly open outwards, semicell scarcely 5 lobed, incision between the polar and lateral lobes deep and slightly open, incision between the lateral lobes rather shallow, polar lobe broadly cuneate with faintly retuse outer margin, polar and lateral angles somewhat acuminate, each furnished with a small, inclined and subacute spine, cell wall smooth. Long and lat. cell 50  $\mu\text{m}$ , isthmus 8  $\mu\text{m}$ .



**Figs. 1-12.** (1. *Euastrum spinulosum* Delp. X 700, 2. *Staurastrum gracile* Rolf X 100, 3. *Cosmarium awadhense* Prasad et Mehrotra X 800, 4. *Staurastrum gracile* Ralf X 100, 5. *Cosmarium quadrum* Lund. X 100, 6. *Euastrum spinulosum* Delp. X 500, 7. *Euastrum ceylanicum* (West and West) Krieger X 700, 8. *Micrasterias zeylanica* Fritsch X 200, 9. *Staurastrum sexangulare* Lund X 500, 10. *Micrasterias foliacea* Bail X 200, 11. *Pleurotaenium ehrenbergii* (Berb.) de bary X 500, 12. *Desmidium swartzii* Ag. X 700).

*Micrasterias foliacea* Bail (fig. 10)

Prasad, B.N. and P.K. Misra. 1992. p. 141, pl. 20, fig. 6.

Cell rather small, united in filaments by interlocking of polar lobes, rectangular in outline, deeply constricted, sinus narrowly linear, semicell 5 lobed, polar lobe exerted, basal parts of polar lobe with sub parallel side, upper part greatly expanded and anvil shaped with an excavation in the median portion, base of excavation exhibits to asymmetrically produce spines of unequal length, polar and lateral angle uncinately lateral lobes asymmetrical, superior lobes divergent, inferior horizontally disposed incision, simple and sub acuminate, the ultimate lobelets with truncate emergent apices, cell wall smooth. Long cell 70  $\mu\text{m}$ , lat. cell 90  $\mu\text{m}$ , isthmus 10  $\mu\text{m}$ .

Genus- *Pleurotaeniufn* Naeg.

*Pleurotaenium ehrenbergii* (Berb.) de bary (fig. 11)

Tiffany, L.H. and M.E. Britton. 1952. p. 180, pl. 55, figs. 607-608.

Cells fairly large about 15-20 times longer than broad, sub cylindrical constricted at the base, semicells cylindrical, gently attenuated from base towards apex, basal inflation small with one undulations apex with a ring of 8-10 tuberos (4-5 visible in front view), cell wall minutely punctate, long cells 393-416  $\mu\text{m}$ , lat. cell 20-28  $\mu\text{m}$ , lateral apex 12-19  $\mu\text{m}$ .

Genus- *Desmidium* Ag.

*Desmidium swartzii* Ag. (fig. 12)

Scott, A.M. and G.W. Prescott. 1961. p. 125, pl. 63, fig. 8.

Cell rather small, united in to spirally twisted filaments lacking gelatinous sheath, cell twice as broad as long narrowly rectangular, moderately constricted with open sinus, semicell oblong with

more or less obliquely rounded, cell wall smooth, chloroplast axile and disposed in relation to two pyrenoids, long cells 14-15  $\mu\text{m}$ , lat. cell 27-33  $\mu\text{m}$ .

## DISCUSSION

Ten desmids taxa - *Euastrum ceylanicum*, *E. spinulosum*, *Cosmarium quadrum*, *C. awadhense*, *Staurastrum gracile*, *S. sexangulare*, *Micrasterias zeylanica*, *M. foliacea*, *Pleurotaenium ehrenbergii* and *Desmidium swartzii* are recorded from Tal Kunda pond of Siddharth Nagar district. Desmids are found only in fresh water habitats particularly in lentic water bodies. No representative is known from marine environment. They prefer slightly acidic pH and oligotrophic environment (Brook 1981).

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