

***Polyopes ligulatus* (Harvey ex Kützinger) De Toni**
1905: 1596

Figs 10C; 22G; 38B; 162

REFERENCES: Desikachary *et al.* (1990: 266, pl. 41), Coppejans & Millar (2000: figs 11-12).

TYPE LOCALITY: Sri Lanka.

Description - Submerged plants gregarious and locally in impressive populations, very well attached by a discoid holdfast from where several strap-shaped fronds arise, 10-15 (-20) cm long; the straps tough cartilaginous, rather stiff, blackish purplish red; originally dichotomously branched in a single plane, but as a result of the sometimes numerous proliferations the original dichotomies become obscure; strap width most generally about 3-4 (-5) mm, with irregular constrictions and broadly rounded apices; marginal proliferations mostly numerous and serial, from small and wart-like over small, dichotomous straps up to almost the size of the mother thallus; other specimens only 1-2 mm wide. Intertidal specimens isolated, much smaller, much more densely branched and with narrow straps. On transverse section, the dense netlike, filamentous medulla is surrounded by a dense cortex of anticlinal rows of cells, gradually becoming smaller towards the periphery. Tetrasporangia in nemathecium confined to the terminal leafy segments, cruciately divided; cystocarps small, immersed in thickened branch tips.

Ecology - Epilithic, mostly and best developed on surf-exposed, vertical walls, just under low water, or on inclined continuously wave-swept rocks just above low water; specimens growing higher up (but still continuously wave-swept) much smaller.

Distribution - Indonesia, Kenya, Papua New Guinea, Sri Lanka, Tanzania, Vietnam.

Fig. 162. *Polyopes ligulatus*. Dense growth form in a low intertidal rock pool.

***Champia ceylanica* Harvey**
1857: no. 92, nom. inval.

Figs 17E; 33F; 163

REFERENCES: Svedelius (1906b: 190, 214, 217, fig. 10).

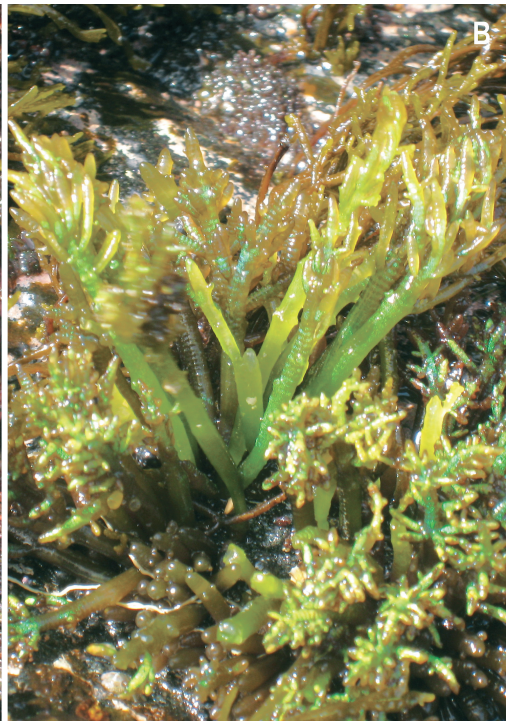
TYPE LOCALITY: Sri Lanka.

Description - Thalli gregarious, in separated groups, but in rather extensive populations; individual plants vertical, straight, 2-3 (-4) cm high, relatively stiff though flexible, lubricous, mostly cylindrical but some plants somewhat compressed; basal parts of the marked main axis unbranched, upper parts either radially branched (the specimens with cylindrical axes) or more or less pinnate to alternate (the more compressed specimens); side branches tapering towards the basis as well as to the apices, resulting in a spindle-shaped appearance; all branches slightly constricted into short, regular segments by septa, all apices acute; dark brownish red, the upper parts markedly goldish-bluish iridescent; central cavity filled with jelly. According to Svedelius (1906b: 214) only fertile in August.

Ecology - Epilithic on rather steep to subhorizontal rock slopes, at mid tide level along coasts exposed to extreme surf. Continuously wave-swept, even at low tide. A seasonal species. Its observation and collection is therefore rather difficult.

Distribution - Sri Lanka.

Fig. 163. *Champia ceylanica*. A. Almost non-iridescent specimen; B. Strongly iridescent specimen.



***Gelidiopsis repens* (Kützinger) Weber-van Bosse**

1928: 425-426

Fig. 164

REFERENCES: Payri *et al.* (2000: 232, bottom fig. p. 233), Littler & Littler (2003: 104, bottom fig. p. 105), De Clerck *et al.* (2005b: 216, fig. 190), Oliveira *et al.* (2005: 105, + fig.), Huisman *et al.* (2007: 117, + fig., as *G. scoparia*), Skelton & South (2007: 79, figs 168-174).

TYPE LOCALITY: Wagap, New Caledonia.

Description - Plants very well attached by terete, creeping stolons; erect fronds, 2-4 cm high, dark red, tough and stiff but flexible, with a basal, cylindrical, unbranched portion giving rise to markedly compressed to flattened branches, 0.5-1 mm wide and ca 120 µm thick, with 2-5 dichotomies in a single plane; branching often strongly condensed, giving the axes a typical pseudopalmate appearance. Internal structure consisting of a darkly pigmented outer cortex composed of up to 4 layers of small cells grading into larger, angular inner cortical cells; medulla composed of hyaline cells of mixed size; rhizines lacking.

Ecology - Small groups on vertical walls, frequently under rock overhangs, in the lower intertidal, frequently in surf-exposed gulleys; larger populations in the 'fish gardens' in the shallow subtidal down to -1 m.

Distribution - Indian Ocean, tropical Pacific Ocean.

Note - According to Skelton & South (2007: 81), the confusion between *G. repens* and *G. scoparia* (Montagne et Millardet) De Toni is unlikely to be resolved until the presently unlocated type materials are studied.

Fig. 164. *Gelidiopsis repens*.

***Gelidiopsis variabilis* (J. Agardh) Schmitz**

1895: 148

Fig. 165

REFERENCES: Cribb (1996: 85, top fig. p. 84), Oliveira *et al.* (2005: 105, + fig.).

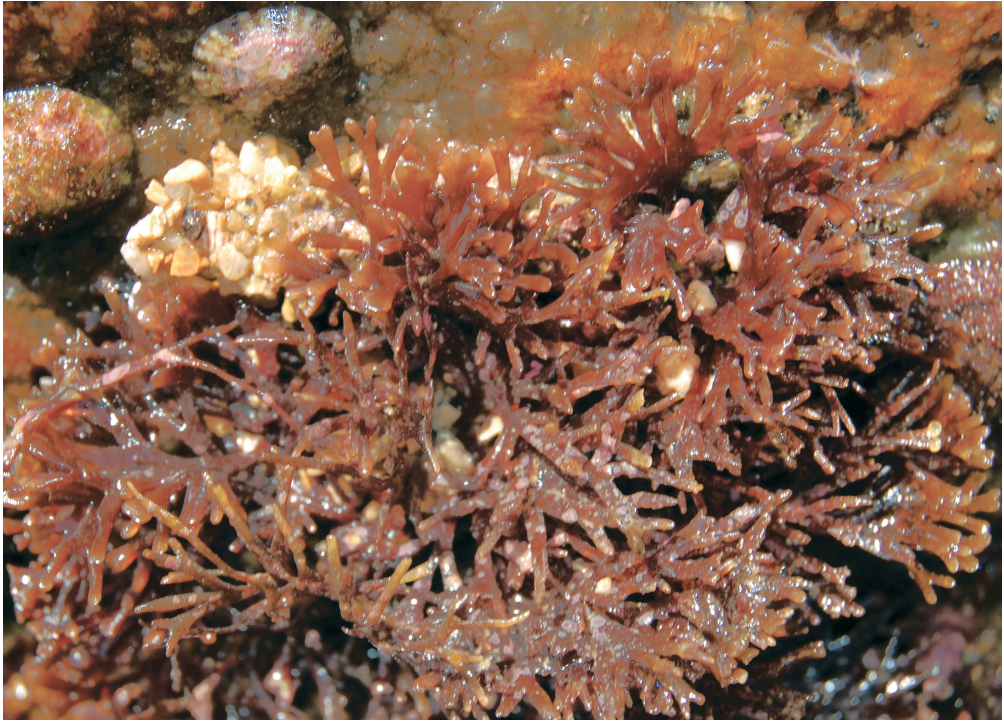
TYPE LOCALITY: Madras, India.

Description - Plants very well attached by very well branched, thin, pinkish stolons; erect fronds, 5-8 cm high, dark (blackish) red, tough and stiff but flexible, all axes cylindrical and very thin, sometimes slightly compressed in the upper portions; branching lax, irregular or opposite, especially in the upper parts, resulting in typical 'cross-like' apices. Anatomy similar to that of *G. repens*.

Ecology - Mostly in low intertidal rockpools, on the sand-covered bottom, continuously wave-swept.

Distribution - Pantropical.

Fig. 165. *Gelidiopsis variabilis*.



***Botryocladia skottsbergii* (Børgesen) Levring**

1941: 645, footnote

Figs 18C; 166

REFERENCES: Tseng (1984: 118, pl. 62, fig. 3), Trono (1997: 241, fig. 152), Payri *et al.* (2000: 228, + figs p. 229), Oliveira *et al.* (2005: 102, + fig. p. 103), Huisman *et al.* (2007: 118, + figs), Ohba *et al.* (2007: 115, + figs), Skelton & South (2007: 76, figs 156-158).

TYPE LOCALITY: Easter Island, Chile.

Description - Plants densely clustered, more rarely solitary, firmly attached by a discoid holdfast; thallus up to 20 mm high, deep brownish red, consisting of an irregularly branched, firm stipe bearing ovate to pyriform, hollow, shortly stipitate vesicles 2-4 mm wide and 3-10 mm long, filled with jelly. Walls of the vesicle consisting of 2 layers of inner, ovate, colourless cells, 30-70 µm in diameter and 1-2 layers of outermost ovate to subrectangular cortical cells, 2.5-4 µm wide and 4-11 µm long; medulla hollow; elongate and pyriform 'gland cells' up to 60 µm long often projecting in the cavity of the vesicles.

Ecology - Epilithic on vertical walls just above low water level, frequently under overhangs, mostly on the landward side of rocks; continuously wave-swept.

Distribution - Indo-Pacific.

Fig. 166. *Botryocladia skottsbergii*. A. *In situ* view of a dense population; B. Detail of one thallus.

***Centroceras clavulatum* (C. Agardh) Montagne**

1846: 2

Fig. 167

REFERENCES: Tseng (1984: 126, pl. 66, fig. 2), Lewmanomont & Ogawa (1995: 98, + fig.), Abbott (1999: 261, figs 73A-F), Huisman (2000: 134, + fig.), Littler & Littler (2000: 144, bottom figs p. 145), Payri *et al.* (2000: 240, bottom figs p. 241), Oliveira *et al.* (2005: 108, + figs), Huisman *et al.* (2007: 123, + figs), South & Skelton (2007: 89, figs 192-197).

TYPE LOCALITY: Callao, Peru.

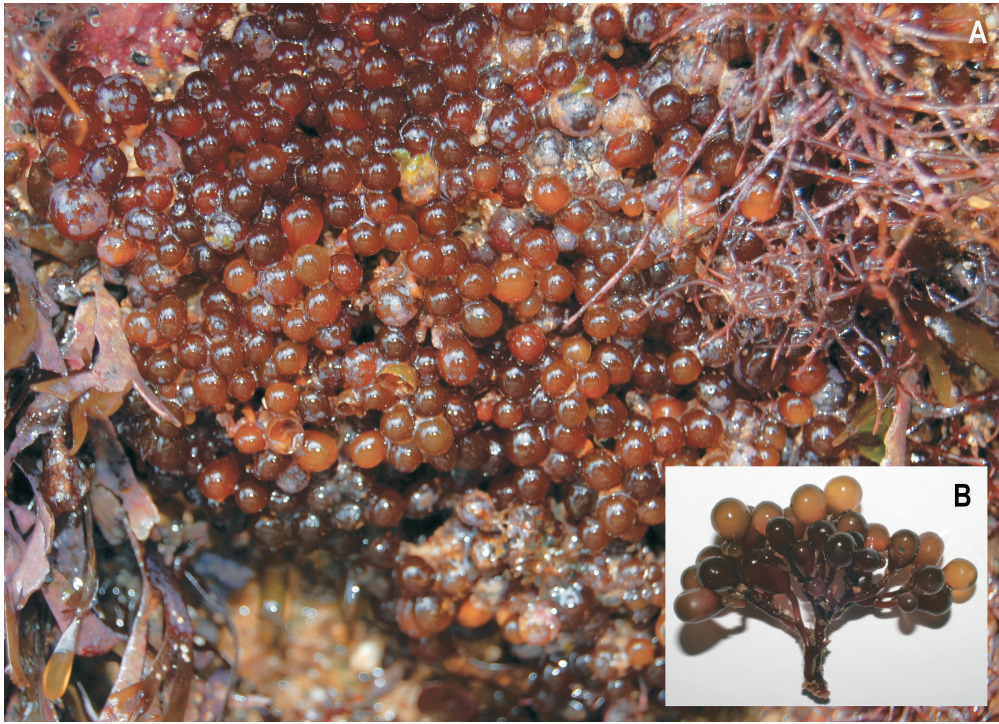
Description - Thalli gregarious, forming isolated tufts or intricate mats, 1 cm high along surf-exposed shores, up to 4 cm long in more sheltered pools, composed of supple filaments; pinkish red to creamy; attachment by clustered rhizoids arising from periaxial cells and ending in a multicellular pad; axes cylindrical, up to 300 µm in diameter, sub-dichotomously branched, successive branches 8-12 segments apart, apices mostly forcipate, more rarely unbranched and slightly incurved; adventitious branches often present; axial cells cylindrical to barrel-shaped, up to 750 µm long; nodes with 14 periaxial cells, each giving rise to 3 corticating filaments: 2 acropetal and 1 longer basipetal; nodes provided with whorled, 1-3-celled spines; internodes covered by 28 major basipetal cortical filaments composed of square cells which are arranged on longitudinal as well as on transverse rows. Tetrasporangia emergent, loosely enclosed by 3-4-celled colourless involucrel filaments, surrounding the nodes, mainly of the main axes (occasionally also of lateral branches).

Ecology - Epilithic in the high to mid-intertidal; as individual tufts or cushions along surf-exposed coasts; as continuous coverings in sand-covered intertidal pools.

Distribution - Pantropical and warm temperate.

Note - Molecular findings (Won *et al.* 2004) have shown *Centroceras clavulatum* as a complex of many species.

Fig. 167. *Centroceras clavulatum*. A. Dense growth form of air-exposed plants at low tide; B. Lax growth form in intertidal pools; C. Microscopic details.



Ceramium marshallense Dawson

1957: 120-121, figs 27a, b

Fig. 168

REFERENCE: Wynne (1995: 294, figs 38-39).**TYPE LOCALITY:** Rigili Island, Eniwetok, Marshall Islands.

Description - Plants extremely elegant and supple, up to 10 mm high, composed of limited prostrate and well-developed erect axes, dark red; attachment by pluricellular rhizoids with discoid ends; prostrate axes 200-300 µm in diameter, erect axes about 150 µm in diameter; all axes with marked nodes (50-70 µm high) and internodes; branching pseudosympodial, with the less developed branches alternating in a single plane, resulting in a sympodial appearance; side branches formed every third node; side branches with 3 unbranched basal nodes, then again branching alternately at every third node; all branches tapering and slightly forcipate. Axial cells bilenticular; nodes twice as broad as high, composed of irregularly placed, small cortical cells, completely covering the periaxial cells; mature internodes shorter than the nodes; tetrasporangia slightly projecting from the nodes and covered by a layer of involucre cells; nodes of the branchlets with tetrasporangia markedly inflated.

Ecology - Epiphytic on diverse red algae; best developed specimens on old plants of *Grateloupia lithophila*, in the mid intertidal zone, but continuously wave-swept.

Distribution - In the Indian Ocean only mentioned from the Maldives and Seychelles.

Note - This identification is the best match with our specimens and very similar to Wynne's description and illustrations (l.c.).

Fig. 168. *Ceramium marshallense*. A. Apex of a sterile specimen with sympodial growth form; B. Apex of a tetrasporophyte with the tetrasporangia in the nodes of short, inflated branchlets.

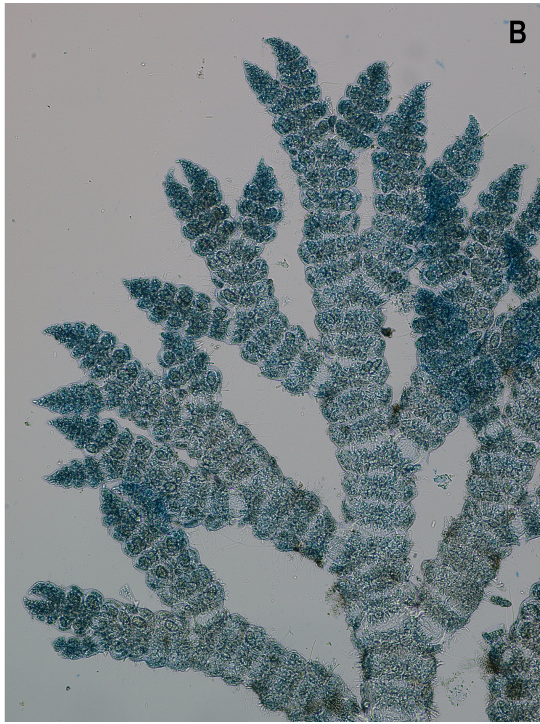
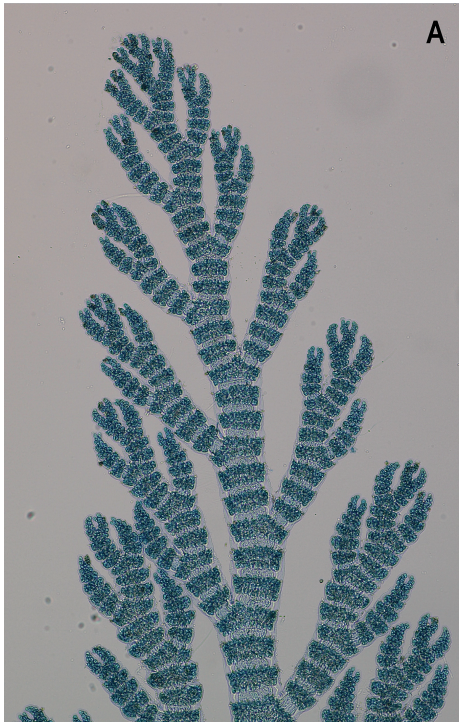
Ceramium sp.

Figs 11C; 169

In the absence of reproductive structures, we prefer not to identify this entity on species level, but based on its morphology and placement of cortical cells it comes close to *C. taylorii* Dawson which is considered a synonym of *C. flaccidum* (Kützinger) Ardissonne by Silva *et al.* (1996: 397). In our specimens, the transversely elongated cells in the lower part of the cortical bands, typical for *C. flaccidum*, are absent.

Note - According to Guiry & Guiry (2009), 216 species names of *Ceramium* are currently in use worldwide. Based on records from literature, Silva *et al.* (1996: 390-405) mention 59 species from the Indian Ocean, some of which with several varieties. Only 4 are reported from Sri Lanka. We observed several species, mostly as small epiphytes or growing in algal turf.

Fig. 169. *Ceramium* sp. A. Epiphytic on a *Caulerpa*; B. Whole plant under microscope; C. Microscopic detail of the cortical bands.



***Euptilota fergusonii* Cotton**

1907: 262-264, figs 1-6

Figs 36E, J; 170

REFERENCE: De Clerck *et al.* (2005b: 224, fig. 202).

TYPE LOCALITY: "Pantura" [Panadura?], Sri Lanka.

Description - Plants erect or with an erect basis and horizontally spread upper part, reaching a length of 10 cm, bushy, composed of irregularly branched axes, densely clothed with distichously arranged determinate laterals, medium red to pinkish, with a vivid bluish iridescence *in situ*; attached by a small discoid holdfast giving rise to several erect axes; determinate laterals remaining completely uncorticated, 800-1100 µm long, with a main filament curving toward the apex, apical cells of the main filament of the determinate lateral typically with 2-4 slightly hooked spinose cells; indeterminate branches formed at irregular intervals along the axes, cylindrical, heavily corticated to within a few mm of the apex, ca 0.8-1.2 mm in diameter near the base. Tetrasporangia sessile, formed singly at the distal ends of cells of the ultimate branches of determinate laterals, tetrahedrally divided, ovoid, 40-55 x 55-65 µm.

Ecology - Epilithic, exclusively recorded from the subtidal, from 1 m down to 25 m depth.

Distribution - Widely distributed in the western Indian Ocean.

Fig. 170. *Euptilota fergusonii*. A. Habit of a herbarium specimen; B. Microscopic detail.

***Spyridia fusiformis* Børgesen**

1937: 338-341, figs 12-14

Fig. 171

REFERENCE: Oliveira *et al.* (2005: 116, + figs p. 117).

TYPE LOCALITY: Krusadi Island, near Pamban, Tamil Nadu, India.

Description - Plants gregarious, forming isolated tufts, erect, 5-10 cm long, bright pinkish red; attachment by well-developed stolonoid structures; all axes cylindrical, the side branchlets markedly fusiform; basal parts of the main axes (almost) bare, about 1 mm in diameter, the upper parts more densely branched, in some specimens even becoming densely intricated, resulting in a bushy aspect, gradually tapering towards the apices. Main axes and indeterminate side branches completely corticated, but the segments still clearly visible in transparency with the naked eye in the field, cortical cells markedly elongated. All axes bearing relatively stiff, straight, uniseriate filaments, 600-750 µm long, 20 µm in diameter, composed of cells about 60 µm long, presenting a single tier of small cortical cells, 10 µm high at their transverse walls; apices of these filaments rounded, without a terminal spine. Tetrasporangia formed at the basal nodes of the uniseriate filaments, singly or in groups of 3-4, oval, 100 µm long and 70 µm broad.

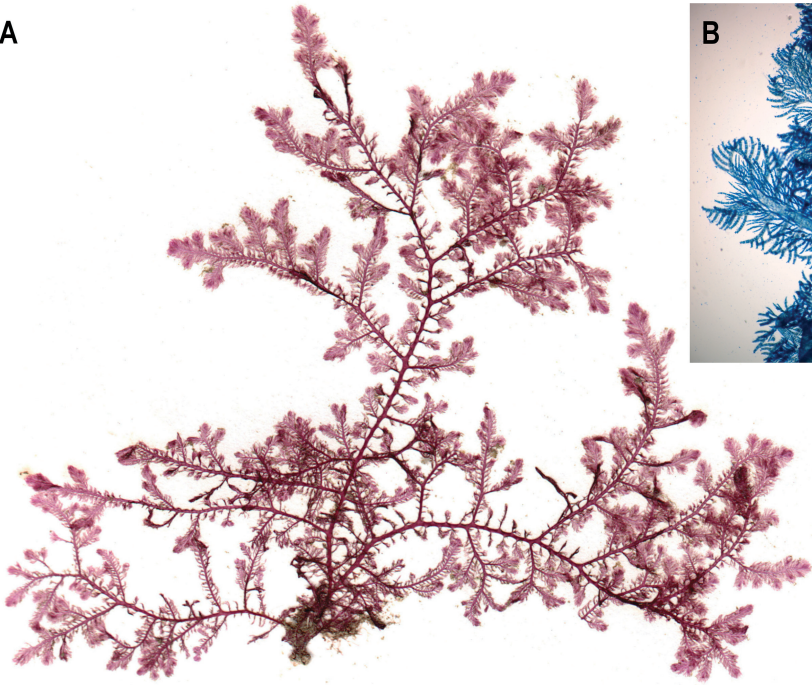
Ecology - Epilithic, on the sand-covered bottom of shallow rock pools at mid intertidal level; continuously wave-swept.

Distribution - Andaman Islands, India, Tanzania.

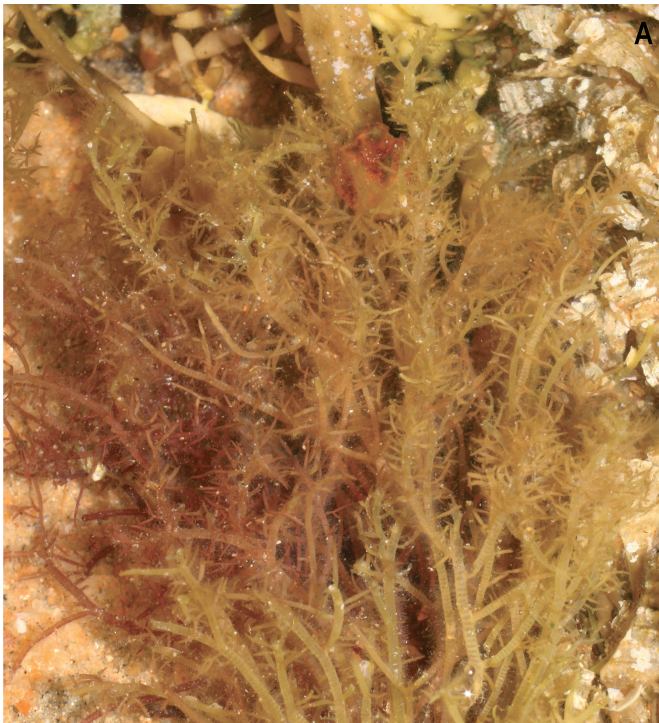
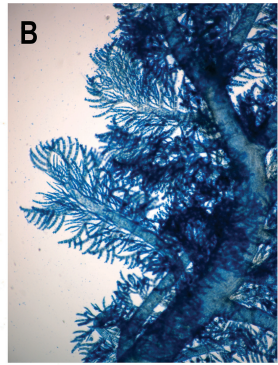
Note - In the field, the plants look like *Chondria dasyphylla*, but the presence of the *Ceramium*-like lateral filaments with interrupted cortication are typical for *Spyridia*.

Fig. 171. *Spyridia fusiformis*. A. Habit; B, C. Microscopic details of main axis, side branches and branchlets, tetrasporangia.

A

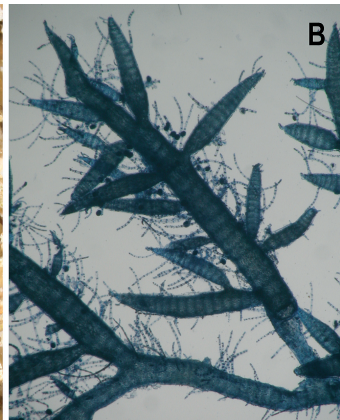


B

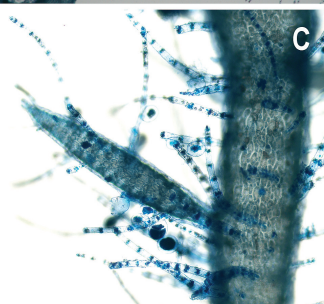


A

B



C



Spyridia hypnoides (Bory de Saint-Vincent) Papenfuss

1968: 281-282

Figs 23C; 172

REFERENCES: De Clerck *et al.* (2005b: 230, fig. 211), Oliveira *et al.* (2005: 116, + figs p. 117).

TYPE LOCALITY: Cape Comorin, Tamil Nadu, India.

Description - Plants erect, robust and densely branched, composed of percurrent, plumose axes, attached by means of a conspicuous stupose holdfast to 1.5 cm in diameter, brownish-red with orangy apices; axes completely corticated up to immediately below the apices, ca 2 mm in diameter in the proximal parts, spirally branched, every segment producing a determinate lateral at 60° angles; determinate laterals straight, 300-900 µm long, proximally 150-280 µm in diameter, gradually tapering toward the apices, terminating in a single erect spine subtended by a variable number (2-5) of recurved spines on subterminal cells. Internal structure of the axes composed of a central axial filament and whorls of (12-) 14-15 (-17) periaxial cells which give rise to 2 basipetal cortical filaments each; primary cortex obscured by secondary cortical cells; determinate branchlets with a smaller number of periaxial cells (6-8) and only just becoming completely corticated, always with the initial cortical bands readily discernable. Tetrasporangia sessile, on the nodes of the proximal segments of determinate laterals, tetrahedrally divided, 45-65 µm in diameter. Sexual reproductive structures not observed.

Ecology - Epilithic, at about low water mark.

Distribution - Pantropical and some temperate regions.

Note - It is striking that *S. filamentosa* (Wulfen) Harvey is not present in our collections; Durairatnam (1961) mentions it from Hambantota.

Fig. 172. *Spyridia hypnoides*. A. Lax growth form from an intertidal pool; B. Dense growth form from wave-swept low intertidal; C, D. Microscopic details of last order branchlets with apical spines.

Wrangelia argus (Montagne) Montagne

1856: 444

Fig. 173

REFERENCES: Lewmanomont & Ogawa (1995: 140, + fig.), De Clerck *et al.* (2005b: 232, figs 214-216), Oliveira *et al.* (2005: 118, + figs).

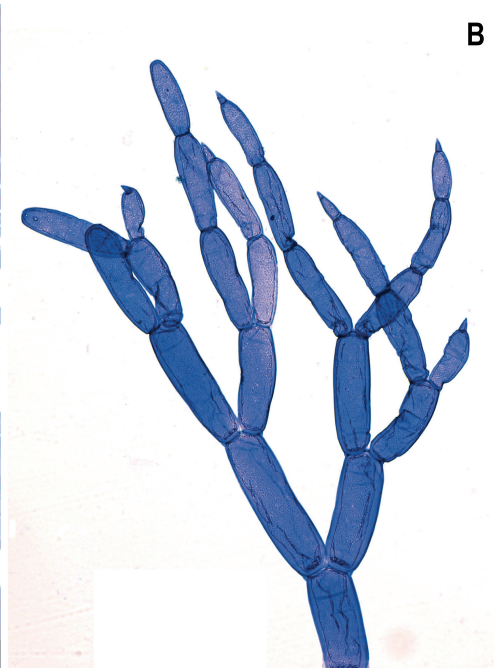
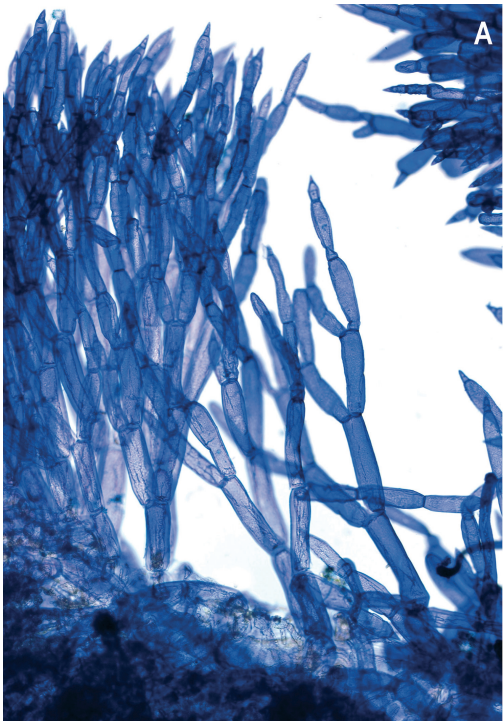
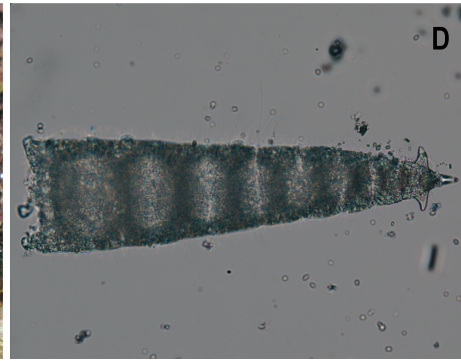
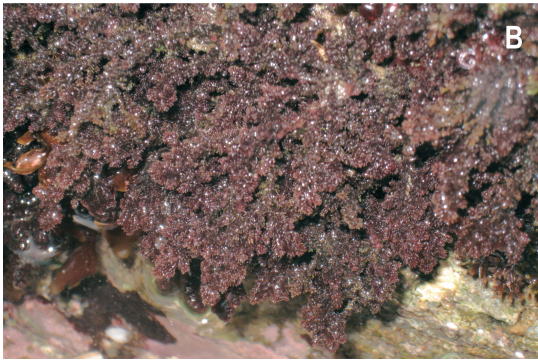
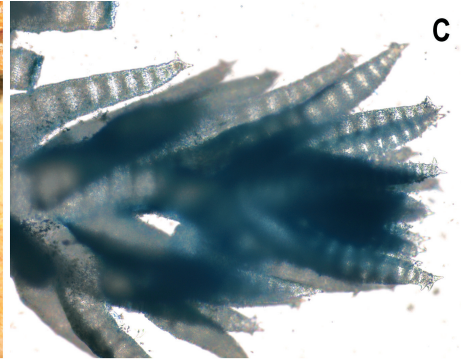
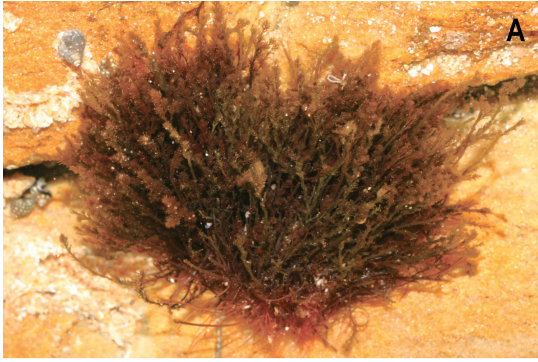
TYPE LOCALITY: Roque del Gando, Islas Canarias.

Description - Plants decumbent, soft and fluffy, penicillate, entirely uniseriate, composed of prostrate and erect axes, up to 5-8 mm high, iridescent purplish-red; prostrate axes composed of cells 120-250 µm in diameter and up to 700 µm long; erect axes with determinate branchlets produced in whorls of 4 from every axial cell; determinate laterals unequally developed with one lateral being much smaller than the remaining three, 1-3 times dichotomously branched, up to 400 µm long, proximally 30 µm in diameter, tapering gradually toward the apices, with acute apical cells; cortication loose and rag-like. Tetrasporangia produced on the proximal cells of whorl-branchlets, enclosed by two involucrel filaments of 2 cells each. Sexual reproductive structures not observed.

Ecology - Epilithic in the low intertidal, continuously wave-swept.

Distribution - Widespread in tropical and warm temperate regions.

Fig. 173. *Wrangelia argus*. A, B. Microscopic details of the verticillate branchlets.



Dictyurus purpurascens* Bory de Saint-Vincentin* Bélanger et Bory de Saint-Vincent 1834: 170-171, pl. 15: fig. 2 Fig. 174REFERENCES: De Clerck & Coppejans (2002: 102, fig. p. 103), Oliveira *et al.* (2005: 120, + figs).

TYPE LOCALITY: Cape Comorin, Tamil Nadu, India.

Description - Plants gregarious, erect from prostrate axes, up to 4 cm high, erect parts spongy, pinkish red in the field, becoming blackish upon drying; main axes (prostrate as well as erect) cylindrical and firm cartilaginous, with axial cells surrounded by 4 periaxials which are quickly enclosed by descending rhizoidal filaments, collectively forming a thick cortex. These indeterminate axes bearing determinate branches, produced alternately and distichously from every other polysiphonous segment of the indeterminate axes; determinate branches densely branching and becoming interlinked with maturity by growth of connective cells, resulting in spirally disposed networks surrounding the axes. Final spongy structure composed of a complex, threedimensional reticulum, elongate, longitudinally 4-ribbed along the four flat sides, coarsely dentate on the ribs.

Ecology - On vertical walls at the landward (lagoon) side of beachrock platforms at about low tide level.

Distribution - Tropical Indo-Pacific.

Fig. 174. *Dictyurus purpurascens*. A. Habit; B, C. Details of the reticulum.

***Caloglossa lepriurii* (Montagne) G. Martens**

1869: 234, 237

Figs 13E; 175

REFERENCES: De Clerck & Coppejans (2002: 102, fig. p. 103), Oliveira *et al.* (2005: 122, + fig.), Skelton & South (2007: 153, figs 411-413).

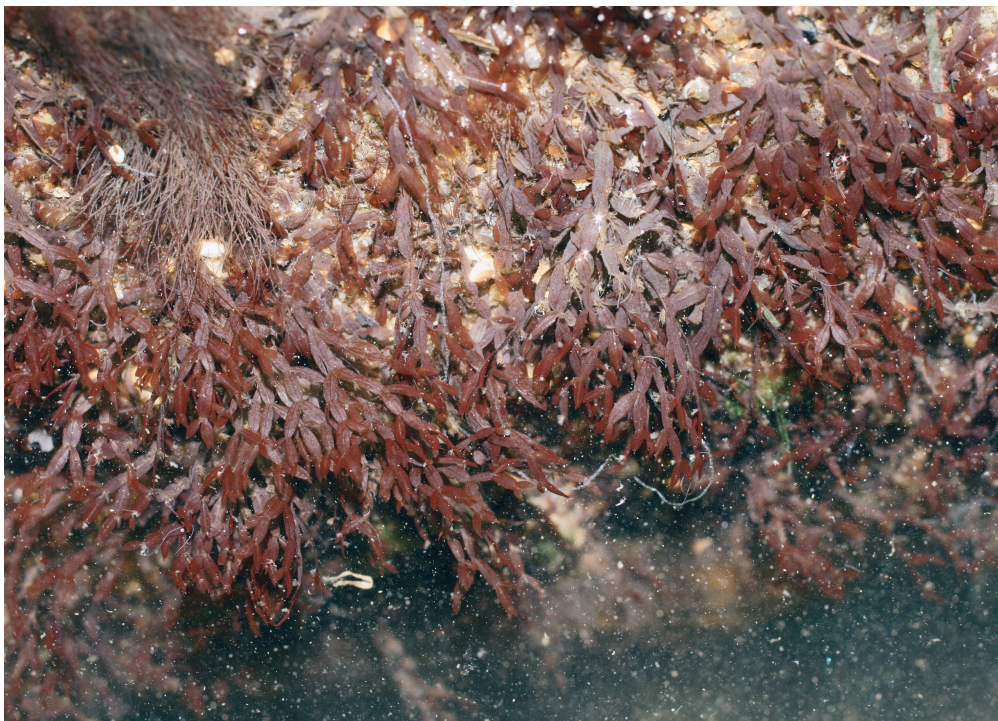
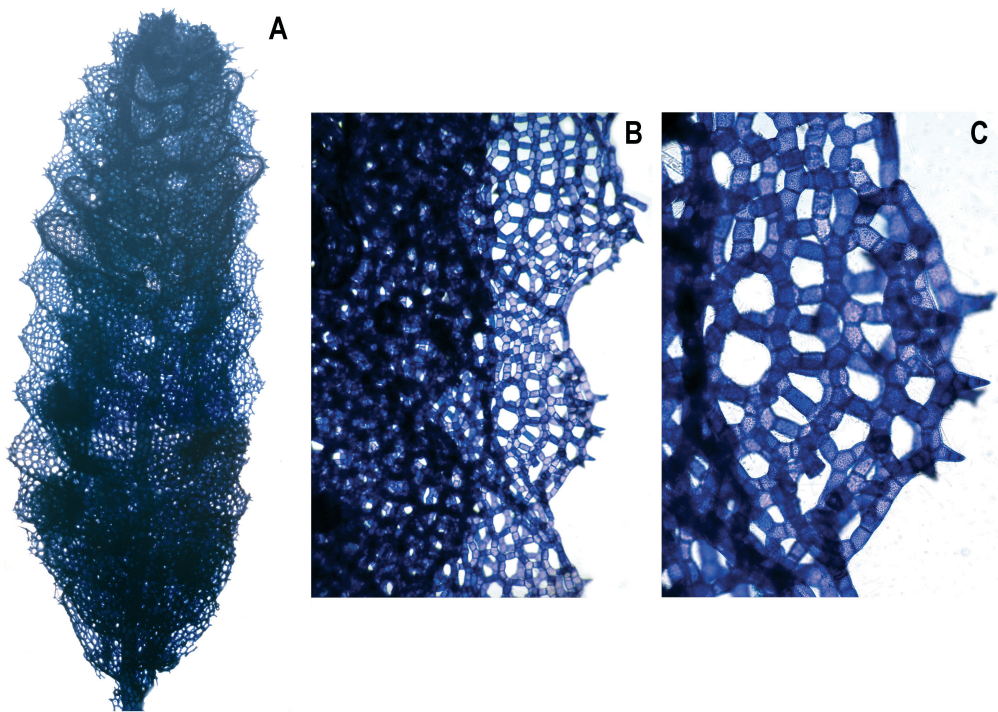
TYPE LOCALITY: Near Cayenne, French Guiana.

Description - Plants growing in dense populations, hanging down along the substrate, overlapping each other like roof tiles, dark red; individual thalli small, up to 17 mm long, delicate, monostromatic except for the midrib, leafy, 1 mm broad and 2-3 mm long with regular constrictions separating the oval segments; branching mainly pseudodichotomous, but locally opposite in a single plane; attachment by multicellular rhizoids departing from the nodes; microscopically, a midvein is visible, composed of a central axis surrounded by 4 periaxial cells; only the basal (5-6) cells of second order bear third order cell rows, all reaching the blade margin. Tetrasporangia in V-shaped sori on the terminal bladelets.

Ecology - Hanging down from the lower part of mangrove tree trunks and aerial roots; extremely shaded and sheltered; air-exposed at low tide.

Distribution - Pantropical and some warm temperate regions.

Fig. 175. *Caloglossa lepriurii*.



Claudea multifida Harvey

1854: 145, pl. VI

Figs 39A; 176

REFERENCES: Papenfuss (1937: 5-30, figs 1-27), Krishnamurthy & Varadarajan (1990: 15-17, figs 1-4).

TYPE LOCALITY: Weligama, Sri Lanka.

Description - Plants gregarious, generally growing in large populations; individual thalli stiff-brittle, erect, 2-3 cm high, composed of a short, parenchymatous, cylindrical, perennial stipe that can be branched in older specimens, supporting annual, divided, net-like fronds situated in a single plane; attachment by numerous multicellular rhizoids. The initial gives rise to a primary blade, the proximal part of which is becoming heavily corticated, resulting in a stipe, the distal part developing in the blade of the first order. The ventral surface of this primary blade gives (unilaterally) rise to a regular series of upwardly directed, secondary blades from each segment of the midrib; as a result, the thallus becomes asymmetrical, with a narrow membranous blade on one side of the midrib and a long series of long, parallel secondary blades on the other side. A series of tertiary blades is formed in a similar way on the topward side of each secondary blade; they have a limited growth and anastomose at their tips with the lower surface of the secondary blade immediately above them, resulting in a net-like structure with a sympodial appearance. In older fronds a fourth order of blades can be formed but they are associated with the formation of secondary growth regions. All third order cell rows of all the bladelets reach the margin.

Ecology - Epilithic on horizontal substratum, just under low water level, in lagoons but in places with regular wave action or marked tidal currents.

Distribution - Indian Ocean: Andaman Islands, India, Mauritius, Sri Lanka; Pacific Ocean: Micronesia, Philippines, Taiwan.

Fig. 176. *Claudea multifida*.

Cottoniella amamiensis Itono

1972: 57-59, fig. 4

Figs 32E; 177

REFERENCES: Islam (1976: 63, pl. 59, figs 354-358, pl. 70, figs 403-406, as *C. filamentosa* (Howe) Børgesen), Wynne & Norris (1991: 263-265, figs 7-8).

TYPE LOCALITY: Tatsugo, Amami-oshima, Kagoshima Prefecture, Japan.

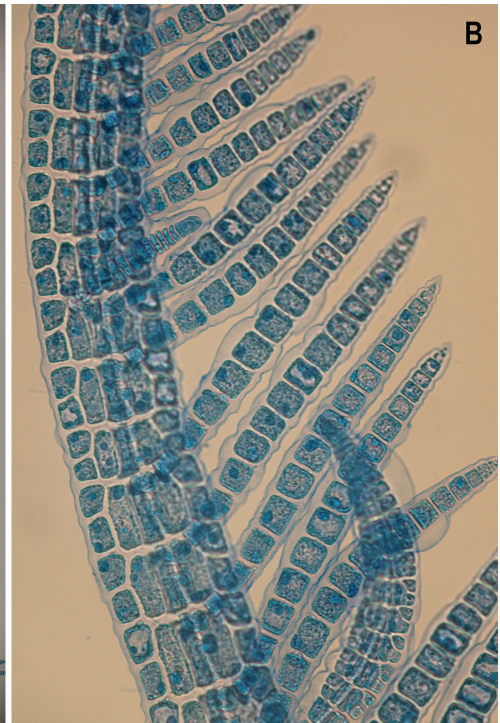
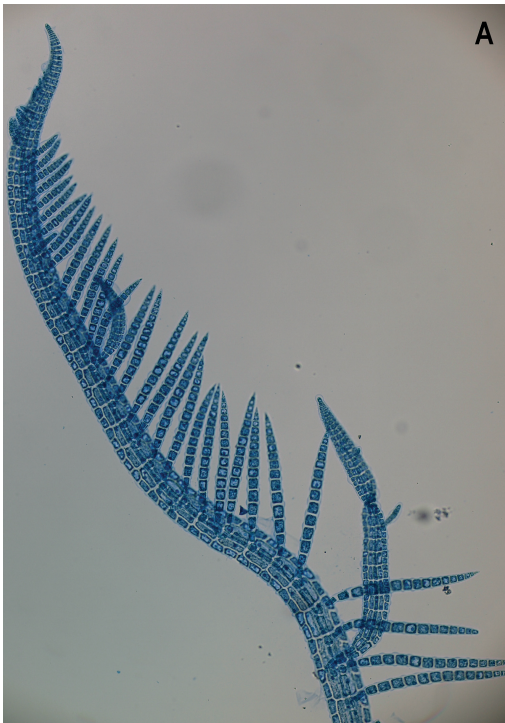
Description - Plants growing in isolated, very delicate tufts, composed of erect, radially placed, extremely supple filamentous-looking narrow straps, 3-4 cm long; purplish iridescent. Prostrate parts terete, polysiphonous with 4 pericentral cells, attached by rhizoids with pads at the tips; erect parts compressed, like extremely narrow straps, fusiform, with slightly incurved apex; two opposed pericentral cells of each segment bearing 2 lengthwise superposed cells (all in the same plane of the 'strap'); the basis of the plants have some rhizoidal corticating filaments; the side branches bear series of unilaterally (adaxially) placed monosiphonous filaments, 12-13 (-16) cells long (250-500 µm), very narrow at the base, broad in the middle part and terminating in a very abruptly pointed apex, departing from the axial cell.

Ecology - Epilithic, on coral rubble, between 0.5 to 1 m depth. Only observed at a single site of Bar Reef, Kalpitiya, but abundant at that location.

Distribution - Indian Ocean: Bangladesh, South Africa, Sri Lanka; Pacific Ocean: Japan, Western Australia.

Notes - *C. amamiensis* differs from *C. filamentosa* by its short and stubby monosiphonous filaments. This is a new record for Sri Lanka.

Fig. 177. *Cottoniella amamiensis*. A, B. Microscopic details.



Martensia fragilis Harvey

1854: 145

Figs 39B; 178

REFERENCES: Magruder & Hunt (1979: 85, middle fig. p. 84), Cribb (1996: 105, bottom fig. p. 104), Abbott (1999: 344, figs 99C-E), Huisman (2000: 150, + figs), Littler & Littler (2003: 136, middle and lower figs p. 137), Huisman *et al.* (2007: 137, + figs), Skelton & South (2007: 162, figs 436-440).

TYPE LOCALITY: Weligama, Sri Lanka.

Description - Thallus membranous, extremely supple, fan-shaped and undulated, up to 9 cm high and 10 cm wide, divided in numerous fan-shaped straps, erect when submerged, creamy-pink in shallow water, pinkish red with a slight bluish iridescence deeper down or in shaded places; attached by rhizoids from the lower stipe-like part of the plant; basal part of the blade entire, followed by a net-like zone composed of radial and transversal lamellae, the interstices being radially rectangular; in well-developed blades, several new lobes develop from the margin of the basal blade, again with alternation of entire and grid-like portions; in the largest specimens up to 5 alternations are present; all parts of the blade are composed of a single cell layer and outer blade margin entire. Cystocarps very densely placed and only produced on the net-like parts.

Ecology - Epilithic in low intertidal pools (very small specimens), on dead corals at -1/-2 m as well as at -20 m. In February 2008, a limited surface of the coral reef between 1 and 2 m depth of Bar Reef was densely covered by large tufts of this species, waving with the waves.

Distribution - Indian Ocean and tropical western Pacific Ocean, but also mentioned from Cuba.

Note - Millar (1990: 418-420) synonymized *M. denticulata* Harvey with *M. fragilis*, but Littler & Littler (2003: 136) distinguish both taxa on the basis of the presence of marginal teeth in *M. denticulata*.

Fig. 178. *Martensia fragilis*. A. Habit *in situ*; B. Detail.

Nitophyllum marginale (Kützting) J. Agardh

1872: 51

Figs 25D; 37B; 179

REFERENCES: Krishnamurthy et Varadarajan (1991b: 61-63, figs 1-8).

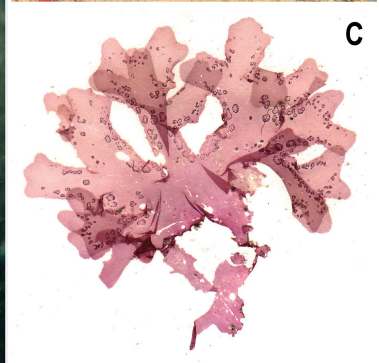
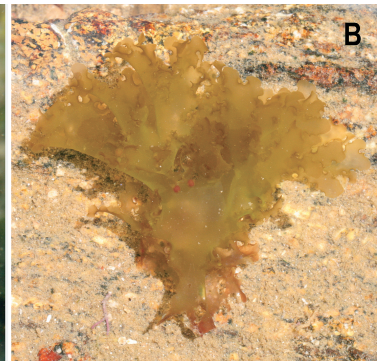
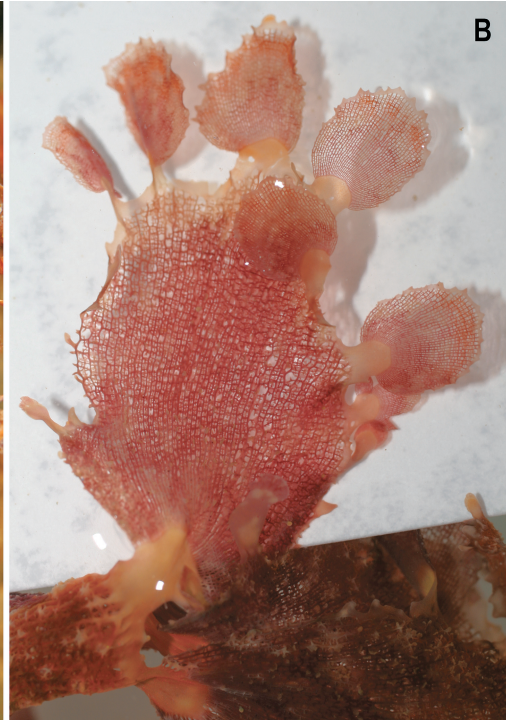
TYPE LOCALITY: Sri Lanka.

Description - Thalli membranous, extremely supple and delicate, either shallowly to deeply lobed or more strapshaped and then pseudodichotomously to irregularly branched, 3-5 cm long, the straps 5-10 mm wide, with markedly undulated margins provided with very fine teeth, (orangy-) pink; estipitate; some specimens isolated, others clustered in ponpon-like, hemispherical tufts. Whole thallus monostromatic except for the extreme basis where the blade can be up to 3 layers thick; veins absent. Cystocarps, sori of spermatangia and tetrasporangia, abundant in the collected material, most of them situated along the blade margins, a few being submarginal.

Ecology - Epilithic in the shallow subtidal (-0.5 to -1 m), mostly in lagoons and most frequent close to the barrier reef, where it can be extremely abundant.

Distribution - India, Sri Lanka.

Fig. 179. *Nitophyllum marginale*. A. Habit *in situ*; B. A cystocarpic specimen; C. Herbarium specimen with sori of tetrasporangia.



Taenioma perpusillum (J. Agardh) J. Agardh
1863: 1257

Fig. 180

REFERENCES: Abbott (1999: 348, figs 101A-E), Skelton & South (2007: 165, figs 445-446).

TYPE LOCALITY: San Agustín, Oaxaca, Mexico.

Description - Plants forming a short turf, a few mm high, composed of prostrate and erect parts with a central axis and 4 pericentral cells, dark red; prostrate axes 100-150 µm in diameter, repeatedly branched, anchored by unicellular rhizoids, up to 1 mm long, with rounded apex or terminal pad-like structure; erect axes about 80 µm diameter, issuing short, determinate branches which are flattened, two opposed periaxial cells of every segment each producing two isodiametric flanking cells, each again producing two tangentially elongated marginal cells, resulting in bladelets 7 cells (80-100 µm) wide; apex of fully grown determinate branchlets bearing (2-) 3 (-4) cylindrical, non-pigmented, unbranched, hairs.

Ecology - Epilithic on horizontal rock surface, just above low water mark, but continuously wave-swept.

Distribution - Pantropical to subtropical.

Note - According to Abbott (1999: 350) *T. dotyi* Hollenberg is a synonym of *T. perpusillum*, as the number of terminal monosiphonous filaments, which is used as a main distinguishing character (3 in *T. perpusillum* and 4-5 (occasionally 3) in *T. dotyi*), seems to be more variable than previously recognized. *T. nanum* (Kützinger) Papenfuss and *T. macrourum* Thuret, both with 2-haired apices were merged by Papenfuss (1952). Hollenberg (1967) has argued that even the grounds for separating *T. nanum* and *T. perpusillum* are insufficient.

Fig. 180. *Taenioma perpusillum*. Microscopic details. A. Whole specimen; B, C. Details of apical parts.

Vanvoorstia coccinea Harvey ex J. Agardh
1863: 1271-1272

Fig. 181

REFERENCES: Papenfuss (1937: 55-60, figs 62-72), Abbott (1999: 350, fig. 101F), Littler & Littler (2003: 140, middle fig. p. 141).

TYPE LOCALITY: Sri Lanka.

Description - Plants stiff-crispy, to 3 cm tall, dark red with some bluish iridescence, consisting of a sessile, coarse, net-like frond, frequently horizontally placed and downwardly bent like a watchglass or irregularly contorted; attachment by pad-like structures, at the base and where the thallus contacts the substratum; frond composed of two orders of long, curved 'blades', which soon become cylindrical and thickened as a result of heavy cortication, and several orders of anastomosing short blades, all of them being in a single plane; the penultimate and ultimate orders of branching are flattened blades, but corticating cells are quickly produced, thickening them; the blades of one order develop on the dorsal side of blades of the preceding order and are initiated by the central cells in alternate segments. The first-formed interstices of the net are progressively subdivided by the anastomoses of the subsequent orders of short blades. Tetrasporangia in bladelets of last order, placed in the net interstices.

Ecology - Epilithic on horizontal surfaces just above low water mark, mostly in mixed seaweed vegetations; continuously wave-swept, even at low tide; rather rare.

Distribution - Scattered regions in the Indian Ocean and western tropical Pacific Ocean.

Note - *Vanvoorstia spectabilis* Harvey, type locality also Sri Lanka, differs from *V. coccinea* on the basis of its more elegant stature and the more supple consistency as a result of the absence of cortication of the bladelets.

Fig. 181. *Vanvoorstia coccinea*. A. Habit *in situ*. B. Herbarium specimen.