ADDITIONS TO THE MARINE FLORA OF BRAZIL. III.

A. B. JOLY, M. CORDEIRO, M. L. MENDOZA,
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1. INTRODUCTION.

Since the appearance of the second paper of this series (Joly and Cordeiro 1962) and as a result of a very thorough exploration of certain places not previously visited in the area under survey (Joly and Cordeiro 1962), we came across a few very interesting algae not known in the Brazilian coast or even in the American Atlantic (Taylor 1960).

In one instance, however, the plant is not strictly a new addition to the flora. It was first reported by Möbius (Möbius 1890, p. 1078), but this reference has escaped notice (Taylor 1960, p. 333).

Perhaps the more attractive additions are those of one species of *Dorhniella* known to occur in very restricted points in the Caribbean Sea, and the two species of *Taenioma*. Both species of *Taenioma* found in reproduction, sexual and tetrasporic, are very beautiful and delicate plants.

Another point of interest is the finding of a certain species of the genus *Arthrocardia* whose center of distribution is in South Africa. This is the second species of this genus reported from Southern Brazil (Joly 1957, p. 115).

It is also to be noted that other plants known to occur in the Caribbean area are for the first time reported in the American South Atlantic. This last group comprises species of the following genera:

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(1) Departamento de Botânica, Fac. Fil. C. Letr., Universidade de São Paulo, Brasil.

(2) Cryptogamic Section, "Instituto de Botânica do Estado". São Paulo, Brazil.

(3) Research Fellow of I.N.T.I., Buenos Aires, Argentina.

(4) Research Fellow of "Fundação de Amparo à Pesquisa", São Paulo, Brazil.

Scinaia, Coelothrix, Herposiphonia and *Gracilariopsis*. From the last mentioned genus was found its type species and is a plant very common in the region. Abundant reproductive material, both sexual and tetrasporic, was found. Very interesting also is the finding of *Gelidiella tenuissima,* an European plant obtained by dredging in the region and also found growing in the intertidal zone. This species was recently found in Puerto Rico (Blomquist and Almodovar, 1961).

2. SYSTEMATIC ACCOUNT.

Scinaia complanata (Collins) Cotton

References: Börgesen 1916, p. 85-88, figs. 93-94; Collins & Hervey 1917, p. 101; Setchell 1917, p. 100-102, pl. 11, figs. 19-22; Taylor 1928, p. 141, pl. 21, fig. 19; Taylor 1960, p. 333-334, pl. 42, fig. 3.

Plate I, figs. 1-5.

Plants up to 3 cm high, showing a pale rosy-red colour when alive, repeatedly closely dichotomous branched (fig. 1) fixed by a small roundish holdfast. The thallus is hollow and has a diameter varying from 1,5 to 3 mm and is complanate. At the surface a continuous layer of varying size, polygonal cells are closely set forming an epidermal covering of the thallus (fig. 3). Immediately below are located small groups of much smaller cells (fig. 4), that had its origin in the central strands of filaments. These cells have a varying size being with and irregular to somewhat roundish outline (fig. 4). A cross section of the thallus shows the epidermal cells as a very regular covering. These cells have a somewhat square outline in section (fig. 5). Cystocarpic plants (fig. 2) were also found. Our plants agree very well with the figures given by Setchell (Setchell, l. c., pl. 11, figs. 19-22) and by Börgesen (Börgesen, l. c., fig. 94). This plant is a rare one in the region. A few plants were collected in very restricted points only three times and it was found with cystocarps during the month of January. The refe-

rence of Möbius, (Mobius, 1890, p. 1078-1079), is of *S. furcellata* (Turner) Bivona, but, as suggested by Taylor (Taylor 1960, p. 334), probably all American plants are to be referred to *S. complanata* (Collins) Cotton. This reference was not included in Taylor's book (Taylor 1960) on the tropical algae of the American Atlantic.

Gelidiella tenuissima Feldmann et Hamel

References: Feldmann et Hamel 1936, p. 226-228, figs. 11-12; Feldmann et Hamel 1934, p. 534, figs. 1-2 (under *G. pannosa* (Bornet) Feldmann et Hamel).

Plate II, figures 1-4.

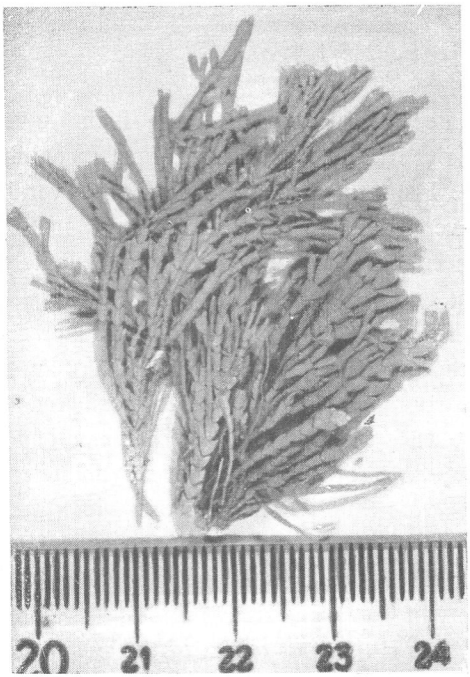
Plants minute, measuring 1,5-2 mm high, having a prostrate cylindrical portion, fixed to the substratum by numerous tufts of rhizoids (fig. 1). From this decumbent portion, several erect branches arise. These have a diameter varying from 60 to 75μ. Structurally the erect portion is composed of cells of approximately the same size (fig. 2) being the externally placed disposed in a regular fation. They form transverse rows (fig. 3). The stichidia are placed at the upper free portion of the erect branches (fig. 1). They are slightly swollen and produce the sporangia in two regular rows (fig. 4). The young stichidia measure 136μ long and have a diameter of about 58μ. The older ones are up to 526μ long and have a diameter of 78μ. Only tetrasporic plants were found. The measures given above are in good accordance with the ones given by Feldmann et Hamel (Feldmann et Hamel 1936, p. 228). The only differences being the size of the stichidia. Our plant has a larger size stichidium as compared with the european ones. This is the first report of the species in the American South Atlantic. This plant was collected once and came from 10 m deep dredging. It was found with tetraspores in the month of February.

Arthrocardia gardneri Manza

References: Manza 1937, p. 568; Manza 1940, p. 286-287.

Text fig. 1, Plate II, figs. 5-8.

Plants growing in tufts measuring up to 5-7 cm high (Photo 1). The plants have a distinctive brick-red colour when alive. The thallus is formed by a succession of flattened, calcified segments (genicula) (fig. 5), joined together by the non calcified central strand of filaments (intergenicula) (fig. 6). The segments have a varying form and size. Most of them are distinctly longer than broad, measuring up to 3-4 mm long. The way of branching is very characteristic, the lower and the upper segments can branch di- or trichotomously in one plane.



The branched segment has a distinct cuneiforme shape, being the upper portion at least two times broader than its base (fig. 5). The fertile plants bear conceptacula at the upper median larger portion

of the segments (fig. 7). The fertile plants are also much more branched than the sterile ones. Each conceptaculum bears a terminal pore and produces 5 to 6 large tetrasporangia (fig. 7). These are distinctly spindle shaped (fig. 8) being regularly transversely zonate. The plant was found with the tetrasporangia in the month of August.

This is the first reference of the occurrence of this species outside South Africa since its description by Manza in 1937. The plant is very characteristic and was compared with a photograph of the type taken by Prof. Wm. R. Taylor in 1952, from material borrowed from the University of California through the kindness of Prof. G. Papenfuss.

Gracilariopsis sjoestedtii (Kylin) Dawson

References: Dawson 1949, p. 40-42, pl. 15, fig. 10, pl. 16, figs. 5-8, pl. 17, figs. 1-9, pl. 18, fig. 4; Doty 1947, p. 178; Taylor 1960, p. 445 (as *Gracilaria sjoestedtii* Kylin).

Plate III, figs. 1-4.

Plants up to 19 cm high (usually 10-15 cm) with a distinct rosy-red colour when alive, growing isolated or in tufts. They are usually fixed in rocks or pebbles covered with sand in shallow water. The plant is abundantly ramified, specially at the upper portions where several short branches arise unilaterally giving a peculiar appearance to the plant (fig. 1). All branches are cylindrical or in some places a little flattened and all of them are distinctly constricted at the base. A cross section made at 2 cm above the holdfast shows the central portion to be composed of large roundish cells covered with smaller cells towards the periphery (fig. 2). The cortical portion is formed by numerous small roundish cells rich in cromatophores (fig. 2). The cystocarps are a very prominent feature when mature. They form conspicuous round swellings at the upper portions of the thallus. A median longitudinal section of a mature systocarp shows a distinct pore and the mass of gonimoblasts at the center (fig. 3). The carpospores are formed in distinct rows at the surface of the

gonimoblasts. The pericarp wall is thick and as one can see from fig. 3, no nutritive filaments develop from the gonimoblasts to the wall of the cystocarp (fig. 3). Tetrasporic plants were also found. The tetrasporangia are cruciately divided (fig. 4) and are found in the cortical region. The tetrasporangia measure up to 31μ long. This is the first reference of the occurrence of the genus and species in the South Atlantic. It was found with cystocarps in the months of January and July and with tetrasporangia during the month of March.

The plant is very common in the region under survey. The senior author wishes to acknowledge Dr. E. Yale Dawson for the identification of this species, when a few years ago he visited us.

Coelothrix irregularis (Harvey) Börgesen

References: Börgesen 1920, p. 389, figs. 373-374; Taylor 1928, p. 160, pl. 22, fig. 19, pl. 23, fig. 18; Taylor 1960, p. 488-489, pl. 45, fig. 3, pl. 46, fig. 4; Harvey 1853, p. 156 (under *Cordylecladia* ? *irregularis* Harvey); Collins & Hervey 1917, p. 113 (under *Cordylecladia rigens* (C. Agardh) Collins & Hervey).

Plate IV, figs. 1-4.

Plants small, growing in dense interwoven cushions over tufts of articulated corralines (fig. 1). The plant shows a rosy colour when alive. The axes are cylindrical and irregularly branched showing frequent anastomoses between neighbouring branches (fig. 1). The branches are hollow in its greatest portion, but in certain places the cavity is completely filled by cells (fig. 2). Numerous small cells with a denser content are formed facing the internal cavity (figs. 2-3). These are the so-called "glandular cells". These are approximately of the same size, measuring usually 12 x 10μ. The cavity is traversed by numerous longitudinally placed thin filaments whose cells can have a diameter of 5μ and being 72μ long (fig. 2). Seen from the surface the thallus has large and small cells interspersed (fig. 4). The larger cells can have a size up to 24μ in diameter and the smaller ones from

9,6 to 4,8μ. The plant was once found in the month of August and it was sterile. This is the first reference of the occurrence of this genus and species outside the Caribbean area.

Dorhniella antillarum (Taylor) Feldmann-Mazoyer var. *brasiliensis* Joly and Ugadim n. var.

References: (for the species)

Feldmann-Mazoyer 1940, p. 433; Taylor 1960, p. 501-502, pl. 65, fig. 1; Taylor and Arndt 1933, p. 659-660, figs. 1-10 (under *Actinothamnion antillarum*).

Plate V, figs. 1-4.

Plants small, filamentous, 5-7 mm high, very delicate, growing in tufts upon colonies of a hydrozoan or epiphytically upon other algae, showing a rosy-red colour when alive. They have a prostrate, uniseriate portion, that bears on the dorsal side from each node, either short determinate branches or long indeterminate ones, and are fixed to the substratum by two-celled rhizoids (fig. 3). These short branches, found upon the decumbent axis, have the same structure as the ones found on the erect indeterminate axis. The prostrate portion has a diameter varying from 30-61μ and the segments measure from 120-150μ long. The rhizoids are produced in a very peculiar way, instead of being cut from the segments of the decumbent axis, they are formed by the short basal cell of the determinate branches (figs. 3,4). They have a diameter varying from 12.2 up to 18.3μ. The uniseriate indeterminate erect branches are besect with spirally placed short laterals, and they also can bear one or two branches similar to the main ones. The determinate short branches are formed by 5 up to 12 cells and are produced at the distal portion of the cells of the main axis. They have at their base from two to three small cells (fig. 1). These cells have a diameter of 9μ. The erect axis has a diameter varying from 21 up to 48.8μ and the segments are from 60 to 150μ long. The diameter of the short laterals varies from 9 up to 21μ. The upper cells of the short laterals

can bear from one, rarely two, papilliform cells each, at their distal portion, usually on the outside of the branch (fig. 1), or they can be entirely suppressed in certain branchlets (fig. 1). These papilliform cells, when developed, have a size varying from 7.2 — 12μ long and a diameter ranging from 6-9μ. The tetrasporangia are a very distinctive structure on the delicate thallus. They are produced on the segment of the erect axis that already has a normal short branch (fig. 2) and are born on a one-celled stalk (fig. 2). The mature tetrasporangia are 42.7μ long and have a diameter of 36.6μ. This plant belongs unquestionably to the genus *Dorhniella* and it comes very near to *D. antillarum* (Taylor) Feldmann-Mazoyer rather than to *D. neapolitana* Funk, but it is not, as can be judged by the drawings, the same plant as the one described by Taylor (Taylor & Arndt 1933, p. 659). Taylor's species is a very beautiful and delicate plant with the regular branching and the well developed papiliform cells at the upper portions of each lateral branch. In our material, though the papiliform cells are present, they never occur so regularly or in the way pictured by Taylor. And as one thinks of the enormous geographical distance between the two records, it is almost natural, that our material should be different. The Brazilian plants being tetrasporangial — and Taylor's species was never found in reproduction — were only found once; so nothing can be said about similarities of reproduction.

The tetrasporangia are for the first time described in this species. They occupy the same position as the tetrasporangia of *D. neapolitana* Funk figured by Feldmann-Mazoyer (Feldmann-Mazoyer 1940, fig. 170 a, b).

D. antillarum (Taylor) Feldmann-Mazoyer var. *brasiliensis* Joly and Ugadim *n. var.*

A typo difert statura minore nec non cellulis papiliformibus parce evolutis et irregulariter distributis atque tetrasporangiis magnioribus lateraliter dispositis.

Taenioma perpusillum J. Agardh

References: Papenfuss, 1944, pls. 23-24; Tseng 1944, p. 223, pl. 25, figs. 1-6; Dawson 1944, p. 324; Taylor 1960, p. 549; Dawson 1962, p. 82-83, pl. 37, fig. 1.

Plate VI, figs. 1-4.

Plants minute, measuring up to 3.6 mm high, very delicate, composed of a decumbent portion fixed to the substratum by rhizoids and with erect branches (fig. 1). These are of two types, indeterminate with indefinite growth that can send out similar branches and bear also flat determinate branches with limited growth (fig. 1). These end characteristically by 3 long hairs (fig. 2). Sometimes certain branches can end by two hairs as can be seen in the drawing presented in fig. 1. The decumbent axis has 4 pericentrals and have a diameter varying from 186 up to 510μ. The rhizoids are very robust and have a diameter varying from 30μ up to 120μ. They are formed by a single cell and are produced directly by a pericentral cell. The erect indeterminate, cylindrical branches which have commonly 4 pericentrals, have a diameter varying from 90μ to 165μ. The flat determinate branches on the other hand have a width varying from 75μ up to 105μ and they are up to 900μ long. Cystocarpic plants were collected. A mature cystocarp is a large structure for so delicate a plant; it has the form of a pear and is sessile upon the cylindrical erect branch (fig. 3). They show a variation in size ranging from 450 to 750μ long and with a width varying from 225μ to 375μ at its broadest basal portion. The numerous carpospores measure usually 30 x 30μ. Male plants with mature antheridial stands were also found (fig. 2). These are produced by the entire transformation of the flat determinate branch. The only cells to remain vegetative in this structure are the ones found on the terminal hairs, the central cells and the cells at the periphery on both sides. The antheridial stands measure from 900-1200μ long and have a diameter of about 300-360μ. The spermatia have a diameter of 2.4μ up to 4.8μ. Plants bearing tetraspores were also found (fig. 4). The tetrasporangia are produced in an acropetal succession on the flat determinate branches, which are then transformed into stichidia (fig. 4). The tetrasporangia are tetrahedrically divided and placed in two vertical rows.

The stichidium measures from 345-750μ long and has a diameter varying from 75-120μ. A mature tetrasporangium measures from 37.5 up to 90μ. As one can see from the measures given above, the Brazilian plants are in the whole more robust than the Caribbean, Pacific or African ones. This is the first reference of the occurrence of this peculiar genus and species in the American South Atlantic. The plant was found with cystocarps, spermatangia and tetraspores in the months of January and March.

Taenioma macrourum Thuret

References: Falkenberg 1901, T. 15, figs. 21-29; Tseng 1944, p. 224, fig. 1; Taylor 1960, p. 548; Collins & Hervey 1917, p. 117 (as *T. perpusillum* J. Agardh); Börgesen 1919, p. 338-341, fig. 337 (as *T. perpusillum* J. Agardh).

Plate VII, figs. 1-5.

Plants minute, very delicate, growing on rocks in dense tufts, having a size of about 3mm high. This plant has a decumbent axis from which erect indeterminate branches arise (fig. 1). These in turn can branch similarly and also produce flat determinate branches (fig. 2). The rhizomatic portion has 4 pericentrals with a diameter varying from 90μ to 180μ; it is fixed to the substratum by numerous strong rhizoids which have a diameter varying from 45μ to 75μ. The cylindrical indeterminate branches have usually 4 pericentrals and a diameter varying from 75μ to 150μ. The flat determinate branches are much longer than broad. They measure from 375μ up to 805μ long and with a uniform diameter of 75μ. As in *T. perpusillum* the mature flat determinate branch ends with long hairs. In this species, however, there are only two apical cells that later give rise to two long hairs at the distal portion of the flat branch. Cystocarpic plants were collected (fig. 3). A mature cystocarp is found sessile over the erect cylindrical branches. It has a flask shape and forms numerous carpospores. Near the apical pore the neck of the pericarp is slightly swollen (fig. 3). The cystocarp is a large structure in

this delicate plant; it measures up to 600μ long and at its broader base has a diameter of about 300μ. The carpospores measure from 30 to 45μ. Male plants with antheridial stands were also found (fig. 4). As in the preceding species, almost the entire flat branch is envolved in the production of spermatia (fig. 4). The antheridial stands measure from 450-525μ long and have a maximum diameter of 210μ. The spermatia commonly measure 2.4μ but can reach up to 3.6μ. Tetrasporic plants were also found. The tetrasporangia are produced in stichidia (fig. 5). These are formed by the transformation of a determinate flat branch and measures from 525μ up to 750μ long and with a diameter varying from 105μ to 150μ. The tetrasporangia are tetrahedrically divided and placed in two vertical rows. They measure from 30μ to 48μ. They are, as in *T. perpusillum* produced in an acropetal succession.

This plant was collected in a place very near where *Taenioma perpusillum* was found. This is the first reference of the occurrence of this species in the American South Atlantic. The plant was found with cystocarps and tetraspores in the month of January and March. In March we also found antheridial plants.

Herposiphonia secunda (C. Agardh) Ambronn

References: Falkenberg 1901, p. 307-11, T. 3, figs. 10-12; Collins & Hervey 1917, p. 126; Harvey 1853, p. 35-36 (under *Polysiphonia secunda*); Börgesen 1918, figs. 288, 289; Börgesen 1920, p. 469-472, fig. 428; Taylor 1928, p. 176, pl. 25, figs. 8-10; Taylor 1960, p. 604, pl. 72, figs. 10-11.

Plate VIII, figs. 1-5.

Plants small, delicate, showing a deep red wine colour when alive, growing in dense tufts upon the shells of *Mytilus*. The plants have a prostrate axis fixed to the substratum by numerous one-celled rhizoids (fig. 1). These are produced at the distal end of certain pericentrals and terminate in a roundish attachment disc (fig. 2). From the dorsal side, every second or third segment produces an

erect branch of limited growth (figs. 1, 3). These are cylindrical and devoid of trichoblasts in our material. They have a varying number of pericentrals, from 7 to 10 being 8 the commonest (fig. 4). Near the growing point the prostrate portion has a diameter of 42μ being the segments 23μ long and the diameter of older portions, up to 95μ, being each segment in this region about 72μ long. The erect short branches have a diameter varying from 28μ to 87μ from young and older portions respectively. The segments are from 49μ to 133μ long in the young and older portions, respectively. From certain segments, in between the erect ones, indeterminate branches are formed. These are not produced in a regular fashion, as is for instance in *H. tenella*. The cystocarps are produced in the erect branches (fig. 5). They are a roundish structure with a pore at the distal end and contains numerous carpospores. Cystocarpic plants were found in the month of August.

3. DISCUSSION

The above mentioned species ,the majority belonging to the flora found in the Caribbean region, for the first time reported as occurring in Southern Brazil is of significance. The present paper brings the number of "characteristic" algae of the Caribbean region increasingly restricted. It is to be noted that the region under exploration is located at 23° 30' Lat. S. near the southern limit of the typical tropical algae. On the other hand, certain elements of this flora are of another origin, as can be judged by the findings of *Arthrocardia gardneri* and *Gelidiella tenuissima*. The first mentioned species is a typical component of the South African algal flora. It is worth remembering that another species of this genus, *A. stephensonii* is a common inhabitant of the Southern Brazilian shores, besides *Levringia brasiliensis,* the only known species of this African genus, to be found outside Africa (Joly 1952).

4. ACKNOWLEDGEMENTS

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5. SUMMARY

The present paper gave notice of the occurrence of certain genera and species ot marine algae for the first time found in the American South Atlantic area. Detailed description of the Brazilian material enables comparison with the plants known in other regions. A plant believed to be a variety new to science is described herein.

6. RESUMO

O presente trabalho relata o encontro pela primeira vez na costa atlântica sulamericana de alguns gêneros e várias espécies de algas marinhas conhecidas anteriormente da região caraíbica, da África e da Europa sòmente. E' apresentada uma detalhada descrição em cada caso, comparando-se nossas plantas com as anteriormente conhecidas, ressaltando-se as diferenças peculiares ao nosso material. Cada espécie é ilustrada por vários desenhos. Apresenta-se a descrição de uma variedade nova para a Ciência.

7. REFERENCES

1 — BÖRGESEN, F. 1916. The marine algae of the Danish West Indies. III. Rhodophyceae (2). Dansk Bot. Arkiv 3 (1b): 81-144.

2 — BÖRGESEN, F. 1918. The marine algae of the Danish West Indies. IV. Rhodophyceae (4). Dansk Bot. Arkiv 3 (1d): 241-304.

3 — BÖRGESEN, F. 1919. The marine algae of the Danish West Indies. IV. Rhodophyceae (5). Dansk Bot. Arkiv 3 (1e): 305-368.

4 — BÖRGESEN, F. 1920. The marine algae of the Danish West Indies. III. Rhodophyceae (6). Dansk Bot. Arkiv 3 (1f): 369-498.

5 — COLLINS, F. S. and A. B. HERVEY 1917. The algae of Bermuda. Proc. Amer. Acad. Arts & Sciences LIII (1): 1-195 (incl. 6 pls.).

6 — DAWSON, E. Y. 1944. The marine algae of the gulf of California. Allan Hancock Pacific Expeditions 3 (10): 189-464 (incl. 77 pls.).

7 — DAWSON, E. Y. 1949. Studies of Northeast Pacific Gracilariaceae. Allan Hancock Foundation Publ. Ocas. Paper N.º 7: 1-105 (incl. 25 pls.). Los Angeles.

8 — DOTY, M. S. 1947. The marine algae of Oregon. Rhodophyta II. Farlowia 3 (2): 159-215 (incl. 4 pls.).

9 — FALKENBERG, P. 1901. Die Rhodomelaceen des Golfes von Neapel und der angrenzenden Meeres-Abschnitte. Fauna und Flora des Golfes von Neapel. Monographie 25: 1-754 + 24 T.

10 — FELDMANN, J. & G. HAMEL 1934. Observations sur quelques Gélidiacées. Rev. Gen. Bot. 46: 528-549.

11 — FELDMANN, J. & G. HAMEL 1936. Floridées de France VII. Revue Algol. 9: 209-264 + pls. 2-6.

12 — FELDMANN-MAZOYER, G. 1940. Recherches sur les Céramiacées de la Méditerranée Occidentale: 1-510 + 4 pls. Alger.

13 — HARVEY, Wm. H. 1853. Nereis Boreali Americana. II. Rhodospermeae: 1-258 + 25 pls. Washington.

14 — JOLY, A. B. 1952. Re-discovery of *Mesogloea brasiliensis* Montagne. Bol. Inst. Ocean. Univ. São Paulo III (1, 2): 39-47 (incl. 1 pl.).

15 — JOLY, A. B. 1957. Contribuição ao conhecimento da flora ficológica marinha da Baía de Santos e arredores. Bol. Fac. Fil. Ciências e Letras U.S.P. 217. Botânica 14: 1-199 + XIX pr. + 1 mapa.

16 — JOLY, A. B. and M. CORDEIRO 1962. Additions to the marine flora of Brazil II. Bol. Fac. Fil. Ciênc. Let., Univ. São Paulo 257. Botânica 18: 223-228 + pl. I-IV.

17 — MANZA, A. 1937. New species of articulated corallines from South Africa. Proc. Nat. Acad. Sci. U.S.A. 23: 568-572.

18 — MANZA, A. 1940. A revision of the genera of articulated corallines. Philip. Journ. Science 71 (3): 239-316 + pl. 1-20.

19 — MÖBIUS, M. 1890. Algae Brasiliensis a cl. Dr. Glaziou collectae. Notarisia 5: 1065-1090. Pl. 1.

20 — SETCHELL, Wm. A. 1917. The *Scinaia* assemblage. Univ. Calif. Public. in Bot. 6 (5): 79-152 + pls. 10-16.

21 — TAYLOR, Wm. R. 1928. The marine algae of Florida with special reference to the Dry Tortugas. XXV + 1-219 (incl. 37 pls.). Washington.

22 — TAYLOR, Wm. R. 1960. Marine algae of the eastern tropical and subtropical coasts of the Americas. XXI + 1-870 (incl. 80 pls.). Ann Arbor.

23 — TAYLOR, Wm. R. and C. H. ARNDT 1933. The marine algae of the southwestern peninsula of Hispaniola. Amer. Journ. Bot. 16: 651-662.

24 — TSENG, C. K. 1944. Notes on the algal genus *Taenioma*. Madroño 7: 215-226.

PLATE I

Scinaia complanata

Fig. 1 — Habitus.
Fig. 2 — Detail of the upper dichotomies of a cystocarpic plant.
Fig. 3 — Superficial cells seen from above.
Fig. 4 — Surface cells and adjacent filaments seen from inside the thallus cavity.
Fig. 5 — Cross section of the thallus, showing the continuous cortical layer and the external portion of the filaments.

All drawings from formalin preserved material.

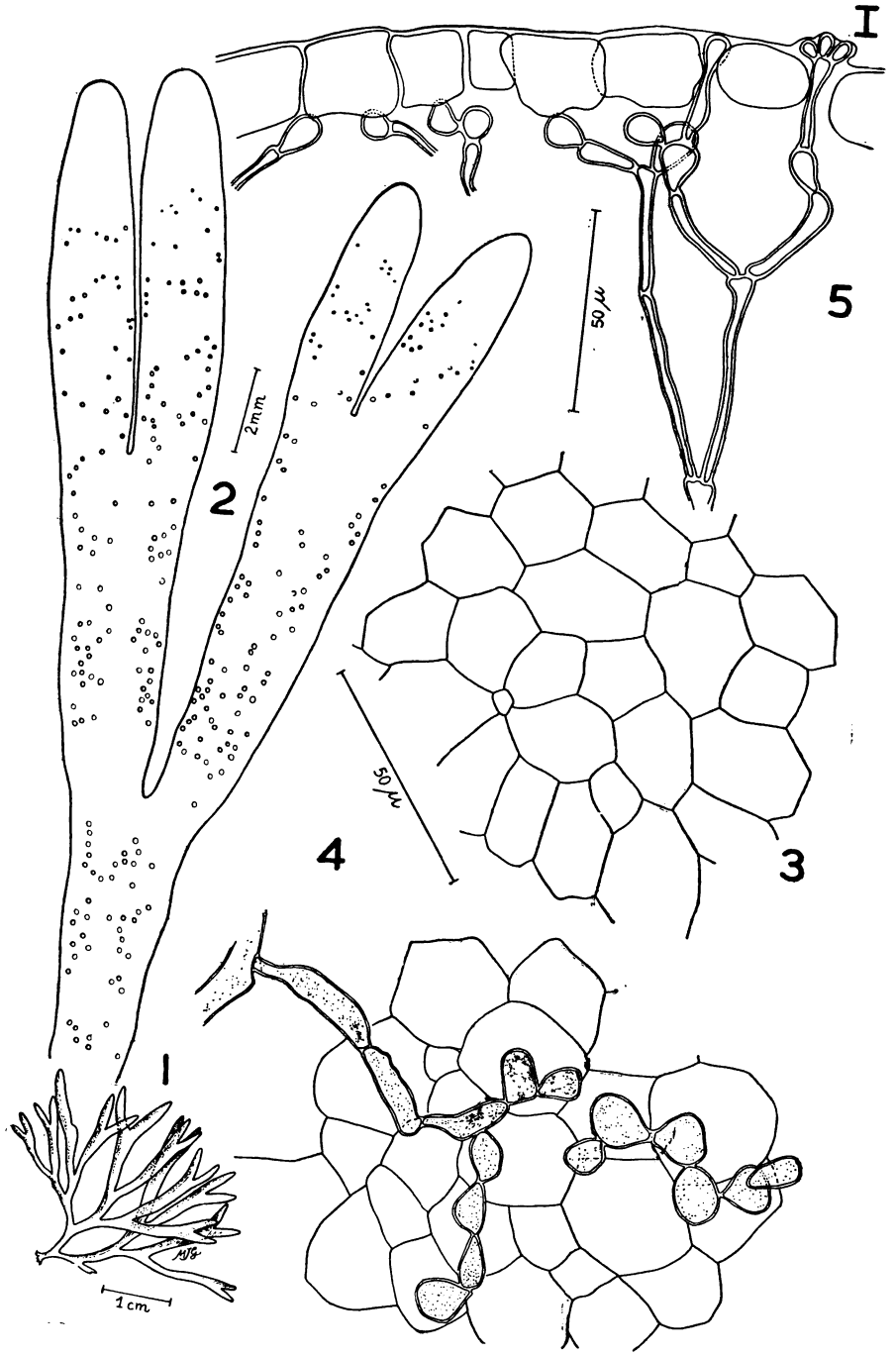
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PLATE II

Gelidiella tenuissima

Fig. 1 — Habitus of a portion dissected from a tuft. Note a young stichidium on the left side.
Fig. 2 — Cross section of an adult thallus.
Fig. 3 — Surface view of a portion of an erect thallus. Note the regularly placed cells.
Fig. 4 — A mature stichidium.

Arthrocardia gardneri

Fig. 5 — Upper portion of a vigorously growing plant.
Fig. 6 — Cells of the node.
Fig. 7 — Detail showing tetrasporic conceptacles.
Fig. 8 — A mature tetrasporangia.
All drawings from formalin preserved material. Figs. 6, 7, 8 obtained from decalcified material.

II

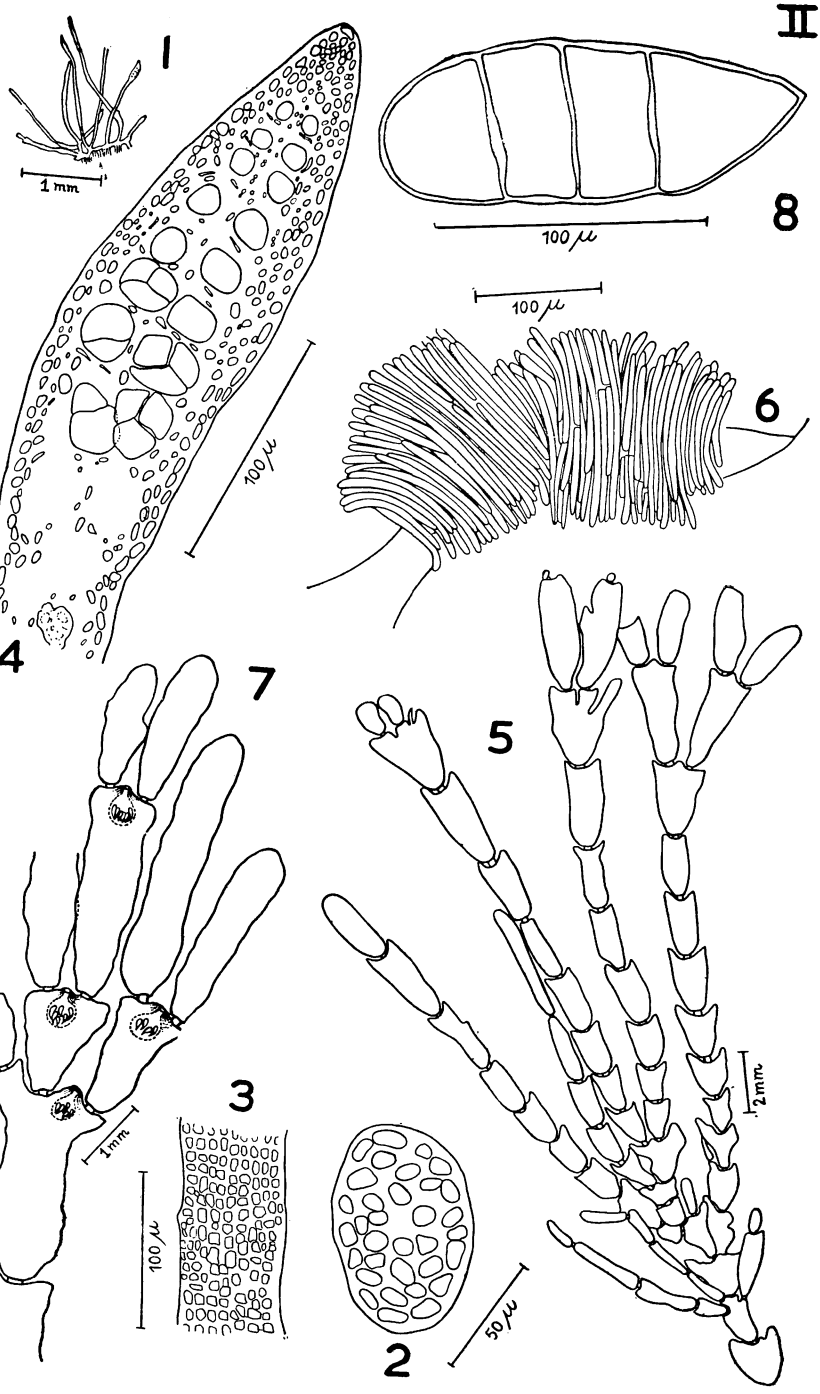


PLATE III

Gracilariopsis sjoestedtii

Fig. 1 — Habitus of a sterile specimen.
Fig. 2 — Part of a cross section of the thallus.
Fig. 3 — Longitudinal median section of a cystocarp. Note the absence of nutritive filaments between pericarp wall and the mass of carpospores.
Fig. 4 — Part of a cross section of a tetrasporic plant.
All drawings from formalin preserved material, except Fig. 2 made from living material.

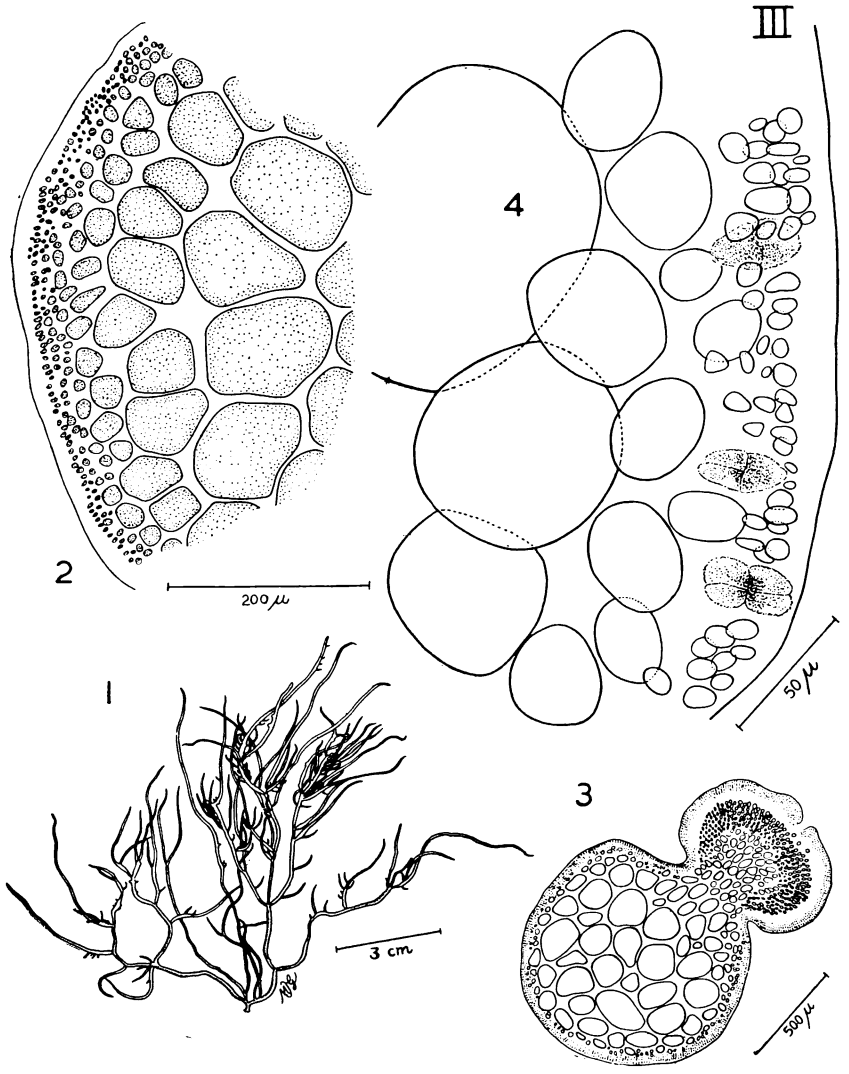

III
4
2
200 μ
50 μ
1
3 cm
3
500 μ

PLATE IV

Coelothrix irregularis

Fig. 1 — Habitus of a portion dissected from a tuft. Note several anastomosing branches.

Fig. 2 — Part of a longitudinal section of the thallus showing many "gland" cells projecting inside the interior cavity.

Fig. 3 — Part of a cross section of the thallus.

Fig. 4 — Surface view of the cortical cells. Note large and smaller cells interspersed.

All drawings from formalin preserved material.

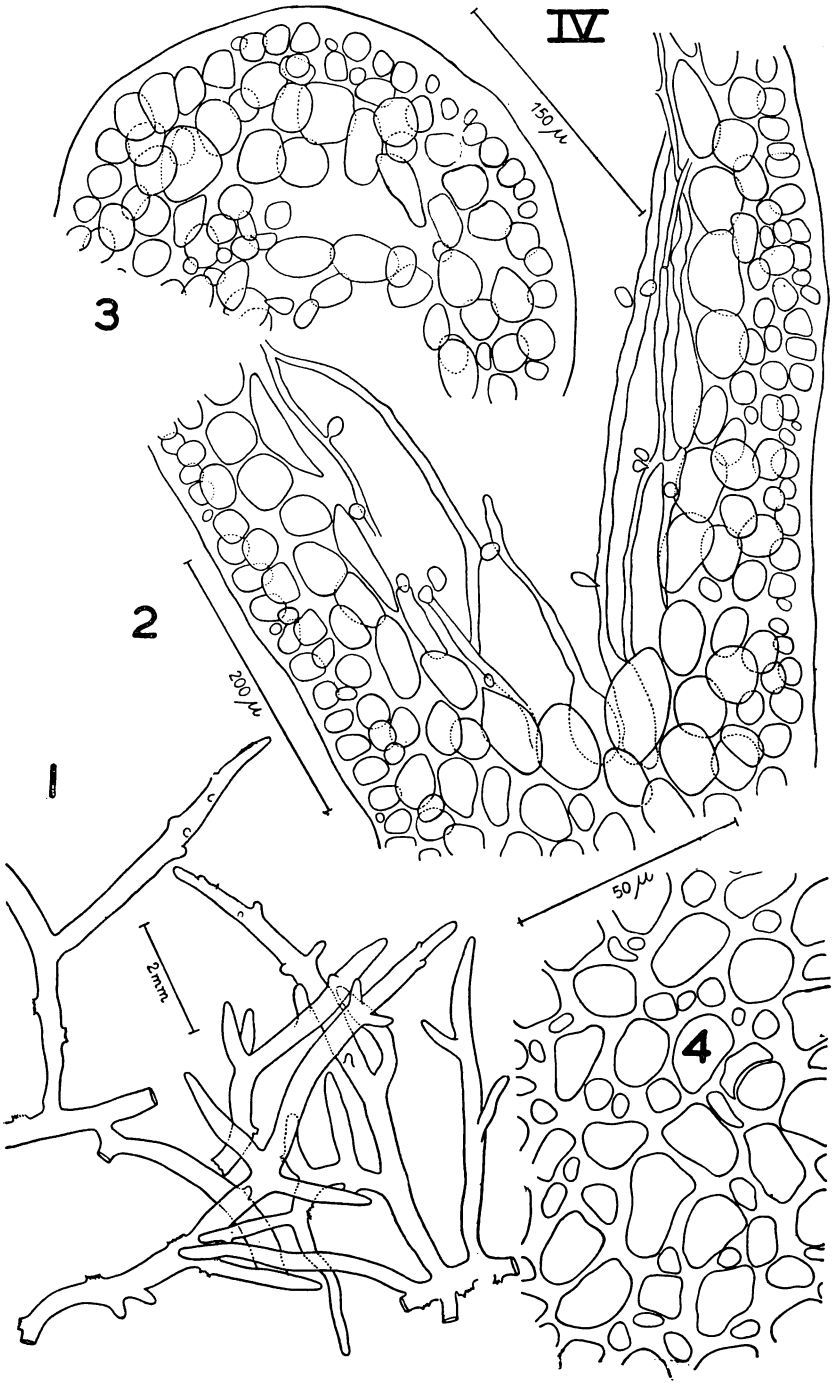

IV
150 µ
3
2
200 µ
1
2mm
50 µ
4

PLATE V

Dorhniella antillarum var. *brasiliensis* n. var.

Fig. 1 — Upper portion of an erect axis.
Fig. 2 — Detail showing tetrahedrically divided tetrasporangia born on a special short branch at the same segment that already has a sterile branch.
Fig. 3 — Detail of the proximal cells of the erect axis, showing the basal cells of the short laterals giving rise to rhizoids.
Fig. 4 — A rhizoidal branch from the prostrate axis.
All drawings from formalin preserved material.

V

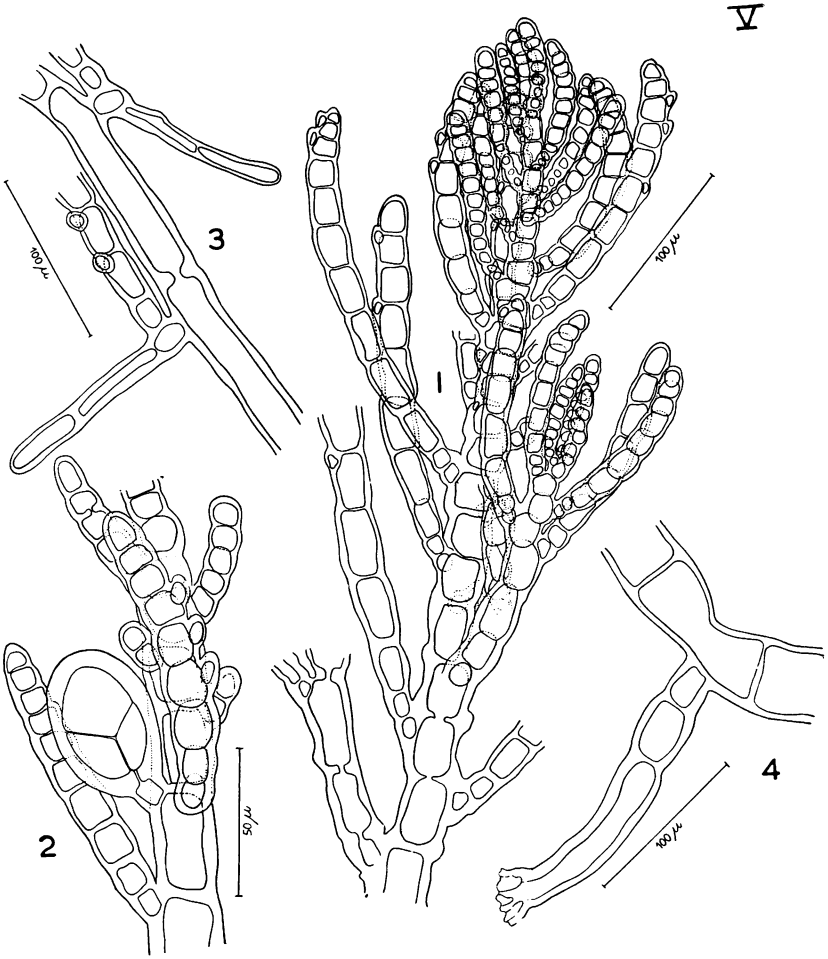


PLATE VI

Taenioma perpusillum

Fig. 1 — Habitus of part of a plant.
Fig. 2 — Detail of an antheridial branch.
Fig. 3 — Detail of a mature cystocarp.
Fig. 4 — Detail of a mature stichidium.
All drawings from formalin preserved material.

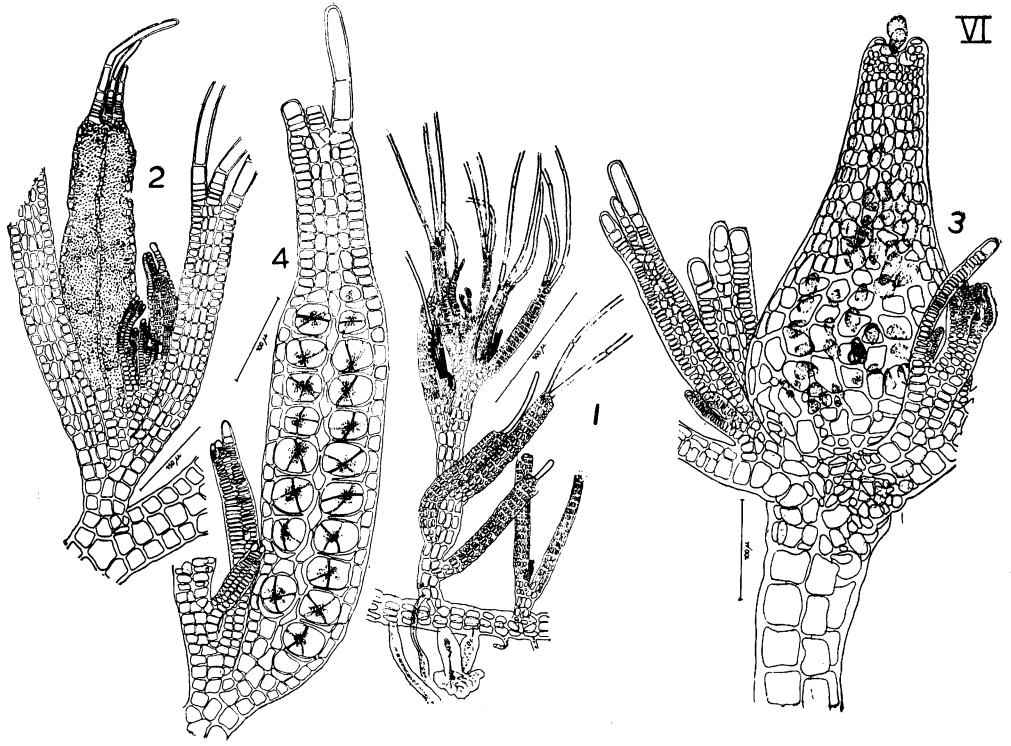

VI
1
2
3
4

PLATE VII

Taenioma macrourum

Fig. 1 — Habitus of a portion of a plant.
Fig. 2 — Detail of a growing apex.
Fig. 3 — A mature cystocarp.
Fig. 4 — Detail of an antheridial branch.
Fig. 5 — Detail of a mature stichidium.
All drawings from formalin preserved material.

VII

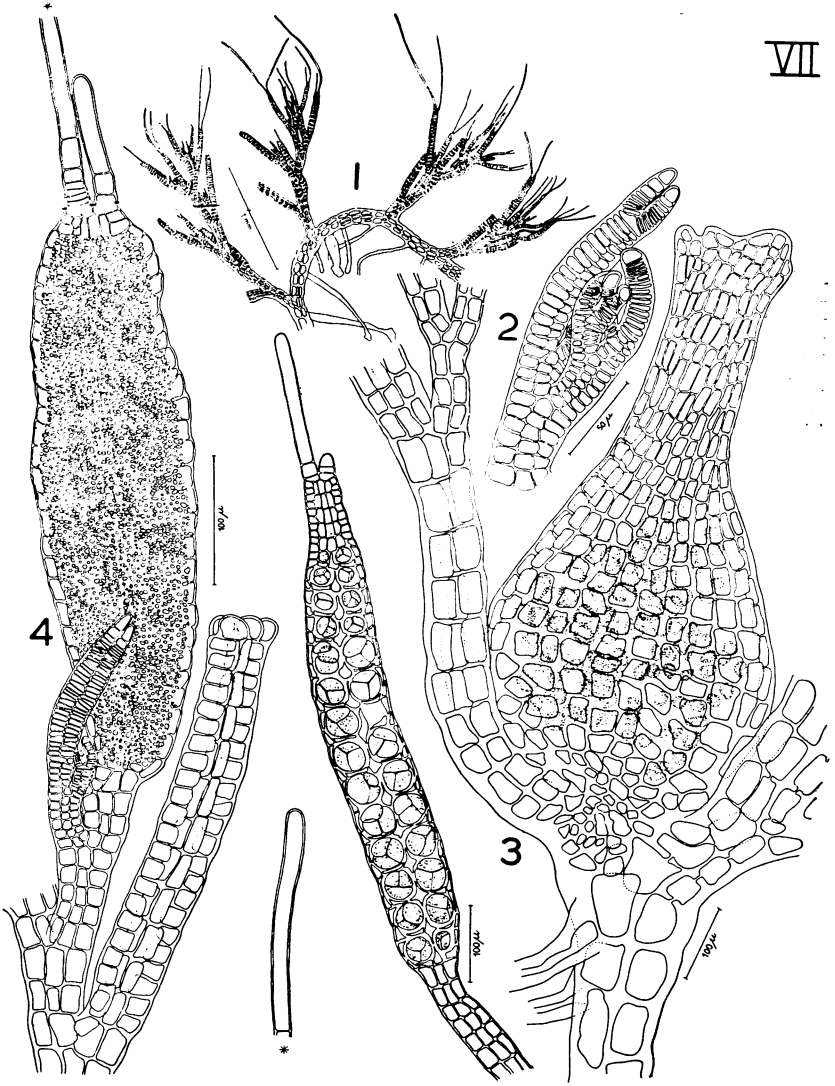
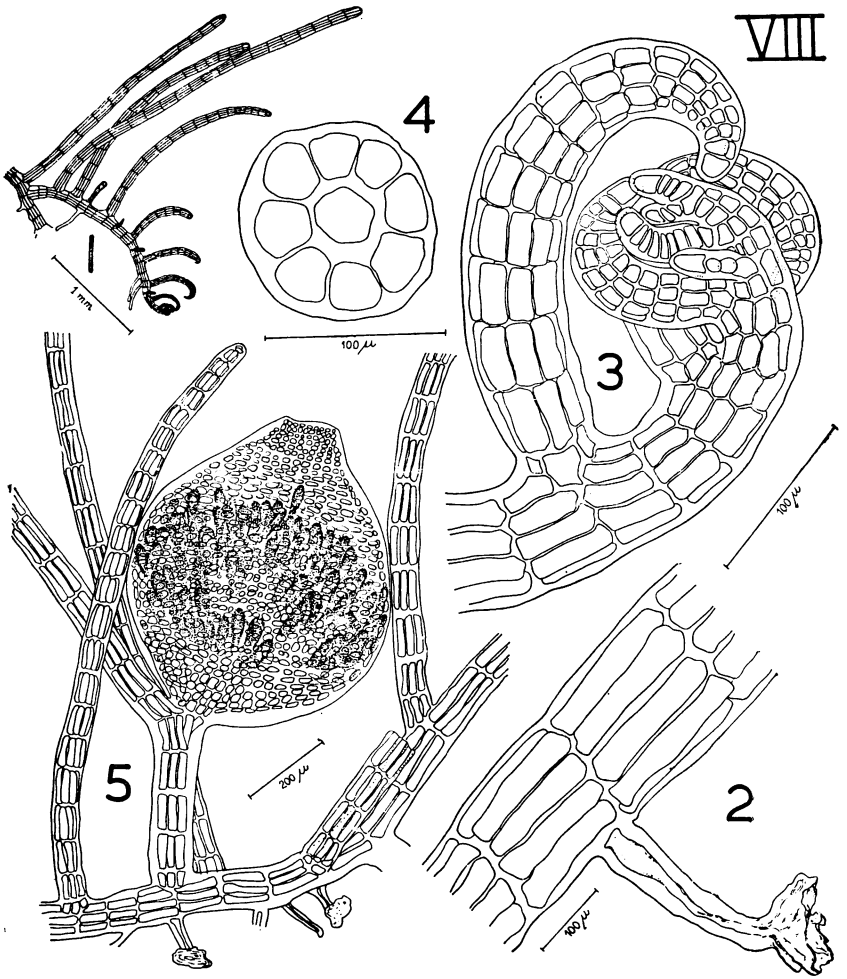


PLATE VIII

Herposiphonia tenella

Fig. 1 — Habitus of a portion of a plant.
Fig. 2 — Detail of a rhizoid from the decumbent axis.
Fig. 3 — Growing apex of the decumbent portion.
Fig. 4 — Cross section of the decumbent axis.
Fig. 5 — Detail of a mature cystocarp.
All drawings from formalin preserved material.


VIII
1
1 mm.
4
100 μ
3
100 μ
5
200 μ
2
100 μ