

DET KGL. DANSKE VIDENSKABERNES SELSKAB  
BIOLOGISKE MEDDELELSER, BIND XVIII, NR. 11

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# SOME MARINE ALGAE FROM MAURITIUS

ADDITIONS TO THE PARTS PREVIOUSLY  
PUBLISHED. II

BY

F. BØRGESEN



KØBENHAVN  
I KOMMISSION HOS EJNAR MUNKSGAARD  
1950

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The present part with a single exception contains additions to Part 2, 1943, and Part 3, 1944, dealing with the *Gelidiales*, *Cryptonemiales*, *Gigartinales*, and the *Rhodymeniales*, respectively.

In all 32 species are mentioned and of these 10 species have not previously been recorded from Mauritius. To the remaining species various information, as to their structure, biology, etc., is added, this being made possible by means of new material arrived from the island.

Because of Dr. VAUGHAN's visit to Europe last summer I have not recently received any new material from the island.

The small dredge which, as mentioned in the paper of 1949, I have sent to Mauritius has at last arrived there and according to a letter recently received from Dr. VAUGHAN some algae from deeper water not yet met with have been gathered by means of the dredge.

To the Trustees of the Carlsberg Foundation I am much indebted for a continued grant for algological investigations.

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## Nemalionales.

### *Fam. 1. Chaetangiaceae.*

#### **Actinotrichia** Decsne.

##### 1. **Actinotrichia fragilis** (Forssk.) Børgs.

Alg. Mauritius, III, 1, 1942, p. 44.

Some well developed specimens have lately been received from Mauritius. Most regrettably the specimens are sterile.

Mauritius: Pointe aux Cannoniers, Febr. 16, 1946, R. E. V. no. 535.

## Gelidiales.

### *Fam. 1. Gelidiaceae.*

#### **Gelidiella** Feldm. & Hamel.

##### 1. **Gelidiella acerosa** (Forssk.) Feldm. & Hamel.

Alg. Mauritius, III, 2, 1943, p. 5.

Having formerly seen very little material of this species I have in a later collection received a well developed specimen (no. 477) of this species.

Nothing is said about the locality.

Mauritius: Without locality 1943, C. NEYROLES, no. 477.

## Gelidium Lamour.

1. *Gelidium pusillum* (Stackh.) Le Jolis.  
var. *pulvinatum* (Ag.) Feldm.

Alg. Mauritius, III, 2, 1943, p. 6, fig. 1.

Of this small rather variable plant several specimens are found in a later received collection.

The specimens had rather narrow tongue-shaped lobes. It was growing "in rock crevices exposed to waves".

Mauritius: Îlot Brocus, March 10, 1948. R. E. VAUGHAN, no. 855.

## Cryptonemiales.

### Fam. 1. *Rhizophyllidaceae.*

#### *Desmia* Lyngb., J. Ag.

1. *Desmia Hornemanni* Lyngb.

Alg. Mauritius, III, 2, 1943, p. 13.

Some few well prepared specimens have been received from Mauritius in recently received collections.

Mauritius: Grande Rivière, Nov. 11th, 1941. G. MORIN, no. 419.

### Fam. 2. *Corallinaceae.*

#### *Amphiroa* Lamour.

1. *Amphiroa fragilissima* (L.) Lamour.

Alg. Mauritius, III, 2, 1943, p. 17.

Some specimens of this species have lately been received. An examination shows that the padlike swollen ends of the joints, a characteristic feature of this species, were not developed in the specimens or in any case very little. As to the central strands these were very alike in the specimens, having 4—5 rows of long cells interrupted by a row of short ones.



One of the specimens (no. 580) was in all respects larger, forming tufts up to 6 cm high and with joints in the thallus reaching a length of 5 mm or even more. This specimen was gathered in shallow water in a lagoon. Another specimen (no. 353) was growing in a lagoon and mixed with sea-grasses. And a third one (no. 821) was found on exposed rocks, mixed with other algae.

Mauritius: Pointe aux Sables, Aug. 1939, R. E. V. no. 353. Gris-Gris near SOUILLAC, June 20, 1946, R. E. V. no. 850. Îlot Barkly, May 24, 1948, R. E. V. no. 821.

## **Cheilosporum (Decsne) Aresch.**

### **1. *Cheilosporum acutilobum* Decsne.**

Alg. Mauritius, III, 2, 1943, pp. 19—21, fig. 5.

Of this beautiful species of which I formerly have seen only some few small specimens, a collection including several fine specimens is present in a gathering no. 754 of a late date.

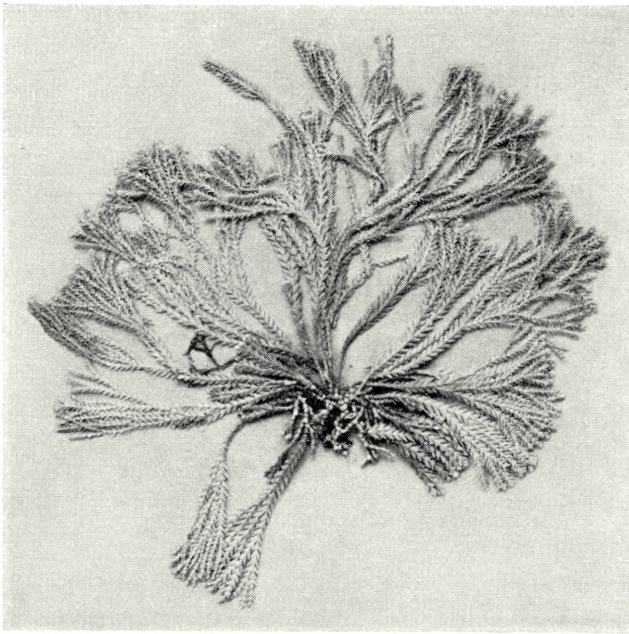


Fig. 1. *Cheilosporum acutilobum* (Decsne) Aresch. Natural size.

Fig. 1 shows the habit of a specimen.

The colour of the dried specimens is very beautiful, changing from a whitish rosy-red to a light-green.

The specimens were sterile.

As to its near relationship to several similar species compare my remarks *l. c.*

It was growing on a reef.

Mauritius: Pointe aux Roches, Nov. 17, 1947. R. E. V. no. 754.

## 2. *Cheilosporum jungermannioides* Rupr.

RUPRECHT, in ARESCHOUG, J. E., *Corallineae* in J. AGARDH. Spec. Alg., II, 2, p. 546.

Of this tiny elegant *Corallinacea* a small tuft was found in a collection of algae from Mauritius. The specimen is in good conformity with several specimens from Tahiti received some years ago from SETCHELL, Tahiti being the type-locality of the species; later it has been found by YENDO in Japan and on the south coast of Java by WEBER v. BOSSE.

The specimen forms a dense tuft, the much ramified filaments being felted together. Most regrettably any information as to the locality is not given.

Mauritius: Without locality and date, C. NEYROLES, 1943, no. 433. Geogr. Distr.: Tahiti, Japan, Java.

## *Corallina* Lamour.

### 1. *Corallina polydactyla* Mont. et Mill.

Alg. Mauritius, III, 2, 1946, pp. 21—22, fig. 6.

In collections recently received from Dr. VAUGHAN several specimens of this variable species are present.

As fig. 6 a (*l. c.*) shows, a trait of character in this species is that several pinnae, two to three, often are given off from the upper edge on both sides of the joints in the mid-rib; in *Corallina mauritiana* a single and less developed pinna, only, as a rule is developed from the upper edge of the joint on both sides.

Some of the specimens formed tufts up to 7 cm high. The specimens were growing upon reefs in exposed localities; one, no. 758, was an epiphyte upon stems of *Cymodocea* growing in a lagoon and accordingly the thallus was more flabby.

Mauritius: Pointe aux Roches, May 3, 1947, R. E. V. no. 688. Same locality, Nov. 17, 1947, R. E. V. nos. 758 and 759.

## **Jania Lamouroux.**

### 1. *Jania tenella* Kütz.

Alg. Mauritius, III, 2, 1946, p. 26.

Some few small specimens of this tiny species have lately been received.

They were epiphytes upon pieces of larger algae.

Mauritius: Without locality and date, C. NEYROLES, 1943, no. 434.

## **Fam. 3. *Grateloupiaceae.***

### ***Halymenia* J. Ag.**

#### 1. *Halymenia maculata* J. Ag.

AGARDH, J., Till Algeries Systematik, Nya bidrag. 4de afdl. VII. Florideae, 1884, p. 12; *Analecta Algologica*, 1892, p. 53.

Besides some smaller fragments I have for examination had an, as it seems, entire large lamina of a specimen measuring  $45 \times 28$  cm. And finally, just when the paper was going to be printed, a small, complete specimen fixed to a piece of a coral and preserved in formol has been received from Mauritius.

By means of this specimen I have been able to examine the base of the plant. The specimen, about 25 cm high, has a quite short stipe scarcely  $1\frac{1}{2}$  cm long and is fastened to a piece of coral by means of a flattened, irregularly lobed disc. From the lower part of the terete stipe several small 2—3 cm broad irregularly shaped lamina-like lobes are given out. Above, the stipe makes an abrupt transition in the cordate base of the thallus, the decumbent edges of which near the stipe are smooth without

proliferations. The laminae of the specimens are in the most irregular way lobed and sinuated in larger and smaller cuneate lobes with roundish bases between them and their margins are again provided with densely placed irregularly shaped fimbriate

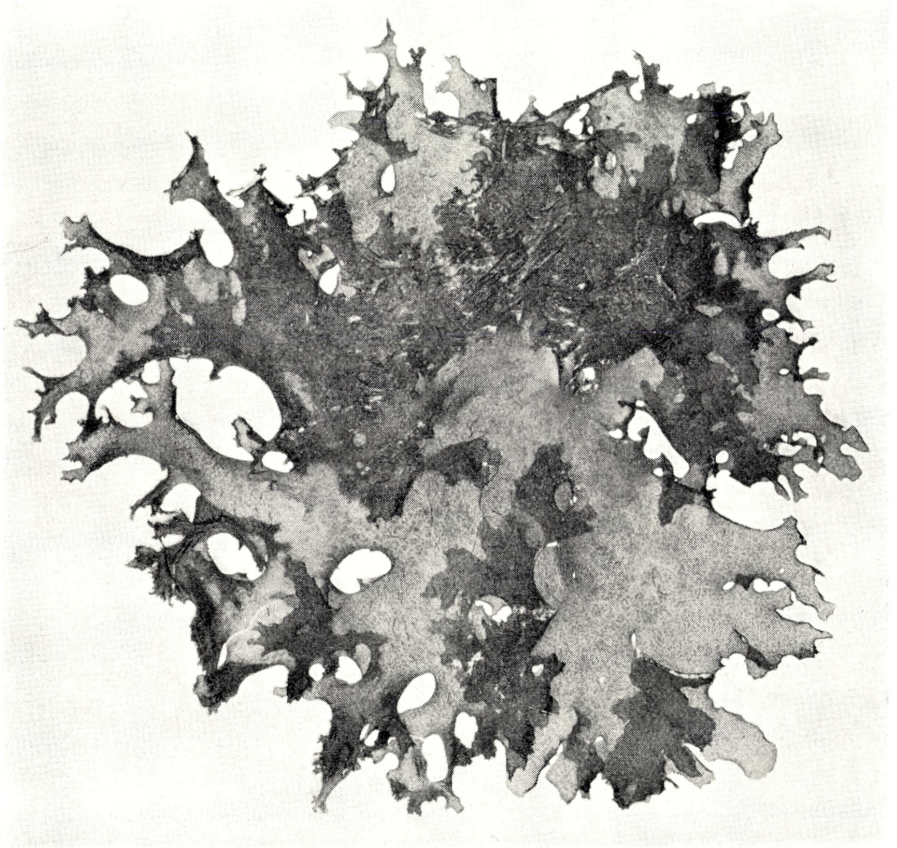


Fig. 2. *Halymenia maculata* J. Ag. Lamina of a small specimen. About  $\frac{1}{2}$  size.

proliferations (Fig. 2). In a dry condition the outmost lobes are often quite narrow and nearly thornlike, but when moistened they become much broader and roundish, the whole thallus at the same time swelling highly, becoming soft and slimy.

The lamina in a dried condition is darkish purple; its surface is densely maculated by quite small roundish or polygonal spots gathered more or less densely into larger ones. The spots are due

to the fact that the surface is more or less densely wrinkled and bullate with small bulges, assuming a darker colour in the swelled parts.

A transverse section (Fig. 3) of the thallus shows that the epidermal layer consists of elongated papilla-like cells about  $20\ \mu$  long, emerging from oblong-ovate cells, from which there is an even transition to larger ones lower down, the cells gradu-

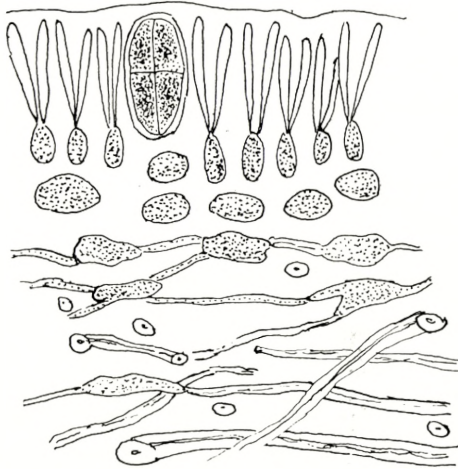


Fig. 3. *Halymenia maculata* J. Ag. Transverse section of the thallus with a sporangium. ( $\times 600$ ).

ally assuming an elongated more or less stellate appearance and giving out filaments from the projections; the medullary layer is filled with slime in which filaments are running in all directions.

The specimens are tetrasporic. The cruciately divided sporangia are about  $30\ \mu$  long and  $15\ \mu$  broad and developed in the upper part of the cortical layer from cells below the papilla-like epidermal ones, being more or less embedded among them.

The plant is endemic in Mauritius, being called there "Red Sea Lettuce", and is said to be common in places, but any information about its habitat, f. in. if it is found in the littoral or sublittoral zone or in exposed or sheltered places is not given.

Mauritius: Ilôt Barkly without dates, FR. NEYROLES, no. 431. Cassis, Jan. 7, 1947, G. MORIN, no. 627.

Geogr. Distr. Endemic.

## Carpopeltis Schmitz.

### 1. *Carpopeltis rigida* (Harv.) Schmitz.

Alg. Mauritius, III, 3, 1943, p. 27, fig. 9.

In later received collections some more specimens of this species are included, but none of them have been collected in situ; all are said to have been washed ashore.

As mentioned in the former part and said by JADIN this species occurs on exposed coast in the violent surf.

Mauritius: Pointe aux Roches, May 3, 1947, R. E. V. no. 687.  
Cassis, Jan. 1, 1948, G. MORIN nos. 772 and 773.

## Gigartinales.

### *Fam. 1. Nemastomaceae.*

### **Titanophora** (J. Ag.). Feldmann.

#### 1. *Titanophora Pikeana* (Dickie) Børgs.

F. BØRGESEN, Alg. Mauritius, III, 2, 1943, p. 31, figs. 10—12. —  
*Titanophora Pikeana* (Dickie) Feldm. p.p., Remarques sur les Nemastomacées, 1942, p. 111.

During the war FELDMANN in the year 1942 in his above quoted paper pointed out that J. AGARDH's subgenus *Titanophora* ought to have generic rank; but since my paper quoted above and dealing with the same matter did not appear till 1943 FELDMANN has the priority.

While FELDMANN followed WEBER in considering the plant from New Guinea to be the same as that from Mauritius, I came to the result that Mme WEBER's plant specifically was different from that from Mauritius.

The species has not been rediscovered since Colonel PIKE collected it.

**Fam. 2. *Solieriaceae.***

**Sarconema Zanard.**

1. *Sarconema filiforme* (Sonder) Kylin.

Alg. Mauritius, III, 2, 1943, p. 39.

In the paper quoted above a fragment of a specimen from Réunion was referred to this species, but in a later collection some specimens of this species have been received from Mauritius also. When compared with specimens I have collected in Bombay and referred to this species (Kew Bulletin, 1934, p. 11, fig. 7) the specimens from Mauritius agree quite well with the Indian ones; but it cannot be denied that they are also very like *Sarconema indicum* (J. Ag.) Kylin, 1932, p. 22, pl. 8, fig. 17, where the original specimen found in J. AGARDH'S herbarium is reproduced; these two species are surely very closely related, and their size and shape upon the whole alters surely much as to the more or less exposed localities in which they occur.

In the above quoted paper I gave a transverse section of the Indian plant (fig. 7); as compared with a section of the plant from Mauritius, the cells of the medulla in the latter are smaller, having only a diameter of up to 90  $\mu$ .

The specimens were washed up by the waves.

Mauritius: Cassis, Jan. 28, 1948, G. MORIN, no. 765.

**Solieria J. Ag.**

1. *Solieria robusta* (Grev.) Kylin.

KYLIN, H., Die Florideengattung Gigartinales, 1932, p. 18. — *Dumontia robusta* Grev., Alg. Brittan., 1830, p. LXII. *Solieria australis* Harv., Phycol. Austr., tab. 149. *Rhabdonia robusta* J. Ag., Spec. Alg., II, p. 355.

f. *flagelliformis* J. Ag., KYLIN *l. c.* pl. 5, fig. 9.

Two specimens found in the collections from Mauritius agree quite well with the figure of KYLIN reproduced from the original specimen of this form in J. AGARDH'S Herbarium in Lund.

One of the specimens is tetrasporic.

Mauritius: Ilôt Barkly, Aug. 26, 1941, G. MORIN, no. 420. The other specimen, no. 435, was collected by Father C. NEYROLES, but is without locality and date.

Geogr. Distr.: Australia, Japan, Malayan Archipelago, India.

## ***Eucheuma* J. Ag.**

### 1. ***Eucheuma serra* J. Ag.**

Alg. Mauritius, III, 2, p. 43.

Some few specimens (no. 892 a) coming near to those I formerly referred to this species have recently been received from Mauritius.

Besides the short spines characteristic of this species, long ones are present in places, reminding of those figured by KÜTZING in his figure of *Grateloupia opposita* Kütz., Tab. Phycol. vol. 17, pl. 31 referred by DE-TONI to *Eucheuma jugatum* J. Ag. in Sylloge Alg., vol. IV, 1, p. 371.

Another feature which was not found in the specimens of Dr. MORTENSEN is that the uppermost parts of some of the filaments are curved like tendrils. This is yet more the case in two smaller specimens (no. 892 b) which are better referred to *Eucheuma jugatum*.

The thallus of the specimens is terete.

The specimens were collected in a lagoon and have been laid dry at low tide.

Mauritius: Mahébourg, Aug. 1948, I. VINSON, no. 892.

### 2. ***Eucheuma jugatum* J. Ag.**

Alg. Mauritius, III, 2, 1943, p. 47.

Some specimens of *Eucheuma* (no. 893) together with the above-mentioned two smaller ones (892 b) are referable to this species, being in good accordance to the original specimen of this species found in AGARDH's Herbarium in Lund, of which a photo has been published by KYLIN, Gigartinales, 1942, p. 23, pl. 9, fig. 20.

The characteristic feature of this species is the numerous



sharp, in most cases rather short ( $1-1\frac{1}{2}$  mm long), spines placed densely all round the thallus; but some few longer spines are found now and then.

But as said in my paper (1943) this species together with the above-mentioned one and furthermore *Euch. nodulosum* Aresch. and *E. horridum* (Harv.) J. Ag. are most probably only forms of a very polymorphic species.

The specimens were collected in the same locality as the above-mentioned species.

Mauritius: Mahébourg, Aug. 1948, I. VINSON, nos. 892 b and 893.

### *Fam. 3. Rhodophyllidaceae.*

#### **Gelidiopsis** Schmitz.

##### 1. *Gelidiopsis variabilis* (Grev.) Schmitz.

SCHMITZ, FR., Marine Florideen von Deutsch-Ostafrika, 1895, p. 148.

FELDMANN, J., Remarques sur les genres *Gelidium* Lamour., *Gelidiopsis* Schmitz et *Echinocaulon* (Kütz.) Feldm., 1931, p. 6. — *Gigartina variabilis* Grev. mscr., *Gelidium variabile* J. Ag., Epicrisis, p. 547, KÜTZING, Tab. Phycol., XIX, tab. 23, figs. C. D.

Several specimens (nos. 457, 538, 629, 638, 847) are referable to this species, agreeing quite well with KÜTZING's figures referred to above.

The breadths of the thallus of the different specimens varied from about  $110\ \mu$  in the thinner filaments to about  $250\ \mu$  in the thick ones.

As to the habitat of the species it is said about one specimen only: "On rocks and in pools near reef."

Mauritius: Cassis, Jan. 18, 1947, G. MORIN, nos. 629 and 630. Grand Baie, Febr. 16, 1946, G. MORIN, no. 538. Îlot Brocus, May 9, 1948, R. E. V. no. 847.

Geogr. Distr.: Indian Ocean.

## *Fam. 4. Hypnaceae.*

### 1. *Hypnea charoides* Lamx.

Alg. Mauritius, III, 2, 1943, p. 56.

In later received collections from Mauritius several specimens referable to this very variable species were found.

Characteristic of this species is the fact that the branches are more or less densely clad with short acute branchlets.

Cystocarpic and tetrasporic specimens are met with.

As was stated already by JADIN this species is surely common at the shores of Mauritius.

Mauritius: Cassis near Port Louis, G. MORIN, nos. 421, 428, 429, 430. Îlot Barkly, April 1, 1946, G. MORIN, nos. 520, 516, 517. Pointe aux Sables, March 30, 1947, G. MORIN, no. 665. Îlot Barkly, March 25, 1948, G. MORIN, no. 781.

### 2. *Hypnea Valentiae* (Turn.) Mont.

Alg. Mauritius, III, 2, 1943, p. 58.

Some few specimens (no. 126) were found in lately received collections. The specimens agree with those I have formerly mentioned, being easily recognized by means of the stellate bulbils developed more or less densely over the thallus.

Mauritius: Pointe aux Vaeao, March 1, 1931. R. E. V. no. 126.

### 3. *Hypnea Esperi* Bory.

BORY, Voyage de Coquille, p. 157. KÜTZING, Spec. Alg. p. 759; Tab. Phycol., vol. 18, pl. 26. GRUNOW, Alg. Novara, p. 79. BØRGESEN, Alg. Easter Island, p. 306, fig. 48. TANAKA, The Genus *Hypnea* from Japan, 1941, p. 243, fig. 16.

Some sterile specimens of this small species were found in later received collections.

Mauritius: Cassis, Apr. 24, 1940, G. MORIN, no. 427.

Geogr. Distr.: In most warm seas.

#### 4. *Hypnea nidulans* Setchell.

SETCHELL, W. A., American Samoa, 1924, p. 161, fig. 30. WEBER, A., Alg. Siboga, 1928, p. 454, fig. 192, TANAKA, T., The Genus *Hypnea* from Japan, 1941, p. 246, figs. 18—19.

Some small specimens (no. 850) are referable to this species.

This characteristic species was first described by SETCHELL (*l. c.*), having earlier been distributed by HARVEY in his Friendly Island Algae as *Hypnea pannosa* J. Ag. It has later been found to be common in the Malayan Archipelago by Mme WEBER and in Japan by TANAKA.

The specimens from Mauritius are tetrasporic, the tetrasporangia being found in saddle-like nemathecia upon the ramuli as figured by SETCHELL and TANAKA.

Mauritius: Îlot Barkly, May 10, 1948, G. MORIN, no. 850. Grand Baie, Febr. 16, 1946, G. MORIN, no. 546.

Geogr. Distr.: Pacific and Indian Oceans.

#### 5. *Hypnea Cenomyce* J. Ag.

AGARDH, J., Spec. Alg., II, 1852, p. 452. Epicrisis, 1876, p. 564. TANAKA, T., The Genus *Hypnea* from Japan, 1941, p. 250, fig. 21.

Some few specimens (no. 807) forming low, dense tufts produced by the entangled, irregularly ramified filaments are referable to this species.

Characteristic of this species is the fact that the sporangia develop in the basal swollen parts of the short lateral ramuli emerging from the branches; compare TANAKA *l. c.* p. 249, fig. 21 A. But nearly the whole material is sterile and I have seen only a very few fertile branchlets.

This author mentions that in the Japanese specimens the branchlets often instead of being acute are provided with a small disc. This was not observed in the Mauritian specimens.

The plant was found "upon block of old cement".

Mauritius: No locality, April 24, 1948, G. MORIN, no. 807.

Geogr. Distr.: Australia, Japan.

6. *Hypnea*(?) *horrida* (Ag.) J. Ag.

Alg. Mauritius, III, 2, 1943, p. 62, fig. 32.

Having formerly seen only some small bleached specimens cast ashore of this species endemic to Mauritius I have recently received some few small but well prepared specimens from the island. The colour of the specimens is dark red.

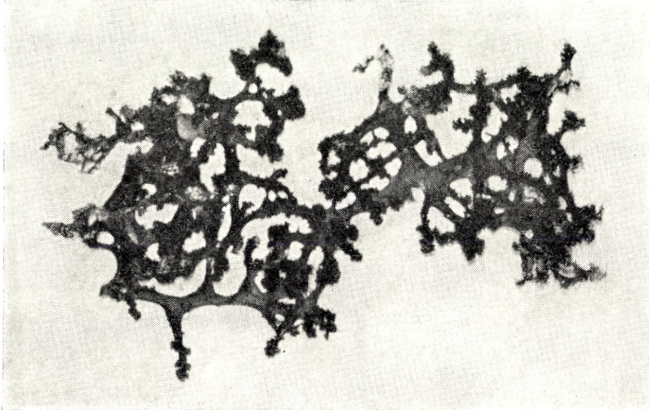


Fig. 4. *Hypnea horrida* (Ag.) J. Ag. Natural size.

Fig. 4 shows one of the specimens, demonstrating the very irregular ramification of the main branches from which short side branches are given out, the branchlets towards their summits being crowned by densely placed thorny, short outgrowths.

The anatomical structure agreed with my former description.

The plant is never found fruiting and the specimens mentioned here were sterile, too.

As to the habitat of the specimens no information is given, but according to JADIN it grows on reefs.

Mauritius: Pointe d'Esny, Aug. 17, R. E. V. no. 714.

**Fam. 5. *Sphaerococcaceae*.**

***Caulacanthus* Kütz.**

***Caulacanthus ustulatus* (Mert.) Kütz.**

KÜTZING, Phycol. gener. p. 395; Spec. Alg., p. 753; Tab. Phycol., vol. XVIII, pl. 8. J. AGARDH, Spec. Alg., vol. II, p. 433. BORNET et THURET, Notes algal., p. 55, pl. 19. — *Fucus ustulatus* Mert. fide KÜTZING.

A small alga recently received from Mauritius is according to its structure a *Caulacanthus* and most probably referable to *C. ustulatus*, agreeing quite well with the description and beautiful figures of BORNET (*l. c.*).

For the use of later comparison, when better material is to be had, I give here some few figures of the plant. A small piece of the thallus is seen in Fig. 5, showing the irregular ramification. The thallus is mostly terete, but here and there some of the branchlets are flattened (Fig. 6 b).



Fig. 5. *Caulacanthus ustulatus* (Mert.) Kütz. Habit of a fragment of the thallus. ( $\times 15$ ).

The plant is fixed to the substratum by means of short rhizoidal discs (Fig. 6 b, c, d) formed by coherent rhizoids breaking out from the epidermal cells, some of them also fixing themselves to neighbouring filaments.

Upon a transverse section (Fig. 6 a) of the thallus the thick-walled axis is seen in the middle; a longitudinal section shows that it is composed of cylindrical cells about 4—5 times as long as broad; from these cells a single or two filaments issue from

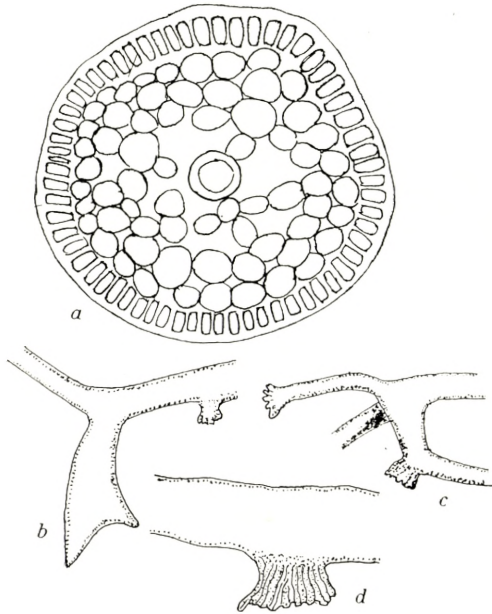


Fig. 6. *Caulacanthus ustulatus* (Mert.) Kütz. a, transverse section of the thallus. b, fragment of the thallus with a flat branchlet. c, d, fragments with rhizoids. (a,  $\times 250$ ; b, c,  $\times 20$ ; d,  $\times 50$ ).

each cell on all sides, which by their ramification form the peripheral tissue.

As to the size of the Mauritian plant the main filaments are about  $250 \mu$  thick, but some parts may be more than  $300 \mu$  and the thinner ones about  $150 \mu$  only. The plant was sterile.

Several species are described of the genus; they all seem to be very closely related; besides the size of the thallus the most essential characters are whether the thallus is more or less flattened or whether the discs are more or less numerous or the ramification more or less dense, etc.; this also applies to *C. divaricatus* (Suhr) Papenfuss, Notes on South African Mir. Alg. II, 1943, p. 86, originating from South Africa. A critical revision of the genus based upon original specimens is surely much

needed; compare also my remarks about Indian specimens in the Kew Bulletin, 1933, p. 115.

As to its systematic relationship *Caulacanthus* has formerly been placed in the fam. *Gelidiaceae*; but FELDMANN and HAMEL, 1934, p. 15, point out that the right place of the genus is in the Fam. *Sphaerococcaceae* near the genus *Heringia*, basing this view upon the facts that the apical cell is divided by oblique walls, that the sporangia are zonately divided and that the cystocarp shows a great resemblance to that of the genus *Heringia*.

And in a later paper FELDMANN, 1938, p. 298 about the germinating of the tetraspores of *Caulacanthus ustulatus* arrives at the result that the development of the spores is carried out in a way often found in the *Gigartinales*, but very different from what is the case in the *Gelidiales*.

Still I want to point out that the plant from Easter Island I (1920, p. 280, fig. 27) referred to *Caulacanthus spinellus*, because of its massive thallus surely is not this genus, but should rather be considered a small *Hypnea*; as said above the plant was sterile.

The specimens were collected: "In rock crevices exposed to waves."

Mauritius: Îlot Brocus, May 9, 1948, R. E. V. no. 845.  
Geogr. Distr.: Widely distributed in warmer seas.

## *Fam. 6. Sarcodiaceae.*

### **Sarcodia** J. Ag.

#### 1. *Sarcodia ceylanica* Harv.

Alg. Mauritius, III, 2, 1943, p. 66.

From Dr. VAUGHAN I have in recent years received some few specimens of *Sarcodia*, but all are fragments and most probably cast ashore. Some of the specimens may show some likeness to the small fragments upon which J. AGARDH based the species *Sarcodia Gattya* (J. Ag.) Kylin and *S. ceylonensis* (J. Ag.) Kylin, 1932, p. 56, pl. 21, figs. 51 and 52, both species I feel inclined to refer to *S. ceylanica*.

Upon the whole, according to the few specimens I have

seen, a great variability as to the shape of the thallus seems to reign in this genus, making a large number of specimens necessary to be able to clear up the delimitation of the species.

As a characteristic of the 3 species: *S. Gattyi*, *S. Montagneana* and *S. ceylanica* KYLIN points out (*l. c.* p. 56) the presence of stellate cells in the medullary layer of these species and I have



Fig. 7. *Sarcodia* spec. Natural size.

also mentioned this in the above quoted paper. But as to these "stellate cells" Professor PIERRE DANGEARD, Bordeaux, in a letter asking me about a specimen of *Sarcodia*, remarks, referring also to KYLIN, that it is the contents of the cells which are stellately contracted not the cell wall, and in this I quite agree with Professor DANGEARD.

Fig. 7 shows a small specimen (no. 468) recently received from Mauritius. The thallus in this specimen is much furcated and divided and the lobes are again provided with small irregular projections along the margins. The plant is cystocarpic; the structure of the plant is rather like that of *Sarcodia ceylanica* (*l. c.* fig. 34) but the contents of the cells in the medullary layer are, especially regarding the outmost ones, less stellately con-



tracted. A transverse section of the cystocarp shows that it is very like that pictured by OKAMURA, *Icones Jap. Alg.*, vol. IV, 1921, pl. 178, fig. 10. The parenchymatic tissue in the cystocarp in this specimen had cells with less stellately contracted content than I have found for instance in *S. ceylanica*.

Another specimen (no. 464), being most probably the same species as that mentioned above, is tetrasporic. Fig. 8 shows a

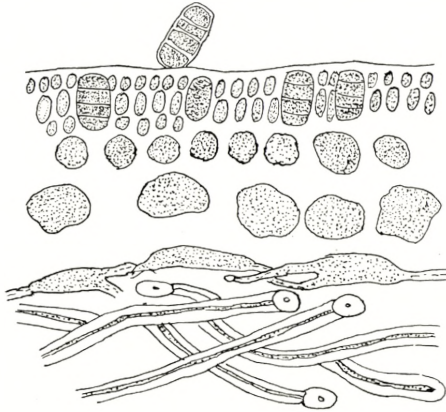


Fig. 8. *Sarcodia* spec. Transverse section of a tetrasporic specimen (no. 464).  
( $\times 250$ ).

fragment of a transverse section of this specimen. The oblong cylindrical, transversely divided tetrasporangia, about  $38 \mu$  long and  $13 \mu$  broad, are formed in the epidermal layer composed of oblong densely placed small cells which are more elongated below. In the medullary tissue below the cell-contents in the uppermost cells are only contracted in a less degree, somewhat more in those lower down.

The two specimens were collected by Father NEYROLES, but are without locality and dates.

There is of course a possibility that the two small specimens represent a new species.

Mauritius: Without localities, C. NEYROLES nos. 464 and 468.



Fig. 9. *Corallopsis Opuntia* J. Ag. Fragments of a specimen (no. 536) preserved in formol. Natural size.

### *Fam. 7. Gracilariaceae.*

#### ***Corallopsis* Grev.**

##### 1. *Corallopsis Opuntia* J. Ag.

Alg. Mauritius, III, 2, 1943, p. 67.

Referring to what I have previously said about this species and its relationship to *Gracilaria crassa* (Harvey) J. Ag. (compare my papers: Some Marine Algae from Ceylon 1936, p. 86 and Contributions to a South Indian Marine Algal Flora, II, 1937, p. 328) the recently received material from Mauritius has confirmed my supposition that the two species belong together, as even transitions occur from forms with a quite or nearly cylindrical thallus to such ones as have a markedly constricted thallus.

One of the specimens (no. 536) is a larger form, the thallus of which in parts is quite cylindrical, in others with more or

less distinct narrowings. Because of the very thin walls of the large cells in the medulla and the great contents of water, the plant shrivels very much when it is dried and it is also very little capable of assuming its original shape even when boiled in water, but fortunately some small fragments have been preserved in formol and seawater, a piece of which is seen in Fig. 9. As the figure shows, parts of the thallus are cylindrical,



Fig. 10. *Corallopsis Opuntia* J. Ag. Habit of a specimen. Natural size.

others are constricted. When the constrictions are much developed a form like the figure (Fig. 10) is the result; this figure originates from a specimen collected by JADIN and is preserved in my herbarium.

Another specimen (no. 731) is a more poorly developed form, having most probably been growing upon rocks in an exposed locality. The thallus in this form is more irregularly ramified and likewise more irregularly constricted; it is thinner, often with short internodes and curved branches.

A third specimen (no. 885) agrees very well with the latter; some fragments of this specimen have been preserved in formol and seawater and have thus kept their original shape. They show that the terete, ab. 4 mm thick, fleshy thallus is very irregularly ramified, often curved, in parts nearly cylindrical, in others

irregularly constricted. About its habitat, habit, and colour it is said by the collector: "Forms large cushions or mats up to 50 cm broad. Thallus smooth, terete, purple-yellow."

Mauritius: Pointe aux Cannoniers, Febr. 16, 1946, R. E. V., no. 536. Pointe d'Esny, Aug. 17, 1947, R. E. V., no. 731. Îlot Barkly, Sept. 19, 1948, R. E. V. no. 885.

## Gracilaria Grev.

### 1. *Gracilaria Millardetii* (Mont.) J. Ag.

Alg. Mauritius, III, 2, 1943, p. 72, figs. 36—40.

Of this species, originally described by MONTAGNE upon a unique fragment only, I have lately received a rather large material, but in spite of this a complete specimen with basal disc has been searched for in vain. And most regrettably the information about the localities and the external conditions in which the specimens have lived is also rather insufficient.

J. AGARDH (1884, p. 64) enumerates 3 forms of this species.

The first of these is the forma *Millardetii* J. Ag. of which MONTAGNE's fig. 3, pl. XXV shows a fragment of the thallus with rather broad lobes. In the rather rich material I have got now any form answering exactly to MONTAGNE's specimen is not found, all the specimens having much narrower lobes; and this also applies to the small specimen, fig. 36, in my former paper (1943), which I with doubt referred to this form. Hence, even if I presume that MONTAGNE's specimen and those I have got now belong together, I prefer to consider the latter as representing a form of its own for which I propose a special name, forma *exposita*.

Fig. 11 shows a specimen of this form; it appears surely as low, 5—6 cm high, dense, firm tufts on rocks and corals in the littoral zone fixed to the substratum by a vigorous disc, thus being able to endure the violent surf of the ocean. The thallus is very irregularly divided and lobed, provided along the margins with numerous proliferations and teeth of variable shape and size. When dry the thallus has a dark red-brown colour and a horny-cartilaginous consistence. In the female specimens the large, about 1 mm broad, semiglobular cystocarps are scattered



Fig. 11. *Gracilaria Millardetii* (Mont.) forma *exposita* Borgs. Natural size.

over the flat sides of the thallus. Compare MONTAGNE and MILLARDET'S figs. 3 a and 3 c *l. c.* 1862, pl. XXV.

The other two forms described by J. AGARDH, namely f. *crenulata* and f. *linearifolia* have proportionally narrow thalli with longer distances between the furcations; they have also a

much thinner thallus and their colour is lighter red. These forms surely live in more sheltered localities with more or less stagnant water or they have been cast ashore by the surf and carried into lagoons and other sheltered places, assuming the altered shape algae adopt when living in such places. In my paper (1943) figs. 39 and 40 give illustrations of these forms such as I have understood them without having been able to see AGARDH's specimens.

Finally several larger specimens are found in the later received collections which are in good conformity with the unique specimen which I in my former paper, p. 76, presumed to be *Gracilaria denticulata* (Kütz.) Schmitz, but which I now after examination of the recently received large material by means of intermediate forms consider a more broad-lobed and robust form of this highly variable species.

Fig. 12 shows a specimen of this form (nos. 417 and 774) for which I propose the name of forma *latifolia*. The specimens have a rather thick cartilaginous thallus and a dark red colour; it is irregularly lobed with narrower or broader lobes, up to  $1\frac{1}{2}$  cm broad, cuneately narrowed towards their base and along their margins more or less densely provided with irregularly shaped proliferations or teeth. The tetrasporangia are scattered in the surface of the thallus and likewise the cystocarps.

At last I want to point out that by means of the large material available to me it has appeared that the different forms mentioned above are linked together by means of intermediate forms (figs. 13—14), an even transition being met with forms with narrow lobes and forms with broader ones, with much divided thalli and less divided ones, with numerous proliferations and fewer ones and so on.

Having nearly brought to an end the examination of the material of this polymorphous species I received E. JALE DAWSON's interesting paper, "Studies on the Northeast Pacific Gracilariaceae" (1949) and occasioned by this I have re-examined the material with reference to DAWSON's observations.

For more details referring to the treatise itself I shall mention only here that DAWSON with starting-point in SJÖSTEDT's (1926, p. 51) thorough examinations of 3 *Gracilaria*-species arrives at the result that one of these species, namely that which SJÖSTEDT called *Gr. robusta*, but which KYLIN (1930, p. 55) later described



Fig. 12. *Gracilaria Millardetii* (Mont.) J. Ag. forma *latifolia* Borgs. Natural size.

as *Grac. Sjöstedtii*, is the representative of a new genus: *Gracilariopsis*. This new genus is especially characterized by the want of the nutritive filaments arising from the gonimoblast and

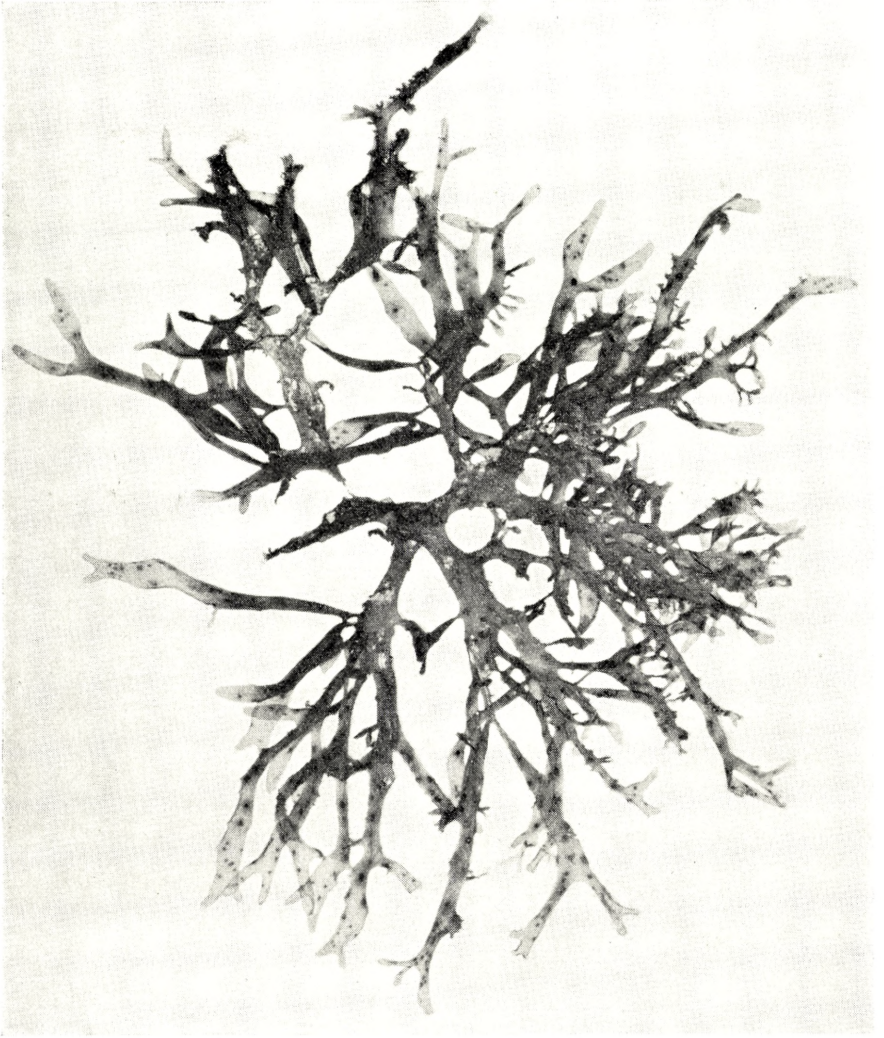


Fig. 13. *Gracilaria Millardetii* (Mont.) J. Ag. Intermediate from approaching forma *crenulata* J. Ag. and f. *linearifolia* J. Ag. Natural size.

piercing the pericarp which are found in *Gracilaria confervoides*, the type species of the genus and therefore to be expected also in other species of *Gracilaria*, and furthermore the gonimoblast in the new genus is dome-like and formed by small cells densely filled with protoplasma. Regarding the shape of the thallus all the species in the new genus are cylindrical.





Fig. 14. *Gracilaria Millardetii* (Mont.) J. Ag. Intermediate form (tetrasporic specimen) approaching *f. latifolia* Borgs. Natural size.

However, by the examination of some cystocarps of *Gracilaria Millardetii* and comparing them with those of a specimen of *Gr. confervoides* collected by ROSENVINGE at Biarritz I was unable in the Mauritian specimens to find the nutritive filaments which are so common in the upper part of the cystocarps in *Grac. confervoides*. And furthermore I also found that the cells of the gonimoblasts were smaller in *Gr. Millardetii* than those in *Gr. confervoides* and moreover it also struck me that the innermost cells in the rows of cells forming the pericarp, into which the nutritive filaments penetrate, in *Gr. confervoides* were much larger and filled with protoplasm forming a much softer parenchyma than in *G. Millardetii*. Finally in the latter species the base of the gonimoblastic parenchyma was much broader than in *Gr. confervoides*.

Because of these rather essential differences I wrote to Dr. DAWSON about the matter, at the same time sending him some material of a cystocarpic specimen of *Gr. Millardetii*.

Most kindly Dr. DAWSON answered me that he had found the nutritive filaments in the specimen, but adds:

“I was surprised somewhat at the position of the nutritive filaments. You probably missed finding them by looking for them in the upper parts of the pericarp. I find no nutritive filaments in the region of the ostiole and very few in the upper two thirds of the pericarp. However, the nutritive filaments are both abundant and large in the lower parts of the pericarp. In some sections I can count six or seven, most of them descending and invading the tissue lateral to the base of the large celled gonimoblast-parenchyma. Some of them even invade the margins of the platform of small cells beneath the gonimoblast-parenchyma. The gonimoblast-parenchyma is relatively small in the specimens, but the cells are quite large, especially in the middle. In my opinion *Gracilaria Millardetii* is a true *Gracilaria* in every respect, though the cystocarp differs from *G. confervoides* in the position of the majority of the nutritive filaments.”

So far Dr. DAWSON. After re-examination of the cystocarps of *Gracilaria Millardetii* and staining the sections with anilin blue, I have also found the nutritive filaments to be present, often in a great number, but all or nearly all emerging from the bottom of the gonimoblasts, penetrating the lowermost parts of the pericarp, or turning downwards, invading the small-celled paren-

chyma below the gonimoblastic tissue (Fig. 15). Only in a few cases I have met with nutritive filaments higher up in the pericarp and in a single case only a small one quite near the ostiole. Even if, like Dr. DAWSON, I still want to place *Gr. Millardetii* in the genus *Gracilaria* it seems to me that the deviating occurrence of the nutritive filaments in connection with the above-mentioned differences, e. g. the greater breadth of the gonimoblastic parenchyma being composed of smaller cells and the firmer consistence



Fig. 15. *Gracilaria Millardetii* (Mont.) J. Ag. Transverse section of a cystocarp. Nutritive filaments are seen emerging downwards from the basal part of the gonimoblast-parenchyma. ( $\times 75$ ).

of the pericarp are rather essential, and if future examinations should substantiate that other species of this genus rich in species should agree with this one they ought perhaps to be considered as a distinct group of the genus.

Having found the above-mentioned peculiarities in female specimens of forma *exposita* and forma *latifolia* and in intermediate forms, this strengthens my supposition that the, as to habit, rather different forms rightly are to be referred to *Gracilaria Millardetii*.

Another peculiarity which I have met with in the cystocarps I have examined of this polymorphous species was that the cell-contents not only in the cells of the pericarp, but also in most cells elsewhere in the cystocarps, were stellately contracted; in the tissues of the cystocarp of *Gr. confervoides* in the specimen I have examined this was not found.

Regarding the antheridial bodies I have formerly (1943, p. 74) met with them once in the forma *linearifolia*. And in the mate-

rial later received I have found them in a specimen of *f. exposita* (no. 469 a, Fig. 16) in which specimen the peculiarity was present that tetrasporangia as well as antheridia occurred mixed together in great number. Like those in the above specimen the antheridia were developed upon the walls of small cavities (Fig. 17).

These were scattered over the surface of the thallus solitarily



Fig. 16. *Gracilaria Millardetii* (Mont.) J. Ag. *f. exposita* Borgs. The specimen with tetrasporangia and antheridial bodies. Natural size.

or gathered in small irregular groups which protrude cupola-like above the surface. When placed solitarily the caves are broadly urn-shaped, when packed together oblong. They have above a somewhat narrowed opening and are about 70—80  $\mu$  deep.

The occurrence of sexual and asexual organs in the same plant is by no means any rare phenomenon. According to CHURCH, "Historical Review of the Florideae", II, p. 332, note 1 "in *Gracilaria confervoides* tetraspores, antheridia, carpogonial branches and cystocarps may all occur in the same individual". And FRITSCH in his important work "The Structure and Reproduction of the Algae", vol. II, 1945, p. 725, mentions a number of such instances in different *Florideae*, but in most cases some few

tetrasporangia were present only in the cases of an antheridial plant and conversely in the opposite case. In the present one both kinds of reproductive organs were abundantly present and mixed densely together, even if in places the sporangia were

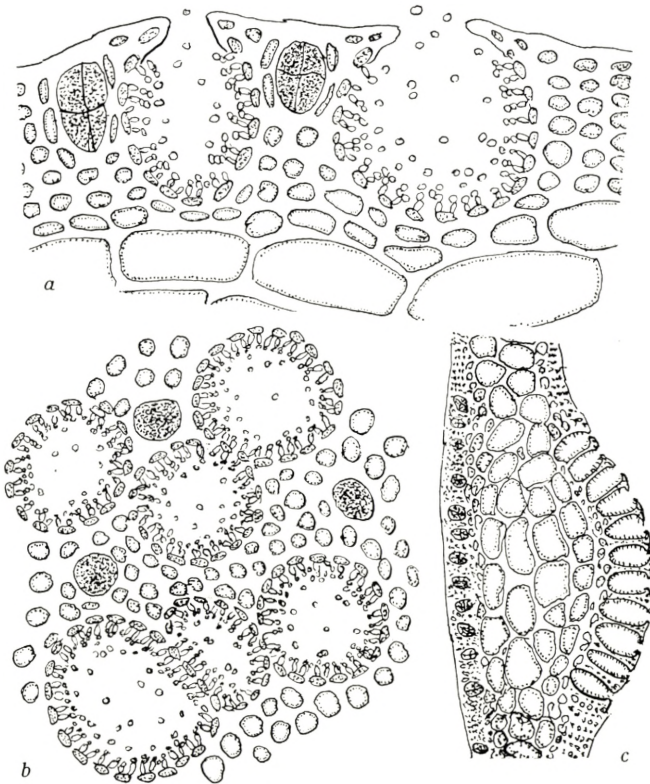


Fig. 17. *Gracilaria Millardetii* (Mont.) J. Ag. f. *exposita*. Tetrasporangia and antheridial bodies mixed together in great number. *a*, transverse section of the thallus, *b*, view from above, *c*, transverse section of thallus with tetrasporangia on the one side and antheridial bodies on the other. (*a*, *b*  $\times 300$ , *c*  $\times 60$ ).

present in greater number on one side of the thallus and the antheridia on the other (Fig. 17 a).

In continuation of the above I want to mention that I, when examining, as said above, for comparison with *Gr. Millardetii* a cystocarp of *Gr. confervoides*, in the wall of the pericarp to my great surprise found two well-developed antheridial bodies, the female organ thus on her back carrying the male one (Fig. 18).

The tetrasporangia are scattered in the surface of the thallus and each tetrasporangium is surrounded by more or less marked paraphysis-like filaments.

Fig. 19 shows a tetrasporangium with surrounding cells of forma *latifolia*, and those of f. *exposita* are very like that.

Closely related to *Gracilaria Millardetii* if not identical seems *Gracilaria purpurascens* (Harvey) J. Ag. to be, of which species AGARDH says ("Till Algernes Systematik", VII, 1884, p. 63) that

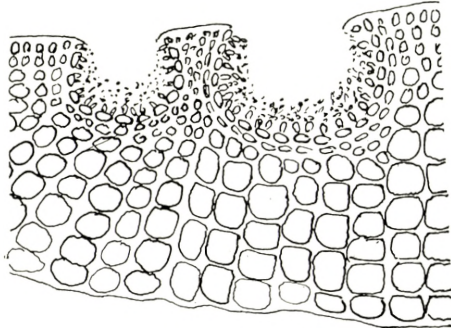


Fig. 18. *Gracilaria confervoides* (L.) Grev. Two antheridial cavities on the pericarp of a cystocarp. ( $\times 150$ ).

he has seen numerous specimens from Mauritius. HARVEY distributed this species as *Rhodymenia purpurascens* in "Alg. Ceylon Exsicc." no. 96. I have not seen any specimen of it nor any of J. AGARDH's, but according to the description it seems to come very near to the variable *Gracilaria Millardetii*. And a figure of an alga referred by YAMADA (*l. c.* p. 125, pl. XXV, 1) to *Gracilaria purpurascens* also shows a very great likeness to this species.

And yet another species described upon specimens from Mauritius, namely *Gracilaria Protea* J. Ag., "Species Alg.", III, 4, 1901, p. 58, which I have once seen in AGARDH's herbarium in Lund, seems to me to be at any rate closely related to this species. And Dr. PAPPENFUSS has most kindly sent me a fragment of a specimen he has collected in South Africa and referred to *Gr. Protea* (1948, p. 87), a specimen which seems to me to be closely related to if not identical with certain forms of *Gracilaria Millardetii* as I interpret the species.

And finally, as pointed out by DAWSON (*l. c.* p. 28), the Pacific species *Gracilaria crispata* Setch. and Gard., 1924, p. 453,

pl. 44, and especially *Gr. lacerata* Setch. and Gard. *ibd.*, p. 755, pl. 51 C, are very like the Mauritian species, but in one respect at any rate a difference is present, viz. the antheridia in *Gracilaria crispata* "are borne in small shallow, well-defined depressions" and not in cavities.

As said above, the information regarding the external conditions in which the different forms were growing is rather scanty, but some is found.



Fig. 19. *Gracilaria Millardetii* (Mont.) J. Ag. A tetrasporangium. ( $\times 500$ ).

As to *exposita*, which I presume to be a form occurring in exposed localities, it is said about no. 830 that it is "growing on rocks and corals", about nos. 476 and 787: "growing on old pieces of cement", and about nos. 769 and 853: "washed up by waves". Considered together I think these observations may be indicative of a locality exposed to the surf.

Regarding specimens of forma *latifolia* it is said about no. 785: "Growing on coral in one foot of water at low tide" and about no. 774: "washed up by waves": This I think is to be interpreted in the way that this form grows in rock pools in localities exposed to the surf in the upper sublittoral zone in contradiction to forma *exposita*, which I presume is found in exposed localities in the littoral zone, being a surf-form.

About no. 663, being referable to forma *linearifolia*, it is said only: "in lagoon", and about no. 853, a somewhat larger form with a somewhat firmer and darker red thallus, it is said: "on rocks and old pieces of coral". This form and forma *crenulata* with their narrow thalli are surely forms from protected places in lagoons, where they very probably are found also lying loose in more or less stagnant water.

Mauritius: Forma *exposita*. Îlot Barkly, 19.3.45, G. MORIN, no. 530. Cassis, 28.1.48, G. MORIN, no. 769. Îlot Barkly, 25.3.48. G. MORIN, no. 776. Îlot Brocus, 20.3.48. G. MORIN, no. 787. Îlot Barkly, 24.3.48, R. E. V., nos. 830, 831. Îlot Barkly, 10.5.48. G. MORIN, no. 851. Cassis, 28.1.48. G. MORIN, no. 853.

Forma *latifolia*. Cassis, 5.5.40. G. MORIN, no. 417. Cassis, 7.1.47. G. MORIN, no. 636. Cassis, 1.1.48. G. MORIN, no. 774. Îlot Barkly, 25.3.48. G. MORIN, no. 785. Îlot Barkly, 10.5.48. G. MORIN, no. 860.

Forma *crenulata*. Pointe aux Sables, 30.3.47. G. MORIN, no. 666. Without locality and date, C. NEYROLES, no. 443.

Forma *linearifolia*. Pointe aux Sables, 4.4.47. G. MORIN, no. 663. Îlot Barkly, 10.5.48. G. MORIN, no. 853. Without locality and date. C. NEYROLES, no. 444.

## 2. *Gracilaria arcuata* Zan.

Alg. Mauritius, III, 2, 1943, p. 69.

Var. *typica*.

In later received collections several specimens referable to this species are found, two of which belong to var. *typica*. One of the specimens (no. 426) is a large specimen, the other (no. 478) smaller; the latter is cystocarpic and quite agrees with FELDMANN's figure of a specimen from Tunis, (*Algues marines de Tunisie*, 1931, p. 14, fig. 4); compare also my figure of a specimen from Karachi in the *Kew Bulletin*, 1934, p. 9, pl. III.

Var. *Snackeyi* Web. v. Bosse.

The Mauritian specimens referable to this variety are in good accordance with Mme WEBER's figure; the specimens have terete, fleshy, very irregularly divided branches, being more or less arcuately bent and tapering abruptly towards the apices.

The plant has a purple colour, often turning into greenish, and occurs in pools.

Mauritius: var. *typica*: Cassis, 20.7.40, G. MORIN, no. 426. Without locality: Father C. NEYROLES, no. 478. var. *Snackeyi*: Port Louis, 1.10.40, G. MORIN, no. 424. Pointe aux Cannoniers, 16.1.1946, R. E. V. nos. 539 and 544.



## Genus incertae sedis.

### *Wurdemannia* Harv.

#### 1. *Wurdemannia miniata* (Drap.) Feldm. & Hamel.

FELDMANN & HAMEL, Observations sur quelques *Géliidiacées*, 1934, p. 17, and *Floridées* de France, *Géliidiales*, 1936, p. 260, where literature is mentioned. — *Wurdemannia setacea* Harv., *Nereis Bor.-Amer.*, part 2, 1853, p. 245.

After examination of a specimen of *Fucus miniatus* Drapernaud (*Gigartina miniata* Lamouroux) found in Museum National d'histoire Naturelle, Paris, FELDMANN & HAMEL have found that this plant is the same as *Wurdemannia setacea* from the West Indies, where it seems to be much distributed, I myself having found it in the former Danish Islands. Later I have also found it in the Canary Islands. And according to FELDMANN & HAMEL it is much distributed in the Mediterranean Sea. It is therefore of interest that it also occurs at the shores of Mauritius.

The specimens quite agree with my figures of the West Indian specimens as described and figured in "Mar. Alg. D. W. I.", vol. II, p. 368, figs. 360—1. The plant forms low carpets or tufts composed of the much intricated filaments firmly connected by the numerous short hapteres formed everywhere where the filaments come near each other. The filaments have a breadth about 200—300  $\mu$ . The specimens were sterile. KÜTZING in "Tab. Phyc.", XIX, pl. 21 gives a figure of the zonately divided sporangia found in specimens from Kew West, Florida, but elsewhere it is always found only as sterile. Because of the absence of cystocarps its systematic position is uncertain.

Mauritius: Near Gris-Gris, Souillac, June 6, 1947, R. E. V. no. 692.

Geogr. Distr.: West Indies, Canary Islands, Mediterranean Sea.

## Rhodymeniales.

### Fam. 1. *Rhodymeniaceae*.

#### *Coelothrix* Børgs.

##### *Coelothrix indica* Børgs.

Alg. Mauritius, III, 3, 1944, p. 14, fig. 9—11.

When in 1944 I described this species I had only a single dried, sterile specimen to rely on and the differences I found when comparing the Mauritian plant with *Coelothrix irregularis* (Harv.) Børgs. were upon the whole small, but to these came at any rate also the geographical distribution.

I was therefore gladly surprised, when, in recently received material from Mauritius, I found some very good and even fertile (tetrasporic) specimens (no. 667 A). By means of this material I have not only been able to correct my former description, but have also found characters which strengthen the proposing of the Mauritian species.

In the description of the new species I pointed out that I had not been able to find any of the rhizoidal discs by means of which the filaments in the West Indian plant are fixed together. A search in the new material has shown that they are present, although less numerous than in the West Indian plant.

I shall not dwell on the remaining differences pointed out in the description, but mention only that the Mauritian plant seems to be somewhat slenderer than the West Indian one. But are these differences in the vegetative thallus small, then those as to size and shape of the stichidia in the West Indian and Mauritian plants are so much more essential.

COLLINS in his paper "The Algae of Jamaica", 1901, p. 225, describes the stichidia in this way: "the modified portions of the branches being ovate or subspherical rather than lanceolate". And according to TAYLOR's description and figures (The Marine Algae of Florida, 1928, p. 160, pl. 22, fig. 19 and pl. 23, fig. 18) "the tetrasporangia are carried in short swollen, ovoid pedicellate branches".

In the specimens from Mauritius the stichidia (Fig. 20) are elongated, clavate, tapering upwards to an obtuse, occasionally

almost subacute apex (fig. 21 a). The stichidium pictured in fig. 21 a has a length of 2.1 mm and a breadth of  $580 \mu$ , where it is thickest, and those seen in fig. 20 are about  $1950 \mu$  long and about  $600 \mu$  broad; the pedicels carrying these stichidia were



Fig. 20. *Coelothrix indica* Borgs. Fragments of the thallus. ( $\times$  about 4).

about  $750 \mu$  long, but that carrying the stichidium shown in fig. 21 a was 3 times this length.

A great difference regarding the length of the pedicel and the shape of the stichidia of the West Indian plant as compared with that from Mauritius is thus present, separating the latter clearly from the former.

Regarding the division of the tetrasporangia, this is carried out in different ways, some being tetrahedrally divided, but most of them cruciately or more irregularly, rather many like that shown in fig. 21 b.

In continuation of what was said in my former paper (1944, p. 17) about the question of the systematic position of this genus, I want to state that it seems to me that it can remain in the group *Rhodymenieae* of the fam. *Rhodymeniaceae* until

further observations also regarding the cystocarps (cfr. COLLINS, 1901, p. 55) are brought forward; we know only what has been stated by COLLINS.

At last follows a new altered and augmented diagnosis of the species:

Thallus plus minus dense caespitosus, suberectus, ca. 5—6 cm

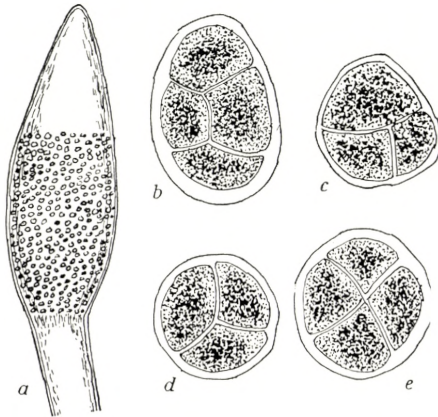


Fig. 21. *Coelothrix indica* Børgs. a, a stichidium; b—e, tetrasporangia (a  $\times$  20, b—e  $\times$  250).

altus, irregulariter ramosus, exfilamentis 240—500  $\mu$  latis, rhizoideis sparsis connectis, compositus.

Stichidia pedicellis plus minus elongatis instructa, elongata-subpyriformia, ad apicem obtusa aut subacuta, ca. 2 mm longa et 500—600  $\mu$  lata.

Tetrasporangia cruciatim, triangule aut magis irregulariter divisa.

Mauritius: Pointe aux Sables, in lagoon, April 4, 1947, G. MORIN nos. 667 and 667 A. A specimen no. 471 was collected by C. NEYROLES, but is without locality and dates.

Geogr. Distr.: Mauritius.

## Botryocladia (J. Ag.) Kylin.

### 1. *Botryocladia Skottsbergii* (Børgs.) Levr.

LEVRING, T., Die Meeresalgen der Juan Fernandez-Inseln, 1941, 645.  
 FELDMANN, G., Revision du genre *Botryocladia* Kylin, 1945, p. 55. —  
*Chrysymenia Skottsbergii* Børgs., Alg. Easter Island 1920, p. 317, figs.

44—50. *Chrysymenia Kuckuckii* Weber, Alg. Siboga, 1928, p. 466, fig. 799. *Botryocladia Kuckuckii* (Weber) Yamada et Tanaka, Mar. Alg. Yonakuni, 1938, p. 77, figs. 8—9. BØRGESSEN, Alg. Mauritius, 1944, p. 23, figs. 16—48.

In my paper (1944) named above I, not without much hesitation, referred some few small specimens of a *Botryocladia* to *B. Kuckuckii* (Weber) Yamada et Tanaka, but at the same time printing out that it seemed to me very questionable whether the

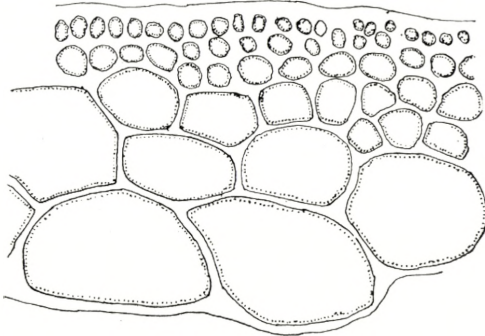


Fig. 22. *Botryocladia Skottsbergii* (Børgs.) Levring. Transverse section of a vesicle. ( $\times 350$ ).

species of WEBER was to be kept separate from *B. Skottsbergii* Børgs. from Easter Island described in 1920. When describing her species Mme WEBER did not take my species into consideration. In reality it is only some minor differences, in the more or less thick wall of the inflated branchlets and the size of specimens, upon which the separation of the species depends; the differences are in reality unessential and surely due to the external conditions under which the specimens have lived.

My paper was published during the war and the same is the case with that of Mme FELDMANN quoted above. In this the author points out that the differences between the two forms are insignificant and hence refers WEBER's plant to *B. Skottsbergii*. Had Mme FELDMANN not done so I had at any rate done so now as in recently received material from Mauritius I have been able to examine some few specimens, rather small of size, showing the variability of this plant.

The height of these specimens was only  $1-1\frac{1}{2}$  cm and the inflated branchlets 3—4 mm long and up to 3 mm broad. A

transverse section of the latter shows that their wall is firmly built, about  $150\ \mu$  thick, and composed of several layers of cells; the innermost ones facing the cavity are large, the following ones decreasing gradually in size to the quite small densely placed peripheral ones (Fig. 22).

About the character of the locality in which the latest received specimens are found it is said: "On rocks exposed to waves", and if this has been a coast open to the violent surf of the Indian Ocean, it is no wonder that the specimens have been small with a firm structure; compare also JADIN's description (1934, p. 166) of the locality of *Chrysyminia obovata*, as said in my former paper (1944, p. 26) to be the present species.

Mauritius: Ilôt Brocus, May 9, 1948, R. E. V. no. 842.

Geogr. Distr.: Easter Island, Malayan Archipelago, Japan, Mascarene Island.

## Fam. 2. *Champiaceae*.

### *Champia* Desv.

#### 1. *Champia parvula* (Ag.) Harv.

Alg. Mauritius, III, 3, 1944, p. 30.

Having formerly seen only some few small specimens I have in a recently received collection found some well developed large specimens of this species.

They were growing "in calm water in a lagoon".

Mauritius: Ilôt Barkly, 19.9.48, R. E. VAUGHAN, no. 888.

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