Fresh water planktonic algae from Basti, Uttar Pradesh

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The present paper deals with 34 species of 12 genera of fresh water planktonic algae. The forms belong to Cyanophyceae and Chlorophyceae. Since the algal flora of Basti District has not been reported earlier, all the taxa described in this paper constitute new records from the area.

Key-words– Algae, Cyanophyceae, Chlorophyceae, Basti, Uttar Pradesh, India

INTRODUCTION

RECENT global surveys have revealed that scientists today have little knowledge about the aquatic flora and fauna of tropical countries. The same applies to our country specially to the Northern part of Uttar Pradesh where fresh water algae have not been studied in the sufficient details. Prasad and Mehrotra (1977), Srivastava and Srivastava (1990), Prasad and Misra (1992), Prasad and Srivastava (1992) have given a detailed account of the earlier work done on the fresh-water algae of our country.

Prasad and Singh (1996) have worked on algal indicators of water pollution. Verma *et al.*, (1998) have edited a book on Advances in Phycology. This work deals with different aspects of algae. Gandhi (1999) has given a detailed account of fresh water diatoms of central Gujarat. Verma *et al.* (1996, 2000) have worked on lotic algae of river Gomati, Lucknow. Suseela and Dwivedi (2001) have recorded 42 taxa of class Chlorophyceae and Xanthophyceae from Mahoba District of Bundelkhand region of Uttar Pradesh.

During the present investigation algal samples were collected from different localities of District Basti, U.P. (Text-fig. 1). Main localities are Bakhira Lake and Chando pond. Lake Bakhira falls in Dhadya Gram Sabha and geographically located between 26° 51' 30" to 26° 55' 15" north latitude and 83° 5' 30" to 83° 10' 30" east longitude, moving 3 km towards north on a branch metallic road from "Bakhira Market" which lies on main Mehdawal Khalilabad metallic road. Chando Pond is approximately 7 km long and 8 km. wide and is about 12 km from district Basti Headquarter. It is surrounded by the forest Kothare and village Ramgarh, Kuhrawa, Pokhara, Ramapur, Naghera, Barona, Nagarkhas, Hathia and Ugrasenpur, etc.

District Basti is situated in north-eastern part of Tarai and Bhabar belt in Uttar Pradesh. It is surrounded by Faizabad (south) Gonda (west) Gorakhpur (east) and Nepal (north), Map I.

During the present investigation a total of 34 species belonging to 12 genera were identified. These genera belong to class Cyanophyceae and Chlorophyceae. Names of various genera (with number of species of each genus in parenthesis, are as follows:-

Gloeocapsa (1), *Chlorococcum* (1), *Coelastrum* (2), *Oocystis* (1), *Pediastrum* (3), *Scenedesmus* (8), *Arthodesmus* (1), *Cosmarium* (10), *Closterium* (1), *Euastrum* (2), *Micrasterias* (3), *Staurastrum* (1).

So far, no work has been done on the algal flora of Basti district, hence all these forms constitute new records from the area.

SYSTEMATIC DESCRIPTION

Class – Cyanophyceae

Order – Chroococcales

Family – Chroocaceae

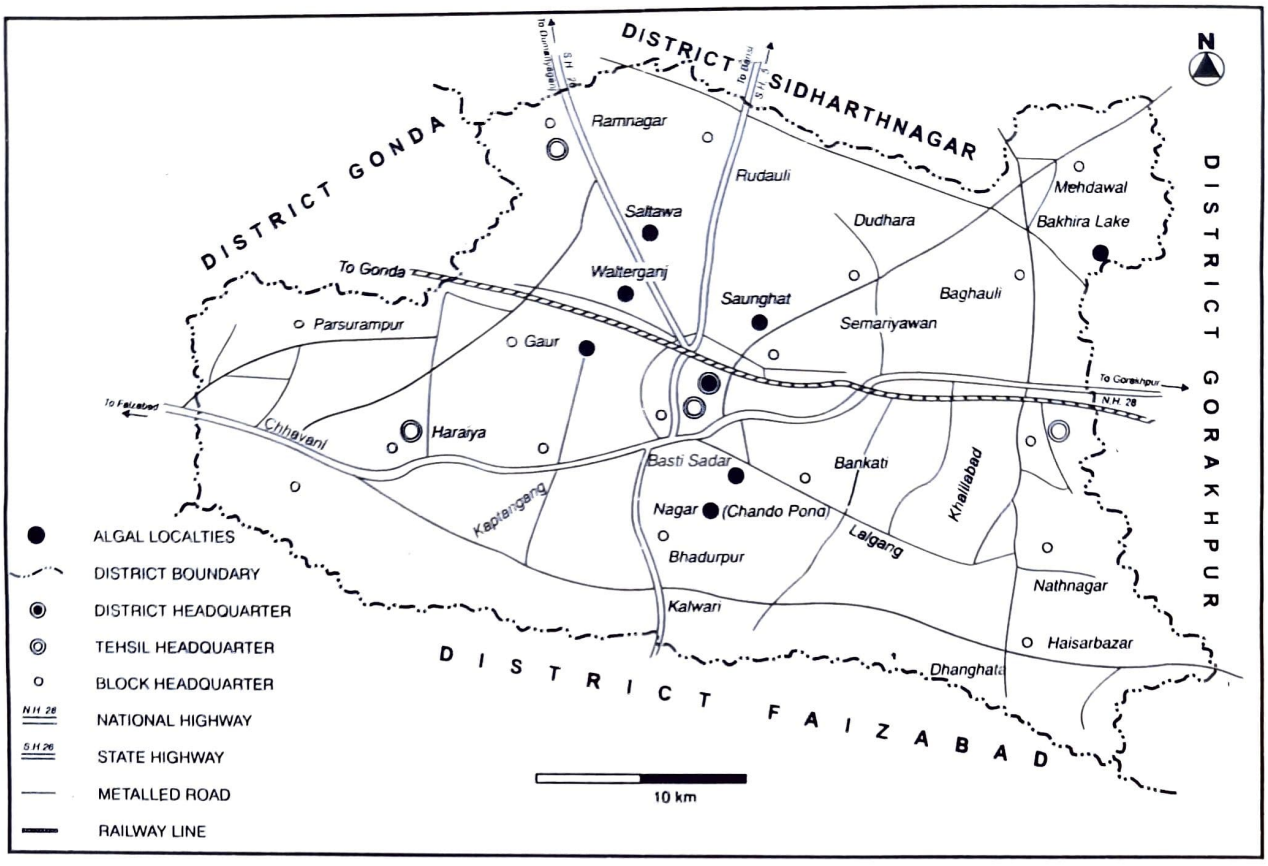
Genus – *Gloeocapsa* Kuetz 1843

Gloeocapsa sp.

Pl. 1, Fig. 13, Pl. 2, Fig. 13, Pl. 25

Prasad, B.N. & Srivastava, M.N. (1992), p. 33.

Thallus crustaceous, leathery, lubricous or



Map of district Basti showing the locations of algal samples

mucilagenous, expanded, brownish green, cells spherical or ovoid arranged irregularly forming colonies which may be single or many together forming expanded masses. Each cell with distinct, lamellated sheaths, cell contents coloured homogenous, cell division in all three directions, reproduction by fragmentation occasionally with nannocytes.

Diameter = 4-6.5 µm

Locality = Chando Pond

Coll. No. & Date = BT/II 1, 2, 3, 4, 5, 6, 7, 14, 16, 46 (1/5/99)

Class – Chlorophyceae

Order – Chlorococcales

Family – Chlorococcaceae

Genus – *Chlorococcum* (*Hypnomonas*) Starr 1955

Chlorococcum sp.

Pl. 2, Fig. 19

Philipose, M.T., 1967, p. 72.

Cells solitary or aggregated in temporary colonies of indefinite form and never imbedded in gelatine, spherical to ellipsoid cell-wall smooth, some-times thickening with age. Chromatophore a parietal sphere with or without a unilateral opening and with one to many pyrenoids. Cells with or without contractive vacuoles, uninucleate or multi-nucleate. Old cells some times with range. Reserve starch and oil also some times present. Hypospoes with spiny walls some-time formed.

Asexual reproduction by aplanospores or zoospores formed by progressive cleavage of chloroplast.

Diameter = 3-24 µm

Locality = Chando Pond.

Coll. No. & Date = BT/II 6, 11, 14, 16, 17 (1/5/99)

Family– Hydrodictyaceae

Genus – *Pediastrum* Meyen 1829

Pediastrum duplex Meyen.

Pl. 1, Fig. 10

Philipose, M.T. 1940, P.161, Pl.2, F.41.

Colonies usually of 16-32, occasionally of 4, 8, 64, or 128 cells with small lens shaped perforations between cells. Inner cell quadrate to angular and not in contact at the central portion of the side-walls. Inner side of marginal cells concave, outer-side produced in to two short truncate processes. Cells (6)-8-21 mm in diameter. 16- celled colonies up to 90 µm in diameter.

Diameter cells = 11-22 µm

Localities = Chando Pond, Rapti River, Old Rapti River

Coll. No. & Date = BT/II 1, 2, 3, 4, 6, 7, 10, 11, 14, 15, 16, 17, 46 (1/5/99) BT/II 18, 19, 33, 36, 50 (3/5/99)

Pediastrum angulosum (Ehr.) Meneghini

Pl. 2, Fig. 3

Brunnthaler, J. 1915, P. 99.

Philipose, M.T. 1967, P.118, F.39.

Colonies with out perforations, usually single layered and round, elliptical or kidney-shaped, sometimes large and two-layered with small irregular perforations. Internal cell 4-6 angled broader than long with the outer side slightly sinuous. Marginal cells broad, outer face slightly emarginate, lobes with or without short processes. Cell-wall hyaline, some-times thickened and with granulate colonies 8-28 celled with variable arrangement of cells. Cells 15-50 µm in diameter. Colonies up to 400 µm in diameter.

Localities = Chando Pond, Rapti-river, Old Rapti river.

Coll. No. & Date = BT/II 1, 2, 3, 4, 6, 7, 10, 11, 14, 15, 16, 17, 46 (1/5/99) BT/II 18, 19, 33, 36, 50 (3/5/99)

Pediastrum coronatum Raciborski

Pl. 2, Figs. 9, 28

Brunnthaler, J. 1915, P.96, F.57, 1., Bruhl J. and Biswas, K. 1926, P.270, Pl.15, F.159.

Colonies 16-32-64 celled. Inner cells four-cornered with a small lens-shaped perforation in front and another at the back. Marginal cells usually longer than broad and in lateral contact along one-third the length. Processes of marginal cells ending in short spines. Cell membrane with a net work of punctae. Inner-cells 18-26 µm broad, 25-26 µm long. Colonies 120-214 µm in diameter.

Localities = Chando Pond, Rapti-river, Old Rapti river.

Coll. No. & Date = BT/II 1, 2, 3, 4, 5, 6, 7, 10, 11, 14, 15, 16, 17, 46 (1/5/99)

Family – Oocystaceae

Genus – Oocystis Naegeli 1855

Oocystisgigas Archer

Pl. 2, Fig. 1

Tiffany, L.H. & Britton, M.E. 1952, P.117, Pl.32, Fig. 321, Prescott, G.W. 1962, P.244, Pl.51, Fig.14, Philipose, M.T. 1967, P.183, Fig.94a.

Colonies of 4 cells, cells broadly ellipsoid with rounded ends, poles not thickened, chloroplasts parietal, discoid, pyrenoid not seen.

Length = 24-26 µm; Lateral cells 15-17 µm

Locality = Chando Pond.

Coll. No. & Date = BT/II 6 (1/5/99)

Family – Coelastraceae

Genus – *Coelastrum* Naegeli 1849

Coelastrum sp.

Pl. 1, Fig. 12

Colony usually a hollow sphere, rarely polygonal to pyramidal with 4-8-16-32 up to 128 cells, cell spherical, ovoid or pyramidal, closely adjoined and compressed or inter connected by processes to form inter-cellular spaces, cell-wall often thickened to form Polar out growth or lateral processes for connecting the cells, chloroplast parietal cup-shaped or diffuse with one pyrenoid, reproduction by formation of autocolonies.

Diameter = Cell 15-18 µm

Localities = Chando Pond, Bakhira lake.

Coll. No. & Date = BT/II 1, 2, 3, 5, 46 (1/5/99)

BT/II 20, 21 (3/5/99)

Coelastrum proboscideum Bohlin

P1.1, Fig. 15

Prescott, G.W. 1962, P.230, P1.53, Figs. 4, 5, 8, Philipose, M.T. 1967, P.229, Fig.137.

Colonies pyramidal or cubical, consisting at 16-32 cells, cells enclosed by a gelatinous sheath and joined along lower lateral walls, cell-wall slightly thickened at poles. Chloroplast, single, parietal with one pyrenoid.

Diameter colonies = 25-30 µm; Diameter cell 8-11 µm

Localities = Chando Pond, Bakhira lake

Coll. No. & Date = BT/II 1, 2, 3, 5, 46 (1/5/99)

BT/II 20, 21 (3/5/99)

Family – Scenedesmaceae

Genus – *Scenedesmus* Meyen 1829

Scenedesmus dimorphus (Turp.) Kuetz.

P1. 2, Fig. 20

Tiffany, L.H. and Britton, M.E. 1952, P1. 123, P1.35, Fig. 370, Prescott, G.W. 1962, P.277, P1.63, Figs. 8-9, Philipose, M.T. 1967, P.249, Figs. 160 a-c.

Colonies of 4-8 cells, arranged in linear or alternating series, cells fusiform, inner-cells straight, outer cells lunate strongly curved, cell apices sharp and acute.

Long cell = 16-20 µm, at. Cell. 3-4 µm.

Localities = Barachhatra, Kanet Ghat, Daeipar, Dorikha ditch, Maha Dewa Ghat, Nirmali-Kund

Coll. No.& Date = BT/2, 3, 5, 11(10/4/99)

BT/ 1, 4, 6, 10 (11/4/99)

Scenedesmus bijugatus (Turp.) Kuetz. var. *alternans* f. *parvus* (G.M. Smith) Philipose

P1. 2, Fig. 23

Smith, G. M. 1916, P. 447, P1. 25, Figs. 14-15.

Philipose, M.T. 1967, P.256, Figs. 164 h, j.

Prasad, B. N. & Misra, P. K. 1992, P. 37, P1. 5, F. 5.

Colonies 8- celled with the cells arranged in subalternating series, cells oblong-ovoid and smaller than that of main variety.

Long cell = 8-9 µm, lat. Cell 4-5 µm.

Localities = Barachhatra, Kanet Ghat, Daeipar, Dorikha ditch, Maha-Dewa Ghat, Nirmali Kund, A.I.C. Saltawa Basti, Razaya-canal.

Coll. No. & Date = BT/2, 3, 5, 11 (10/4/99)

BT/ 1, 4, 6, 10 (11/4/99)

Scenedesmus quadricauda (Turp.) Breb. var. *longispina* (Chodat) Smith

P1. 1, Fig. 4

PLATE–1 →

1. *Euastrum spinlosum* x 700 2. *Micrasterias* sp. x 700 3. *Caelastrum* sp. x 150 4. *Scenedesmus quadricauda var. longispina* x 2000 5. *Cosmarium partianum* x 200 6. *Cosmarium quadrum* x 100 7. *Cosmarium reniforme* x 100 8. *Cosmarium cucurbitinum* x 100 9. *Micrasterias pinnatifida* x 900 10. *Closterium kuetzingii* x 20 11. *Cosmarium angulosum* x 2500 12. *Coelastrum* sp. x 2000 13. *Gloeocapsa* sp. x 2500 *14. Cosmarium awadhense* x 700 15. *Coelastrum proboscideum* x 50

PLATE–1

Prescott, G.W. 1962, P.280, P1.63, Fig.22, Philipose, M.T., 1967, P.285, Figs. 187 b,c.

Colonies 4 celled, cells ovoid-cylindrical, spines on poles of terminal cells slightly curved and relatively longer than that of sp., internal cells without spines on poles, cell-wall smooth.

Long cell = 11-12 µm; lat. Cell 3-5 µm.

Localities = Barachhatra, Kanet Ghat, Daeipar, Dorikha ditch, Mahadewa Ghat, Nirmali kund.

Coll. No. & Date = BT/2, 3, 5 (10/4/99)
BT/ 1, 4, 6 (11/4/99)

Scenedesmus armatus (Chodat) G.M. Smith

P1. 2, Fig. 27

G.M. Smith, 1916, PP.460-461, P1.28, F.53, P1.29 F. 90-93, P1.30, F.109-10.

Philipose, M.T., 1967, P.261, Figs. 171 a,c.

Colonies usually four-celled, rarely two or eight Celled. Cells oblong-ellipsoid with acute spices and arranged in a linear series. Terminal cells with a single long spine from each pole. All cells with a median lateral longitudinal rib, which is some-time indistinct or distinct only at either end of the cell. Cells 3-8 µm broad 7-16 µm long. 4- celled colony 7-16 µm broad, 12-25 µm long.

Long cell = 7-17 µm; Width 3-9 µm.

Localities = Chando Pond, Rapti river, Bakhira lake, Aami river.

Coll. No. & Date = BT/II 1, 2, 3, 6, 14, 16 (1/5/99)
BT/II 18, 19, 20, 42, (3/5/99)

Scenedesmus dispar (Brebisson) G.M. Smith

P1. 2, Fig. 14

Smith G.M. 1916, p.472, P1.27, f. 41.

Colonies four-celled. Cells oblong fusiform with acute ends and arranged in a subalternating series, usually in two planes, 2- cells above and two cells below. Inner cells with a single spine from one pole only. Terminal cells with a spine from each pole, the spine at one pole being often placed at right angles to the longitudinal axis of the cell. The oblique-spine of one terminal cell generally alternating with the oblique spine of the other terminal cell. Cell-wall usually smooth. Cells 3-7.2 µm broad, 8.2-17.3 µm long, spines 1.8 – 3.5 µm long. Colony 8.5 – 14.2 µm broad, 13.6 – 21 µm long.

Localities = A.I.C. Saltawa Basti, Chando Pond, Rapti river, Ban Ganga river, Bakhira lake.

Coll. No. & Date = BT/10 (11/4/99)
BT/II 1, 6, 14, 16 (1/5/99)

Scenedesmus prismaticus Bruehl & Biswas

P1. 2, Fig. 13

Bruehl P. & Biswas, K. 1922, P.10, P1.3, f. 21, Biswas K. 1928-29, P.415, P1.9, f.11.

Colonies 4-celled with the cells arranged in a single-linear series. Cells prismatic to pyramidal, terminal and lateral-faces meeting at sharp angles. Inside view, the longitudinal ridges in front and at the back-appear as dark-lines. Cells 4-6 µm broad, 10-16 µm long.

Long cell = 11-12 µm; lat. Cell 4-5 µm.

Localities = A.I.C. Saltawa Basti, Chando-Pond, Rapti river, Bakhira-lake, Aami river, Old Rapti-river.

Coll. No. & Date = BT/10 (11/4/99)
BT/II 1, 14, 15, 16 (1/5/99)

PLATE–2 ⟶

1. *Oocystis gigas* x 1000 2. *Cosmarium vermae* x 700 3. *P. angulosum* x 100 4. *Micrasterias mahabuleshwarensis* x 200 5. *Scenedesmus capitatus* x 2000 6. *Cosmarium speciosum* x 600 7. *Staurastrum gracile* x 100 8. *Euastrum sinuosum* x 500 9. *Pediastrum coronatum* x 700 10. *Pediastrum duplex* x 700 11. *Cosmarium cucurbitinum* x 400 12. *Cosmarium pseudobroomei* x 1500 13. *Scenedesmus prismaticus* x 150 14. *Scenedesmus dispar* x 2000 15. *Cosmarium quinarium* x 500 16. *Cosmarium cucurbitinum* x 300 17. *Micrasterias mahabuleshwarensis* x 200 18. *Cosmarium angulosum* x 2500 19. *Chlorococcum* sp. x 1500 20. *Scenedesmus dimorphus* x 1500 21. *Cosmarium awadhense* x 650 22. *Staurastrum gracile* x 1000 23. *Scenedesmus bijugatus* x 500 24. *Arthrodesmus curvatus* x 1500 25. *Gloeocapsa* sp. x 2500 26. *S. irregularis* x 1000 27. *S. armatus* x 1500 28. *P. coronatum* x 1500 29. *Cosmarium decoratum* x 500

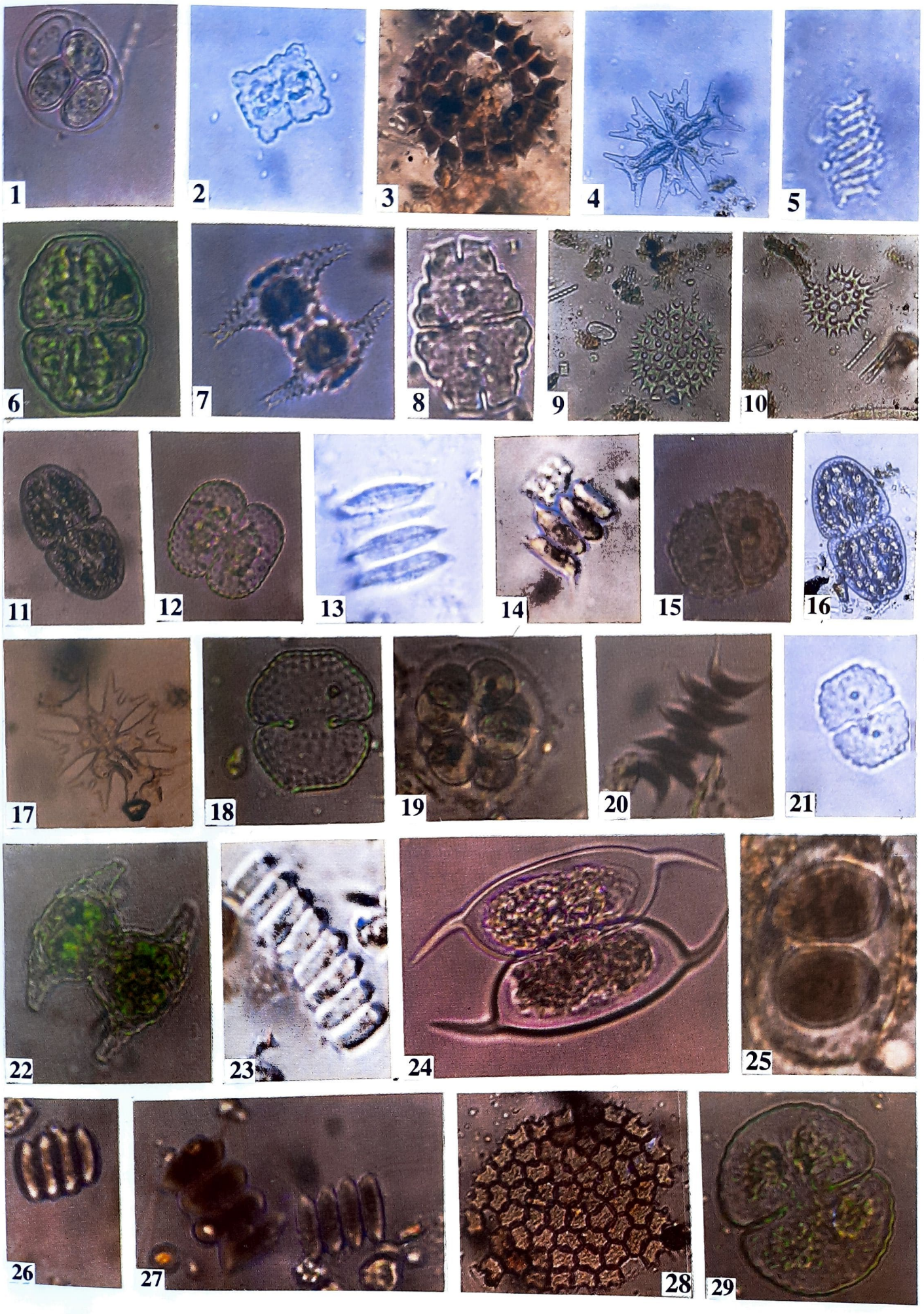


PLATE -2

Scenedesmus capitatus Smith, G.M.

P1.2, Fig.5

Tiffany, L.H. and Britton, M.E., 1971, Page. 107, P1.35, Fig. 361.

Cells 4.5 – 7.5 x 8-17 µm, oblong-ellipsoid, coenobium flat.

Localities = Chando Pond, Bakhira lake, Aami river.

Coll. No, & Date = BT/II 1, 2, 3, 4, 5, 6, 11, 14, 16, 17 (1/5/99)

Scenedesmus irregularis Wille

P1. 2, Figs. 26

Wille, N. 1903, P.94, f.4.

This form morphologically resembles S. *bijugatus* Kuetz but differs from in the cells being arranged in an irregular subalternating or sometimes in an almost double series.

Long cell = 7-15 µm; Broad 3-6 µm.

Localities = Chando Pond, Bakhira lake, Aami river.

Coll. No. & Date = BT/II 1, 2, 3, 4, 5, 6, 11, 14, 16, 17 (1/5/99)

BT/II 42 (3/5/99)

Order – Zygnematales

Family – Desmidiaceae

Genus – *Closterium* Nitzsch 1817

Closterium kuetzingii Breb.

P1. 1, Fig. 10

Prescott, G.W. and Scott, A. M. 1952, P.56, Fig.1, No.8, Croasdale, H. 1955, P.524, P1.9, Fig.1, Prescott, G.W. 1957, No.11, P. 10, P1.3, Fig.30.

Cells of Medium size, 21-22 times longer than broad, almost straight, median part fusiform-lanceolate with convex margins, cells tapering towards each extremity and ending in long setaceous processes with parallel sides and rounded apices, cell-wall longitudinally striated, striae delicate 18-20 visible across the cell, chloroplast with 4-5 pyrenoids arranged in a row.

Long. = Cell 429-439 µm, lat.cell 21-23µm, lat.apex 2-3 µm

Localities = Kalikund, Goria Bridge, A.I.C. Saltawa, Basti, Narharia Pandy, Rasanaditch, Kanet Ghat.

Coll. No. & Date = BT/3, 12, 25, 33, (10/4/99)

BT/ 10 (11/4/99)

Genus – *Euastrum* Ehrenberg 1832

Euastrum sinuosum Lenorm var. *reductum* W.et G.S. West

P1. 2, Fig. 8

West, W. & West, G.S. 1897, P.160, P1.8, Fig. 17, 1905, P.22, P1.36, Figs. 2, 3,

Cell-small, 1.7 times longer than broad, deeply constricted, sinus narrowly linear with dilated extremity, semi-cells 3 lobed, lateral lobes bilobulate & less prominent, polar lobe quadrate oblong with deep median incision, semi-cell with 3 protuberences in the centre and two above them an lateral sides, punctations on cell-wall not seen.

Long = Cell 58 µm, lat.cell 34 µm, lat. 9 µm Isthmus 8 µm

Localities = Chando Pond, Bakhira lake, Rapti river.

Coll. No. & Date = BT/II 1, (1/5/99)

Euastrum spinulosum Delp.

P1. 1, Fig.1

Prescott, G.W. & Scott, A.M. 1945, P.245, P1.2, Fig. 18, Prescott, G.W. 1957, No. 11, P.11, P1.4, Figs. 12-13, Scott, A.M. & Prescott, G.W. 1961, P.40, P1.10, Fig.3.

Cell rather small, slightly longer than broad, deeply constricted, sinus narrow linear, semi-cells 5 lobed, lateral lobes rounded & Furnished with 5-6 small & acute spines, Polar lobe small, broadly truncate with a shallow-median Notch & angles furnished with 3 small & acute spines, cell wall granulate within the polar and

lateral, lobes, each semi-cell with a rounded, central protuberance, consisting of two rows of relatively larger-granules.

Long = Cell 60 µm, lat.cell 46 µm, lat. Isthmus 11 µm

Localities = Chando Pond, Bakhira lake, Rapti river.

Coll. No. & Date = BT/II 1 (1/5/99)

Genus – *Micrasterias* Agardh 1827

Micrasterias mahabuleshwarensis Hobson

Pl. 1, Figs. 4, 17

West, W. & West, G.S. 1905, P. 121, Bruehl, P. & Biswas, K. 1926. P. 283, Pl.7, Figs. 56a-b, Prescott, G.W. 1966.

Cells of medium size, 1-1.5 times longer than broad, constriction deep, sinus open with acuminate extremity. Semi-cells 3-lobed, with symmetry in three planes, incisions between lobes wide, polar lobe large with sub-quadrate lower half and dialated upper half producing prominent diverging denticulate processes and exhibiting a pair of small, accessory, asymmetrical denticulate processes in front and back near slightly concave base, margin with small and acute spines, lateral lobes with wide, deep and acute angled incision, divided into two attenuated and denticulate processes, apices of all the processes tri-or quadri-denticulate, portion above the isthmus furnished with a row of denticulations.

Long = Cell 119-126 µm, lat.cell 88-92 µm

Localities = Chando Pond, Rapti river, Bakhira lake, Old Rapti river.

Coll. No. and date = BT/II 3, 6, 16 (1/5/99)

BT/II 18, 19, 20, 36 (3/5/99)

Micrasterias pinnatifida (Kuetz.) Ralfs

Pl. 1, Fig. 9

Croasdale, H. 1956, P.10, Pl.1, Fig. 7.

Cells small, slightly broader than long, deeply constricted, sinus linear but slightly open-out-wards, semi-cells 3-lobed, inter lobular incisions deep outwards, semi-cells 3-lobed, inter-lobular incisions deep and broadly rounded, lateral lobes-horizontal, semi-fusiform with minutely bifid, apices exhibiting accuminate ends, Polar lobe with basal portion sub-rectangular and apical portion with extremities like lateral lobes but relatively shorter in length, cell-wall minutely punctate.

Long = Cell 42-54 µm, lat.cell 51-57 µm

Localities = Chando Pond, Rapti river, Bakhira lake, Old Rapti river

Coll. No. & Date = BT/II 3, 6, 16 (1/5/99)

Genus – *Cosmarium* Corda ex Ralfs, 1848

Cosmarium angulosum Breb. var. *concinnum* (Rab.) W.et. G.S. West

Pl. 1, Fig. 11, Pl. 2, Figs. 11, 18

Croasdale, H. 1956, P.16, Pl.11, Fig. 16, Suxena, M.R., Venkateswarlu, V., Subba Raju, N. & Rao, V.S. 1973, P. 325, Figs. 39 a-b.

Cell very small, a little longer than broad, deeply constricted, sinus Narrow and Linear, Semi Cells hexagonal with sharp angles and parallel sides, apex narrow and slightly retuse. cell-wall smooth.

Long = Cell 12 µm, lat.cell 10 µm, lat.Isthmus 3 µm

Localities = Adarsh Inter Collage Saltawa Basti, Chando Pand, Bakhira, Rapti river, Old Rapti, Ban. Ganga etc.

Coll. No. & Date = BT/10 (11/4/99)

BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16, 96, (1/5/99)

Cosmarium awadhense Prasad & Mehrotra

Pl. 1, Fig. 14, Pl. 2, Figs. 14, 21

Prasad, B.N. & Mehrotra, R.K. 1977b, p. 55, figs. 35, 81

Cell-small, slightly longer than broad, constriction deep, sinus narrowly linear towards apex & slightly open out wards, semi cells sub-semi-circular, sides 4-

5 crenate, apex truncate with more or less straight-margin, cell-wall smooth. Each semi-cell with one massive chloroplast, containing one pyrenoid.

Long = Cell 28-32 µm, lat.cell 26-28 µm, lat.isthmus 7-9 µm

Localities = A.G.C. Basti, Chando Pond, Bakhira lake, Rapti river, Old Rapti, Ban Ganga.

Coll No. & Date= BT/ 10, (11/4/99).

BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16, 46 (1/5/99).

Cosmarium decoratum W. & G.S. West

P1. 2, Fig. 29

Skuja, H. 1949, P. 122, P1. 32, Fig. 12 as *C. decoratum* w. et. G.S.West var. *dentiferum* w. et. West G.S., Scott, A.M. & Prescott, G.W. 1961, P. 57, P1. 25, Fig. 1.

Cells of medium size, slightly longers than broad deeply constricted, sinus narrowly linear & bilipped, semi-cells. Semi-elliptic, apex flattened truncate with rounded angles, margin deeply crenate, erenations emarginate, 24-26 in number. Margin followed by 4-5 concentric series of large granules, triangular pits surrounded granules in irregular fashion in the centre. Semi-cells exhibits 2 chloroplasts. Each containing one pyrenoid.

Long = Cell 71 µm, lat.cell 53 µm, lat.isthmus 21 µm

Localities = Adarsh Inter Collage (Saltawa) Basti, Chando Pond, Bakhira Lake, Rapti river, Old Rapti, Ban ganga river

Coll No. & Date= BT/ 10, (11/4/99).

BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16, 46 (1/5/99).

Cosmarium partianum Arc. var. *nephroideum* Witter.

P1. 1, Fig. 5

West, W. & West, G.S. 1908, P. 167, P1.80, Figs. 10,11, Irenee-Marie, F. 1939, P. 185, P1. 23, Fig. 3, 1956, P. 116.

Cells-small, about 1.3 times longer than-broad, deeply constricted, sinus gradually opening from a rounded extremity, Isthmus slightly elongated, semi-cells subreniform and granulate, granules-rounded and evenly disposed in indistinct vertical series, about 24-29 visible at margin of each semi-cell. Each semi-cell with an axile chloroplast and a pyrenoid.

Long. = Cell 21-25 µm, lat.cell 17-19 µm, lat.isthmus 6-8 µm

Localities = A.I.C. Basti, Chando Pond, Bakhira lake, Rapti river, Old-Rapti river, Ban Ganga river.

Coll. No. & Date = BT/10 (11/4/99)

BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16, 46 (1/5/99)

Cosmarium quadrum Lund.

P1. 1, Fig. 6

West, W. & West, G.S. 1912, P. 20, P1. 100, Figs. 3-6.

Cells rather small, quadrate, nearly as long as broad, deeply constricted, sinus narrowly linear with dilated extremities, semi-cells sub rectangular, basal and apical angles rounded, sides convex, apex slightly retuse, cell-wall granulate, - granules in some what oblique and less distinct vertical series, 28-33 at the margin of semi-cell, top view oblong-elliptic, each semi-cell with an axile chloroplast containing two-pyrenoids.

Long. = Cell 35-37 µm, lat.cell 35-39 µm, lat.isthmus 8-10 µm

Localities = A.I.C. Basti, Chando Pond, Bakhira lake, Rapti river, Old Rapti river, Aami river.

Coll. No. & Date = BT/10 (11/4/99)

BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16, 45 (1/5/99)

Cosmarium quinarium Lund.

P1. 2, Fig. 15

West, W. & West, G.S. 1908, 3, P. 216, P1. 85, Figs. 9, 10, Smith, G.M. 1924, P. 36, P1. 57, Fig. 28, Prescott, G.W. 1966, P. 21, P1.3, Figs. 19, 27.

Cells rather small, sub-hexagonal, slightly longer than broad, deeply constricted, sinus linear with slightly dilated apex and open outwards, semi-cells-broadly truncate-pyramidate with rounded basal and sub acute apical angles lateral margins slightly convex, Apex truncate and somewhat flattened, Margin of semi-cell with 14-17 acute granules followed by a series of rounded granules within the out-line, centre of each semi-cell with 2 transverse series of large granules, 3 in upper and two in lower series and two punctations between-them, chloroplast axile with two-pyrenoids.

Long. = Cell 36-42 µm, lat.cell 28-32 µm, lat.isthmus 7-8 µm

Localities = Aami river, Chando Pond

Coll. No. & Date = BT/II 42 (3/5/99)

BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16 45 (1/5/99)

Cosmarium reniforme (Ralfs) Arch.

P1. 1, Fig. 7

West, W. & West, G.S. 1908, P. 157, P1. 79, Figs, 1, 2, P1. 82, Fig.15, Prescott, G.W. 1966, P. 22, P1.4, Figs. 13.

Cells of medium size, slightly longer than broad, deeply constriction deep, sinus narrow and linear with widely dialated extremity, semi-cells reniform, cell-wale granulate, granules fairly regular, horizontal and in indistinct vertical series (about 25-31 granules seen at Margin of a semi cell, chloroplast axile with 2 pyrenoids in each semi-cell).

Long. = Cell 54-59 µm, lat.cell 41-45 µm, lat.isthmus 13-15 µm

Localities = Chando Pond, Bakhira lake

Coll. No. Date = BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, & 16, 46 (1/5/99)

BT/II 8, 9, 21, 22, 25, 30, 39 (4/5/99)

Cosmarium pseudobrocmei Wolle

P1. 2, Fig. 12

West, W. & West, G.S. 1912, P. 22, P1. 100, Figs, 7, 8, P1. 103, Fig.7, Skuja, H. 1949, P. 139, P1.32, Figs. 10, 11.

Cells small about as long as broad, very deeply dilated extremity, semi-cells oblong-retangular with rounded angles and slightly convex sides and apex, cell-wall with small and solid granules arranged in some what curved, horizontal series, 21-31 seen at the Margin of each semi-cell, side-view, semi circular and top-view oblong with sub-parallel sides, chloroplast axile with two pyrenoids in each semi-cell.

Long. = Cell 35-41 µm, lat.cell 31-35 µm, lat.isthmus 9-11 µm

Localities = Chando Pond, Ban Ganga river.

Coll. No. Date = BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, & 16, 46 (1/5/99)

BT/II 49, 54 (4/5/99)

Cosmarium vermae Prasad & Mehrotra

P1. 2, Fig. 2

Prasad, B.N. and Mehrotra, R.K., 1977.

Cells slightly longer than broad, somewhat rectangular, semicells with rounded angles and flat apices. Cell wall granulate. Each semicell with an axile chloroplast and pyrenoid.

Long. = Cell 21-22 µm, lat.cell 19-21 µm, lat.isthmus 5-6 µm

Localities = Chando Pond.

Coll. No. and Date = BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16, 46 (1/5/99).

Cosmarium speciosum Lund

P1. 2, Fig. 6

West, W. and West, G.S. 1908, P. 247, P1. 89 Figs. 1-3, Tiffany, L.H. and Britton, M.E. 1952, P. 191, P1. 53, Fig. 584.

Cells of medium size, about 1.5 times longer than broad, moderately constricted, sinus narrowly linear, semi-cells sub-rectangular or subpyramidate with

rounded angles, sides slightly-convex and very gradually attenuated upward to broadly truncate apex, margin with 4 apical and 7 lateral-crenations, cell-wall granulate, granules in regular, radial and concentric series, each showing 3-4 granules, space across the base and just about the Isthmus exhibits 5-6 vertical series of 6-7 granules, chloroplast axile with two pyrenoids in each semi-cell.

Long. = Cell 44-51 µm, lat.cell = 31-35 µm, lat.isthmus = 10-13 µm

Localities = Chando Pond, Aami River

Coll. No. & Date = BT/II 1, 2, 3, 4, 5, 6, 11, 13, 14, 15, 16, 46 (1/5/99).

BT/II 42 (3/5/99)

Cosmarium cucurbitinum (Biss) Lutkem. Var. *subpolymorphum* (Nordst.) Lutkem.

Pl. 1, Fig. 8, Pl. Figs. 11, 16

Scott, A.M., Gronblad, R. and Croasdale, H. 1965. 69, P. 43, Pl. 7, Fig. 106, Krieger, W. and Gerloff, J. 1969, 3. P. 373, Pl. 64, Fig.4.

Cells of medium size, about twice as long as broad, moderately constricted, Isthmus broad, semi-cells, sub-elliptical with slightly Narrowed and rounded apex, cell-wall minutely punctate, chloroplast with two pyrenoids in each semi-cell.

Long. = Cells 78-85 µm, Breadth = 39-42 µm, Breadth at.isthmus = 36-38 4 µm

Localities = Adarsh Inter College (saltawa)-Gopal Pur Basti, Aami river, Chando Pond.

Coll. No. & Date = BT/I 10 (11/4/99)

BT/II 42 (3/5/99)

Genus – *Arthrodesmus* Ehrenberg 1838

Arthrodesmus curvatus Turner var. *major* Turner

Pl. 1, Fig. 24

Prasad, B. N. and Misra, P.K. 1992, P. 191, Pl. 25, fig 1,.

Cell of Medium size, almost as long as broad (excluding spines), deeply constricted, sinus narrow with slightly dilated extremity and open outword. Semi-cells transversely oblong-elliptic with straight or faintly retuse apices, lateral angles acute with long and converging spines showing slightly recurved tips, cell-wall smooth, chloro plast axile with one pyrenoid.

Long. cell = 44 µm, lat.cell with spine 95 µm, lat.cell without spin = 19 µm, lat. Isthmus 13 µm

Localities = Chando Pond

Coll. No. & Date = BT/II 11 (1/5/99)

Genus – *Staurastrum* Meyen 1829

Staurastrum gracile Ralfs var. *coronulatum* Boldt.

Pl. 2 Figs. 7, 22

West, W. West, G.S. and Carter, N. 1923, P. 100, Pl. 144, Fig. 10.

Cell of medium size, about 2.3 times longer than broad (excluding the processes), depressed, constriction shallow with an acute Notch. Semi-cells somewhat broadening-towards the slightly convex apex, apices showing undulate margins and relatively shorter and emerginate processes tipped with 2-3 minute-spines and showing 45-5 concentric rows of dentations, top-view triangular with dentations within the lateral margins.

Long. cell = 29 µm, lat.cell with processes 44 µm, lat.isthmus 12 µm

Localities = Chando Pond

Coll. No. & Date = BT/II 1 (1/5/99)

DISCUSSION AND CONCLUSION

The present work shows that due to urbanization and industrialization algae do not thrive well within the Municipal limit of District Basti. It may be due to covering up of ponds, ditches etc. for building purposes. Another reason for the algal extinction may be pollution growing population and limited water resources leading to significant disturbances in the aquatic life. However as we move towards rural side luxurient growth of algae is observed in different water bodies such as rivers ponds and lakes. These habitats show

rich floristic variation. Except for few taxa, majority of the forms were not localized at any particular location.

Since no physio chemical analysis of water could be performed, a detailed interpretation of floristic (algal) variation and ecological changes in the water bodies could not be made.

However, this work has provided a chance to study the different algal types occurring naturally in lentic water. Size of various ponds does not determine the algal Biodiversity.

Bakhira lake and Chando pond are large stagnant deep water bodies. They harbour rich assemblage of various algal forms. Limnological studies on diuranal variations of algal species may bring interesting results.

Considering the floristic variation and richness of algal species, this north-eastern part of U.P. appears to be very interesting and a comprehensive study on the algal composition of this area may reveal more interesting forms.

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