

**HYDROBIOLOGICAL STUDIES WITHIN THE TEA GARDENS
AT SRIMANGAL, BANGLADESH. III. CHLOROPHYCEAE
(EXCLUDING DESMIDS)**

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Abstract

A total of 83 algal taxa belonging to 40 genera of Chlorophyceae (excluding desmids) have been recorded from some acidic water bodies within the tea gardens at Srimangal, Maulvi Bazar. Of these 14 are new records for Bangladesh.

Introduction

In the previous two installments of the current series of papers, Islam and Irfanullah have described the aquatic macrophytes (Islam and Irfanullah 2000a) and algal flora (excluding Chlorophyceae) (Islam and Irfanullah 2005) of some selected habitats within the tea gardens of Srimangal, Maulvi Bazar. The present paper deals with algae belonging to the Class Chlorophyceae (excluding desmids) of the same habitats.

Materials and Methods

For the descriptions of the studied waterbodies and meteorological data of the study area see Islam and Irfanullah (2000a). These habitats were predominantly acidic: Baraora Lake (pH 5.5-6.8), ditch (pH 5.8-6.6) and the Burburia River (pH 6.0-7.2). A total of 120 algal samples (phytoplankton and periphyton) were collected in winter of 1996 (9 January) and different seasons of 1997 (winter, 6 January; spring, 18 March; rainy season, 20 July and autumn, 20 October). For the sample collection methods, and their preservation and examination see Islam and Irfanullah (2005).

Taxonomic enumeration

This study reveals a total of 83 chlorophycean taxa belonging to 40 genera. Among these, 14 taxa are newly recorded for Bangladesh (marked by asterisks). Nonetheless, a few algal taxa from this area have already been reported by the same authors for the first time in Bangladesh (Islam and Irfanullah 1998, 2000b), which are not marked in this account.

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The results of all the studied taxa are given below with the descriptions and illustrations.

Class: Chlorophyceae; Order: Tetrasporales; Family: Palmellaceae

1. ? **Asterococcus limneticus** Smith, G.M. (Pl. 1, Fig. 11)
(Smith 1920, 104, 20: 7-10)
Colony d. 40.5 µm; cell d. 3.4-4.7 µm; smaller than the typical. Lake; rainy 1997; few.
2. **Asterococcus superbus** (Cienk.) Scherffel (Pl. 1, Fig. 10)
(Prescott 1951, 86, 4: 10; Islam 1973, 78, 3: 7-12)
Cell d. with sheath 35-44 µm, without sheath 21.6 µm. Lake; winter 1997; few.
3. **Chlamydocapsa ampla** (Kütz.) Fott (Pl. 3, Fig. 54)
(Fott 1972, 30, 6: 13; Islam 1973, 78, 3: 5-6 as *Gloeocystis ampla* Kütz.)
Colony d. 20.2-25.6 µm; cell L. 8 µm, d. 4-5.4 µm. Lake; winter 1996 and spring 1997; few.
4. **Pseudosphaerocystis lacustris** (Lemm.) Novak.
(Islam and Irfanullah 2000b, 116, 1: 6)
Lake; winter 96; few.

Family: Tetrasporaceae

5. **Schizochlamys gelatinosa** A. Br. (Pl. 1, Fig. 13)
(Islam 1969, 29, Figs. 35-36; Yamagishi 1998, 65)
Cell d. 12.8-15.5 µm. Lake; winter 1997; few.
6. **Tetraspora gelatinosa** (Vauch.) Desvaux (Pl. 1, Figs. 1-4)
(Whitford and Schumacher 1973, 15, 3: 15)
Hard, deep green macroscopic colony on rock by the bank of the river subjected to splash; colony d. 1.5-2.0 mm; no pseudocilia, spherical cells in groups embedded in thick mucilage, cell d. 5.4-9.4 µm. River; autumn 1997; few.

Family: Coccomyxaceae

7. **Elakatothrix viridis** (Snow) Printz : Lake; winter 1997; rare.

Order: Chlorococcales; Family: Chlorococcaceae

8. **Desmatractum bipyramidatum** (Chod.) Pascher
(Islam and Irfanullah 1998, 92, Figs. 10-15)
Lake: winter 1997 (rare); River: spring 1997 (common).

Family: Dictyosphaeridiaceae

9. **Dictyosphaeridium** sp. : Lake; winter 1997; rare.

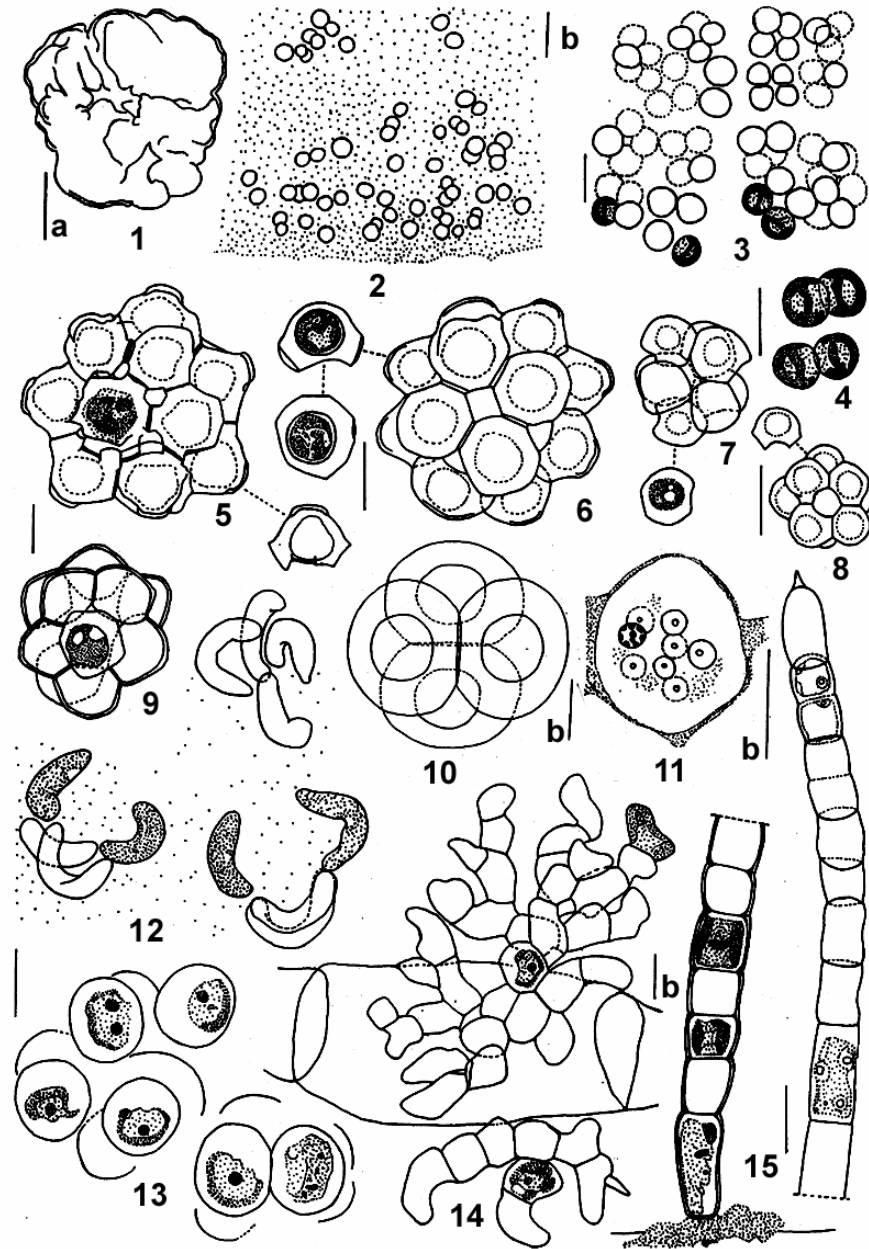


Plate 1 (Figs. 1-15)

Figs. 1-4. *Tetraspora gelatinosa* (1. a colony, 2. cells on the periphery, 3-4. cells in the middle), 5-6. *Coelastrum cambricum*, 7. *C. sphaericum* fa., 8. *C. microporum*, 9. *C. sphaericum*, 10. *Asterococcus superbus*, 11. *A. limneticus*, 12. *Tetrallantos lagerheimii*, 13. *Schizochlamys gelatinosa*, 14. *Protoderma viride*, 15. *Ulothrix tenerrima*. (Scales: a = 0.5 mm, b = 20 μ m, rest = 10 μ m)

10. **Dimorphococcus lunatus** A. Br. (Pl. 2, Fig. 36)
(Islam 1969, 25, Figs. 24-25)
Cell L. 13.5-23 μm , d. 4.7-8 μm . Lake; winter 1996; common.

Family: Hydrodictyaceae

11. **Pediastrum duplex** Meyen (Pl. 2, Figs. 42-43)
(Islam and Khatun 1966, 99, 6: 141)
Colony d. 40.5-67.5 μm ; cell L. 13.5-18.2 μm , d. 13.5-16.2 μm . Lake; winter to rainy 1997; rare to few.
12. **Pediastrum duplex** var. **rugulosum** Racib. (Pl. 2, Fig. 41)
(Prescott 1951, 224, 49: 3; Islam 1973, 76, 3: 1)
Colony d. 67.5 μm , cell L. 16.2 μm , d. 13.5-14.8 μm . Lake; spring 1997; few.
13. **Pediastrum tetras** (Ehr.) Ralfs var. **tetraödon** (Corda) Hansg. (Pl. 2, Figs. 44-45)
(Smith 1920, 174, 48: 13-14, 49: 1-2)
Colony d. 21.3-40 μm ; cell L. 9.4-12 μm , d. 8-13.3 μm . Lake; winter 1997; few.

Family: Coelastraceae

14. **Coelastrum cambricum** Archer (Pl. 1, Figs. 5-6)
(Smith 1920, 161, 42: 2-3)
16-celled coenobium, d. 33.7-51.3 μm ; cells are curved from the side view with thickening in the cell wall on the periphery appearing as a flat protrusion, each cell is connected with 3-4-6 other cells, cell d. 10.8-19 μm . Lake; winter 1996; common.
15. **Coelastrum microporum** Näg. (Pl. 1, Fig. 8)
(Smith 1920, 160, 41: 12-13, 42: 1)
8-celled small coenobium, d. 16.2 μm ; thin cell wall, cell d. 6.7 μm . Lake; autumn 1997; rare.
16. ***Coelastrum sphaericum** Näg. (Pl. 1, Fig. 9)
(Whitford and Schumacher 1973, 43, 11: 19)
10(?) -celled coenobium, d. 32.4 μm ; polygonal cells with uniformly thick cell wall, cell d. 12.2 μm ; parietal chloroplast. Lake; winter 1997; very rare.
17. **Coelastrum sphaericum** Näg. fa. (Pl. 1, Fig. 7)
8-celled coenobium, d. 18.2-21.6 μm ; vegetative cells broadly curved with thin cell wall, d. 7.4-8.7 μm . Lake; winter 1996; few.

Family: Oocystaceae

18. **Ankistodesmus falcatus** (Corda) Ralfs (Pl. 2, Figs. 39-40)
(Islam and Begum 1970, 244, 3: 85-86; Yamagishi 1998, 69)
Cell L. 86.4 μm , d. 2.7 μm . Lake; winter 1996, winter and spring 1997; few.

19. **Ankistodesmus spiralis** (Turner) Lemm. : Lake; autumn 1997; few.
20. ? **Closteriopsis longissima** Lemm. var. (Pl. 2, Fig. 37)
Cell L. 144.4 μm , d. 7.4 μm , tip d. 2 μm . Lake; winter 1997; common.
21. **Glaucocystis nostochinearum** Itz.
(Islam and Irfanullah 1998, 93, Figs. 6-9)
Lake; rainy 1997; common.
22. **Kirchneriella** sp. : Lake and river; winter 1997; few.
23. **Nephrochlamys subsolitaria** (G.S. West) Kors.
(Islam and Irfanullah 2000b, 116, 1: 4-5)
Lake; rainy 1997; few. However, Islam and Alfasane (2001) suggested it would be a species of *Nephrocystium* or *Kirchneriella*.
24. ? **Nephrocystium limneticum** Smith, G.M. (Pl. 3, Fig. 60)
(Smith 1950, 261, Fig. 176c)
Slightly curved long cells with blunt poles embedded in thick, heterogeneous mucilage; cells are single or in pairs, cell L. 15.5-17.5 μm , d. 6.7-8.2 μm . Lake; rainy 1997; rare.
25. **Nephrocystium obesum** W & W (Pl. 3, Fig. 61)
(Prescott 1951, 249, 54: 20)
Four slightly curved large cells are loosely enclosed in a thick sheath (d. 2 μm) without any nodules on it; colony L. 75.6 μm , d. 58 μm ; cell L. 35-39 μm , d. 19-23 μm . Lake; winter 1996; rare.
26. **Oocystella lacustris** (Chod.) Hind. (Pl. 3, Fig. 53)
(Hindak and Moustaka-Gouni 1990, 172, Figs. 7-8; Yamagishi 1998, 73; Smith 1920, 112, 22: 8-9 as *Oocystis lacustris*)
Colony d. 20.2-21.6 μm , cell L. 10-13.5 μm , d. 6.7-7.4 μm . Lake; rainy 1997; few.
27. **Oocystella lacustris** (Chod.) Hind. fa. (Pl. 2, Fig. 32)
Colony d. 31.7-34.4 μm ; cells L. 14.2-22.3 μm , d. 11.5-13.5 μm ; lamellated, hyaline cell wall. Lake; winter 1996; rare.
28. **Oocystis borgei** Snow (Pl. 2, Fig. 31)
(Smith 1920, 111, 22: 4; Tiffany and Britton 1952, 117, 32: 322)
Colony d. 20.2-21.6 μm ; cell L. 10.8-12 μm , d. 8-10 μm . Lake; rainy 1997; common.
29. **Oocystis crassa** Wittrock : Lake; winter 1997; few.

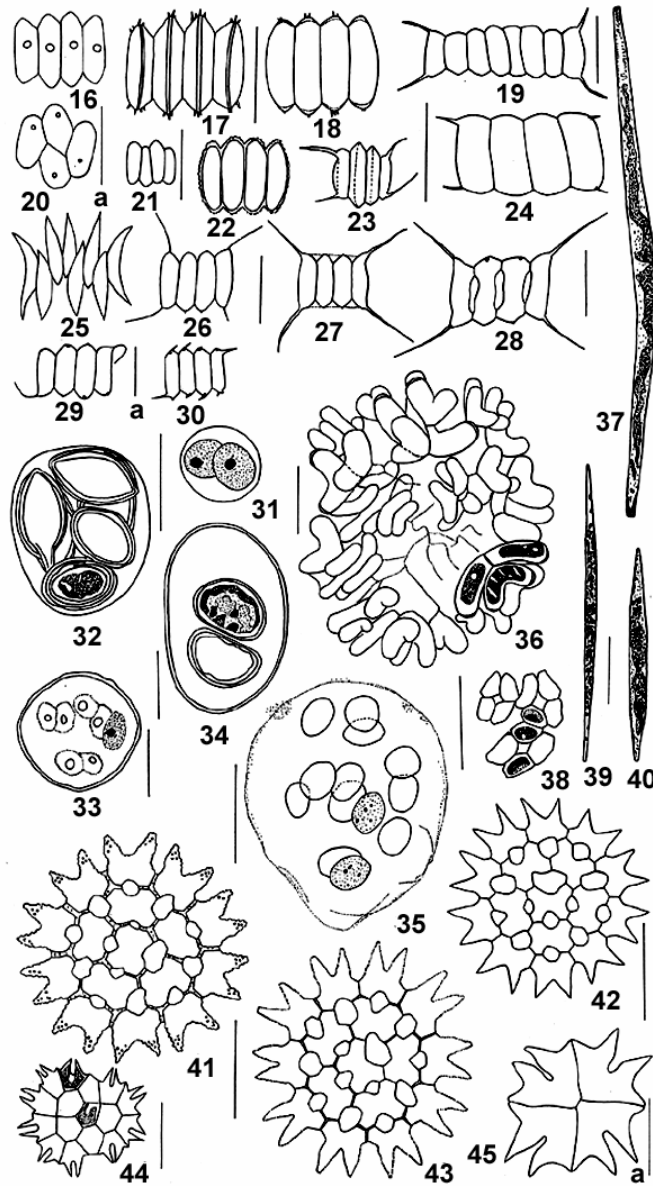


Plate 2 (Figs. 16-45)

Figs. 16, 22. *Scenedesmus quadricaudatus* var. *ecornis*, 17. *S. brasiliensis*, 18. *S. denticulatus* fa. *maximus*, 19, 26-27. *S. quadricauda*, 20. *S. arcuatus* var. *platydiscus*, 21. *S. bijuga*, 23. *S. armatus* var. *spinosus*, 24. *S. quadricauda* var. *rectangularis*, 25. *S. acuminatus*, 28. *S. perforatus*, 29-30. *S. longispina* var. *asymmetricus*, 31. *Oocystis borgei*, 32. *Oocystella lacustris* fa., 33. *Oocystis* sp. -1, 34. *O. novae-semlicae*, 35. *Oocystis* sp. -2, 36. *Dimorphococcus lunatus*, 37.? *Closteriopsis longissima* var., 38. *Crucigenia crucifera*, 39-40. *Ankirodesmus falcatus*, 41. *Pediatrurus duplex* var. *rugulosum*, 42-43. *P. duplex*, 44-45. *P. tetras* var. *tetraödon*. (Scales: a = 10 μ m, rest = 20 μ m)

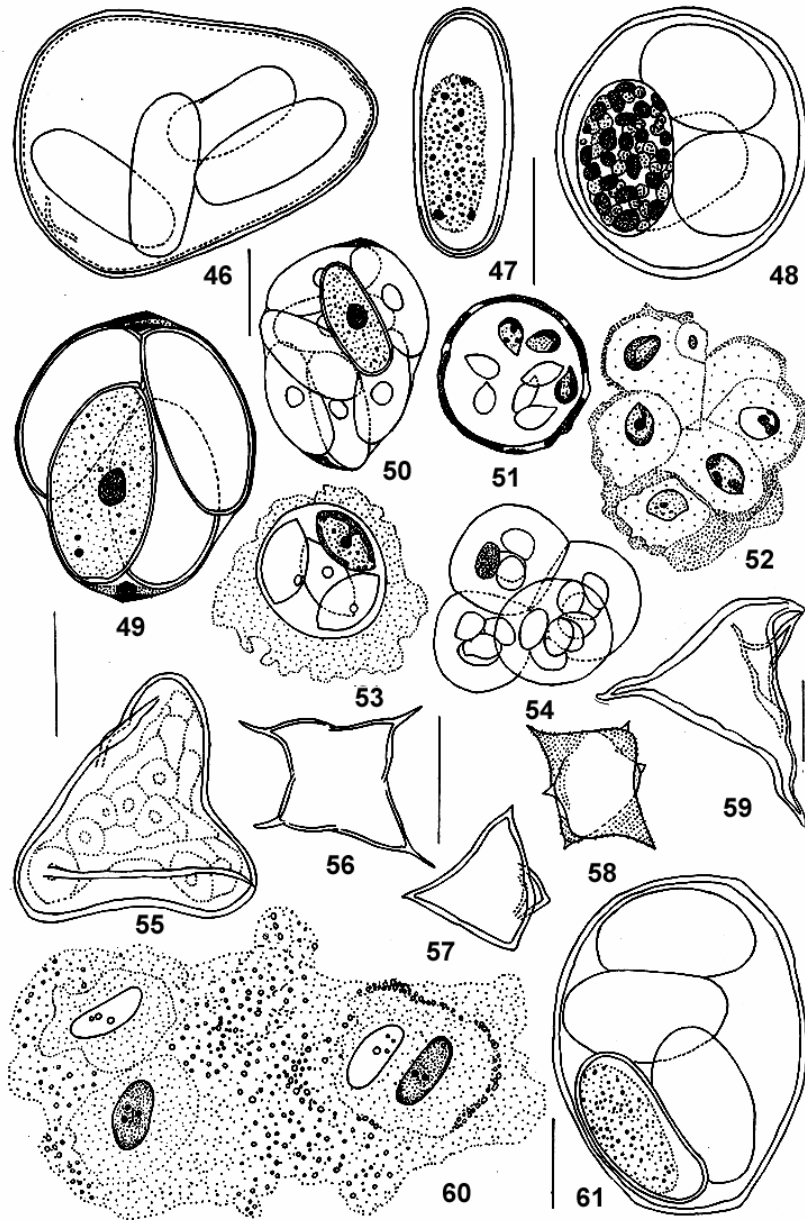


Plate 3 (Figs. 46-61)

Figs. 46-47. *Oocystis* ? *panduriformis* var. *minor*, 48. *O. gigas* fa., 49. *O. solitaria*, 50. *O. naegeli*, 51-52. *O. granulata*, 53. *Oocystella lacustris*, 54. *Chlamydocapsa ampla*, 55. *Tetradron tumidulum*, 56. *T. regulare* var. *torsum*, 57. *T. regulare* var. *minor*, 58. *Tetradron* sp., 59. *T. regulare*, 60. ? *Nephrocytium limneticum*, 61. *N. obesum*. (Scales = 20 μ m)

30. **Oocystis gigas** Archer fa. (Pl. 3, Fig. 48)
4-celled globose colony surrounded by a thick, hyaline mucilage sheath, colony d. 46 μm ; cells broadly elliptic with numerous disc-shaped chloroplasts, cell L. 24.3-27 μm , d. 17 μm . Smaller than Prescott (1951, 244, 51: 13). Lake; winter 1997; rare.
31. ***Oocystis granulata** Hortobágyi (Pl. 3, Figs. 51–52)
(Hindak and Moustaka-Gouni 1990, 169, 6: 3)
8-celled spherical colony with thick mucilage sheath (d. <1.3 μm), colony d. 23-24.3 μm , each cell may possess individual sheath (d. 13.5-16.2 μm); elliptical cells with pointed poles, cell L. 5.4-7.4 μm , d. 4-4.7 μm . Lake; rainy 1997; few.
32. **Oocystis naegelii** A.Br. (Pl. 3, Fig. 50)
(Tiffany and Britton 1952, 117, 32: 320)
8-celled colony with thin sheath having two polar nodules, colony L. 48.6 μm , d. 37.8 μm ; cylindrical cells compact in a colony, cell L. 24.3-25.6 μm , d. 10.8-12 μm . Lake; rainy 1997; common.
33. **Oocystis novae-semlicae** Wille (Pl. 2, Fig. 34)
(Prescott 1951, 245)
Colony L. 54-55.3 μm , d. 36.4-40.5 μm ; cell L. 19-21.6 μm , d. 13.5-14.8 μm . Lake; winter 1996, winter and autumn 1997; few.
34. ***Oocystis ? panduriformis** W & W var. **minor** Smith, G.M. (Pl. 3, Figs. 46–47)
(Smith 1920, 114, 23: 3)
4-celled pear-shaped colony with thick mucilage sheath having two polar protrusions, colony L. 62 μm , d. 46 μm ; long elipto-cylindrical cell L. 43 μm , d. 16.8–18.2 μm . Smith (1920) noted the cells to be slightly convex on both lateral sides. Lake; winter 1996; few.
35. ***Oocystis solitaria** Wittrock (Pl. 3, Fig. 49)
(Tiffany and Britton 1952, 117, 32: 319)
4-celled colony with thin sheath having two polar nodules, colony L. 41.8 μm , d. 35 μm ; elliptic cells compact in a colony, cell L. 27–29.7 μm , d. 13.5-16.2 μm . Lake; rainy 1997; common.
36. **Oocystis** sp. -1 (Pl. 2, Fig. 33)
Colony d. 35-48.6 μm ; cell wall granulated, L. 8-12 μm , d. 5.4-8 μm . Lake; winter 1997; common.
37. **Oocystis** sp. -2 (Pl. 2, Fig. 35)
Colony L. 48.6 μm , d. 28.3 μm ; cell L. 6.7-8 μm , d. 5.4-6.7 μm . Lake; rainy 1997; rare.
38. **Selenastrum** sp. : River; spring 1997; rare.

39. **Tetraedron regulare** Kütz. (Pl. 3, Fig. 59)
(Smith 1920, 118, 24: 14)
Cell max. d. with spine 50.7-57.4 μm . Lake; winter 1996; rare.
40. ***Tetraedron regulare** var. **minor** Reinsch (Pl. 3, Fig. 57)
(Skuja 1949, 65, 10: 33)
Cell pyramoidal with curved sides; cell max. d. 25 μm . Lake; winter 1996; rare.
41. ***Tetraedron regulare** var. **torsum** (Turner) Brunthaler (Pl. 3, Fig. 56)
(Smith 1920, 119, 24: 17-18; Prescott 1951, 269, 61: 8-10)
Quadrangular cell with smooth cell wall, single spine-like process at each angle, cell d. with spine 36.4-41.8 μm , without spine 25-30.4 μm . Lake; autumn 1997; rare.
42. ***Tetraedron tumidulum** (Reinsch) Hansg. (Pl. 3, Fig. 55)
(Prescott 1951, 270, 61:17-18)
Cell triangular with round angles, sides are concave, cell wall smooth, cell d. 37.8-43.2 μm . Lake; rainy 1997; rare.
43. **Tetraedron** sp. (Pl. 3, Fig. 58)
Cell quadrangular from top view, each of the six angles possesses single spin, very minute spine like granules are concentrically arranged on the cell wall around the spine, cell d. with spine 25.6-30.4 μm . Paddy field; autumn 1997; rare.

Family: Scenedesmaceae

44. **Crucigenia crucifera** (Wolle) Collins (Pl. 2, Fig. 38)
(Smith 1920, 145, 36: 6; Whitford and Schumacher 1973, 54, 14: 37)
Colony L. 12-14.2 μm , d. 8.8-10.8 μm ; cell L. 5.4-8 μm , d. 3.4-4.7 μm . Lake; autumn 1997; rare.
45. **Scenedesmus acuminatus** (Lager.) Chodat (Pl. 2, Fig. 25)
(Islam and Khatun 1966, 99, Fig. 79)
Colony L. 21.6 μm ; cell L. 14.8-20.2 μm , d. 2.7-4 μm . Lake; spring 1997; few.
46. **Scenedesmus arcuatus** var. **platydiscus** Smith, G.M. (Pl. 2, Fig. 20)
(Islam and Begum 1970, 251, 5: 140-141)
Colony L. 11 μm ; cell L. 7.4-8 μm , d. 5.4 μm . Lake; winter 1997; few.
47. **Scenedesmus armatus** var. **spinosus** Fritsch & Rich (Pl. 2, Fig. 23)
(Hegewald and Silva 1988, 102, Fig. 161)
Colony L. 13.5 μm ; cell L. 9.4-14.8 μm , d. 3.4 μm . Lake; winter 1996; rare.
48. **Scenedesmus bijuga** (Turp.) Lagerheim (Pl. 2, Fig. 21)
(Islam and Begum 1970, 252, 5: 147, 149-150)
Colony L. 13.5 μm ; cell L. 10.8-12 μm , d. 4 μm . Lake; winter 1997; rare.

49. **Scenedesmus brasiliensis** Bohlin (Pl. 2, Fig. 17)
(Hegewald and Silva 1988, 131, Fig. 214)
Colony L. 21-27 μm ; cell L. 19-22.3 μm , d. 5.4-7.4 μm . Lake; winter 1996 and spring 1997; few.
50. ***Scenedesmus denticulatus** fa. **maximus** Uherk (Pl. 2, Fig. 18)
(Hegewald and Silva 1988, 208, Fig. 330)
Colony L. 25.6 μm ; cell L. 20.2-21.6 μm , d. 6.7 μm . Lake; winter 1996; rare.
51. **Scenedesmus longispina** Chod. var. **asymmetricus** Hortob. (Pl. 2, Figs. 29-30)
(Hortobágyi 1960, 181, 27-28: 315-324)
Colony L. 13.5-16.8 μm ; cell L. 10.2-12.8 μm , d. 3.4-6 μm ; terminal cells have thin, curved spines at alternate tips, spine L. 5.4 μm . Lake; spring 1997; few.
52. **Scenedesmus perforatus** Lemm. (Pl. 2, Fig. 28)
(Hegewald and Silva 1988, 388, Fig. 625)
Colony L. 28.3 μm ; cell L. 19-19.7, d. 6.7-8 μm . Close to var. *pologranulatus* Teil., although not separable from the typical (Hegewald and Silva 1988). Lake; spring 1997; few.
53. **Scenedesmus quadricauda** (Turp.) Bréb. (Pl. 2, Figs. 19, 26-27)
(Hegewald and Silva 1988, 428, Fig. 687)
Colony L. 21-47.2 μm ; cell L. 16.2-18 μm , d. 5-6.7 μm . Lake; autumn and winter 1997; few.
54. ***Scenedesmus quadricauda** var. **rectangularis** G.S. West (Pl. 2, Fig. 24)
(Hegewald and Silva 1988, 462, Fig. 746)
Colony L. 33.7 μm ; cell L. 17.5 μm , d. 8-9.4 μm . It resembles *S. quadricauda* var. *quadrispina* (Chodat) Smith, G.M. Lake; autumn 1997; rare.
55. ***Scenedesmus quadricaudatus** var. **ecornis** Ehr. ex Ralfs (Pl. 2, Figs. 16, 22)
(Hegewald and Silva 1988, 468, Fig. 756)
4-celled colony, L. 20.2 μm ; cell L. 13.5-17 μm , d. 4.7-5.4 μm , cell wall smooth or granulated. Lake; rainy and autumn 1997; rare.
56. **Tetrallantos lagerheimii** Telling (Pl. 1, Fig. 12)
(Islam 1969, 27, Figs. 31-33)
Cell L. 12-14.8 μm , d. 4 μm . Lake; winter 97; rare.

Order: Ulotrichales; Family: Ulotrichaceae

57. **Schizomeris leibleinii** Kütz.: Lake; on snail, among *Cladophora*; rainy 1997; few.
58. **Ulothrix tenerrima** Kütz. (Pl. 1, Fig. 15)
(Islam and Zaman 1974, 87, 1: 3, 18-19)

Cell L. 5.4-17.5 μm , d. 6.7-8 μm . Lake; on snail, among *Cladophora* spp.; rainy 1997; few.

Family: Cyliandrocapsaceae

59. **Cylindrocapsa geminella** Wolle
(Islam and Irfanullah, 2000b, 116, 1: 9-11)
Lake; primarily epiphytic but free-floating after maturation; winter and rainy 1997; few to common.

Order: Chaetophorales; Family: Chaetophoraceae

60. **Chaetophora elegans** (Roth) C.A. Agardh (Pl. 4, Fig. 65)
(Islam and Ahia 1964, 105, Fig. 14)
Colony d. 2.5-3 mm; cell dimension: main axis 24.3-48.6 \times d. 13.5-6.7 μm , branch 10.8-27 \times 4.7-7.4 μm ; seta d. 2-2.7 μm . River; colonies free-floating or epilithic; winter and autumn 1997; common.
61. **Protoderma viride** Kütz. (Pl. 1, Fig. 14)
(Printz 1964, 290, 90: 1-2)
Cell d. 13.5-19 μm , L. 1-2 times than breadth. Lake; on *Oedogonium* sp.; winter 1997; few to common.
62. **Pseudopleurococcus printzii** Vischer (Pl. 4, Fig. 69)
(Printz 1964, 278, 86: 1-9)
Cell dimension: apical 19-27 \times 16.2-20.2 μm , intercalary 16.2-27 \times 21.6 μm . Lake; winter 1996 and rainy 1997; rare to few.
63. ***Pseudulvella americana** (Snow) Wille (Pl. 6, Fig. 80)
(Bourelly 1972, 53: 4-8)
Thallus microscopic, epiphytic on *Chara fibrosa*, enclosed in gelatinous envelop, irregular margin, thallus size 173 \times 109 μm ; cell are irregular in shape, roundish polygonal to true polygonal, cell L. 7.4-14.8 μm , d. 6.7-10 μm ; chloroplast parietal. Lake; winter 1997; few.
64. **Stigeoclonium aestivale** (Hazen) Collins (Pl. 4, Figs. 62-63)
(Printz 1964, 144, 34: 1)
Cell dimension: main axis 18-59 \times 5.4-7.4 μm , branch 13.5-27 \times 5.4 μm , basal 5.4-10.8 \times 4-8 μm , seta d. 3.4-4 μm . Lake and ditch; on *Oedogonium* sp.; autumn to spring 1997; rare to common.
65. **Stigeoclonium curvirostrum** Skuja (Pl. 4, Fig. 64)
(Skuja 1949, 73, 12: 4-8)
Cell dimension: primary branch 13.5-40.5 \times 4.7-7.4 μm , secondary branch 14.8-32.4 \times 4.7-7.4 μm , basal 8-16.2 \times 8-10.8 μm . Lake; epiphytic; winter, few.

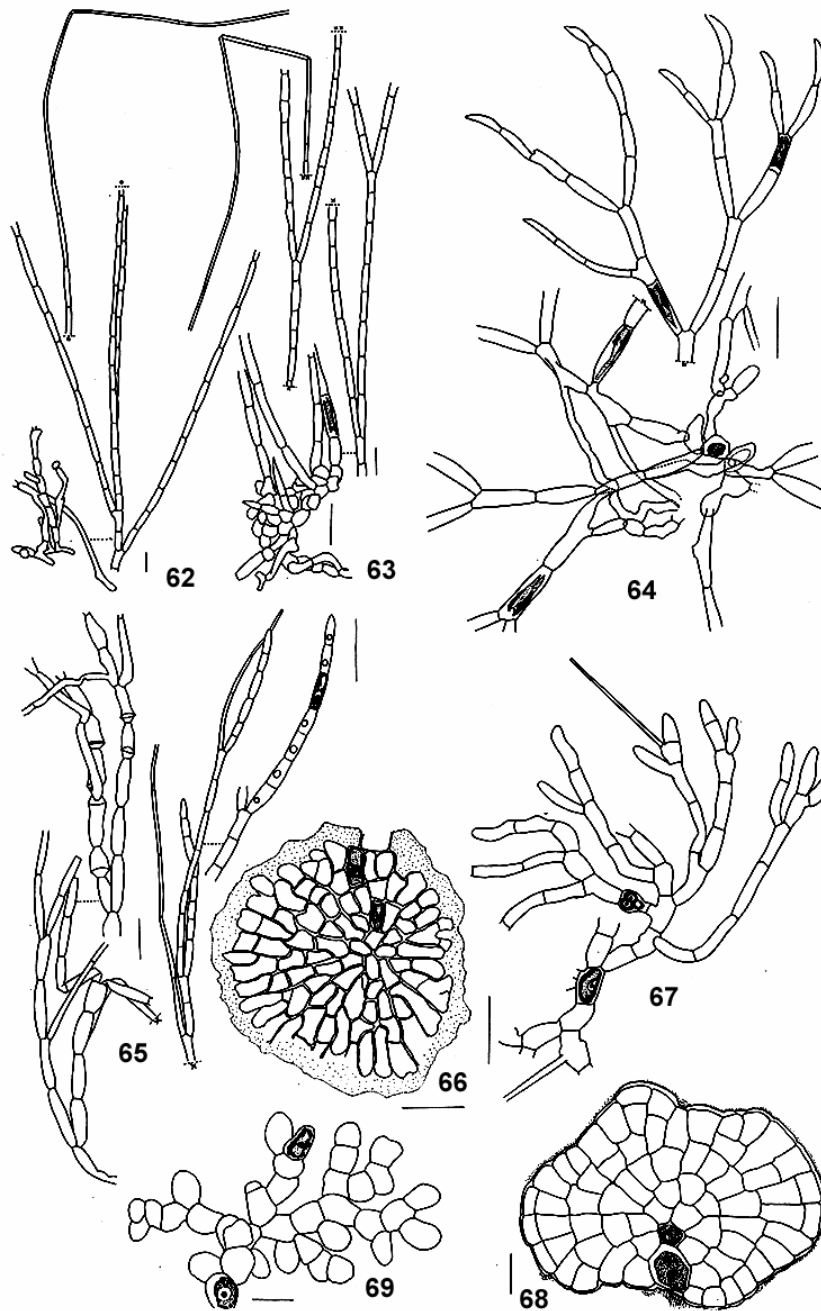


Plate 4 (Figs. 62-69)

Figs. 62-63. *Stigeoclonium aestivale*, 64. *S. curvirostrum*, 65. *Chaetophora elegans*, 66. *C. soluta* var. *soluta*, 67. *C. conchata*, 68. *C. scutata*, 69. *Pseudopleurococcus printzii*. (Scales: Figs. 62-63 = 20 μ m, Fig. 67 = 50 μ m, rest = 30 μ m)

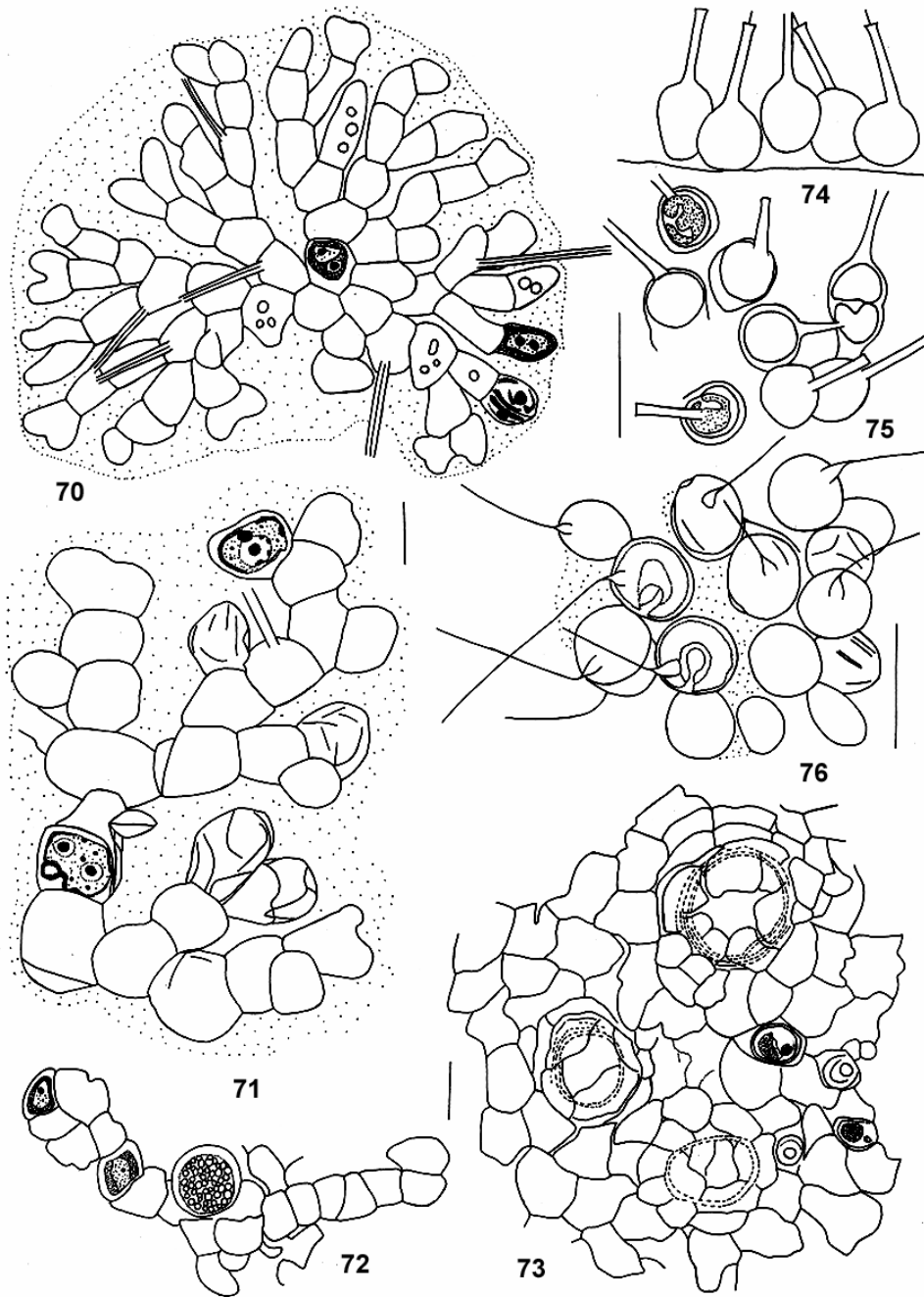


Plate 5 (Figs. 70-76)

Figs. 70-71. *Coleochaete conchata*, 72-73. *C. nitellarum*, 74. *Chaetosphaeridium globosum*, 75. *C. pringsheimii*, 76. *C. ? pringsheimii*. (Scales = 20 μ m).

66. **Stigeoclonium geraldii** Islam: Lake; on *Nymphoides indicum* petiole; rainy 1997; rare.

67. ***Ulvelia frequens** Butcher (Pl. 6, Fig. 79)
(Bourrelly 1972, 288, 53: 9)

Thallus microscopic, epiphytic on stems of *Panicum paludosum*, forms one-cell-thick pseudoparenchymatous disc, irregular in outline, filaments radiating near periphery; cells irregularly angular in shape, central cell L. 13.5-21 µm, d. 9.4-16.2 µm, peripheral cell L. 8-19 µm, d. 8-13.5 µm; tip cells triangular; chloroplast parietal. Lake; winter 1997; few.

Order: Coleochaetales; Family: Aphanochaetaceae

68. **Aphanochaete repens** A. Br. (Pl. 6, Figs. 77–78)
(Islam 1974, 35, 3: 15-16)

Thallus L. >200 µm; cell dimensions: apical 10.8-13.5 × 5.4–6 µm, intercalary 12-15.5 × 6-8.8 µm; seta base d. 2.7-4 µm. Lake; on *Oedogonium* sp.; autumn to spring 1997; rare to common.

Family: Coleochaetaceae

69. **Coleochaete conchata** Moeb. (Pl. 4, Fig. 67, Pl. 5, Figs. 70–71)
(Khan and Islam 2000, 15, 1: 1, 2: 2–4, 4: 11)

Cell L. 27-32.4 (-40.5) µm, d. (6.7-) 10.8-16.2 µm; seta L. 32.4-54 µm. Lake; on *Nymphoides indicum* petiole; rainy and autumn 1997; few to common.

70. **Coleochaete nitellarum** Jost (Pl. 5, Figs. 72–73)
(Islam 1974, 36, 1: 4-7, 2: 8-12)

Lake; on *Chara fibrosa*; winter 1996 and 1997; few.

71. **Coleochaete scutata** Bréb. (Pl. 4, Fig. 68)
(Islam 1974, 37, 1: 1–3)

Thallus d. 153-218 µm; cell L. 14.8-32.4 µm, d. 13.5-27 µm. Lake; epiphytic; winter and rainy 1997; few to common.

72. **Coleochaete soluta** (Bréb.) Pringsh. var. **soluta** (Pl. 4, Fig. 66)
(Islam 1974, 37, 3: 19-20)

Thallus d. 113-122 µm; cell L. 10.8-27, d. 8-12 µm. Lake; on *Nymphoides indicum* petiole; rainy and autumn 1997; few.

Family: Chaetosphaeridaceae

73. **Chaetosphaeridium globosum** (Nordst.) Klebahn (Pl. 5, Fig. 74)
(Islam 1974, 38, 1: 7a)

Cell L. 10.8-12.8 µm, d. 10-12 µm; seta L. 13.5 µm. Lake; winter 1996, winter to rainy 1997; rare to few.

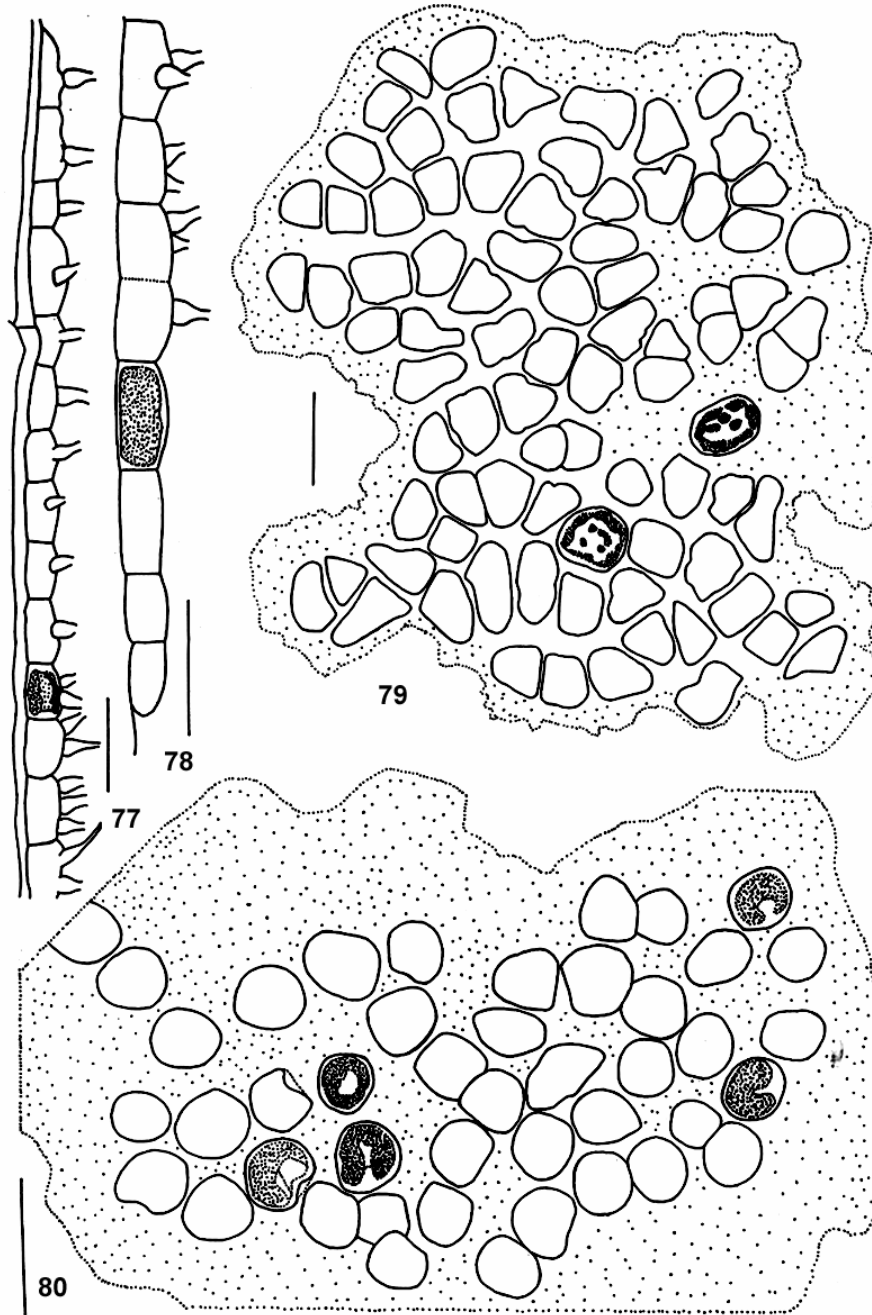


Plate 6 (Figs. 77-80)

Figs. 77-78. *Aphanochaete repens*, 79. *Ulvella frequens*, 80. *Pseudulvella americana*. (Scales = 20 μ m)

74. **Chaetosphaeridium pringsheimii** Klebahn (Pl. 5, Fig. 75)
(Printz 1964, 332, 104: 1-2; Bourrelly 1972, 323, 63: 10, 64: 1)
Cell d. 8.8-10.8 μm , seta L. max. 12.5 μm , d. 1.3 μm ; utricle present. Epithytic on *Oedogonium* sp. along with *Stigeoclonium aestivale*. Lake; winter 1997; rare.

75. **Chaetosphaeridium ? pringsheimii** Klebahn (Pl. 5, Fig. 76)
(Tiffany and Britton 1952, 44, 6: 59)
Globose cells irregularly arranged on the substrate, d. 8-13.5 μm ; seta base d. 2-2.7 μm ; utricle not clearly visible. Lake; on *Nymphoides indicum* petiole; rainy 1997; rare.

Order: Oedogoniales; Family: Oedogoniaceae

76. **Bulbochaete** spp. : Lake; year round; common; lacked mature oospores.
77. **Oedogonium** spp. : Lake and ditch; year round; common; lacked mature oospores.

Order: Cladophorales; Family: Cladophoraceae

78. **Cladophora profunda** Brand (Pl. 7, Fig. 82)
(Islam and Zaman 1975, 48, 2: 18)
Cell dimensions: main axis, 170-740 \times 32-43 μm and branch, 105-570 \times 22-39 μm ; sporangia dimension 128-269 \times 32-45 μm . Lake; on snail; rainy 1997; few.

79. ***Cladophora sterrocladia** Skuja (Pl. 7, Fig. 81)
(Skuja 1949, 94, 37: 1-7)
Red-brown branched thallus growing on snail, primary branches are opposite but secondary branches are unilateral, few successive unilateral branches can also be seen on the main axis; cell dimension: main axis 134-205 \times 35-51 μm , primary branch 147-307 \times 26-45 μm ; reproduction was not observed. Lake; rainy 1997; few.

Order: Zygnemales; Family: Zygnemaceae

80. ***Mougeotia viridis** (Kütz) Wittrock fa. (Pl. 7, Fig. 83)
Zygospores formed in the conjugation tube, quadratic, wall smooth, sides concave, corners retuse, dimension 35 \times 28 μm . Differs from Prescott (1951, 306, 71: 8-10). Lake; winter 1997; common.

81. **Mougeotia** sp. (Pl. 7, Figs. 84-85)
Azygospores formed in the sporangia, cubico-cylindrical, dimension 24 \times 19 μm . Lake; winter and autumn 1997; few to common.

82. **Spirogyra** spp. : Lake and river; year round; common; lacking mature zygospores.

83. **Zygnema** sp. : River; spring 1997; few.

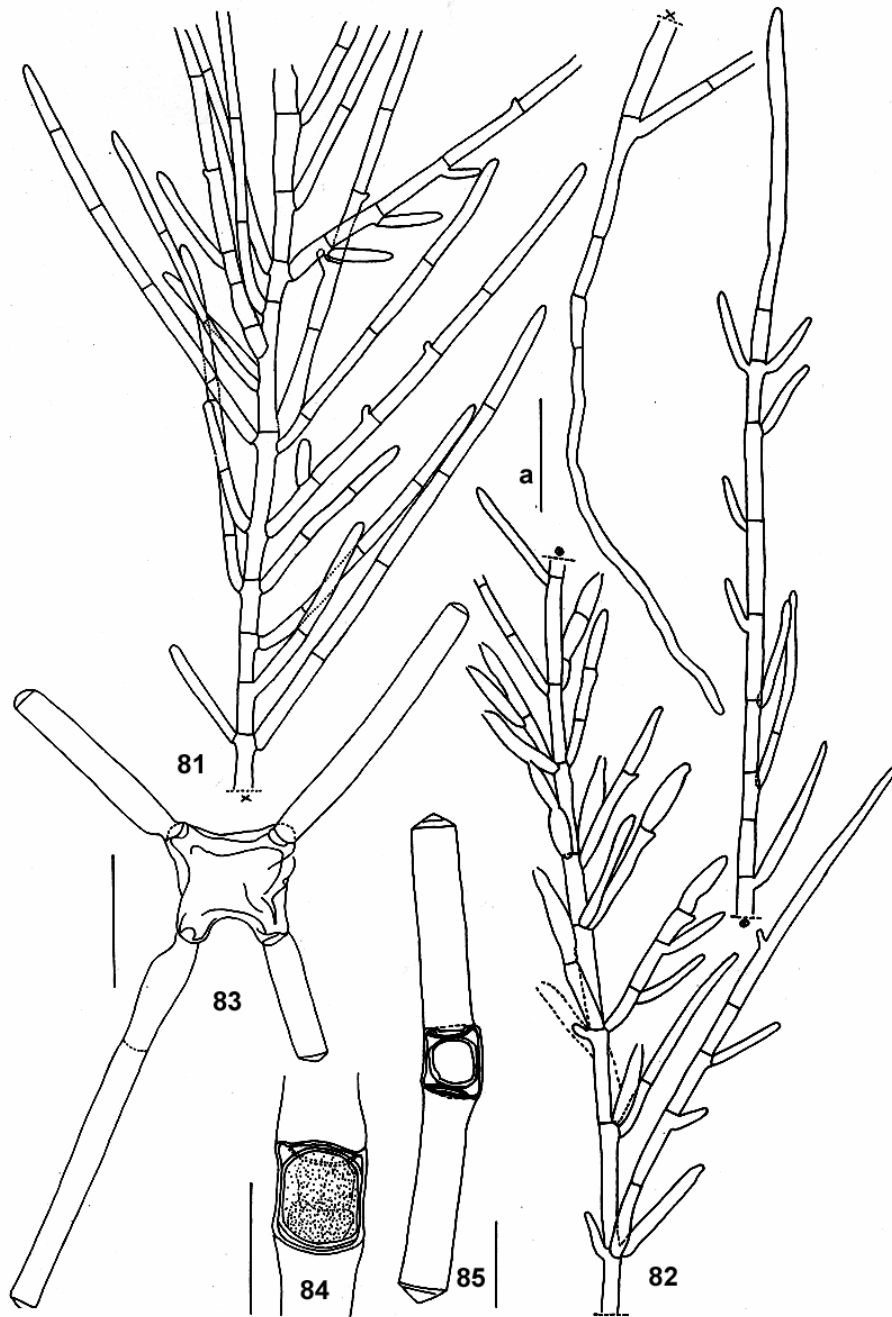


Plate 7 (Figs. 81-85)

Fig. 81. *Cladophora sterrocladia*, 82. *C. profunda*, 83. *Mougeotia viridis* fa., 84-85. *Mougeotia* sp. (Scales: a = 300 μ m, rest = 30 μ m)

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