

ADDITIONS TO THE MARINE FLORA  
OF BRAZIL. I.

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This paper deals with a few marine algae found along the Brazilian shores in recent collections by the author and not reported yet as components of the algal flora of Brazil.

The genera or species referred to as new on the coast of Brazil, were checked against Taylor's *Prodomus* (Taylor, 1931) and the papers published afterwards. The identification of the material was done partially during the author's stay at Prof. Wm. R. Taylor's laboratory under a Rockefeller fellowship and part at the Dept. of Botany, Univ. of S. Paulo. To Prof. Taylor, whose friendly guidance continued after the author's stay at the University of Michigan and to the Rockefeller Foundation, the author is exceedingly grateful.

## *Systematic account*

*Ralfsia* Berkeley, 1831

*Ralfsia expansa* J. Agardh

*References:* J. Agardh 1848, p. 63; De Toni 1895, p. 313; Weber Van Bosse 1913, p. 146, fig. 45; Börgesen 1914, p. 33-36, figs. 20-22; Taylor 1928, p. 15, Pl. 15, fig. 18, Pl. 37, figs. 1-3.

Plate III, fig. 8.

Plants saxicolous forming in the beginning very regular, almost orbicular, olive-brown patches, which become irregularly lobed

by the spreading and fusing of neighbors thalli. Usually found on rocks exposed to the full force of the breakers and completely absent on more protected areas. The 1-locular sporangia bear invariably one stalk cell, a feature already pointed out by Børgesen (see Børgesen 1914 p. 36) which is not common in the related species *R. verrucosa*. On this ground it is the present author's opinion that the species *R. expansa* is to be maintained according to Børgesen and the Brazilian material should be placed there. The plant is very common; it has been found in every trip that the author made in recent years. It is a conspicuous component of the inter-tidal association in any rocky shore. This is the first time that the genus is reported for Brazil.

Brazilian distributions: States of Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul.

*Sphacelaria* Lyngbye, 1819

*Sphacelaria furcigera* Kützting

*References:* Vickers 1918, Part II, Pl. 25; Børgesen 1914, p. 40; Collins & Hervey 1917, p. 72; Taylor 1928, p. 105; 1937, p. 129; Hamel 1938, p. 255, fig. 47 n.º 16;  
Plate III, Figs. 2-7.

This plant has been collected only once but abundantly. It was found associated with *S. tribuloides*. This is the third species of the genus found along the Brazilian shores. The material agrees with the descriptions and figures of plants from the North Atlantic area (Caribbean and European). It grows attached to rocks, usually on scattered blocks along calm sandy beaches, at the upper limit of the tide, just above the sand which is gathered in the tufts. It has a black-brownish color when alive and a maximum height of about 2-3 cm.

Propagula were found in abundance. Once it was found a structure which resembles unilocular sporangia on the same plants which bore propagula.

Brazilian distribution: Ilhabela, Ilha de S. Sebastião. State of S. Paulo.

*Goniotrichum* Kützing, 1843*Goniotrichum humphreyi* Collins

*References:* Collins 1901, p. 251; Tilden 1910, p. 295; Børgesen 1916, p. 10-11, fig. 5-6 (as *Bangiopsis sub-simplex*); Collins & Hervey 1917, p. 95.

Plate I Figs. 11-13.

Of this very interesting plant, previously known to occur only in the Caribbean region (see the references quoted above) abundant material was collected from which the figures on plate I were made. It agrees very well with the description and figures given by Børgesen in the paper quoted above. The plants have been found in the State of Paraná at the bay of Guaratuba, a typical mangrove bay, growing on rocks and on woodwork near the launching of the boat, a place locally known as "Passagem". This plant appeared unidentified as to species in a previous paper (see July 1950, p. 133).

Brazilian distribution: Passagem, Guaratuba, State of Paraná.

*Goniotrichum alsidii* (Zanardini) Howe

*References:* Harvey 1851, Pl. 246 (as *Bangia elegans*); Kylin 1907, p. 114; Rosenvinge 1909, p. 75-77, figs. 15-16; Tilden 1910, p. 295; Howe 1914, p. 75-76; Børgesen 1916, p. 4-6, fig. 2; Collins & Hervey 1917, p. 95; Hamel 1925, p. 37-39 fig. 7 A; Børgesen 1927, p. 10-11, fig. 4; Hylander 1928, p. 157, Pl. 24, fig. 6; Newton 1931, p. 246, fig. 150; Børgesen 1942, p. 5-6; Smith 1944, p. 161, Pl. 35, figs. 1-2; Kylin 1944, p. 7, fig. 1 G-H (all as *Goniotrichum elegans*); Hoyt 1920, p. 465; Taylor 1937, p. 215, Pl. 28, figs. 1-4; Feldmann 1939, p. 208-209, fig. 3; Taylor 1942, p. 75-76; Taylor 1945, p. 132.

Plate I figs. 7-10.

This common alga is for the first time reported on the coast of Brazil. It was once found on the coast of Uruguay, this being the second report on the South Atlantic area. (See Taylor 1939, p. 141). Very few plants were gathered among the filaments of

*Lyngbya confervoides* Gomont and *Calothrix crustacea* Bornet et Flahault\* which were scraped from rocks at Matinho in the State of Paraná, well above high tide line. The Myxophyceae with which it was associated appeared as dark greenish-black patches on the rocks, a little below the lowest point where lichens were growing. It was also found as an epiphyte on *Codium decorticatum* mixed with *Callithamnion* sp. at S. Sebastião and as an epizoic on *Sertularia* sp. at the Urubuqueçaba Island, Santos, both on the State of S. Paulo.

*Bangia* Lyngbye, 1819

*Bangia fuscopurpurea* (Dillwyn) Lyngbye

References: Harvey 1846, Pl. 96; Berthold 1882, p. 23-24, T. 1, figs. 12-14; De Toni 1897, p. 11 (as *B. atropurpurea* subsp. *fuscopurpurea*); Collins & Hervey 1917, p. 94; Hamel 1925, p. 35; Nylander 1928, p. 156, Pl. 24, figs. 4-5; Newton 1931, p. 238, fig. 145; Taylor 1937, p. 218, Pl. 28, figs. 10-12; 1939, p. 141; Feldmann 1939, p. 199; Kylin 1944, p. 8-10, fig. 2 E-M; Taylor 1945, p. 132; Lucas 1947, p. 125; Waern 1952, p. 180-182. Plate I figs. 1-6.

Of this widespread plant abundant material was found.

It is one of the commonest components of the intertidal association in the southernmost part of Brazil (Torres, State of Rio Grande do Sul). This is the second report of the species in the South Atlantic. It has been found previously on the coast of Uruguay (cf. Taylor 1939, p. 141). In the writer's opinion this plant, together with *Nemalion helminthoides* and a few others is representing the flora of the temperate South Atlantic in its northern limit. The plant agrees very well with the descriptions and figures given by the authors quoted above.

This is the first report of the genus and species in Brazil.

Brazilian distribution: States of Santa Catarina and Rio Grande do Sul.

\* The Myxophyceae referred to in this paper were kindly identified by Dr. Francis Drouet of the Chicago Natural History Museum to whom the author is exceedingly grateful.

*Nemalion* Targioni Tozzetti, 1818

*Nemalion helminthoides* (Velley) Batters

References: Dawson 1952, p. 34-35; Taylor 1939, p. 142; Hamel 1930, p. 5, fig. 41 A.

Plate II figs. 1-19. Plate III fig. 1.

This species has been found abundantly. It is a common component of the intertidal association. It grows on the upper limit of the tide and associated with *Porphyra* sp. and *Levringia brasiliensis*. It was collected at several points of the State of Santa Catarina and at Torres, State of Rio Grande do Sul, in November. It is the second species of this genus to be found on the Brazilian shores. The first one was reported by Williams and Blomquist from the Northern part of Brazil (State of Pernambuco). (See Williams and Blomquist 1947, p. 392). The species has been previously found on the coast of Uruguay (see Taylor 1939, p. 142).\*

The Brazilian plants may attain a maximum height of 60-70 cm and up to 5-6 mm wide (usually 10-20 cm and 2-3 mm). Sometimes there is only one axis but frequently more, up to 7 axis arise from a common or fused holdfast. Branching occurs seldomly and then the branches are found near the tips of the axis. The plants have a peculiar red-greenish, sometimes quite brown color when alive and are very slippery to the touch. The plant is monoicous, but the upper parts bear invariably only spermatangia. Spermatia still attached to tricogynes were found twice. Several stages of the development of the carposporophyte was seen. As it is the case in other species of the genus, the number of cells of the carpogenic branch is not always the same; the most frequent number in our plant is 4. The gonimoblast filaments and carpospores are not protected by any envelope as it is usually the case in this group.

\* The present author was able to examine authentic material of *N. helminthoides* through the kindness of Prof. Wm. R. Taylor who sent him tracings and fragments of 3 european specimens (Taylor 14.582, 18.548, 18.612) and one from Uruguay (Taylor 17.759). It is remarkable that the first and the last numbers of Taylor's european material and perhaps also T. 18.548 are of a "somewhat horny" texture, as Prof. Taylor informed: on the other hand the Uruguayan plant is of a soft texture. This discrepancy, I think can easily be explained through the abundant Brazilian material examined. The softness of the thalli of the Brazilian plants is directly related to the amount of the endophytic *Calothrix* growing in it. This collection is represented by specimens of both kinds: some, without *Calothrix* are, after drying, quite horny and others, with numerous endophytes are too soft to maintain their cylindrical form after drying and naturally collapse completely.

Old, as well as young plants showed, when examined with a microscope, the endophytic *Calothrix parasitica* Borne et Flahault\* living within the thallus. This association is apparently very common. It has been reported from other parts of the world where *Nemalion* occurs. It was noted, however, that the thickness and the slipperiness of the thallus are directly related to the amount of *Calothrix* growing in it. Very young and thin thalli have practically no *Calothrix* associated with them. The more thick and slippery the thalli are, the more *Calothrix* is found.

Brazilian distribution: States of Santa Catarina and Rio Grande do Sul.

#### RESUMO

O presente trabalho relata a ocorrência de algumas algas comuns no litoral sul brasileiro, as quais, entretanto, não haviam sido ainda mencionadas como aí existindo. São descritos e figurados 2 gêneros e 6 espécies, novos para o Brasil. A cada adição proposta segue-se uma lista de referências bibliográficas, onde informações mais amplas podem ser encontradas. Três pranchas com numerosas figuras e extensa lista bibliográfica completam o texto.

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\* See footnote on p. 10.

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## PLATE I

### Figs. 1-6 — *Bangia fuscopurpurea*

1. Basal part of an adult filament. Note rhizoidal outgrowths.
2. Upper portion of a filament. Note the irregular distribution of cells.
3. Basal part of a quite young filament.
4. Basal portion of a young, still 1-seriate filament.
5. Median portion of a young filament to show the beginning of a pluriseriate thallus.
6. Apex of young filament.

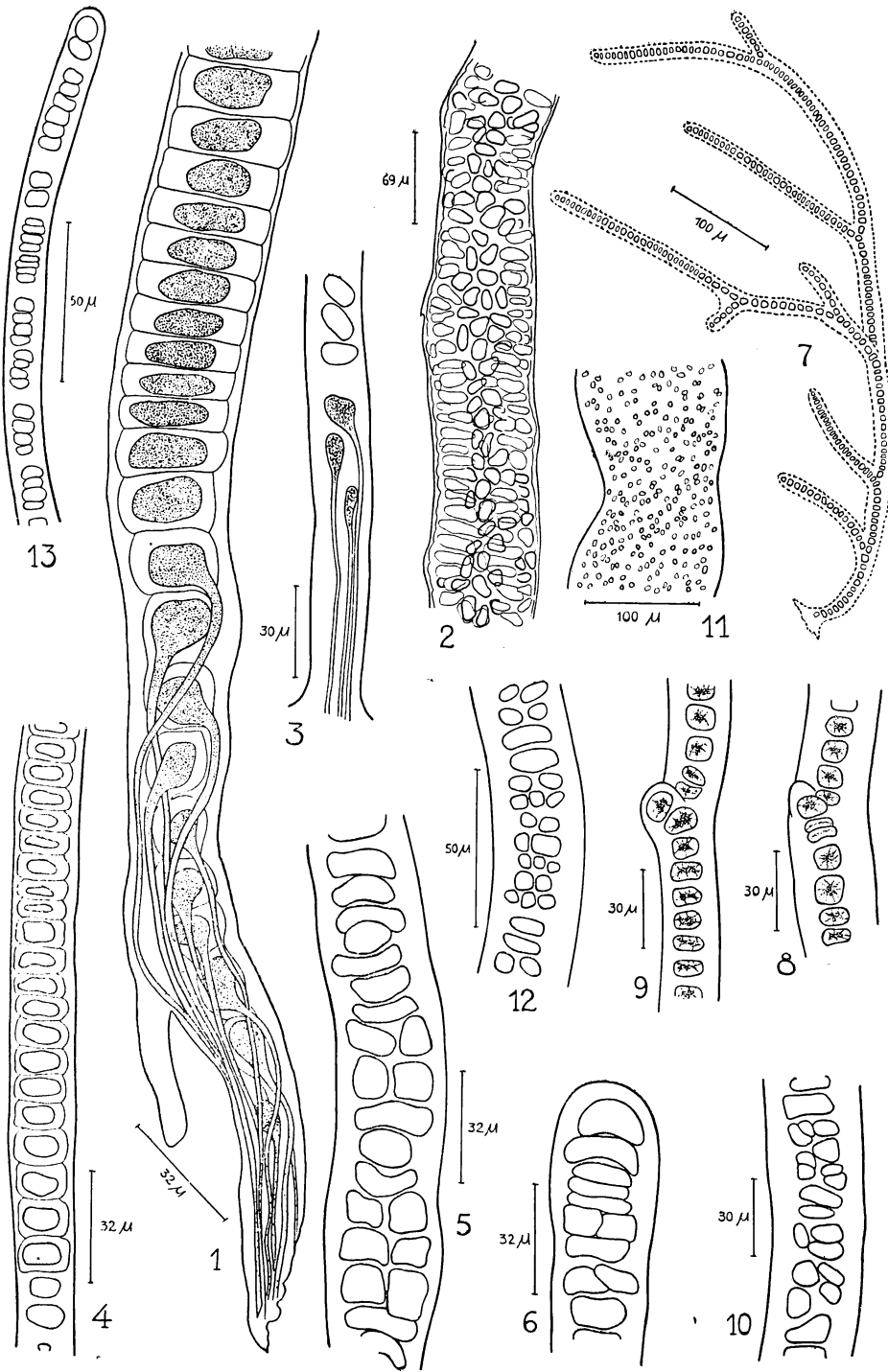
Figures 1 and 2 from plants collected at Torres (State of Rio Grande do Sul); figures 3-6 from plants collected at Matinho (State of Paraná).

### Figs. 7-10 — *Goniotrichum alsidii*

7. Entire plant.
8. and 9. Beginning of a lateral ramification and chromatophores.
10. Older portion of the thallus.

### Figs. 11-13 — *Goniotrichum humphreyi*

11. Part of an old thallus showing the chaotic arrangement of the cells.
12. Young thallus with the beginning of the pluriseriation.
13. Apex of lateral young branch, still 1-seriate. Note that the cells are grouped in "fours".



## PLATE II

### *Nemalion helminthoides*

1. Young assimilatory filaments.
- 2-4. Part of colorless filaments from the medullary portion. Note the irregular pattern of the cells. See the next of assimilatory moniliform filaments in fig. 3.
- 5-6. Spermatangia from the upper portion of the thallus. Details in fig. 6.
- 7-12. Several carpogenic branches in different positions. Note the attached spermatium in fig. 12.
- 13-18. First divisions and earlier stages of the development of the gonimoblast filaments.
19. Nearly mature carpospores.

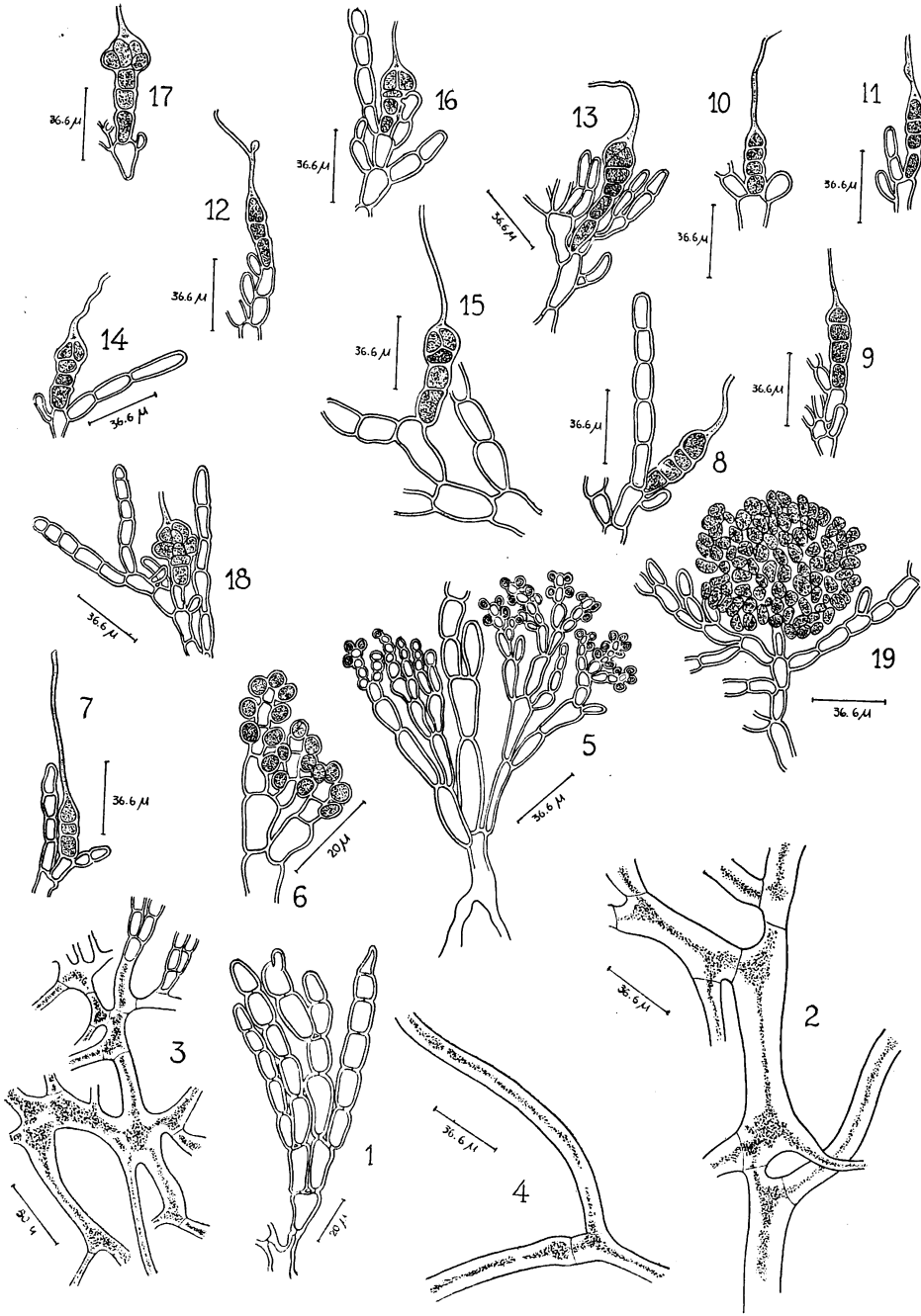


PLATE III

Fig. 1 — *Nemalion helminthoides*.  
Habitus of an old plant.

Fig. 2 — 7. *Sphacelaria furcigera*  
2-6 — Several stages of the development of pro-  
pagula.  
7 — Apex of a shoot.

Fig. 8 — *Ralfsia expansa*  
Unilocular sporangium born laterally upon the assi-  
milating filaments.

III

