

Additions to the Benthic Marine Algal Flora of Fiji

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Abstract.—Recent collections add 43 species to the benthic marine algal flora of Fiji, bringing the total reported for the island to 167.

Introduction

While numerous monographs and checklists of benthic marine algae in the five island groups of Micronesia are available (Tsuda and Wray, 1977), modern published accounts dealing with the algal flora of Fiji are restricted to a checklist and note (Chapman, 1971, 1977) based primarily on collections from the main island of Viti Levu. Consequently, when one of us (W.A.B.) had an opportunity to travel extensively in Fiji from June through December, 1975, numerous collections were made on Viti Levu and Vanua Levu, as well as Rambi, Moala, and Vanua Mbalavu to augment our phycological knowledge of this large island group. This paper lists 43 additional benthic marine algae from Fiji: Chlorophyta (12 spp.), Phaeophyta (5 spp.), and Rhodophyta (26 spp.).

The main islands of the Fijian archipelago, lying between 177° W. Lat. and 178° E. Lat., and 16° to 18° S. Long., are primarily high islands of volcanic origin. With a land area of 18,272 sq. km, they are one of the largest island groups east of New Caledonia.

Collections were made in the following areas (Fig. 1): 1. Suva Point, Viti Levu, littoral and sublittoral coralline flats pocked with sandy tide pools; 2. Lauthala Bay, Viti Levu, breakwater of large boulders; 3. Moala, reef flat with broken areas of sand, coral rubble, and seagrass; 4. Vanua Mbalavu, beach area of coarse coralline sand and seagrass beds; 5. Rambi, reef flat with sandy tide pools; 6. Savu Savu, reef flat in a region of hot saline springs.

Catalogue of Species

CHLOROPHYTA

Avrainvillea nigricans Decaisne. 10903. Vanua Mbalavu. 25 July 1975.

Bornetella oligospora Solms-Laubach. 10900. Rambi. 31 October 1975. Plants to 3 cm tall and 6 mm wide at the apex; radial walls 40–60 μ m thick in transection.

Chaetomorpha linum (Muell.) Kuetz. [= *Chaetomorpha aerea* (Dillw.) Kuetz.]. 10155.

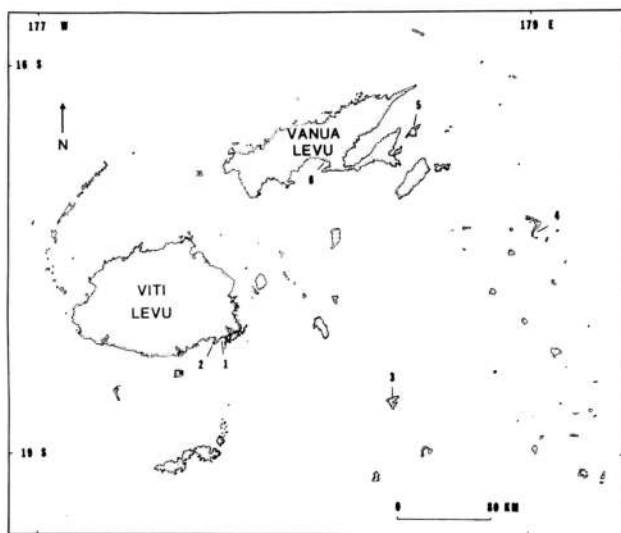


Fig. 1. Map of Fiji showing collection sites referred to in text.

- Suva Point. 22 September 1975. Common epiphyte on coarser algae in tide pools. *Cladophora vagabunda* (L.) van den Hoek [= *Cladophora fascicularis* (Mert.) Kuetz.]. 10122. Suva Point. 25 June 1975. Epilithic in the upper eu littoral.
- Dictyosphaeria cavernosa* (Forssk.) Børg. [= *Dictyosphaeria favulosa* (J. Ag.) Decaisne]. 10901. Suva Point. 25 June 1975. Common in shallow tide pools.
- Enteromorpha clathrata* (Roth) J. Ag. 10111. Suva Point. 25 June 1975.
- Enteromorpha flexuosa* (Muell.) J. Ag. 10909. Suva Point. 11 December 1975.
- Enteromorpha lingulata* Bliding. 10910. Suva Point. 25 June 1975.
- Enteromorpha multiramulosa* Bliding. 10895. Lauthala Bay. 25 August 1975. Epiphytic on *Ceramium*. This minute species is distinctive with 4–7 pyrenoids in mature cells, and spine-like branchlets with a rounded basal cell. Fig. 34.
- Struvea anastomosans* (Harv.) Piccone. 10117. Suva Point. 25 June 1975. Fig. 33.
- Ulvaria oxysperma* (Kuetz.) Bliding. 10907. Lauthala Bay. 25 August 1975. These minute plants resemble blades of *Ulva*, but are monostromatic.
- Valonia aegagrophila* C. Ag. 10905. Savu Savu. 6 November 1975. Cells distally swollen, 5 mm long and 1 mm wide. Irregularly branched with cells forming in terminal and lateral positions.

PHAEOPHYTA

- Dictyota bartayresii* Lamx. 10058. Lauthala Bay. 11 June 1975. Abundant on eu littoral rocks.
- Dictyota cervicornis* Kuetz. 10057. Rambi. 1 November 1975.
- Padina gymnospora* (Kuetz.) Vickers. 10065. Suva Point. 22 September 1975. Epilithic in littoral tidepools.
- Padina minor* Yamada. 10063. Suva Point. 25 June 1975. Epilithic in lower eu littoral.
- Padina tenuis* Bory. 10064. Lauthala Bay. 11 June 1975.

RHODOPHYTA

- Amphiroa fragilissima* (L.) Lamour. 10911. Suva Point. 25 June 1975. Epilithic at low tide mark.
- Amphiroa tribulus* (Ell. & Sol.) Lamour. 10912. Suva Point. 25 June 1975. Epilithic in the lower eulittoral.
- Bangiopsis humphreyi* (Collins) Hamel. 10908. Rambi. 31 October 1975. Fig. 22.
- Bostrychia tenella* (Vahl) J. Ag. 10897. Lauthala Bay. 25 August 1975. Figs. 6, 11.
- Caloglossa leprieurii* (Mont.) J. Ag. 10892. Lauthala Bay. 25 August 1975. Associated with *Bostrychia* species in the upper littoral. Figs. 12–13, 30.
- Ceramium brevizonatum* Peterson. 10896. Suva Point. 12 November 1975. Fig. 20.
- Ceramium vagabunde* Dawson. 10895. Lauthala Bay. 25 August 1975. Figs. 18–19.
- Champia parvula* (C. Ag.) Harvey. 10906. Moala. 15 July 1975. Fig. 28.
- Gelidiopsis variabilis* (Grev.) Schmitz. 10041. Suva Point. 25 June 1975. Forming mats in the upper littoral.
- Gracilaria coronopifolia* J. Ag. 10034. Suva Point. 22 September 1975.
- Gracilaria mammillaris* (Mont.) Howe. 10048. Suva Point. 22 June 1975.
- Grateloupia filicina* (Wulf.) C. Ag. 10049. Suva Point. 22 September 1975.
- Hypnea cervicornis* J. Ag. 10038. Suva Point. 22 June 1975.
- Hypnea cornuta* (Lamour.) J. Ag. 10046. Suva Point. 22 September 1975. Common epiphyte on seagrasses.
- Laurencia columellaris* Børg. 10053. Suva Point. 25 June 1975.
- Laurencia distichophylla* J. Ag. 10045. Suva Point. 25 June 1975. Eulittoral on coral.
- Laurencia intermedia* Yamada. 10042. Suva Point. 25 June 1975.
- Lophosiphonia reptabunda* (Suhr) Jaasund. 10893. Lauthala Bay. 25 August 1975. Figs. 7–10.
- Murrayella pericladus* (C. Ag.) Schnidt. 10904. Rambi. 31 October 1975. Figs. 2–5.
- Polysiphonia mollis* Hook. & Harv. 10894. Suva Point. 12 November 1975. Figs. 25–27.
- Polysiphonia scopularum* Harv. 10891. Lauthala Bay. 25 August 1975. Figs. 23–24.
- Pterocladia nana* Okamura. 10899. Suva Point. 22 September 1975. Fig. 21.
- Spyridia hypnoides* (Bory) Papenfuss [= *Spyridia aculeata* (Schimper) Kuetz.]. 10037. Suva Point. This species is best distinguished from *S. filamentosa* on the basis of cortical bands rather than presence of terminal branch spines. Figs. 31–32.
- Tolypoclada calodictyon* (Harv.) Silva. 10890. Suva Point. 22 September 1975. Fig. 29.
- Wurdemannia miniata* (Lamx. & D. C.) Feldmann & Hamel. 10898. Suva Point. 22 September 1975. Fig. 17.

Discussion

Of the 167 species of benthic marine algae reported from Fiji, 67 are not included in the extensive bibliography compiled for Micronesia (Tsuda and Wray, 1977). This group includes a large proportion of species in three families: Corallinaceae,

Chaetangiaceae, and Sargassaceae, which often present formidable taxonomic problems unless abundant specimens are available. Although the presence of many of these taxa in Fiji could eventually be confirmed, the earlier reports should be treated with caution. Some of the errors associated with checklists can be attributed to the lack of adequate illustrations for taxonomically reliable characters useful in delimiting tropical species. Several recent publications have made noteworthy contributions to our knowledge of the Indo-Pacific flora by providing illustrations with descriptions (Dawson, 1954, 1956, 1957; Gordon et al., 1976; Jaasund, 1976; Taylor, 1950; Trono, 1968, 1969; and Tsuda, 1972). The present paper includes illustrations of 18 species newly reported for Fiji to augment illustrations available elsewhere in the literature.

Exclusive of Cyanophyta, 530 species of benthic marine algae have been reported for Micronesia (Tsuda and Wray, 1977) compared with 167 for Fiji. The ratio of Rhodophyta to Phaeophyta (R/P), used to characterize the floristic affinity of a geographic region (Feldmann, 1938), is 4.9 for Micronesia and only 3.6 for Fiji. This information suggests that a large number of Fijian algae remain unreported and that the greater part of these are Rhodophyta. In particular, many taxa of Ceramiales, abundantly represented in Micronesia, are unreported for Fiji, while other genera such as *Ceramium*, *Polysiphonia*, *Herposiphonia*, and *Lophosiphonia* seem to have been essentially ignored.

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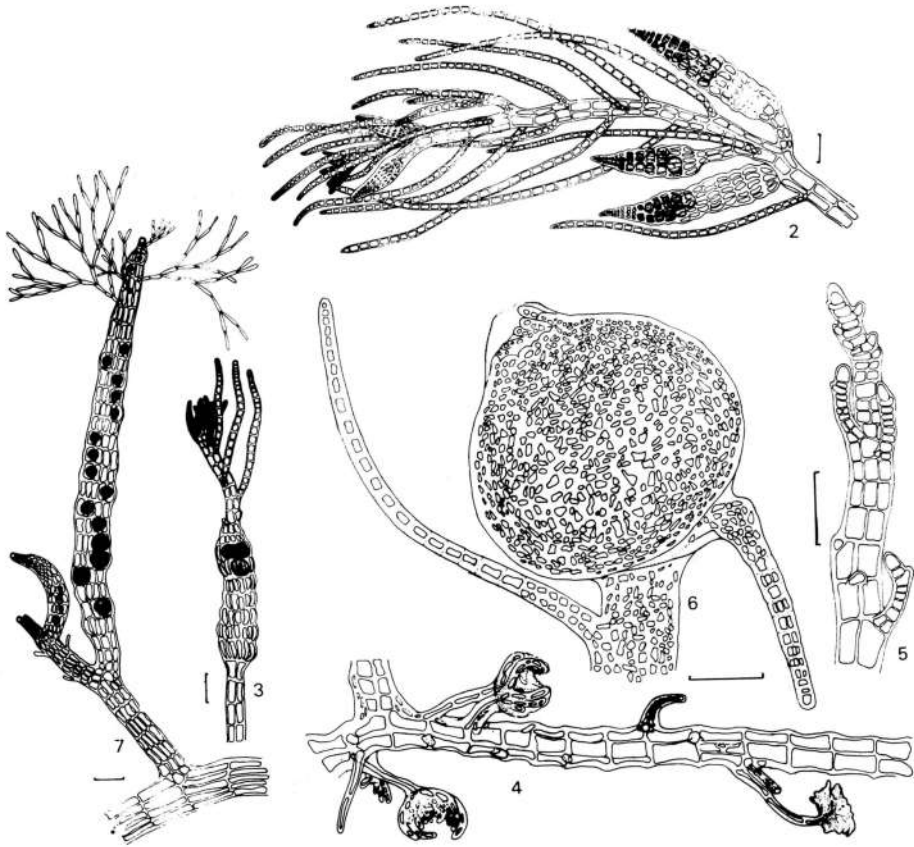


PLATE I

Fig. 2-5. *Murrayella pericladus*. Fig. 2-3. Tetrasporangial stichidia. Scale = 100 μ m.

Fig. 4. Prostrate axis with multicellular rhizoids. Fig. 5. Branch development from prostrate axis. Scale = 50 μ m.

Fig. 6. *Bostrychia tenella*. Mature pericarp borne terminally on a branchlet. Scale = 50 μ m.

Fig. 7. *Lophosiphonia reptabunda*. Erect branch with tetrasporangia.

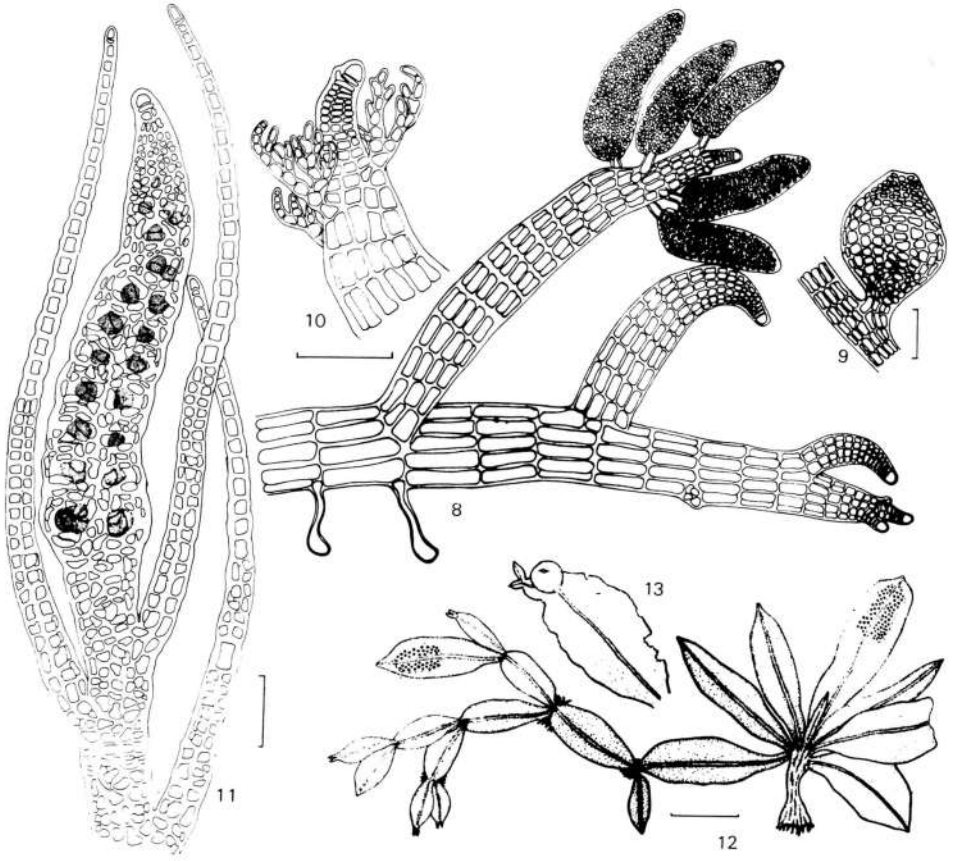


PLATE II

- Fig. 8-10. *Lophosiphonia reptabunda*. Fig. 8. Spermatangial branch. Fig. 9. Mature pericarp. Fig. 10. Branch apex showing trichoblast development. Scale = 100 μ m.
 Fig. 11. *Bostrychia tenella*. Tetrasporangial stichidium. Scale = 50 μ m.
 Fig. 12-13. *Caloglossa leprieurii*. Fig. 12. Tetrasporangial sori on adaxial blade surface. Fig. 13. Mature pericarp borne on blade midrib. Scale = 1 mm.

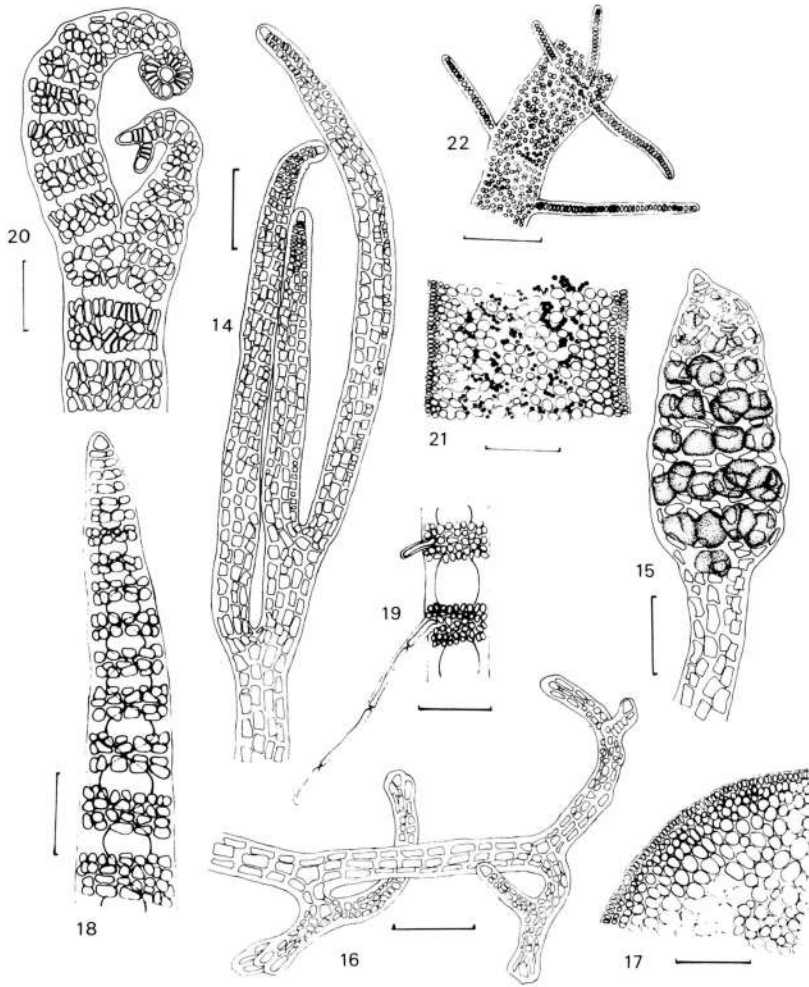


PLATE III

- Fig. 14–16. *Bostrychia radicans*. This species is previously reported from Fiji. Illustrations are included here for comparison with *B. tenella*. Fig. 14. Polysiphonous branch tip. Fig. 15. Tetrasporangial stichidium. Fig. 16. Prostrate axis with multicellular rhizoids. Scale = 100 μ m.
- Fig. 17. *Wurdemannia miniata*. Portion of transection showing medulla of thin-walled cells and 1-cell layered cortex. Scale = 100 μ m.
- Fig. 18–19. *Ceramium vagabunde*. Fig. 18. Branch tip showing cortical development. Fig. 19. Horizontal axis with rhizoids. Scale = 100 μ m.
- Fig. 20. *Ceramium brevizonatum*. Nodal cortication of main axis. Scale = 50 μ m.
- Fig. 21. *Pterocladia nana*. Portion of transection showing rhizines mixed with medullary filaments. Scale = 100 μ m.
- Fig. 22. *Bangiopsis humphreyi*. Portion of filament showing uniseriate branchlets. Scale = 100 μ m.

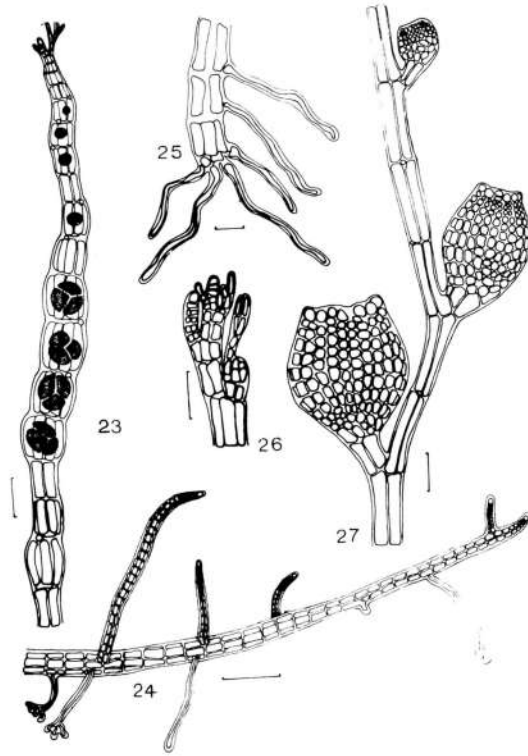


PLATE IV

- Fig. 23-24. *Polysiphonia scopularum*. Fig. 23. Tetrasporangial branch. Fig. 24. Prostrate filament with unicellular rhizoids in open connection with pericentral cells. Scale = 100 μ m.
- Fig. 25-27. *Polysiphonia mollis*. Fig. 25. Basal region with rhizoidal development. Fig. 26. Branch apex with immature carpoogonial branch. Fig. 27. Mature pericarp with large cells on the ostiolar rim. Scale = 100 μ m.

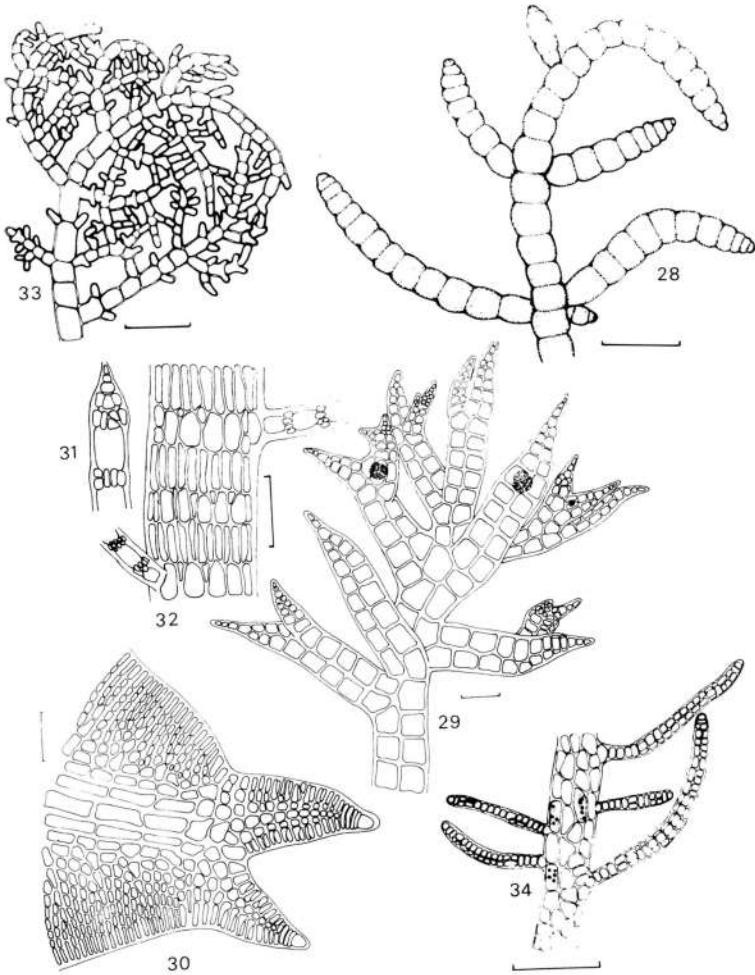


PLATE V

- Fig. 28. *Champia parvula*. Habit. Scale = 1 mm.
- Fig. 29. *Tolyptocladia calydictyon*. Tetrasporangial branchlet. Scale = 100 μ m.
- Fig. 30. *Caloglossa lepreurii*. Blade tip showing development of dichotomous branching. Scale = 35 μ m.
- Fig. 31-32. *Spyridia hypnoides*. Fig. 31. Spine-tipped branchlet. Fig. 32. Distinctive pattern of cortication on a main axis. Scale = 50 μ m.
- Fig. 33. *Struvea anastomosans*. Habit. Scale = 1 mm.
- Fig. 34. *Enteromorpha multiramulosa*. Note spine-like branchlets and mature cells with 4-7 pyrenoids. Scale = 100 μ m.