

MARINE ALGAE FROM SELVAGEM PEQUENA (SALVAGE ISLANDS)

(CANCAP - project Contributions no. 19)

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With 5 figures

SUMÁRIO. Neste trabalho dá-se uma lista anotada de 134 espécies de algas marinhas colhidas na Selvagem Pequena pertencentes às classes seguintes: Cyanophyceae 14, Chlorophyceae 26, Phaeophyceae 25, Rhodophyceae 69. Destas espécies 89 são novas para a Selvagem Pequena, das quais 57 são novas para todo o arquipélago das Ilhas Selvagens, e destas últimas 9 são novas para a Macaronésia. O número de espécies da Selvagem Pequena estende-se assim a 134, ao passo que o de todas as ilhas do arquipélago atinge um total de 192 espécies.

SUMMARY. An annotated list of 134 species of marine algae, collected from Selvagem Pequena, is given; 14 Cyanophyceae, 26 Chlorophyceae, 25 Phaeophyceae, 69 Rhodophyceae. Of these, 89 are new to Selvagem Pequena, of which 57 are new to all the Salvage Islands, of which 9 are new to Macaronesia. The number of species from Selvagem Pequena is thus extended to 134 while that of all the islands of the archipelago reaches a total of 192 species.

INTRODUCTION

This paper is the second one in a series on marine algae from the Salvage Islands. The first dealt with algae from Ilhéu de Fora (Weisscher, 1982), and now attention is focussed on Selvagem Pequena. This algal research is part of the CANCAP-project, a long-term programme of biogeographically oriented marine research in the south-eastern part of the North Atlantic Ocean. For more details about the CANCAP-project the above mentioned paper (Weisscher, 1982) is to be referred to.

Selvagem Pequena (30° 02' N 16° 01' W) was visited during the expeditions CANCAP-III (1978) and CANCAP-IV (1980). This small island has been investigated by scientists on a few occasions only. The number of observed species of algae from the island was only 44 (Gil-Rodriguez et al., 1978). This number can now be extended by 90 species, resulting in a list of 134 species, which is presented here. Of these 90 species, 57 are new to the whole Salvage Archipelago, so that a former list of 135 species for the Salvage Islands (Weisscher, 1982) can be

* Rijksherbarium, Leiden, Holland.

extended to 192 names. A complete list of the marine algae of the Salvagem Islands will be published after termination of the study on the algae from Selvagem Grande.

Nine of the 57 species, new to the Salvagem Islands, are new to Macaronesia, the islands of the region covered by the CANCAP- expeditions, viz. numbers 8, 54, 70, 80, 98, 112, 119, 121, 122.

MATERIAL AND METHODS

The marine algae from Selvagem Pequena were collected with Van Veengrabs, with a rectangular dredge, in free dives and direct inspection, during both expeditions by W. F. Prud'homme van Reine. Samples have been taken from 3 coastal and 3 off-shore stations (fig. 1) :

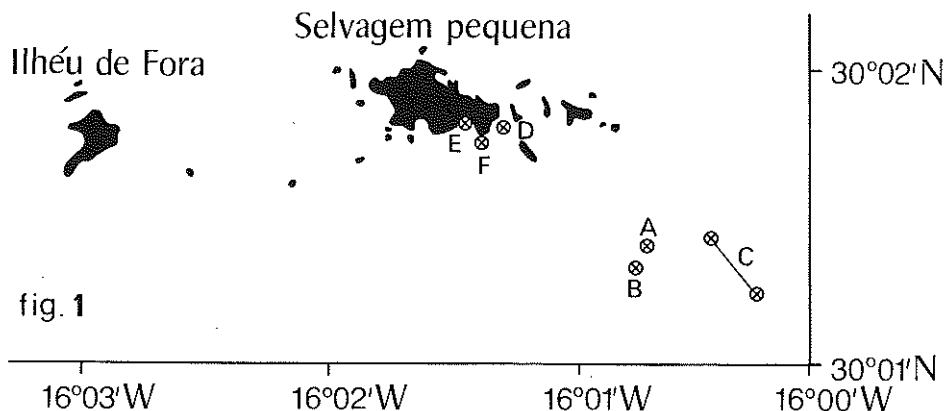


Fig. 1. Map of Selvagem Pequena and Ilhéu de Fora, with collecting-stations A-F.

Station A : SE of Selvagem Pequena, depth 65 m, fine gray sand with clay. Van Veengrab, 22.10.1978.

Station B : SE of Selvagem Pequena, depth 91 m, fine sand, nearly pure white. Van Veengrab, 22.10.1978.

Station C : SE of Selvagem Pequena, depth 140-170 m, rectangular dredge, 22.10.1978.

Station D : E coast of Selvagem Pequena. Free diving in bay, depth 5-6 m, 22.10.1978.

Station E : S coast of Selvagem Pequena, rockpools. 22.10.1978.

Station F : S coast of Selvagem Pequena. Free diving in bay, depth 1-4 m, 26.5.1980.

Some samples have been dried, others were preserved in a 4% formaldehyde solution in seawater. The names in the list of species are according to the following authors :

Cyanophyceae	: Geitler, 1930-1932
Chlorophyceae	: Lawson & Price, 1969
Phaeophyceae	: Price, John & Lawson, 1978
Rhodophyceae-Bangiophyceae	: John, Price, Maggs & Lawson, 1979
Rhodophyceae-Ceramiaceae	: Feldmann-Mazoyer, 1940.
Rhodophyceae-Corallinaceae	: Hamel & Lemoine, 1952
Rest of Rhodophyceae	: Børgesen, 1927-1930
Rest of Rhodophyceae, not in Børgesen	: Taylor, 1960
In case of doubt (Rhodophyceae)	: Kylin, 1956

This new list of species of algae of Selvagem Pequena contains annotations and a synopsis of geographic distribution in the research area and according to the CANCAP-card-index of the Rijksherbarium. This CANCAP-card-index has been extended recently, so the data are more up-to-date than those in the study on algae from Ilhéu de Fora (Weisscher, 1982). New records for Selvagem Pequena have been marked with one asterisk (*), new records for the Salvage Islands with two asterisks (**), new records for Macaronesia with three asterisks (***). The letters, immediately below the name of the species, refer to the station at which the species was found.

ACKNOWLEDGEMENT

Dr. W. F. Prud'homme van Reine once again helped me to identify problematic species, and once again critically read the typescript, for which I am very grateful.

LIST OF SPECIES

Cyanophyceae

1. *Anabaena* spec.

** E, F.

Akinetes are absent, thus identification up to species-level is impossible. Diameter of cells 8 μm , length 4-7 μm ; sheaths visible. Diameter of heterocysts 10 μm , length 9 μm .

2. *Aphanocapsa litoralis* Hansg. var. *macrococca* Hansg.

* E, F.

Often epiphytic on old plants of *Padina pavonica*. Diameter of cells 5-7 (-10) μm .

- Salvage Islands : Selvagem Pequena, Ilhéu de Fora
Canary Islands : Gran Canaria.

3. **Calothrix aeruginea** (Kütz.) Thuret

* E, F.

Epiphytic on several species.

- Salvage Islands : Selvagem Pequena, Ilhéu de Fora
Madeira Archipelago : Deserta Grande.
Canary Islands : Gran Canaria, Tenerife, Gomera.
Africa : Morocco.

4. **Calothrix confervicola** C. Ag.

* E, F.

A common species. One specimen has a sheath of 10 μ m thick: diameter filament up to 36 μ m, diameter trichome up to 16 μ m.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora
Madeira Archipelago : Deserta Grande.
Azores : São Miguel, Terceira.
Canary Islands : Gran Canaria, Tenerife.
Cape Verde Islands : Ilha do Sal.

5. **Calothrix crustacea** Thuret

** E.

Epiphytic on *Heterosiphonia wurdemanni*.

- Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria, Tenerife.
Africa : West Sahara, Mauritania.

6. **Calothrix scopulorum** (W. & M.) C. Ag.

** E, F.

Often growing in mucus of mucigenous algae.

- Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria.

7. **Dermocarpa minima** Geitler

** F.

- Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria.
Africa : Senegal.

8. **Dichothrix penicillata** Zanard.

*** F.

Diameter trichome 15-20 μm . Trichomes are sometimes spirally arranged within their sheaths (Geitler, 1930-1932 : fig. 373d = *D. spiralis*). According to Geitler (l. c. : 592-593) spiral growth often occurs in *Rivulariaceae*.

Salvage Islands : Selvagem Pequena.

9. *Lyngbya confervoides* C. Ag.

** F.

Salvage Islands : Selvagem Pequena.

Madeira Archipelago : Deserta Grande.

Canary Islands : Gran Canaria, Tenerife, Lanzarote.

Africa : Morocco, Senegal.

10. *Microchaete vitiensis* Askenasy

** E.

The specimens are similar to those figured by Frémy (1936 : 38, fig. 9).

Salvage Islands : Selvagem Pequena.

Canary Islands : Gran Canaria.

11. *Oscillatoria subuliformis* Kütz.

Species listed by Gil-Rodriguez et al. (1978 : 62), not found by us.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Canary Islands : Gran Canaria.

12. *Rivularia atra* Roth

F.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Canary Islands : Gran Canaria, Tenerife.

13. *Rivularia bullata* (Poir.) Berkeley

** E.

Diameter trichomes up to 10 μm .

Salvage Islands : Selvagem Pequena.

Azores : São Miguel, Ilhéu de Vila Franca.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, Hierro.

Africa : Morocco.

14. *Symploca hydroides* Kütz.

* F.

Diameter trichomes only 5 μm , cells only at the ends of the filaments more or less moniliform. Endcell rounded, without calyptra.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
 Canary Islands : Tenerife.
 Cape Verde Islands : Santo Antão, Ilha do Sal.

Chlorophyceae

15. **Acetabularia polyphysoides** (Crouan) Kuntze
 ** D, E.
 Diameter discs 4 μ m. Discs with about 16 calcified rays short-stalked.
 Salvage Islands : Selvagem Pequena.
 Canary Islands : Gran Canaria, Tenerife.
16. **Anadyomene stellata** (Wulf.) C. Ag.
 ** E.
 The specimens are very young: lamina-formation has only just started.
 Salvage Islands : Selvagem Pequena.
 Canary Islands : Gran Canaria, Tenerife, la Palma.
17. **Bryopsis plumosa** (Huds.) C. Ag.
 ** E.
 A very small, but definite specimen, growing on a *Ceramiceae*.
 Salvage Islands : Selvagem Pequena.
 Madeira Archipelago : Deserta Grande.
 Azores : São Miguel, Terceira, Ilhéu de Vila Franca.
 Canary Islands : Gran Canaria, Tenerife, Gomera.
 Africa : Morocco, Mauritania, Senegal.
18. **Caulerpa webbiana** Mont.
 * E.
 Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira, Porto Santo.
 Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.
19. **Chaetomorpha linum** (O. F. Müll.) Kütz.
 E.
 Often on or between *Cystoseira* spp.
 Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira.
 Azores : São Miguel, Terceira, Flores, Corvo, Ilhéu de Vila Franca.

- Canary Islands : Gran Canaria, Tenerife, Gomera, la Palma, Hierro.
 Africa : Morocco, West-Sahara, Mauritania, Senegal.

20. **Cladophora coelothrix** Kütz.

Species listed by Gil-Rodriguez et al. (1978 : 63 as *C. repens*), not found by us.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira, Deserta Grande.
 Azores : Santa Maria
 Canary Islands : Canaries.
 Africa : Morocco, Senegal.

21. **Cladophora pellucida** (Huds.) Kütz.

* E.

The dimensions of the Selvagem specimen, agree quite well with *C. pseudopellucida* according to v. d. Hoek (1963 : 220, table 38, no. 4 = a specimen from Algiers). Diameter topcell 70-90 μm , length-width-ratio 6-20. According to Lawson & Price (1969 : 303) however, this name is a synonym of *C. pellucida*.

- Salvage Islands : Selvagem Pequena, Selvagem Grande
 Madeira Archipelago : Madeira.
 Canary Islands : Gran Canaria, Tenerife.
 Cape Verde Islands : São Nicolau
 Africa : Morocco.

22. **Cladophora spec. 1.**

** C.

This dark-green alga was collected from *Melobesieae* in a depth between 140-170 m. The ramification is di-trichotomous to lateral, the ultimate branches are often long, consisting of 2-4 cells. In the basal part of the plant the cells of the main axis are often proximally enlarged, the protoplast in these cells then being enlarged too and more compact. Higher up in the thallus the cells are cylindrical to slightly club-shaped. The protoplast is divided in many disciform-globular plastids. Pluri-cellular rhizoids may originate from the apical cells, ending in a disc. Dimensions: $\emptyset$ main axis: -130 μm , layered cell-walls up to 30 μm thick, cells about 4 $\times$ longer than their diameter. $\emptyset$ apical cells 75 μm , cellwalls 6-10 μm thick, cells about 2 $\times$ longer than their diameter. $\emptyset$ rhizoids -40 μm , cells up to 6 $\times$ their diameter, $\emptyset$ disc -110 μm .

23. **Cladophora spec. 2.**

** F.

Thallus acropetally organized, with a more or less unilateral ra-

mification. Old branches often grow together with the mothercell, and thus seem to originate laterally. No rhizoides observed. Dimensions: $\emptyset$ main axis up to to 90 μm , $\emptyset$ apical cells 25 μm , cells 6-14 $\times$ longer than their diameter.

24. **Cladophoropsis membranacea** (C. Ag.) Børg.

**

E.

The plant is much smaller than the specimens of Børgesen (1925 : 24). The diameter of the main axes is only 100 μm instead of 200, and of the apical cells only 15 μm . Nevertheless, the characteristic ramification in this species makes identification easy.

Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria, Tenerife, Gomera.
Cape Verde Islands : Santo Antão.
Africa : Morocco.

25. **Codium adhaerens** (Cabr.) C. Ag.

Listed by Gil-Rodriguez et al. (1978 : 64), not found by us.

Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
Azores : Santa Maria, Terceira, Flores.
Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera,
la Palma, Hierro.
Cape Verde Islands : São Vicente.
Africa : Morocco.

26. **Dasycladaceae**

E.

The specimen is very young, so identification is almost impossible. It shows some similarity to the alga figured by Hamel (1924-1931 : 132, fig. 40-5 = *Acetabularia mediterranea*). It may be juvenile *A. polyphysoides*, which occurs as adult at this same station.

27. **Dasycladus vermicularis** (Scopoli) Krasser

E, F.

Host to many species of epiphytes.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, Hierro.

28. **Derbesia furcellata** (Zanard.) Ardiss.

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E, F.

- | | |
|---------------------|---|
| Salvage Islands | : Selvagem Pequena, Selvagem Grande. |
| Madeira Archipelago | : Madeira. |
| Azores | : Faial. |
| Canary Islands | : Gran Canaria, Tenerife, Gomera, la Palma. |
| Africa | : Mauritania. |

29. *Derbesia tenuissima* (De Not.) Crouan frat.

** E.

Epiphytic on *Cystoseira* sp., with sporangia similar to the ones figured by Hamel (1924-1931 : 73, fig. 23-III).

- | | |
|---------------------|----------------------------|
| Salvage Islands | : Selvagem Pequena. |
| Madeira Archipelago | : Madeira, Deserta Grande. |
| Canary Islands | : Gran Canaria, Tenerife. |
| Cape Verde Islands | : Santo Antão. |
| Africa | : Morocco, Senegal. |

30. *Enteromorpha clathrata* (Roth) Grev.

Listed by Gil-Rodriguez et al. (1978 : 63), not found by us.

- | | |
|---------------------|--|
| Salvage Islands | : Selvagem Pequena, Selvagem Grande. |
| Madeira Archipelago | : Madeira. |
| Canary Islands | : Gran Canaria, Tenerife, Lanzarote, Hierro. |
| Cape Verde Islands | : Santo Antão. |
| Africa | : Morocco, Mauritania. |

31. *Enteromorpha compressa* (L.) Grev.

Listed by Gil-Rodriguez et al. (1978 : 63), not found by us.

- | | |
|---------------------|---|
| Salvage Islands | : Selvagem Pequena, Selvagem Grande. |
| Madeira Archipelago | : Madeira, Deserta Grande. |
| Azores | : Santa Maria, São Miguel, Faial, Ilhéu de Vila Franca. |
| Canary Islands | : Gran Canaria, Tenerife, Graciosa, Gomera, la Palma, Hierro. |
| Cape Verde Islands | : São Vicente, São Nicolau. |
| Africa | : Morocco, West-Sahara. |

32. *Enteromorpha flexuosa* (Wulf. ex Roth) ssp. *paradoxa* (Dillw.) Bliding

** E.

The specimens are profusely branched, having many monoseriate branches (Bliding, 1963 : 79-85, figs. 42-45). Up to 20 pyrenoids per cell.

- | | |
|-----------------|---------------------------|
| Salvage Islands | : Selvagem Pequena. |
| Canary Islands | : Gran Canaria, Tenerife. |

33. *Enteromorpha linza* (L.) J. Ag.

Listed by Gil-Rodriguez et al. (1978 : 63), not found by us.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Azores : Santa Maria.
 Canary Islands : Gran Canaria (? Vickers, 1896 : 298), Gomera.
 Africa : Morocco.

34. **Enteromorpha ramulosa** (Sm.) Hook. f.

Listed by Gil-Rodriguez et al. (1978 : 63), not found by us.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira.
 Azores : São Miguel, Terceira, Graciosa, Flores, Corvo.
 Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma.
 Africa : Morocco.

35. **Entocladia viridis** Reinke

** E.

Endophytic in *Dasycladus vermicularis*.

- Salvage Islands : Selvagem Pequena.
 Madeira Archipelago : Madeira.
 Azores : São Miguel, Faial.
 Canary Islands : Gran Canaria, Tenerife.
 Africa : Morocco.

36. **Percursaria percura** (C. Ag.) Rosenv.

Listed by Gil-Rodriguez et al. (1978 : 63), not found by us.

- Salvage Islands : Selvagem Pequena.
 Canary Islands : Gran Canaria, Tenerife.
 Africa : Morocco.

37. **Phaeophia dendroides** (Crouan frat.) Batters

** E.

Epi- and endophytic on/in *Cladophoropsis membranacea*.

- Salvage Islands : Selvagem Pequena.
 Madeira Archipelago : Madeira, Deserta Grande.
 Canary Islands : Gran Canaria, Tenerife.

38. **Protoderma marina** Reinke.

Listed by Gil-Rodriguez et al. (1978 : 49, 63), not found by us. No other records within Macaronesia are known to me. If the identification of Gil-Rodriguez et al. is correct, which these authors doubt, Selvagem Pequena is first CANCAP-record of the species.

- Salvage Islands : Selvagem Pequena.

39. *Valonia macrophysa* Kütz.

** E.

Epiphytic on *Cystoseira humilis* var. *humilis*. According to J. Feldmann (1937-1943 : 58) species of the genus *Cystoseira* are the favorite hosts of *V. macrophysa*. The large cells are roundish to pyriform.

Salvage Islands : Selvagem Pequena.

Canary Islands : Gran Canaria, Lanzarote.

40. *Valonia utricularis* (Roth) C. Ag.

E.

Often epiphytic on the discs of *Cystoseira discors*.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Madeira Archipelago : Madeira, Porto Santo.

Azores : Terceira, Faial.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.

Africa : Morocco.

P h a e o p h y c e a e

41. *Acinetospora crinita* (Carm. ex Harv. in Hook.) Kornm.

** E.

Form of plurilocular sporangia, place of growth zones and sparse ramification agree with the description of Cardinal (1964 : 70-71, fig. 37). Epiphytic on several *Cystoseira* spp.

Salvage Islands : Selvagem Pequena.

Canary Islands : Gran Canaria.

42. *Colpomenia sinuosa* (Roth) Derb. & Sol.

F.

Salvage Islands : Selvagem Pequena.

Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.

Azores : Santa Maria, São Miguel, Flores, Corvo.

Canary Islands : Gran Canaria, Tenerife, Gomera, la Palma, Hierro.

Cape Verde Islands : São Vicente, São Nicolau.

Africa : Morocco, Mauritania, Senegal.

43. *Cystoseira abies-marina* (S. Gmel.) C. Ag.

E.

The characteristic combination of *Cystoseira abies-marina* and *Gelidium arbuscula* just above the low-water mark around different

islands of Macaronesia, which has been observed and described by Weisscher et al. (in press), has not been detected on the Salvage Island. According to Børgesen (1926 : 101) and the CANCAP-card-index the *Cystoseira* species occurs mainly in Macaronesia. A record from the continent is, however, given by Dangeard (1949 : 186) from Morocco. A record of Montagne from Senegal is decidedly rejected by Dangeard (1952 : 254), who states that Montagne's specimens must have been washed ashore. However, this rejection is not accepted by Price et al. (1978 : 98), who suppose that the presence of the attached species is very well possible.

Salvage Islands	: Selvagem Pequena, Selvagem Grande.
Madeira Archipelago	: Madeira.
Azores	: Santa Maria, Formigas, São Miguel, Terceira, Graciosa, Faial, Ilhéu de Vila Franca.
Canary Islands	: Gran Canaria, Tenerife, Lanzarote, Fuerteventura, Gomera, la Palma, Hierro.
Cape Verde Islands	: São Vicente, São Nicolau.
Africa	: Morocco, Senegal (?).

44. *Cystoseira compressa* (Esp.) Gerl. & Nizam.

F.

Specimens with receptacula. Host to many species of epiphytes.

Salvage Islands	: Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
Madeira Archipelago	: Madeira.
Canary Islands	: Gran Canaria, Tenerife, Lanzarote, Fuerteventura, Gomera, la Palma, Hierro.
Africa	: Morocco.

45. *Cystoseira discors* (L.) C. Ag.

**

E.

Host to many species of epiphytes. Specimens with receptacula. According to Hamel (1931-1939 : 416, 418), Price et al. (1978 : 100) and Roberts (1978 : 403) problems exist as for the identities of *C. discors* and *C. foeniculacea*: the former should be a Mediterranean species, the latter an Atlantic one. The Selvagem specimen, however, agrees very much with the description of Hamel (1931-1939 : 416, pl. IX) of *C. discors*, and not of his *C. foeniculacea*. Here the former name is chosen. A recent taxonomic revision of the genus *Cystoseira* by Gil-Rodriguez (1980) resulted in recognition of *C. discors* in Macaronesia, so the species probably does occur in the Atlantic Ocean. Regarding the well-known problems of this genus, the geographic distribution, resulting from many publications by as many authors, cannot be determined exactly. Records

given by Gil-Rodriguez (1980) are marked with an asterisk in the following distribution :

Salvage Islands	: Selvagem Pequena.
Madeira Archipelago	: Madeira (*), Porto Santo.
Canary Islands	: Gran Canaria (*), Tenerife (*), Lanzarote (*), Fuerteventura (*), Gomera (*), la Palma (*), Hierro (*).
Africa	: Morocco, Mauritania.

46. *Cystoseira humilis* Kütz. var. *humilis*

* E, F.

Specimens with receptacula at both stations. Host to many species of epiphytes.

Salvage Islands	: Selvagem Pequena, Selvagem Grande.
Madeira Archipelago	: Madeira, Porto Santo, Deserta Grande.
Canary Islands	: Gran Canaria, Tenerife, Lanzarote, Fuerteventura, Gomera, la Palma, Hierro.
Cape Verde Islands	: Cape Verde Islands (no specification known).
Africa	: Morocco.

47. *Cystoseira* spec.

** E.

Host to many species of epiphytes. Thallus attached to the substratum by a firm disc, from which several axes arise (caespitose habit). Primary axes short, less than 1 cm long, with several laterals, and cicatrices of old laterals. Main axes terete in section, smooth, without spines. Ultimate branches flattened, pseudodichotomously branched, with midrib. Few cryptostomata present. No airbladders, no adventitious branchlets.

The specimens belong to the *C. foeniculacea*-group of Roberts (1978 : 402, Group 1), being caespitose, non-foliose, and having terete primary axes and flattened branches (however, not foliaceous). The specimens show much resemblance on first sight with *C. discors* (well-developed disc, small medullary area with small cells, structure of chromatophores, general habit, and color). However, the differences are clear: absence of foliaceous parts, absence of spinous outgrowths, pseudodichotomous ramification. So probably we are not dealing with *C. discors*. The opinion of the species being a member of the *C. foeniculacea*-group is shared by Roberts (pers. comm.). Its real identity is still a problem. More field-study and in different seasons is required.

48. *Dictyota cervicornis* Kütz.

* E, F.

Occasionally the species is difficult to recognize as a result of the grazing of animals, especially in the tidepools of station E. Nevertheless the cervicorn ramification can be established. Sporangia present at station E. Host to many species of epiphytes. This species has only recently been discovered in Macaronesia. (Weischer et al., in press).

Salvage Islands : Selvagem Pequena, Ilhéu de Fora.
Canary Islands : Gran Canaria.

49. *Dictyota dichotoma* (Huds.) Lamour.

D, E.

Like the preceding species the plants have partly been grazed by animals resulting in very irregularly growing specimens. No cervicorn ramification was observed, so this is probably *D. dichotoma*. Identification should be regarded with doubt. Sporangia at both stations.

Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Desertas.
Azores : Santa Maria, São Miguel, Faial.
Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.
Africa : Mauritania, Senegal.

50. *Dilophus fasciola* (Roth) Howe

E, F.

Specimens from station F show several stages of vegetative reproduction. Antheridia at station F.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
Canary Islands : Gran Canaria, Graciosa.
Cape Verde Islands : São Vicente.
Africa : Morocco.

51. *Dilophus kohlmeieri* Nizam. & Gerl.

** E.

This recently described species (Nizamuddin & Gerloff, 1979, 870, from Tenerife) also occurs in the tidepools of station E. A transverse section in the basal parts shows a multi-layered medulla, in the suprabasal parts about 7 layers of medullary cells, and distally a medulla of 2 cells covered on each side by a one-layered cortex. It occurs epiphytic on *Cystoseira* sp.

Salvage Islands : Selvagem Pequena.
Canary Islands : Tenerife.

52. **Ectocarpus siliculosus** (Dillw.) Lyngb.

Listed by Gil-Rodriguez et al. (1978 : 64 as *E. confervoides*), not found by us.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma.

Africa : Morocco, Mauritania.

53. **Feldmannia irregularis** (Kütz.) Hamel

* E.

Unilocular sporangia as well as plurilocular sporangia present.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Lanzarote.

Cape Verde Islands : São Vicente, São Nicolau.

Africa : Morocco, Mauritania, Senegal.

54. **Giffordia intermedia** (Rosenv.) Lund

*** E.

One growthzone, just below a pseudohair. According to Cardinal (1974 : 49) and Lund (1959 : 48) this phenomenon is characteristic for the species, and distinguishes it from *Feldmannia*. According to Cardinal the species occurs mostly at 10 m depth, according to Lund at 2-5 m, and at Selvagem Pequena it occurs in tide pools. Plurilocular sporangia present. Both epiphytic and epilithic.

Salvage Islands : Selvagem Pequena.

55. **Giraudia sphacelarioides** Derb. & Sol.

** E.

With uni- and plurilocular sporangia, similar to those figured by Newton (1931 : 135, fig. 81). Only one, very small specimen collected.

Salvage Islands : Selvagem Pequena.

Madeira Archipelago : Madeira.

56. **Halopteris scoparia** (L.) Sauv.

F.

This species, which occurs in great abundance in the protected localities in the Bahia del Confital, Gran Canaria (Weisscher et al, in press), was only occasionally found in protected localities of Selvagem Pequena.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
 Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
 Azores : Santa Maria, São Miguel, Terceira, Faial, Flores, Corvo, Ilhéu de Vila Franca.
 Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.
 Cape Verde Islands : São Vicente.
 Africa : Morocco.

57. **Hydroclathrus clathratus** (C. Ag.) Howe

Listed by Gil-Rodriguez et al. (1978 : 65), not found by us.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira.
 Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, Hierro.
 Cape Verde Islands : Ilha do Sal.

58. **Lobophora variegata** (Lamour.) Wom.

* E, F.

Sporangia present at station E.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
 Madeira Archipelago : Madeira, Porto Santo.
 Azores : Formigas.
 Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.
 Cape Verde Islands : São Vicente, São Nicolau.
 Africa : West-Sahara, Mauritania, Senegal.

59. **Nemacystus hispanicus** (Sauv.) Kylin

** E.

The plurilocular sporangia are occasionally short-stalked, the sterile stalk consisting of 2-3 cells.

- Salvage Islands : Selvagem Pequena.
 Madeira Archipelago : Madeira.

60. **Padina pavonica** (L.) Lamour.

D, E, F.

Sporangia present at all stations. Host to many species of epiphytes.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
 Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.

- Azores : Santa Maria, São Miguel, Terceira, Faial, Flores, Corvo, Ilhéu de Vila Franca.
 Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.
 Cape Verde Islands : São Vicente.
 Africa : Morocco, Mauritania, Senegal.

61. **Sargassum desfontainesii** (Turn.) C. Ag.

* E.

Young plants. Børgesen (1926 : 105) stated: «In some specimens, especially small young ones, the leaves may become a little broader». Our specimens show the same phenomenon.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira, Deserta Grande.
 Azores : Santa Maria.
 Canary Islands : Gran Canaria, Tenerife, Gomera, Hierro.

62. **Sargassum vulgare** C. Ag.

* E, F.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira, Deserta Grande.
 Azores : Santa Maria, São Miguel, Terceira, São Jorge, Graciosa, Faial, Flores, Corvo, Ilhéu de Vila Franca.
 Canary Islands : Santo Antão, São Vicente, São Nicolau, Sal.
 Africa : Morocco, West-Sahara, Mauritania, Senegal.

63. **Sphacelaria cirrosa** (Roth) C. Ag.

* D, E, F.

A very common epiphyte on *Phaeophyceae*, such as *Cystoseira* spp. and *Dictyota* spp., occasionally also on *Laurencia* and *Liagora*.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira.
 Azores : Santa Maria, São Miguel, Terceira.
 Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma.
 Cape Verde Islands : São Vicente.
 Africa : Morocco.

64. **Sphacelaria tribuloides** Menegh.

* E.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira.
 Azores : São Miguel.

- Canary Islands : Gran Canaria, Tenerife.
 Cape Verde Islands : Santo Antão.
 Africa : Morocco, Senegal.

65. **Taonia atomaria** (Woodw.) J. Ag.

** F.

Sporangia present.

- Salvage Islands : Selvagem Pequena.
 Madeira Archipelago : Madeira, Desertas.
 Azores : Santa Maria, São Miguel, Terceira, Faial.
 Canary Islands : Gran Canaria, Tenerife, Gomera, la Palma.
 Africa : Morocco, Mauritania, Senegal.

R h o d o p h y c e a e

66. **Acrochaetium virgatulum** (Harvey) Bornet

** E.

Mainly epiphytic on *Ceramiceae*, *Rhodomelaceae* and *Cystoseira* spp. Monosporangia present.

- Salvage Islands : Selvagem Pequena.
 Canary Islands : Gran Canaria, Tenerife.
 Africa : Morocco.

67. **Aglaothamnion furcellariae** (J. Ag.) Feldm.-Maz.

** F.

Epiphytic on *Cystoseira compressa*, with sporangia.

- Salvage Islands : Selvagem Pequena.
 Madeira Archipelago : Madeira, Deserta Grande.
 Canary Islands : Gran Canaria.
 Africa : Morocco.

68. **Antithamnion elegans** Berthold

Listed by Gil-Rodriguez (1978 : 68), not found by us.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
 Madeira Archipelago : Madeira.
 Canary Islands : Gran Canaria, Tenerife, Gomera, la Palma.
 Africa : Morocco, Senegal.

69. **Asparagopsis taxiformis** (Delile) Coll. & Herv.

* D.

This species, common in places exposed to swell in the Bahia del Confital at Gran Canaria (Weisscher et al. in press), is very poorly represented at Selvagem Pequena: a few small specimens with cystocarps were collected.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Deserta Grande.
Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera,
la Palma.

70. **Botryocladia boergesenii** J. Feldm.

*** E.

The specimens entirely agree with the descriptions and figures by J. Feldmann (1937-1943 : 299) and by Ardré (1970 : 133). The geographic distribution is now extended from the south coast of Portugal further southward.

Salvage Islands : Selvagem Pequena.

71. **Callithamnion corymbosum** (Smith) Lyngb.

* F.

Spermatangia present. Only recently reported from the Salvage Islands (Weisscher, 1982).

Salvage Islands : Selvagem Pequena, Ilhéu de Fora.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria.

72. **Ceramiceae** spec.

** E.

Thallus consisting of creeping and erect (monosiphonous) filaments (fig. 2). Creeping filaments fixed to the substratum by short, unicellular rhizoids, ending in a disc.

Cells with rhizoids alternate with cells from which erect axes arise. Both rhizoids and erect axes originate from the distal ends of the cells of the creeping filaments. Erect axes distally with unilateral to pseudodichotomous ramification. Many cells filled with more or less disciform chromatophores.

Dimensions: Ø rhizoids — 35 µm, Ø discs — 130 µm, Ø creeping axes 70-85 µm with cells being 300-450 µm long, Ø erect axes — 50 µm with cells being 300-450 µm long, Ø chromatophores — 12 µm. Because of lack of frutifications identification was not possible.

73. **Ceramium ciliatum** (Ellis) Ducluz.

E, F.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Madeira Archipelago : Madeira, Porto Santo.

Azores : São Miguel, Ilhéu de Vila Franca.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera,
la Palma, Hierro.

Cape Verde Islands : São Vicente.
Africa : Morocco.

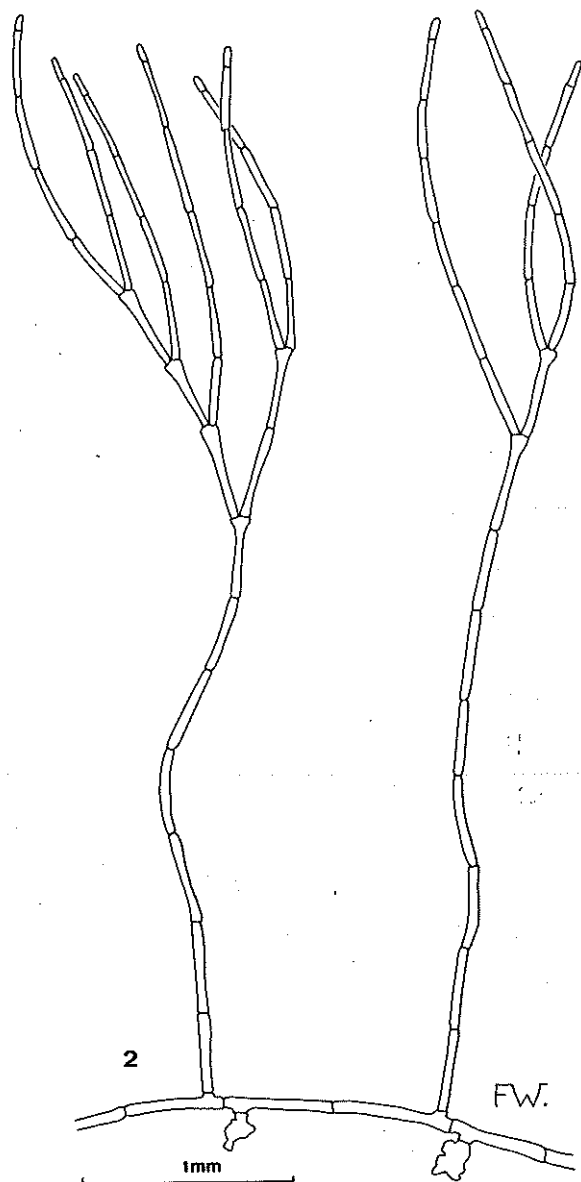


Fig. 2. Detail of an unknown member of Ceramiaceae.

74. *Ceramium codii* (Rich.) Maz.

** E, F.

Often epiphytic on *Dictyotales*.

Salvage Islands : Selvagem Pequena.

Canary Islands : Gran Canaria.

Africa : Senegal.

75. *Ceramium diaphanum* (Roth) Harv.

D, E, F.

A very common epiphyte, often on *Dictyotales* and *Fucales*. Sporangia present at all stations, cystocarps at station E.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Madeira Archipelago : Madeira, Deserta Grande.

Azores : Terceira, Faial.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, Hierro.

Cape Verde Islands : Santo Antão, São Nicolau.

Africa : Morocco, Senegal.

76. *Ceramium echionotum* J. Ag.

E.

Often epiphytic on *Dasycladus vermicularis*, as on Ilhéu de Fora (Weisscher, 1982).

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Madeira Archipelago : Madeira, Porto Santo.

Azores : Azores (no specification known).

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Hierro.

Africa : Morocco.

77. *Ceramium gracillimum* Griff. & Harv. var. *byssoideum* (Harv.) Maz.

** E, F.

Often epiphytic on *Dictyotales* and *Cystoseira* spp. Sporangia present at station E.

Salvage Islands : Selvagem Pequena.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Tenerife.

Cape Verde Islands : Cape Verde Islands (no specification known).

Africa : Morocco, West-Sahara, Mauritania, Senegal.

78. *Ceramium tenuissimum* (Lyngb.) J. Ag.

Listed by Gil-Rodriguez et al. (1978 : 69), not found by us.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Desertas.
Cape Verde Islands : Santo Antão, Ilha do Sal.
Africa : Morocco.

79. *Champia parvula* (C. Ag.) Harv.

E.

Cystocarps present. Sometimes the branches have a gelatinous sheath.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Deserta Grande.
Canary Islands : Gran Canaria, Tenerife, Gomera, la Palma.
Cape Verde Islands : São Vicente.
Africa : Morocco, West-Sahara, Mauritania.

80. *Chondria curvilineata* Coll. & Herv.

*** E.

The very small specimen agrees completely with the descriptions by Taylor (1960 : 617) and Collins & Hervey (1917 : 120-121, pl. II, figs. 10-11). The distally thickened walls of the pericentral cells can easily be observed under the cortex, with the convex sides directed towards the apex. See fig. 3.

- Salvage Islands : Selvagem Pequena.

81. *Chondria tenuissima* (Good. & Woodw.) C. Ag.

E, F.

Sporangia present at both stations, cystocarps as well at station E.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
Madeira Archipelago : Madeira.
Azores : Azores (no specification known).
Canary Islands : Gran Canaria.
Africa : Morocco, West-Sahara.

82. *Choreonema thuretii* (Bornet) Schmitz

E.

Parasite on *Jania capillacea*; diameter of conceptacles 160 μ m.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
Canary Islands : Gran Canaria.
Africa : Morocco, Mauritania.

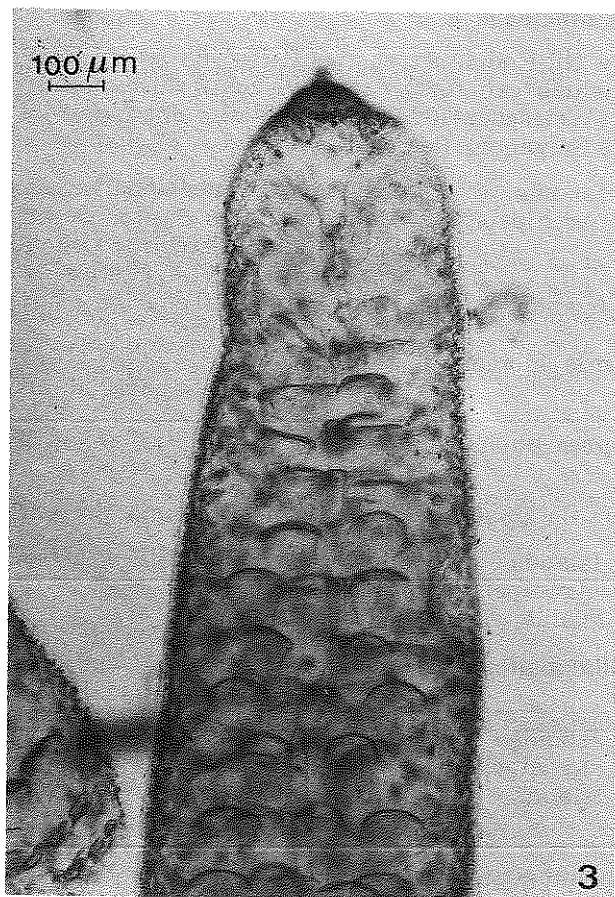


Fig. 3. *Chondria curvilineata*. Longitudinal section.

83. *Corallina granifera* Ell. & Sol.

* F.

Often between or epiphytic on *Phaeophyceae*. Corniculate conceptacula present. Not synonymous with *C. officinalis* (Weisscher, 1982).

- | | |
|---------------------|---|
| Salvage Islands | : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora. |
| Madeira Archipelago | : Madeira. |
| Azores | : São Miguel, Faial. |
| Canary Islands | : Gran Canaria, Tenerife, Gomera. |
| Africa | : Morocco. |

84. *Corallina officinalis* L.

Listed by Gil-Rodriguez et al. (1978 : 68 as *C. mediterranea*). This species, which can form extensive mats on exposed places at Gran Canaria (Weisscher et al., in press) was not found by us on exposed places at Selvagem Pequena.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
Azores : São Miguel, Terceira, Graciosa, Faial, Flores, Ilhéu de Vila Franca.
Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.
Cape Verde Islands : Santo Antão.
Africa : Morocco, West-Sahara, Mauritania, Senegal.

85. *Corynospora pedicellata* (Smith) J. Ag.

** E.

Epiphytic on *Cystoseira* spp. Monosporangia present.

- Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira.
Canary Islands : Gran Canaria.

86. *Cottoniella fusiformis* (Howe) Børg.

** E.

- Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira.
Canary Islands : Gran Canaria, Tenerife, Gomera, la Palma, Hierro.

87. *Crouania attenuata* (Bonnem.) J. Ag.

E, F.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Deserta Grande.
Canary Islands : Gran Canaria, Tenerife.
Africa : Morocco.

88. *Dasya corymbifera* J. Ag.

** E.

The specimen agrees with the figure given by Coppejans (1977 : pl. 191). Ramuli with distinct basal cell.

- Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira.
Canary Islands : Canary Islands (no specification known).

89. *Dasya ridigula* (Kütz.) Ardiss.

** E.

Epiphytic on *Padina pavonica*. Sporangia present.

Salvage Islands : Selvagem Pequena.

Madeira Archipelago : Madeira.

90. *Falkenbergia* cf. *hillebrandii* (Bornet) Falkenb.

** E, F.

Often intermingled with various *Phaeophyceae*. It is very difficult to tell *F. hillebrandii* apart from *F. rufolanosa* and one cannot be sure of the identification. However, only *Asparagopsis taxiformis*, of which *F. hillebrandii* is the tetrasporophyte, was found, and no *A. armata*, of which *F. rufolanosa* is the tetrasporophyte. So probably we are dealing with *F. hillebrandii*.

Salvage Islands : Selvagem Pequena.

Azores : São Miguel, Faial.

Canary Islands : Gran Canaria, Tenerife, Lanzarote.

91. *Galaxaura flagelliformis* (Kjellm.) Børg.

* E.

Sporangia present.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.

Cape Verde Islands : Ilha do Sal.

92. *Gelidiella tenuissima* (Bornet) Feldm. & Hamel

** D.

Epiphytic on *Acetabularia polyphysoides*.

Salvage Islands : Selvagem Pequena.

Madeira Archipelago : Madeira.

Africa : Morocco, Mauritania, Senegal.

93. *Gelidium pusillum* (Stackh.) Le Jolis

* E.

This species, which predominates in parts of the littoral area at Gran Canaria (Weisscher et al., in press), was only found once at Selvagem Pequena. The small thallus often shows a bundle of rhizoids just beneath the apices. Epiphytic on *Cystoseira discors*.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Madeira Archipelago : Madeira, Deserta Grande.

- Azores : São Miguel, Terceira.
Canary Islands : Gran Canaria, Tenerife.
Africa : Morocco, West-Sahara, Mauritania, Senegal.

94. *Goniotrichum alsidii* (Zanard.) Howe

E, F.

Epiphytic on several species.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Deserta Grande.
Azores : São Miguel, Terceira, Faial.
Canary Islands : Gran Canaria, Tenerife.
Africa : Morocco, Mauritania.

95. *Griffithsia barbata* (Smith) C. Ag.

** E, F.

According to Feldmann-Mazoyer (1940 : 408) the species in the vegetative stage is characterized by the presence of dichotomously or verticillately branched trichoblasts, issuing from young cells at the ends of the branches. Only occasionally a few sporangia were present at station E, and antheridia at station F. Epiphytic on several species.

- Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria.

96. *Griffithsia tenuis* C. Ag.

* E, F.

According to Feldmann-Mazoyer (1940 : 411) the species in the vegetative stage is particularly characterized by laterals, issuing from the proximal region of the mothercell instead of from the distal region. Some sporangia present only at station F. Often epiphytic on *Dasycladus vermicularis*.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.
Madeira Archipelago : Madeira, Porto Santo.
Canary Islands : Gran Canaria, Tenerife.
Africa : Senegal.

97. *Halodictyon mirabile* Zanard.

** E, F.

One specimen shows undivided monosporangia in a ripe stichidium, instead of the usual tetrasporangia (fig. 4a, b).

- Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria.
Africa : Morocco (?).

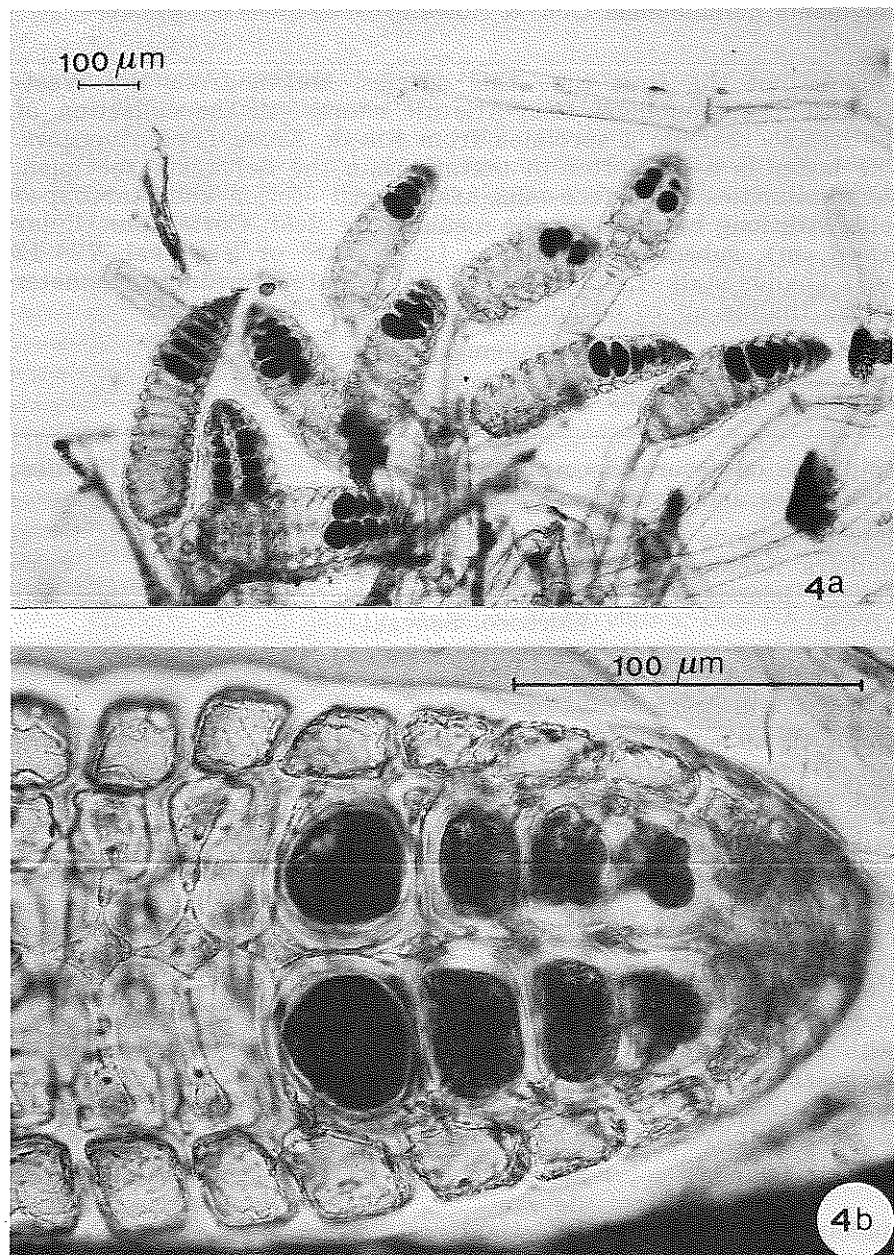


Fig. 4. *Halodietyon mirabile*. a. Ripe stichidia. b. Detail of a stichidium with monosporangia.

98. *Halymenia bermudensis* Coll. & Howe.

*** C.

This is not the first time this species, known from the West-Atlantic, was found on East-Atlantic shores: in the collection of the Rijksherbarium a specimen from Ria de Arosa (Spain) occurs. The latter is a bit softer in texture than the Selvagem specimen, but similarities in surface-cells, transversal section and starshaped cells with long branches in the medulla are clear. Cortex unicellular ($\emptyset$ - 6 μ m), subcortex unicellular (cells more or less oval, 7×12 μ m). Thallus stalked, stalk with parenchymatous medulla. Diameter of the thallus up to 60 μ m. Found at great depth!

Salvage Islands : Selvagem Pequena.

99. *Herposiphonia secunda* (C. Ag.) Näg.

E, F.

Epiphytic on several species, with a slight preference for *Fucales*, *Dictyotales* and *Laurencia obtusa*.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Tenerife, Gomera.

Africa : Morocco, Senegal.

100. *Herposiphonia tenella* (C. Ag.) Näg.

E, F.

Epiphytic on several species, with a slight preference for *Cystoseira* spp., *Dictyotales*, *Laurencia obtusa* and *Liagora* sp. Sporangia present at station E.

Salvage Islands : Selvagem Pequena, Ilhéu de Fora.

Madeira Archipelago : Madeira, SW of Deserta Grande.

Canary Islands : Gran Canaria, Tenerife, Gomera.

Africa : Morocco, Mauritania, Senegal.

101. *Heterosiphonia wurdemanni* (Bail.) Falkenb.

* E, F.

Both forma *typica* Børg. and forma *laxa* Børg. were found. Børgesen (1919 : 326) states, that regarding the differences between these two forms perhaps we are dealing with two separate species. Epiphytic on *Fucales* and *Dictyotales*.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Fuerteventura.

Africa : Morocco, Mauritania, Senegal.

102. *Hypnea cervicornis* J. Ag.

E.

Sporangia present. One specimen shows a crosier-hooked branchtip, which is characteristic for *H. musciformis*. A transversal section, however, clearly shows a very small central cell, surrounded by much larger pericentrals, which is characteristic for *H. cervicornis*. So probably a hooked branchtip is not very distinctive. According to Weisscher et al. (in press) *H. spinella* is synonymous.

Salvage Islands	: Selvagem Pequena, Selvagem Grande.
Madeira Archipelago	: Madeira, Porto Santo, Deserta Grande.
Canary Islands	: Gran Canaria, Tenerife.
Cape Verde Islands	: Santo Antão, São Vicente, Ilha do Sal.
Africa	: Morocco, West-Sahara, Mauritania, Senegal.

103. *Hypnea musciformis* (Wulf.) Lamour.

* F.

See the note to *H. cervicornis*. A transversal section shows a central cell as large as the pericentrals.

Salvage Islands	: Selvagem Pequena, Selvagem Grande.
Madeira Archipelago	: Madeira, Porto Santo, Deserta Grande.
Azores	: São Miguel.
Canary Islands	: Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.
Cape Verde Islands	: Santo Antão, São Vicente, São Nicolau, Ilha do Sal, Fogo.
Africa	: Morocco, West-Sahara, Mauritania, Senegal.

104. *Jania adhaerens* Lamour.

*** E.

Salvage Islands	: Selvagem Pequena.
Canary Islands	: Gran Canaria.
Africa	: Mauritania, Senegal.

105. *Jania capillacea* Harv.

* D, E, F.

At station E specimens epiphytic on *Cystoseira* spp. appear to be uncalcified or only slightly calcified. Conceptacles present at station E.

Salvage Islands	: Selvagem Pequena, Ilhéu de Fora.
Canary Islands	: Gran Canaria.
Cape Verde Islands	: Ilha do Sal.

106. **Jania rubens** (L.) Lamour.

E.

Epiphytic on *Dictyota cervicornis*.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
Azores : Santa Maria, São Miguel, Graciosa, Flores,
Corvo, Ilhéu de Vila Franca.
Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera,
la Palma, Hierro.
Cape Verde Islands : São Vicente.
Africa : Morocco, Mauritania, Senegal.

107. **Laurencia obtusa** (Huds.) Lamour.

E, F.

Sporangia present at station E. Host to many species of epiphytes.

- Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu
de Fora.
Madeira Archipelago : Madeira, Porto Santo, Deserta Grande.
Azores : Terceira, Faial, Flores, Corvo.
Canary Islands : Gran Canaria, Tenerife, Gomera, la Palma.
Cape Verde Islands : Santo Antão, São Vicente.
Africa : Morocco, Mauritania, Senegal.

108. **Laurencia pinnatifida** (Gmel.) Lamour.

* E.

Sporangia present. According to Yamada (1931 : 189) at least in the basal parts of the plant lenticular thickenings are present. Our specimen, however, has been collected without a basal part, and there are no lenticular thickenings in the rest. The thallus is flattened, with pinnate ramification and blackish.

- Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Deserta Grande.
Azores : São Miguel, Terceira.
Canary Islands : Gran Canaria, Tenerife, Graciosa, Gomera,
la Palma, Hierro.
Africa : Morocco, West-Sahara, Mauritania, Senegal.

109. **Liagora tetrasporifera** Børg.

** E.

Cystocarps present. Host to many species of epiphytes.

- Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria, Tenerife, Lanzarote, la Palma.

110. *Liagora ceranoides* Lamour.

E.

Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira.
Canary Islands : Gran Canaria, Lanzarote.

111. *Liagora distenta* (Mert.) C. Ag.

Listed by Gil-Rodriguez et al. (1978 : 66), not found by us.

Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Madeira, Porto Santo.
Canary Islands : Lanzarote, Gomera, la Palma.
Africa : Morocco.

112. *Lithophyllum solutum* (Foslie) Lem.

*** A, B.

Generic structure according to Lemoine (1909 : 2, figs, 3, 4). Conceptacula are rare according to Hamel & Lemoine (1952 : 54). They are absent in the Selvagem specimen. Records known from a depth of 80 m. Near Selvagem Pequena specimens were found at a depth of 91 m.

Salvage Islands : Selvagem Pequena.
Africa : Mauritania.

113. *Lithophyllum* cf. *vickersiae* Lem.

** A, C.

Identification based on external features, therefore uncertain. The specimen is similar to the one figured by Lemoine (1929 : 42, pl. 2, fig. 1).

Diameter of cells about 7 μ m. According to Levring (1974 : 65) occurring at depths down to 40-50 m., near Selvagem Pequena down to 140-170 m.

Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira.
Azores : Faial.
Canary Islands : Gran Canaria, Tenerife.
Cape Verde Islands : Ilha do Sal.
Africa : Morocco.

114. *Lophosiphonia reptabunda* (Suhr) Kylin

** E.

Much confusion exists as for the correct identities of the *Lophosiphonia* spp. (e. g. number of pericentral cells). Kylin's (1956)

opinion of the genus is adopted here. Number of pericentral cells mostly 13-14.

Salvage Islands : Selvagem Pequena.
Canary Islands : Gran Canaria, Tenerife, Gomera.

115. *Lophosiphonia scopulorum* (Harv.) Wom.

Listed by Gil-Rodriguez et al. (1978 : 70), not found by us.

Salvage Islands : Selvagem Pequena, Selvagem Grande.
Madeira Archipelago : Deserta Grande.
Canary Islands : Gran Canaria.

116. *Melobesia farinosa* Lamour.

* E, F.

A very common epiphyte, on *Fucales*, *Dictyota* and *Laurencia obtusa*. Conceptacles present at both stations, their diameter reaching 250 μm . The species is not listed by Gil-Rodriguez et al. (1978). Gain (1914 : 7), however, mentions the species as occurring at the Salvagem Islands. After finishing the typescript for the publication of the marine algae of Ilhéu de Fora (Weisscher, 1982) the species was found to occur at Ilhéu de Fora as well.

Salvage Islands : Selvagem Pequena, Ilhéu de Fora.
Madeira Archipelago : Madeira, Desertas.
Canary Islands : Gran Canaria, Hierro.
Africa : Morocco, Mauritania.

117. *Melobesia minutula* Foslíe

Listed by Gil-Rodriguez et al. (1978 : 67), not found by us.

Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira, Desertas.

118. *Platoma cyclocolpa* Schmitz

** E.

The cystocarps lift the cortical layer somewhat, and open through a pore (Taylor, 1960 : 435). The diameter of the glandcells reaches 25 μm , their lumen 17 μm . The carpospores are more or less globular, apically being attenuated. Their diameter reaches 28 μm .

Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira.
Canary Islands : Tenerife, Gomera.
Africa : Morocco.

119. *Platysiphonia miniata* (C. Ag.) Børg.

*** E.

The plant agrees with remarks on the comparison of the species of *Platysiphonia* by Silva and Cleary (1954 : 259, fig. 26a). Rhizoids issue from both anterior and posterior flanking cells, remaining in open connection with them. See (fig. 5).

Salvage Islands : Selvagem Pequena.
Africa : Morocco, Mauritania.

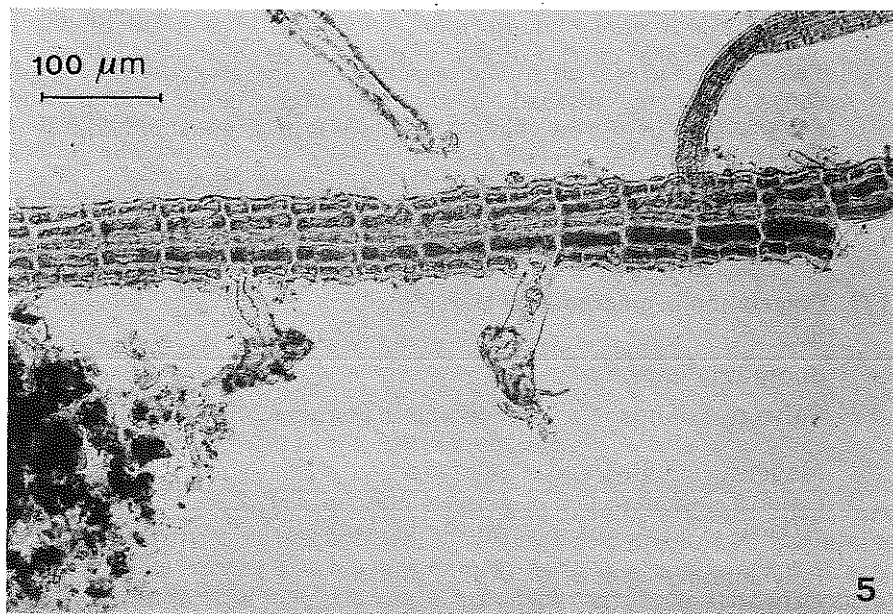


Fig. 5. *Platysiphonia miniata*. Creeping part with rhizoids.

120. *Polysiphonia* cf. *ceramiaeformis* Crouan

*** E.

The plant agrees with the description by Lauret (1970 : 130, pl. VII, figs. 1-13). According to De Toni (1924 : 399) the name is a synonym of *P. furcellata*. Lauret (1970 : 133), however, shows some characteristic differences between the two species. Unfortunately fructifications are absent, so one cannot be sure of the identification. Epiphytic on *Cystoseira* sp.

Salvage Islands : Selvagem Pequena.

121. *Polysiphonia* cf. *foetidissima* Cocks

*** E.

The plant agrees with the description by Batten (1923 : 304). Spo-

rangia, spermatangia and cystocarps are present. Rhizoids may become as large as 160 μ m. Number of pericentrals: 9-10. The only discrepancy is the length-width-ratio of the segments, which should be more than one, but is mostly less than one in my specimen. Identification therefore is doubtful.

Salvage Islands : Selvagem Pequena.

122. *Polysiphonia* cf. *havanensis* Mont.

** F.

The plant agrees with the description by Børgesen (1915-1920 : 266). However, instead of the sporangia being solitary or only with a few in a row, they are placed in a continuous row in the distal ends of the erect axes.

Salvage Islands : Selvagem Pequena.

Azores : São Miguel.

Canary Islands : Gran Canaria.

123. *Polysiphonia macrocarpa* Harv.

E.

Sporangia present.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Tenerife, Gomera.

Africa : Morocco, West-Sahara, Mauritania.

124. *Polysiphonia opaca* (C. Ag.) Zanard.

* E, F.

Epiphytic on *Cystoseira* spp. and *Laurencia obtusa*. Sporangia at station F.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, la Palma.

Africa : Morocco.

125. *Polysiphonia sphaerocarpa* Børg.

** E, F.

Sporangia at both stations.

Salvage Islands : Selvagem Pequena.

Canary Islands : Gran Canaria.

126. *Polysiphonia* sp. 1

** E.

Thallus consisting of a prostrate system, from which erect axes arise. All axes terete. Rhizoids issuing from the median parts of the pericentral cells, cut off from them by a crosswall. Prostrate axes with in every segment a scar-cell, a lateral, or an adventitious branchlet. Erect axes originate from the scar-cells, sparsely branched; every segment with a scar-cell. Both prostrate and erect axes with 4 pericentral cells, ecorticate throughout. Segments in prostrate axes shorter than their diameter, longer in the erect axes. Trichoblasts poorly developed. Sporangia in long rows in the distal parts of the erect axes. Ramuli issuing from the scar-cells. Cell-walls thick and hyaline.

Dimensions: prostrate axes : $\varnothing$ 160 μm , length of a segment 120 μm .
 erect axes : $\varnothing$ basally 90 μm , length of a segment 140 μm , $\varnothing$ medially 75 μm , length of a segment 120 μm .
 rhizoids : $\varnothing$ 40 μm , $\varnothing$ lumen 5-20 μm .
 sporangia : $\varnothing$ 80 μm .

Salvage Islands : Selvagem Pequena.

127. *Polysiphonia* sp. 2.

** E.

At first sight the plants are similar to *P. gorgoniae* Harv. The descriptions by Harvey (1853 : 39) and Taylor (1960 : 576) are not sufficient for a critical identification. Specimens of *P. gorgoniae* from the Harveyan Herbarium, kindly sent to me by Prof. D. A. Webb (Trinity College, Dublin), are different from the Selvagem specimens: cystocarps of the latter bear a row of large, imbricating cells around the ostiole, which the former lacks. So it seems best to describe the Selvagem specimens:

Thallus consisting of one branched erect axis only, attached to the substratum by thick rhizoids, issuing at one side only of the most basal segments of the main axis. Rhizoids cut off from the pericentrals by a crosswall. Ramification alternating-irregularly dichotomous. Basal segments shorter than their diameter (120 $\times$ 260 μm), median segments somewhat longer (240 $\times$ 200 μm), distal segments twice as long as broad (210 $\times$ 100 μm). Unicellular rhizoids sometimes branched distally, ending in a disc. Four pericentral cells, axes ecorticate throughout. Trichoblasts well-developed. Ramuli replacing the trichoblasts. Cystocarps more or less oval, with a row of large imbricating cells around the ostiole (compare Børgesen, 1930 : 92, fig. 37b: *P. breviarticulata*). Spermatangia oblong (C. 70 $\times$ 280 μm) with a long pedicel (- 90 μm) and small apical cell.

Salvage Islands : Selvagem Pequena.

128. *Ricardia montagnei* Derb. & Sol.

* E, F.

On *Laurencia obtusa*; bearing sporangia at station E.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Canary Islands : Gran Canaria, Gomera, la Palma.

129. *Rytiplaea tinctoria* (Clem.) C. Ag.

* E.

Salvage Islands : Selvagem Pequena, Selvagem Grande.

Madeira Archipelago : Madeira, Porto Santo.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera.

Africa : Morocco, Mauritania.

130. *Spyridia aculeata* (Schimp.) Kütz.

** E.

Salvage Islands : Selvagem Pequena.

Madeira Archipelago : Madeira.

Canary Islands : Gran Canaria, Tenerife, Lanzarote.

Cape Verde Islands : Santo Antão, São Vicente, São Nicolau, Ilha do Sal.

Africa : Morocco, Senegal

131. *Spyridia filamentosa* (Wulf.) Harv.

E.

Sporangia and cystocarps present. Suprabasal parts of ramuli sometimes with a long cuff of cortex-cells. If epiphytic, then often on *Fucales*, *Dictyotales* and *Liagora* spp.

Salvage Islands : Selvagem Pequena, Selvagem Grande, Ilhéu de Fora.

Madeira Archipelago : Madeira, Porto Santo.

Canary Islands : Gran Canaria, Tenerife, Lanzarote, Gomera, la Palma, Hierro.

Africa : Morocco, Mauritania, Senegal.

132. *Taenioma perpusillum* J. Ag.

** E, F.

According to Taylor (1960 : 548) and Levring (1974 : 94) *T. perpusillum* and *T. macrourum* should be kept apart. Taylor distinguishes the two species by the number of hairs (2 for *T. macrourum*, 3 for *T. perpusillum*) and the number of segments in the branchlets (8-20 for *T. macrourum*, 20-30 for *T. perpusillum*). Fig.

337 of Børgesen (1919) shows two hairs, and branchlets consisting of more than 20 segments. The same is the case with the Selvagem specimen. So Taylor's distinction is probably not valid. This was also observed at Gran Canaria (Weisscher et al. in press).

Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira.
Canary Islands : Gran Canaria, Lanzarote, Gomera.
Africa : Morocco.

133. **Wrangelia penicillata** C. Ag.

** E.

Salvage Islands : Selvagem Pequena.
Madeira Archipelago : Madeira, Deserta Grande.
Canary Islands : Gran Canaria.

134. **Wurdemannia setacea** Harv.

* E.

Salvage Islands : Selvagem Pequena, Ilhéu de Fora.
Madeira Archipelago : Madeira.
Canary Islands : Gran Canaria, Gomera.
Cape Verde Islands : São Vicente, Ilha do Sal.

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