

FISHERIES RESEARCH STATION
DEPARTMENT OF FISHERIES, CEYLON

BULLETIN No. 15

SOME MARINE ALGAE
FROM CEYLON—I

by

M. DURAIRATNAM

(Research Officer, Department of Fisheries)

1962

PUBLISHED BY THE FISHERIES RESEARCH STATION, CEYLON

PRINTED AT THE GOVERNMENT PRESS, CEYLON, ON PAPER MANUFACTURED AT THE
EASTERN PAPER MILLS CORPORATION, VALAICHENAI, CEYLON.

FISHERIES RESEARCH STATION
DEPARTMENT OF FISHERIES, CEYLON

Bulletin No. 15

SOME MARINE ALGAE
FROM CEYLON—I

by

M. DURAIRATNAM
(Research Officer, Department of Fisheries)

1962

SOME MARINE ALGAE FROM CEYLON—I

by

M. DURAIRATNAM

(Research Officer, Department of Fisheries)

Since my last publication "Contribution to the Study of the Marine Algae of Ceylon" (1961), I have made several collections which contain interesting material which I have not hitherto described. This and any other material which I come across in future surveys will be described

in a series of papers of which this is the first. The present paper includes the description of fourteen species of which three are new to science. These are deposited in the Herbarium of the Royal Botanical Gardens, Peradeniya, Ceylon.

DIVISION 1. Chlorophyta Pascher

Class 1.—Chlorophyceae Kuetzing

ORDER 1. CLADOPHORALES

FAMILY 1. CLADOPHORACEAE

Cladophora Kuetzing

Cladophora ceylanica n. sp.

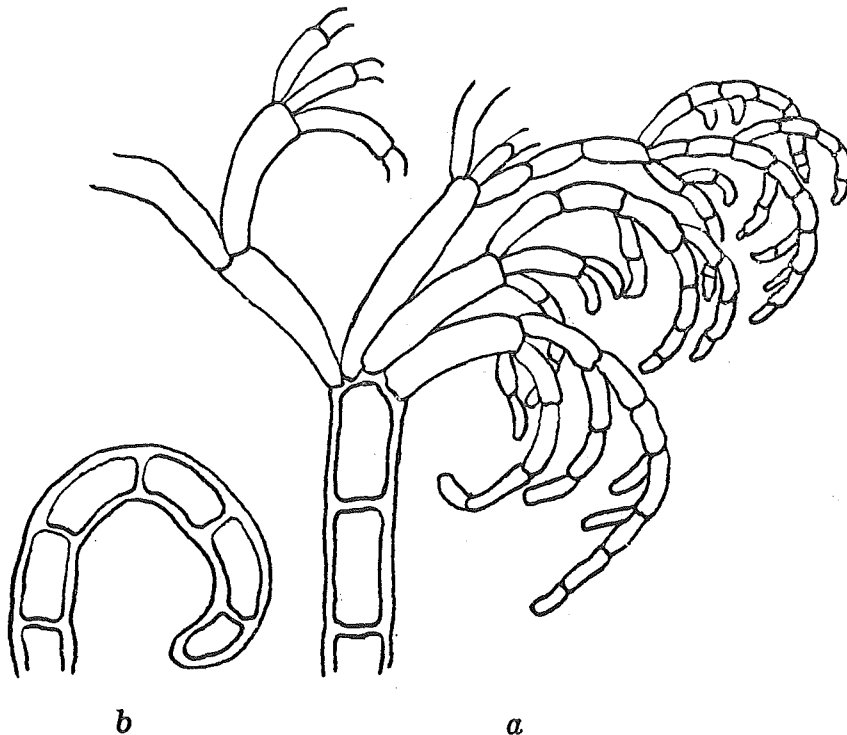


Figure 1. (a) *Cladophora incurvata* n. sp.—Part of principal filament with branchlets ($\times 20$).
(b) upper end of ramulus ($\times 60$).

Cladophora, pulvinato—caespitosa, 3–5 cms. alta, olvaceo—virides in sicco. Filamenta principalia ex cellulis ad 1 mm. longis. Crassa fil. primar. 150–200 μ ; crass. ram. 40–60 μ ; crass. ramul. ultim. 20–30 μ . Ramulis gracillime incurvatis. Cellulis ramulorum ultimorum diametro 2–4 plo longioribus.

Planta typica in loco dicto Kankesanthurai, Jaffna.

Plant forms dense masses 3–5 cms. broad which are olive green in colour. The main filaments are divided at shorter or longer intervals giving off one or more tufts from a single joint. The cells of the main filament up to 1 mm. in length

and 200–250 μ broad. The main branchlet are 40–60 μ broad. Ultimate branchlets 20–30 μ broad. Long rows of ramuli are given off from the upper part of the main filament of each tuft, which in turn give off rows of primary and secondary ramuli. The characteristic feature of the plant is that all long, as well as short rows of ramuli are deeply curved inwards towards the main filament of the tuft. Cells of the ramuli 2–4 times the diameter.

The plants were found as clumps cast ashore at Kankesanthurai.

Jaffna : Kankesanthurai, Durairatnam 1962, No. 1 (type).

ORDER 2. SIPHONOCLEDALES

FAMILY 1. BOODLEACEAE

Boodlea Murr. et De Toni

Boodlea composita (Harvey) Brand

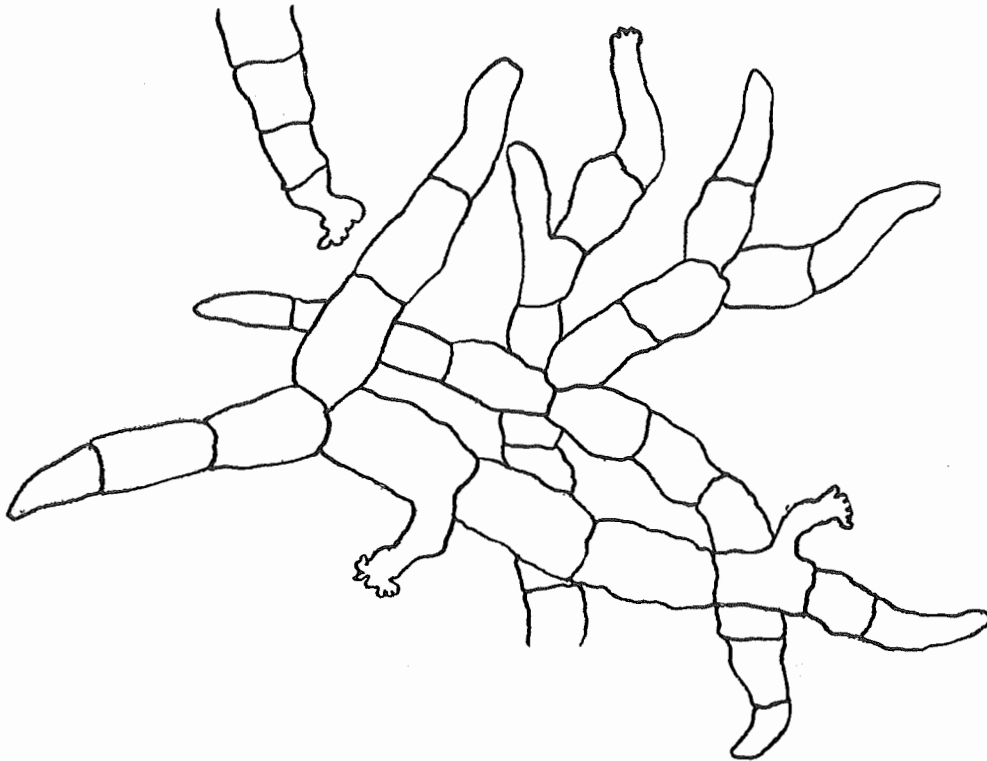


Figure 2. *Boodlea composita* (Harvey) Brand—Part of thallus with tentacula in summit of branches ($\times 50$).

Brand, F., Ueber die Anheftung der Cladophoraceen p. 187 ; Reinbold in Weber Van Bosse, Algues Siboga, p. 70 ; Boergesen, Some marine algae from Mauritius, 1, Chlorophyceae, 1940, Danske Videnskabernes Selskab. p. 21, Fig. 6 ; ibid. 1946, p. 15, Fig. 5 ; *Boodlea Siamensis* Reinbold, The marine Algae of Danish West Indies, Part 1., Chlorophyceae, 1913, Dansk Botanisk Arkiv. Bd. 1, No. 4, p. 49 ; Some Indian Green and Brown algae, especially from the shores of the Bombay Presidency, Journ. Ind. Bot. Society, Vol. IX., Nos. 2 and 3, 1930, p. 153, Fig. 2 ; Reinbold Th., in Schmidt, Flora of Koh Chang, Part V, Bot. Tidsskr., Vol. 24, 1901, p. 107.

This plant was found growing in the rocky littoral zone, near the light house at Kankesanthurai. The plant is densely woven and is conspicuously light green in colour. The filaments are generally irregularly ramified ; In some places the branches are regularly opposite,

and in other places secundly arranged. They form small, low cushions up to about 20-25 cms. broad. Small rhizoids are present on the summit of some branchlets and are not separated from the mother cell by a transverse wall. Occasionally they are found laterally on the filament. Brand (1904) too found tentacula to be rather fairly common in some parts of his plant. The main filaments vary from 300-380 μ while the peripheral branchlets vary from 70-200 μ . Of the two forms *f. contracta* and *f. elongata* mentioned by Brand (1904, p. 190). I think this plant should be referred to *f. elongata*. The plant has a resemblance to figure 2 by Boergesen (1930, p. 154) of specimens collected by him from Dwarka, India.

Distribution in Ceylon : Kankesanthurai.

Geographic distribution : Koh—Chang, Gulf of Siam, Dar es Salam, Malayan Archipelago, Danish West Indies, Mauritius.

DIVISION 2. Phaeophyta Pascher

Class 1.—Phæophyceæ Hauck

ORDER 1. ECTOCARPALES SETCHELL AND GARDNER

FAMILY 1. ECTOCARPACEAE HARVEY

1. *Ectocarpus* Lyngbye

Ectocarpus indicus Sonder

Sonder, in Zollinger, Verz. der im Ind. Arch. ges. Pflanzen, 1854, p. 3 ; Weber, a, Algues Siboga, 1913, p. 129, fig. 34 ; Boergesen, 1941, Some Marine Algae from Mauritius, pp. 16-22, fig. 6 ; Abbott, Brackish Water Algae from the Hawaiian Islands, Pacific Science, Vol. 1, No. 4, 1947, p. 200, fig. 3. *Ectocarpus Duchassaingianus*, Grunow, Alg. Novara, 1870, p. 45, tab. IV, fig. 1a, b, c ; Boergesen, Marine Algae of Danish West Indies, Vol. 1, 1914, p. 159, figs. 127-8 ; Setchell, W. A. American Samoa, 1924, p. 170, fig. 35.

The plant occurs in tufts 1-3 cms. high growing on stones and sometimes epiphytic on *Chnoospora* in sheltered rock pools at Galle Buck, Colombo. Those epiphytic on *Chnoospora* reach a height of only 1 cm. From the lower part of the thallus rhizoid-like filaments are given off, which are irregularly bent and ramified. They are thick-walled and yellowish green in colour. The main filaments are also irregularly ramified but in some places they are not ramified. The cells of the filament are

mostly 1-2 times, occasionally 3 times their own breadth. The cells contain roundish or irregularly disc-shaped chromatophores.

Unilocular sporangia are sessile, obovate or oval, attaining a length of 100-120 μ and a breadth of 70-80 μ . Plurilocular sporangia are cylindrical or clavate. The length varies from 120-250 μ and the diameter from 25-40 μ .

My specimens resemble the figures given by Boergesen (1941, p. 18, fig. 6) and *Ectocarpus Duchassaingianus* Grun. (1914, p. 159, figs. 127-8.)

Distribution in Ceylon: Galle Buck, Colombo.

Geographic distribution: West Indies, Red Sea, Malay Archipelago, American Samoa, Mauritius, Hawaiian Islands.

ORDER 2. DICTYOSIPHONALES SETCHELL AND GARDNER

FAMILY 1. SCYTOSIPHONACEAE FOSILE

Colpomenia Derbes and Solier

Colpomenia nainativensis n. sp.



Plate 1. *Colpomenia nainativensis* n. sp.
Plant showing the branching of the species.
Photographed from a pressed specimen ($\times 1$).

Colpomenia nainativensis n. sp. Planta ad 5-6 cm. altitudine, mollissima, paulum compressa, sparse irregulariterque divisa in ramos 3-5 mm. diameter 5-12 mm. long, partibus terminalibus rotundato—truncatis, segmentis ultimis similis spinis.

Planta typica in loco dicto I Nainativu, Jaffna.

Plants 5-6 cms. tall, 4-7 cms. broad, attached to rocks by multiple attachments. Plant is an irregularly lobed hollow sac. It bears irregularly divided short branches with rounded truncate ends bearing spine-like projections. Branches 3-5 cms. in diameter, cylindrical or slightly compressed. The wall consists of 4 layers and about 275-325 μ thick. The cortex consists of a single row of rounded angular

cells 6.5-9.5 μ in diameter in surface view. They are longitudinally arranged and contain chromatophores. The medullary layer consists of 3 layers of colourless cells. The outermost layer is smaller than the two innermost layers of cells and sub-quadrangular in shape. The cells of the innermost layer are much larger in size and they may be either elongated perpendicular to the cortical layer or parallel to it.

The specimen was found growing on rocks in the littoral region at Nainativu, an island off Jaffna.

Jaffna: Nainativu, Durairatnam, 1962, No. 2 (type).

DIVISION 3. Rhodophyta Pascher

Class 1.—Rhodophyceæ Ruprecht

ORDER 1. NEMALIONALES SCHMITZ

FAMILY 1. HELMINTHOCLADIACEAE (HARVEY) SCHMITZ

Liagora Lamouroux

Liagora valida Harvey

Harvey, W. H., Nereis Bor. Amer, Part II, 1853, p. 138, tab. 311, A; J. Agardh, Epicrasis, p. 517; Kuetzing, F., Tab. Phycol. Vol. VIII, pl. 92 1; Boergesen, F., Marine Alg. Dan. West Ind. Vol. II, 1915, p. 70, Figs. 71-75, Some Marine Algae from Mauritius, 1949, p. 26; 1953, p. 20; Howe, M. A., Algae in Britton and Millspaugh. The Bahama Flora, New York, 1920, p. 555.

The plant is light-pink in colour and reaches a height of 5-6 cms. The thallus is terete, densely ramified and fairly dichotomously branched. It is completely covered by a continuous calcareous coating thus giving it an even surface. When dry they are white in colour. The thicker filaments are 1 to 1.5 mm.

while the thinner ones at the apex are about 0.5 mm. The thallus is annulated towards the summit. Cystocarps appear as dark red dots and project above the calcareous layer. The assimilating filaments are forked repeatedly 4-5 times. The uppermost cells are oval or pear-shaped and about 9-12 μ thick. Antheridial bodies occur terminally upon the assimilating filaments. The cells of the lower part of the filaments are long, thick and sub-cylindrical. The cells of the central filament are sub-cylindrical, thick-walled and taper towards their ends and their length varies from 15-20 times their diameter. Thin filaments which originate from the lowermost cells in the assimilating filaments are found between the thicker filaments.

The carpogonial branch is given off from one of the cells in the middle of the assimilating filament. It consists of 3-5 cells. The terminal cell is the carpogonial cell with the trichogyne. The cystocarps are spherical and reach a diameter about 400-450 μ in diameter. Carpospores are found at the end of sporogenous filaments.

Distribution in Ceylon : Pearl Banks, Silavathurai.

Geographic distribution : West Indies, Madagascar. Hawaii, Mauritius.

Galaxaura Lamouroux

Galaxaura marginata (Solander) Lamx.

Lamouroux, J. V., Hist. Polypiers corall flexible ; 1816, p. 264 ; Boergesen, Mar. Alg. Dan. West Indies, Rhodophyceae, 1916, pp. 106-109, figs. 116-117.

The plant was collected from one of the sheltered rock pools near Galle during the North-East Monsoon. The main branches are terete and slightly red in colour. The filaments above are richly ramified, slightly flattened and with a dull appearance. Transverse striations were absent in these specimens. In a transverse section the parenchymatous tissue consists of 2-4 layers of cells, which are colourless and loosely connected. The assimilating filaments are given off from the outer smaller peripheral cells. Each assimilating filament consists of smaller supporting clavate cells with broad summits and large assimilating cells. The assimilating cells are oblong oval about 55-60 μ long and 25-30 μ broad. I have not seen any apiculus in these specimens. Well developed

parietal chloroplasts are found in the summits of the assimilating cells with thin long prolongations downwards. Chromatophores are also found in the supporting cells.

The medullary tissue consists of irregular sub-dichotomously branched filaments running between each other in the mucilage. The diameter of the walls varies from 10-16 μ .

The plant has a resemblance to *Galaxaura apiculata* Kjellm, from Japan, but they differ in not having apiculate terminal cells normally.

Distribution in Ceylon : Galle.

Geographic distribution : West Indies, Atlantic Coast of South America.

Galaxaura occidentalis Boergesen

Boergesen, The Marine Algae of the Danish West Indies, Vol. II. Rhodophyceae, 1916, p. 109, Figs. 118-123.

This plant was cast ashore, near Kuchaveli on the East Coast of Ceylon. An examination of the plant showed that it belonged to one of Kjellman's groups, namely section *Verpreculae* Kjellman, since the fronds were complanate or sub-complanate, stipitate, stipe terete. Thallus regularly dichotomous. The assimilating tissue consisting of a compact parenchymatous layer bearing one-celled free assimilating papillae, very rarely 2-3 celled, and free assimilating papillae are present.

The plant is olive brown or light yellow in colour. The upper part of the plant is rather smooth and shiny. It is attached to the substratum by means of rhizoids. The erect

shoots are dichotomously branched and have a canaliculate appearance with prominent edges. The thallus is about 2 cms. broad. The internodes of the branches are jointed. A transverse section of the thallus shows rounded 5-7 sided epidermal cells. They are 14-16 μ high and the diameter varies from 18-30 μ . They have well developed chromatophores. This is followed by larger lobed cells about 30-35 μ high. The layer next to this consists of larger cells about 40-50 μ high. These cells do not have chromatophores. Numerous, irregular, dichotomously branched cylindrical filaments are found in the mucilage. The thickness of the filaments vary from 6-10 μ . One-celled papillae characteristic of the group *vepreculae* protrude freely from the surface of the thallus. They are clavate, cylindrical in shape and with a short apiculus at the tip. They are about 35-40 μ long and possess well developed cup-shaped or parietal chloroplasts. Antheridial conceptacles are spherical and open through the wall of the thallus. Their walls consist of branched filaments growing closely together, antheridia producing filaments arising from the cavity. The antheridia are oval.

The plant has a very close resemblance to *Galaxaura veprecula* Kjellman described by Tanaka (1936, p. 169, figs. 36-37 and Plate 43) but the apex of the papillae here is rounded and the colour of thallus is greyish green or light reddish brown. It also resembles *Galaxaura hystrix* Kjellm. However in *G. hystrix* papillose processes are found in each epidermal cell.

Distribution in Ceylon : Kucheveli near Trincomalee.

Geographic distribution : Danish West Indies.

Galaxaura obtusata (Solander) Lamouroux.

Lamouroux in Hist. Polyp. flex. 1816, p. 262 ; Kuetzing, Spec. alg. 1849, p. 529 ; Ibid ; Tab. Phyc., Vol. 8, 1858 t. 35 ; J. Agardh, Epicr., 1876, p. 525 ; De Toni, Syll. Alg., Vol. 4, 1897, p. 110 ; Boergesen, Marine alg. from the Canary Isl. Vol. 3, 1927, p. 78 ; Yamada, Notes on some Japan. alg. IV, Journ. Fac. Sci. Hokk. Imp. Univ. Ser. V., Vol. 2, 1932, p. 274, pl. 7 ; Tanaka, The genus *Galaxaura* from Japan, Sci., Papers of Instit. of Alg. Res., Hokkaido Univ. Vol. 1, No. 2, pp. 171-173, figs. 40 and 41.

A part of this plant was obtained while surveying the Pearl Banks from a depth of 8 fathoms in March, 1961. The frond was about 10 cms., pink or light red in colour and 5 to 6 times regularly dichotomously branched and distinctly articulated. The stipe is terete with numerous rhizodal filaments. The segments are 3-5 times as long as the width. Obovoid segments are 2-3 mm. wide. In transverse section the cortex consists of one layer of lens like parenchymatous cells, containing pigments and two assimilating layers. The inner layer consists of large quadrate or rounded cells. Medullary filaments run loosely in the central cavity.

Distribution in Ceylon : Pearl Banks in the Gulf of Mannar.

Geographic distribution : Malayan Archipelago, West Indies, Florida, Pacific Ocean, Polynesia, Australia, Japan.

FAMILY 2. CHAETANGIACEAE SCHMITZ

Scinaia Bivonia

Scinaia carnosu Harvey

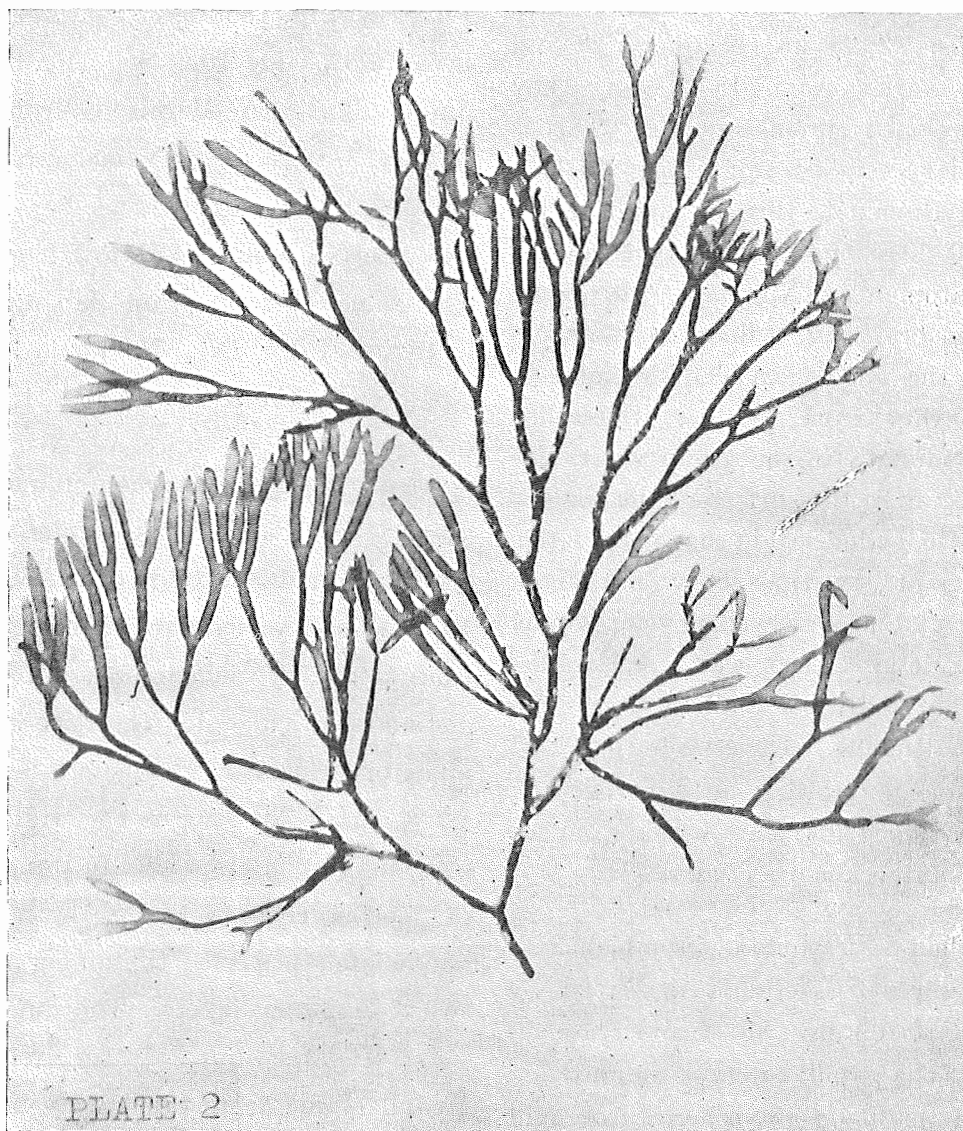


Plate 2. *Scinaia carnosu* Harvey—Part of plant ($\times 1$).

Harvey, Algae of Ceylon Exs. No. 38 : J. Agardh, Spec. Alg ; Vol. 3, 1, p. 513, 1876, Setchell. The *Scinaia* assemblage, Univ. of California publications in Botany, 1914, p. 107, pl, 11, figs. 25-27 ; Boergesen. Two species of *Scinaia* from South India, Botaniska Notiser 1938, p. 188 ; *Ginnania carnosu* Keutz. in Tab. Phycol ; Vol. XVI, p. 30, tab. 38.

Plants are pinkish red in colour, about 15 cms. high, 8-10 times dichotomous, 1.5-2.5 mm. in diameter in pressed specimen, the diameter at the apex of the plants being slightly broader than that of the basal parts. The plants are cylindrical and constricted at irregular intervals as mentioned by Setchell (1914) but as described by Boergesen (1938) constrictions are due to

accident, and where constrictions are found the filaments seem to have broken off, and new shoots with thin bases have been developed from the scars. Axial strand consists of intertwined slender filaments.

In transverse section the epidermis consists of closely packed flat-topped palisade-like utricles with thick cuticula. They are colourless, 21μ in height and 7μ in breadth. The hypodermis consists of 2-3 layers of globular cells, compactly

arranged. Corticating layer thick and compact. The present specimens are sterile and no reproductive organs were seen.

My specimen agrees with Harvey's exs. No. 38 kept at the herbarium of the Royal Botanical Gardens, Peradeniya, Ceylon.

Distribution in Ceylon : Galle.

Geographic distribution : Cape Comorin, India.

ORDER 2. GIGARTINALES SCHMITZ (EMEND) KYLIN

FAMILY 1. GRACILARIACEAE

Gracilaria Greville

Gracilaria opuntia (Svedelius) comb. nova

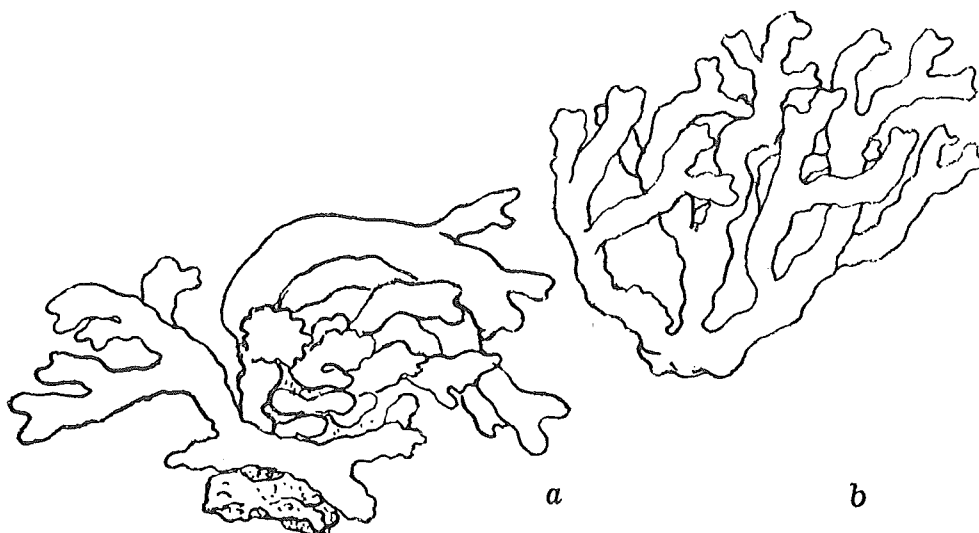


Figure 3. *Gracilaria opuntia* (Svedelius) comb. nova—Habit of plant ($\times 1$).

Svedelius, 1906, *Über Die Algenvegetation Eines Ceylon Korallenriffes mit besonderer Periodizität*, Botaniska Studier tillagnade p. 192, Figs. 4 and 5.

The plant is red in colour, and forms associations on rocks in the littoral zone between the tides. The colour of the plant is constant pink and does not vary from olive green to pinkish red as in the case of *Gracilaria crassa*. The thallus is terete or slightly compressed, regularly

dichotomous, without any constriction and the terminal branchlets are not pyriform. They are succulent with arch-shaped decumbent branches approaching the substratum, and are strongly attached to the rocks by means of haptera. They form extensive beds on the rocks. They are devoid of any constrictions on the thallus. Cystocarps hemispherical or conical with prominent orifice. I have compared this with *Gracilaria crassa* (Alg. Cey. No. 29) kept at the

herbarium of the Royal Botanical Gardens, Peradeniya, and I find that it partly resembles it, but there is no resemblance whatsoever to Harvey's specimen of *Corallopsis cacalia* Harvey, (Alg. Ceyl. No. 30). The plant partly resembles figure 8a of Boergesen's *Gracilaria crassa* (Harvey) J. Ag. in Marine Algae of Ceylon. Since this plant does not resemble in full Harvey's (Alg. Ceyl. No. 29 and Alg. Ceyl. No. 30) I am inclined to believe that the specimen described as *Corallopsis opuntia* by Svedelius (1906), and my specimen of *G. opuntia* are distinct from them. In transverse section the medullary cells of *Gracilaria crassa* are $1\frac{1}{2}$ to 2 times that of *Gracilaria opuntia* and there is sudden transition from the large cells in the centre of the medulla to the cortical cells in the periphery, whereas in *Gracilaria opuntia* the transition from the centre to the periphery is gradual and not well marked. *Corallopsis opuntia* is reduced to *Gracilaria opuntia* since the nutritive filaments of the cystocarp extend to the pericarp.

Distribution in Ceylon : Hikkaduwa to Galle.

Gracilaria crassa (Harvey) J. Ag.

Harvey, Alg. Ceyl. exsic. No. 29 Alg. Ceyl., exsic. No. 30 J. Agardh, 1876, *Epicrisis*, p. 417; De Toni, Syll. Alg. IV., 1900, p. 439, Weber Van Bosse, Liste des alg. due Siboga IV, 1928, p. 421; Yamada, Notes on some Jap. Alg. V, 1933, p. 281, pl. 13; Boergesen, 1936, Marine Algae of Ceylon, Ceylon Journal of Science, section A, p. 86, figs. a, b, c; Some marine algae from Mauritius IV, 1952, p. 33; Dawson, Marine plants vicinity Inst. Oceanogr. Nha Trang, Viet Nam, 1954, p. 438, Durairatnam, 1961, Contribution to the study of the Marine Algae of Ceylon, Bulletin No. 10, Dept. of Fisheries, p. 59, Plate XIV, Fig. 6; *Corallopsis opuntia* J. Agardh, *Epicr.* 1866, p. 409; De Toni, Syll. Alg. IV, 1900, p. 459, Boergesen, Some marine algae from Mauritius. III (2), 1943, p. 67; *Ibid.* Additions II, 1950, p. 24.

Specimens were found in exposed as well as in sheltered areas, growing on corals and rocks. The colour is usually dark green or olive green gradually becoming purplish. The branching unlike *Gracilaria opuntia* is very irregular and dichotomously or trichotomously branched. The thallus is irregularly constricted with subpyriform or club-shaped or oblong articulations, 2-5 times as long as broad. Having gone through the descriptions of this interesting species by various algologists I find that there appears to be much confusion between *Corallopsis opuntia* J. Ag.—(*Corallopsis cacalia* Harvey, Ceylon Exsic., No. 30) and *Gracilaria crassa* (Harvey) J. Ag. Since Boergesen 1936, suggested that these two may be forms of the same species, and since these specimens originally collected by Harvey were from Ceylon I decided to examine this species. It was found abundantly along the coast extending from Hikkaduwa to Galle during the North-East Monsoon from November to March. They were collected at monthly intervals from the exposed littoral zone in exposed places where the waves were breaking as well as from sheltered places. The specimens collected in exposed places had some resemblance to Harvey's Ceyl. Alg. No. 29, while those in sheltered areas resembles Harvey's Ceyl. Alg. No. 30. There were yet others which had resemblance to both and exhibited a condition intermediate between *Gracilaria opuntia* (Svedelius) comb. nova and *Gracilaria minor* (Sonder) Durairatnam, I agree with Boergesen (1952) and Dawson (1954) and (1954a) that *Corallopsis opuntia* J. Ag. = (*Gracilaria cacalia* J. Ag. Harvey's Ceylon Algae No. 30) and (*Gracilaria crassa* J. Ag. Harvey's Ceylon Algae No. 29) which are one and the same species. However I am of opinion that *Corallopsis opuntia* described by Svedelius 1906 is different from the above species. In transverse section the medulla consists of large isodiametric cells and two layers of small pigmented cells arranged anticlinally. Transition from medulla to cortex is abrupt as opposed to *Gracilaria opuntia* (Svedelius) comb. nova.

Distribution in Ceylon : Hikkaduwa to Galle Jaffna Lagoon, Mandativu, Nainativu, Kanke-santhurai, Keerimalai, Mannar and Pooneryn.

Geographic distribution : Indian Ocean, Malayan Archipelago, Vietnam, Japan, Mauritius.

Gracilaria cacalia (J. Agardh) Dawson

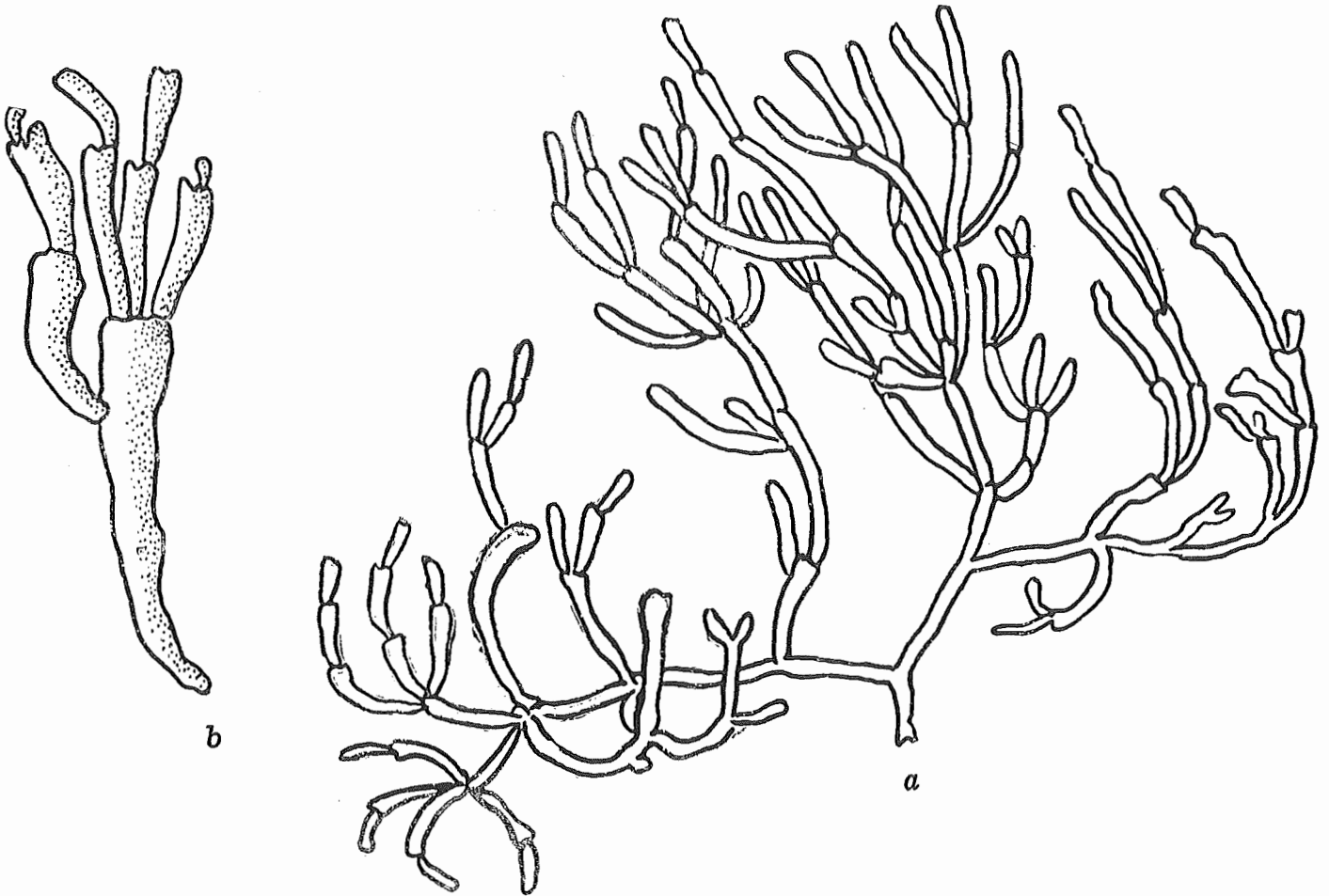


Figure 4. (a) *Gracilaria cacalia* (J. Ag.) Dawson—Habit of plant ($\times 1$).
(b) Apex of Branchlet ($\times 3$).

Dawson, 1954, Notes on tropical Pacific marine algae, Bull. South Calif. Acad. Sci. ; 53 (1) p. 2 ; Durairatnam 1961, Contribution to the study of the Marine Algae of Ceylon, Bulletin No. 10, Department of Fisheries, Ceylon, p. 63 ; *Corallopsis opuntia* J. Agardh, 1852, Spec. Alg. 2, 583 ; Epicrisis, 1876, 409 ; Boergesen 1934, Kew Bulletin No. 1, p. 8, fig. 6a and b ; Yamada, Notes on some Japanese algae V, 1933, p. 280 ; Okamura, Icon. Jap. Alg. VII, 1933, p. 13, pl. 308, figs. 6-11 ; Ibid, Nippon Kaiscshi, 1936, p. 634.

I have examined some of the specimens collected in brackish water areas in Mannar. The plant in some respects resembles *Gracilaria minor* (Sond.) Durairatnam in the possession of pyriform or clavate shaped branchlets. But it differs from it in having the bases of the main branches not attenuated or sometimes very slightly attenuated as in Boergesen's fig. 6a, Kew Bull. No. 1, p. 8, 1934 and my figure. For the same reason it differs from *Gracilaria crassa* (Harvey) J. Ag.

I had the opportunity of examining the single specimen of *Corallopsis opuntia* J. Ag. kept at the herbarium of the Botany Department, University of Hokkaido. The external features of this plant closely resemble those of the present specimens. The description and figures given by the late Dr. Okamura in Vol. VII, p. 13, pl. 308, figs. 6–11 of *Icones of Japanese Algae* also agreed with this specimen. I agree with the

late Dr. Boergesen's view, 1936, *Ceylon Marine Algae*, p. 87, that it is better to refer this as *Gracilaria cacalia* (J. Ag.) Dawson than as *Gracilaria crassa* (Harvey) J. Ag.

Distribution in Ceylon: Puttalam Lagoon and Mannar.

Geographic distribution: Indian Ocean, Red Sea, North Coast of Java, Thursday Island, Formosa.

Gracilaria corticata J. Agardh

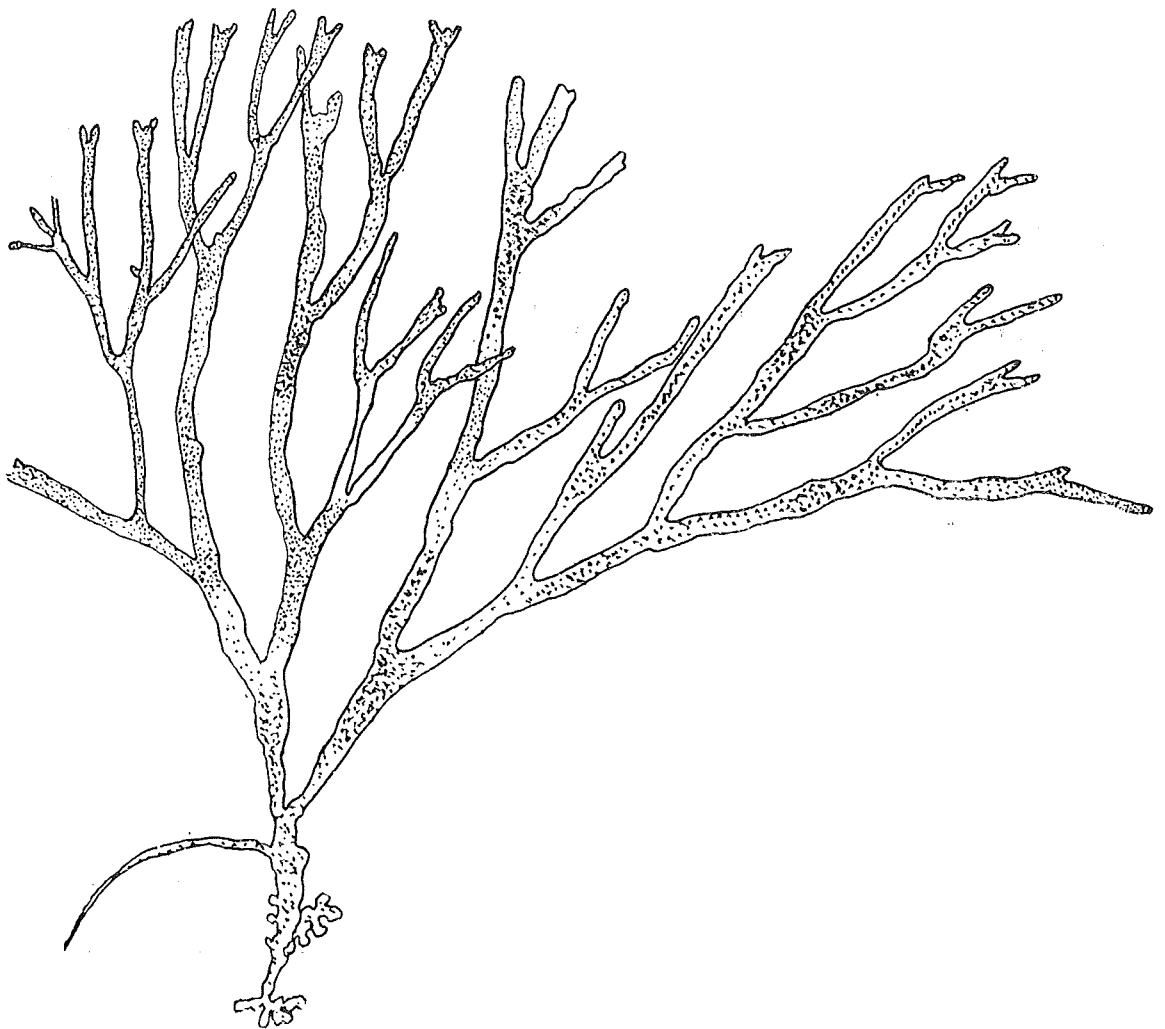


Figure 5. *Gracilaria corticata* J. Agardh—Habit of plant (× 1).

J. Agardh, 1852, *Spec. Alg.* 11, p. 602 ; *Epier.* 1876, p. 423 ; Boergesen, 1933, *Kew Bull.* No. 3, p. 124 ; 1936, *Some Marine Algae from Ceylon*, *Ceylon Journal of Science*, Vol. XII,

Part II, p. 86 ; 1938, *South Indian Mar. Algal Flora*, *Ind. Bot. Society* Vol. XVII, No. 4, p. 225, Durairatnam, 1961, *Contribution to the study of the Marine Algae of Ceylon.* Bulletin No. 10,

Department of Fisheries, Ceylon, p. 10.
Rhodomeniia corticata J. Ag. Symbolae in
Linnaea XV, p. 14, 1841.

Gracilaria corticata is the most common red alga along the Western Coast of Ceylon, extending from Chilaw to Galle. The plants grow in the littoral zone exposed to the tides. During the South-West Monsoon part of the plants or sometimes the whole plants are uprooted and cast ashore. The colour varies from green to purplish or violet red. The thallus is rigid and cartilaginous at the base while it is less cartilaginous in the remaining portions. The plants reach a height of 10–15 cms. The thallus is mostly dichotomously or trichotomously branched. The segments are narrow 2–4 mm. and sometimes proliferations are found along the margin of the thallus.

The apex of each segment is acute. A transverse section of the thallus shows a thick cuticle outside followed by 1–2 layers of small elongated cortical cells. The third layer is slightly larger than the two layers of cortical cells. This is followed by large pentagonal or hexagonal medullary cells with thick walls. The plant has close resemblance to *Gracilaria prolifera* (Forssk.) Borgs. However, in the case of *Gracilaria prolifera* the thallus is thinner, less cartilaginous and the upper parts of the plant more ramified. The uppermost part of the thallus is much divided, often palmately.

Distribution in Ceylon: West Coast of Ceylon from Chilaw to Galle, Hambantota, Kankesanthurai, Keerimalai, Senthankulam.

Geographic Distribution: Indian Ocean, Red Sea.

Gracilaria hikkaduensis n. sp.

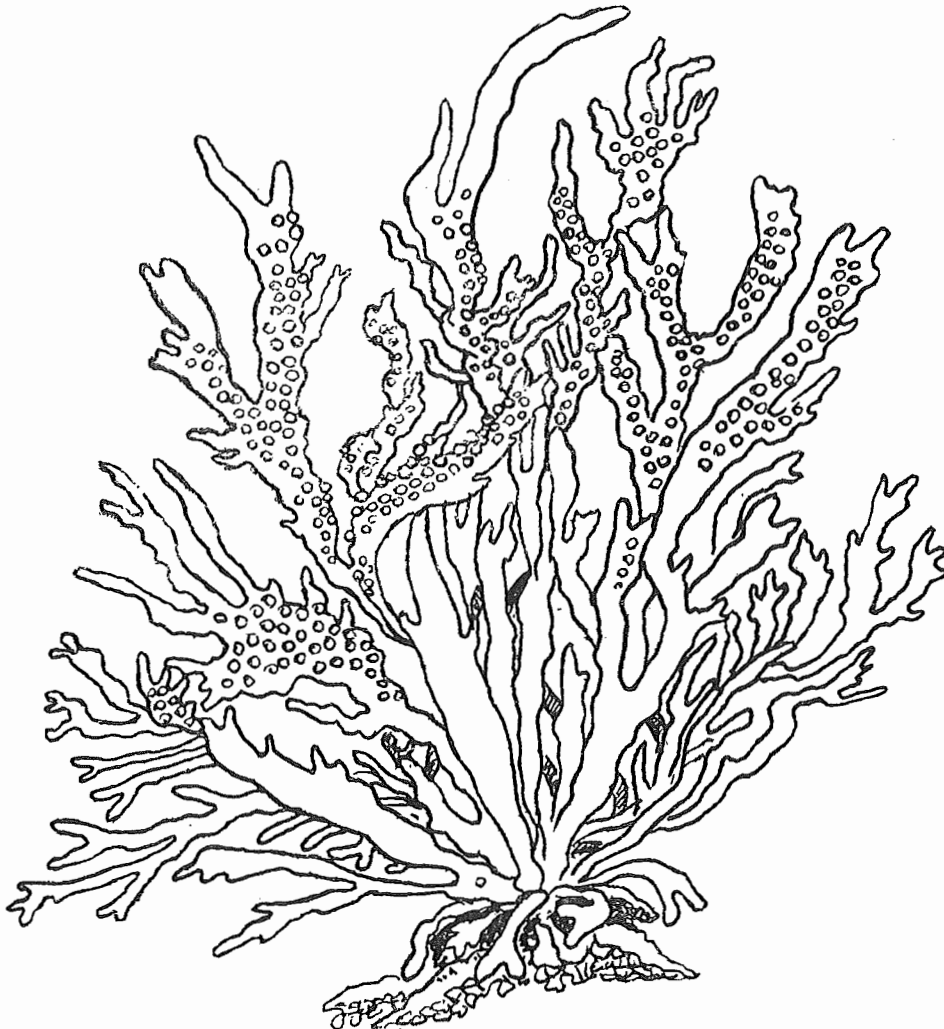


Figure 6. *Gracilaria hikkaduensis* n. sp.—Habit of plant (× 1).

Thallus 8-6 cm. altis, erectis, compressis, infra 2-4 mm. crassis, supra ad 12 mm. diam., irregulariter dichotoma ramosis. Cystocarpus 1100-1200 μ diam, globosis; tetrasporangia sparsa, in cortice immersa.

Planta typica in loco dicto Hikkaduwa, Galle.

The specimens were collected from a rock pool in the littoral zone near Hikkaduwa. Plants green, erect, foliose, growing in tufts reaching a height of 6-16 cms. arising from a callous disc. Thallus is flat or compressed and its main segments are 2-3 mm. broad at the base and 5-12 mm. broad above. Plants irregularly dichotomously branched with proliferations at the apices of the main segments. Segments below are more or less cuneate, tapering gradually upwards. More often, adventitious proliferations are given off from both sides of the margin. These are linear or band-shaped 2-3 mm. broad. In transverse section it consists of colourless prominent large thin walled medullary cells 140-160 μ in diameter. The cortex consists of 2 layers of small pigmented cells, more or less anticlinally elongated.

Thickness of blade 650 μ . Cystocarps numerous, dome-like, sessile, up to 1200 μ in diam. and densely scattered on both the surfaces of the frond. Gonimoblast cells connected to the pericarp by nutritive filaments. Pericarp thick about 250 μ consisting of 10-16 layers of minute cells, which are more or less anticlinally elongated. Carpospores round or ovoid. Antheridia not seen. Tetrasporangia scattered on the surface of the fronds. The plant resembles *Gracilaria corticata* and *Gracilaria foliolifera* but these two species are regularly dichotomously branched and their many segments not so broad as in this plant.

Hikkaduwa: Durairatnam 1962, No. 3 (type).

Acknowledgments

I wish to thank the Deputy Director, Research, Agricultural Department, for granting me permission to refer to the algal specimens kept at the Royal Botanical Gardens, Peradeniya, and Mr. K. L. D. Amaratunga, Research Officer, Systematic Botany, Department of Agriculture, for his co-operation.