

Ahnfeltiopsis pygmaea (J. Agardh) P.C. Silva et DeCew
1992: 578

Fig. 153

REFERENCES: Abbott (1999: 162, fig. 39H).

TYPE LOCALITY: India.

Description - Plants gregarious, growing in isolated bushy clusters; well developed specimens in hemispherical tufts in which the individuals are densely intricately; very well attached by means of discoid holdfasts; thalli erect, 2-2.5 cm high, of rubbery texture, cylindrical at the basis, slightly compressed higher up, 0.5 mm in diameter, repeatedly dichotomously branched in a single plane with wide axils; marginal proliferations absent; dark red. Medulla pseudoparenchymatous, with all cells approximately of the same size and shape; cortex thick and composed of radially arranged filaments of small cells. Cystocarps intercalary on slightly widened parts of branches, often situated proximal to a dichotomy, deeply embedded in branches, with multiple carpostomes.

Ecology - Sloping rock surfaces along surf-exposed coasts, at about mid intertidal; continuously wave-swept.

Distribution - Scattered localities in the Indo-Pacific.

Note - *Ahnfeltiopsis vermicularis* (C. Agardh) P.C. Silva et DeCew, also present in Sri Lanka, is markedly thicker (Fig. 154).

Fig. 153 (left). *Ahnfeltiopsis pygmaea*.
Fig. 154 (right). *Ahnfeltiopsis vermicularis*.

Portieria hornemannii (Lyngbye) P.C. Silva
in Silva *et al.* 1987: 39, 129

Fig. 155

REFERENCES: Tseng (1984: 70, pl. 38, fig. 2), Cribb (1996: 113, middle fig. p. 112), Calumpong & Meñez (1997: 181, + fig.), Trono (1997: 201, fig. 129), Huisman (2000: 92, + figs), Littler & Littler (2003: 84, top fig. p. 85), De Clerck *et al.* (2005b: 190, fig. 164), Oliveira *et al.* (2005: 72, + fig.), Huisman *et al.* (2007: 95, + figs).

TYPE LOCALITY: Probably Red Sea.

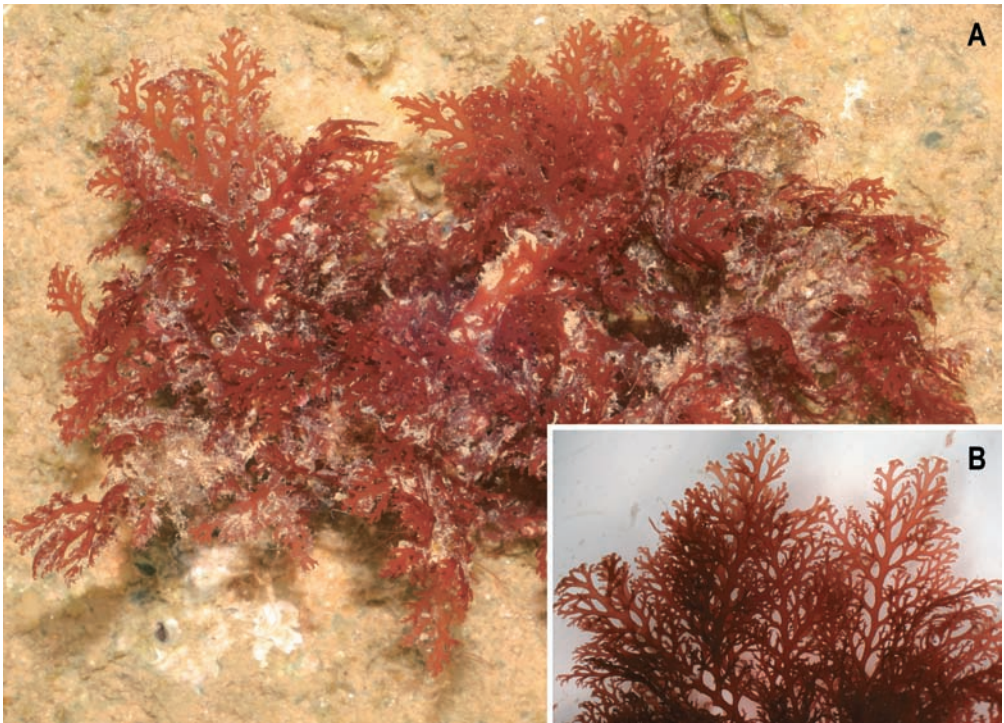
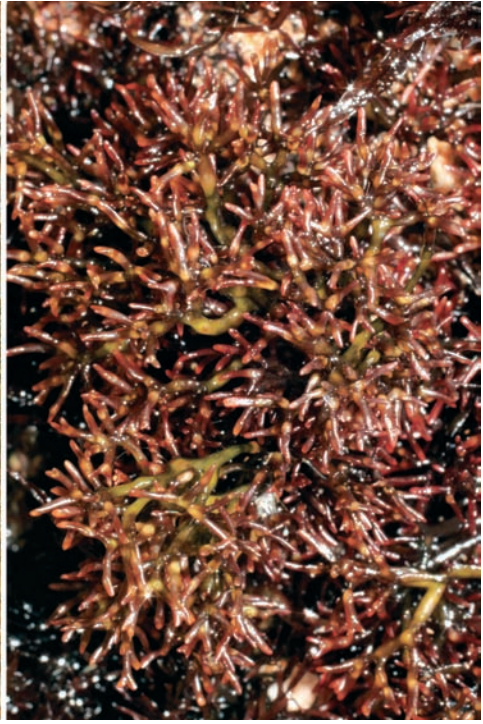
Description - Plants erect, up to 3-5 cm high, growing in isolated tufts composed of complanate, flat fronds, as broad as long, arising from a discoid holdfast, bright red to somewhat orange; axes compressed to flattened, 1-2 mm wide; branching alternate-distichous to subdichotomous in a single plane, with one or several percurrent axes and wide branching angles; indeterminate branches irregularly formed; ultimate pinnae usually less than 1 mm long, appearing like distichous denticulations near the frond apices; margins smooth; apices inrolled. Internal structure uniaxial; in transverse section axial cell ovoid, thick-walled, conspicuous, up to 170 µm in diameter; each axial cell producing a lateral branch; medullary cells globose, decreasing in diameter toward the periphery, quickly grading into a pigmented cortex; cortical cells rounded, often elongate, small, arranged in anticlinal filaments. Tetrasporangia grouped in nemathecium, irregularly cruciately to irregularly zonately divided; cystocarps wart-like, borne on the surface of terminal branchlets.

Ecology - Epilithic in the subtidal, from just under low water mark down to 2-5 m; locally abundant or even dominant; also collected at 25 m depth.

Distribution - Widespread in the Indo-Pacific and tropical eastern Atlantic.

Note - *Portieria* fundamentally differs from *Plocamium* by the absence of pectinate branching, the inrolled apices and the tetrasporangia being formed in nemathecium (in stichidia in the latter).

Fig. 155. *Portieria hornemannii*. A. Habit *in situ*; B. Detail.



Portieria tripinnata (Hering) De Clerck
in De Clerck *et al.* 2005: 192, figs 165, 166

Fig. 156

TYPE LOCALITY: Durban, South Africa.

Description - Plants erect, 2-3 cm high, forming dense little tufts of markedly incurved thalli, composed of complanate fronds, markedly narrower than long, arising from a discoid, brick- to orangy-red; axes compressed to flattened; branching distichous alternate to subopposite, with one or a few percurrent axes and small branching angles; indeterminate branches irregularly placed; axes broadest in the mid thallus, generally 0.5-1 mm; ultimate pinnae usually less than 0.5 mm long, appearing like denticulations near the frond apices; margins smooth; apices inrolled. Internal structure uniaxial; in transverse section axial cell ovoid, thick-walled, conspicuous, up to 120 μm in diameter; each axial cell producing a lateral branch; medullary cells globose, decreasing in diameter toward the periphery, quickly grading into a pigmented cortex usually 2-3 cells thick; cortical cells rounded, sometimes anticlinally elongate, small. Reproductive structures as in *P. hornemannii*.

Ecology - Epilithic on surf-exposed, continuously wave-swept rock walls in the mid intertidal.

Distribution - Mauritius, South Africa, Sri Lanka.

Note - A new record for Sri Lanka.

Fig. 156. *Portieria tripinnata*.

Euryomma platycarpa Schmitz
in Schmitz & Hauptfleisch 1897: 374

Figs 37F; 157

REFERENCE: Kylin (1932: 30-31, pl. 13, figs 30-31).

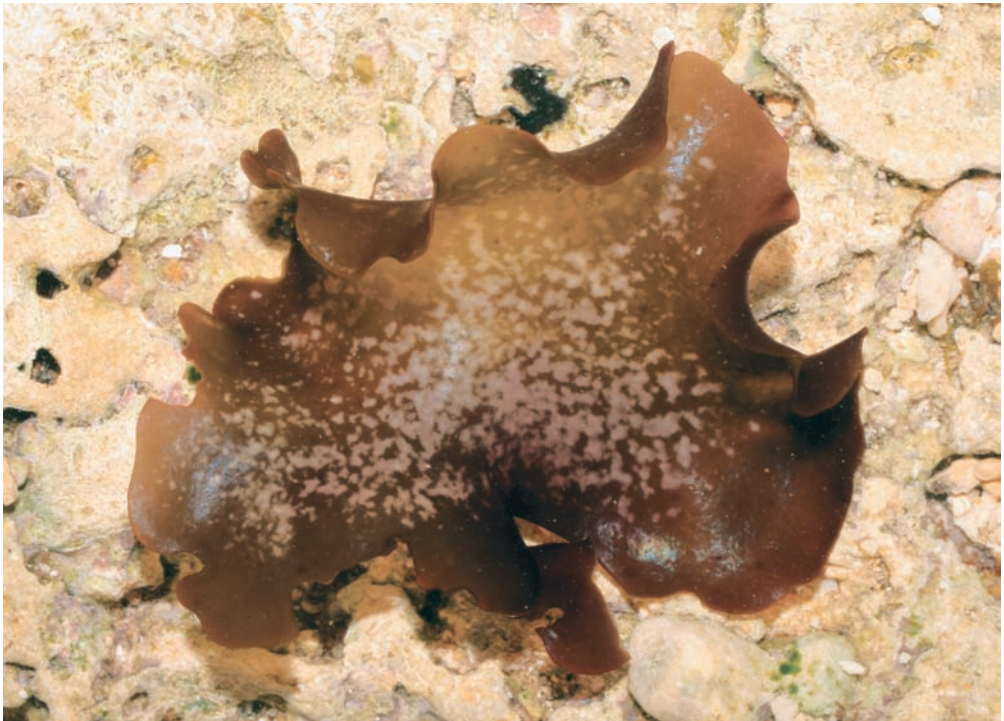
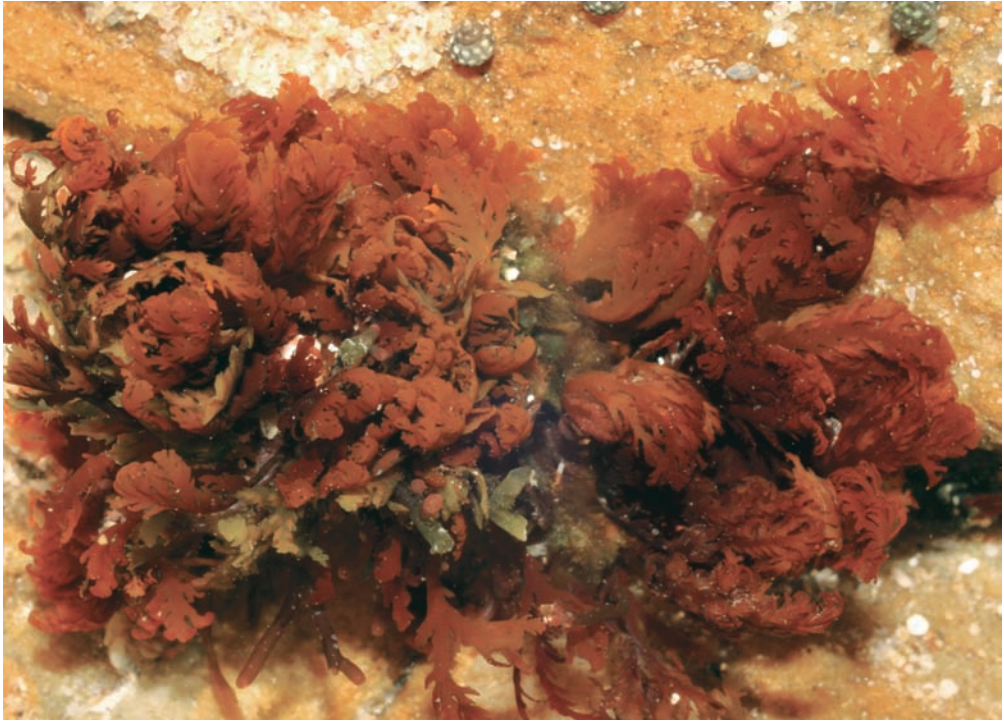
TYPE LOCALITY: Sri Lanka.

Description - Plants composed of a single blade or gregarious, 3-4 cm in diameter; relatively stiff and slippery, flexible cartilaginous, irregularly lobed and markedly undulated; very well attached by a discoid holdfast; dark purple to brownish, sometimes maculate, with creamy dots; cross section about 450 μm thick, composed of a filamentous medulla, 180-200 μm thick, surrounded by a cortex, 90-120 μm thick, composed of 5-6 cell layers, the outermost ones 9 μm long and 5 μm broad; cystocarps numerous and marginal.

Ecology - Epilithic, under rocky overhangs at about low water level. Rather rare.

Distribution - Sri Lanka.

Fig. 157. *Euryomma platycarpa*.



Sarcodia montagneana (J.D. Hooker et Harvey) J. Agardh
1852: 623-624

Figs 21G; 158

REFERENCES: Moorjani & Simpson (1988: 31, pl. 66), Oliveira *et al.* (2005: 92, + figs p. 93).

TYPE LOCALITY: Bay of Islands, New Zealand.

Description - Thalli generally clustered in small groups, arising from a crustose base, with a very short cylindrical stipe bearing 5-10 cm long, fleshy-cartilaginous straps, 1-3 cm broad; these more or less dichotomously branched in a single plane, with rounded axils and apices, irregularly undulated, with greater or lesser numbers of marginal wart-like to papulose proliferations; dark red to purplish. Medulla filamentous with a combination of thin-walled primary and thick-walled rhizoidal filaments; cortex composed of 2-3 layers of isodiametric unpigmented subcortical cells and a single layer of very small pigmented cells. Cystocarps markedly protruding, scattered across the blades (but mostly grouped) or confined to the margins.

Ecology - Epilithic, mostly on vertical substratum, but also collected from horizontal walls of the low intertidal, exposed to surf.

Distribution - Scattered localities in the Indian and tropical Pacific Oceans, but also mentioned from Antarctic regions.

Note - *Sarcodia ceylanica* Harvey ex Kützing has been synonymized with *S. montagneana* by Yendo (1917: 82-83).

Fig. 158. *Sarcodia montagneana*. A. *In situ*, between *Gracilaria corticata*; B. Male plant.

Carpopeltis maillardii (Montagne et Millardet) Chiang
1970: 68-69, pl. XXIV

Fig. 159

REFERENCES: Desikachary *et al.* (1990: 264, pl. 39), Littler & Littler (2003: 92, middle fig. p. 93), De Clerck *et al.* (2005b: 200, fig. 174), Oliveira *et al.* (2005: 66, fig. p. 67).

TYPE LOCALITY: Réunion.

Description - Plants creeping with erect portions, 4-9 (up to 11) cm high, composed of complanate fronds, cartilaginous, stiff and tough but flexible, very well attached by a discoid holdfast, dark bordeaux-red; a short stipe present, especially in older specimens; upper parts strap-like, 0.5-4 mm wide, with a faint proximal midrib, thin but crisp, undulated, with rounded to curled apices and rounded axils; branching dichotomous to irregular. Internal structure composed of a narrow medulla consisting of densely packed filaments, lacking ganglionic cells; cortex 4-8 cells thick, composed of anticlinally directed filaments; inner cortical cells roughly isodiametric; outer cortical cells slightly elongate.

Ecology - Epilithic, mostly on shaded, extremely surf-exposed sites between rock boulders or in surf gulleys at about low tide level and shallow subtidal. Locally forming a well-marked, narrow belt.

Distribution - Indian Ocean and tropical Pacific Ocean.

Fig. 159. *Carpopeltis maillardii*.



***Grateloupia lithophila* Børgesen**

1938b: 215-216, pl. VII

Figs 23F; 32A; 160

REFERENCE: Desikachary *et al.* (1990: 238, pl. XXXI C, XXXIV A, fig. 46).

TYPE LOCALITY: Madras, India.

Description - Plants gregarious, specimens in the higher intertidal zone rather stiff and erect, 3-6 cm high, those from close to low water mark extremely supple and slippery, laying down on the substrate, 5-10 (-22) cm long; morphologically extremely variable within a single population, from yellowish green to purplish or bordeaux red; attachment by a small basal disc; basal part cylindrical, flattening upwardly; frond linear-lanceolate to curved or even sinuous, composed of a narrow strap, 2-5 (-8) mm wide at its widest (middle) part, tapering proximally as well as distally, 200-250 μ m thick, flat to undulated, with straight to sinuous margins, unbranched or di (tri-) chotomous once or twice near the basis; margins bare or with marginal, upwardly curved proliferations which can be small and unilateral to large and pinnately placed; the large proliferations can again be provided with proliferations, finally resulting in a bushy aspect, but still branched in a single plane; apices originally acute, sometimes becoming truncate and bearing several apical proliferations of the same size. Medulla composed of intertwined filaments and stellate cells; inner cortical cells loosely arranged, outer cortex more compact and composed of smaller cells (5-8 x 3-4 μ m).

Ecology - Epilithic, mainly on horizontal (sometimes sand-covered) rock substratum but also on vertical walls, along surf-exposed coasts, from high (extremely surf-exposed) to low (more sheltered) intertidal. Locally forming a well-defined belt.

Distribution - India, Sri Lanka, Yemen.

Note - Molecular research (De Clerck *et al.* 2005: 396) shows that the specimens of *Grateloupia* from Sri Lanka and Madagascar form a separate clade within the *G. 'filicina'* group worldwide.

Fig. 160. *Grateloupia lithophila*.

***Halymenia durvillei* Bory de Saint-Vincent**

1828: 180-181, pl. 15

Figs 38C; 39D; 41D; 161

REFERENCES: Lewmanomont & Ogawa (1995: 121, + fig.), Calumpong & Meñez (1997: 169, + fig. p. 170), Trono (1997: 185, fig. 118), Littler & Littler (2003: 94, bottom fig. p. 95), De Clerck *et al.* (2005b: 204, fig. 178), Oliveira *et al.* (2005: 68, + fig. p. 69), Ohba *et al.* (2007: 99, + figs).

TYPE LOCALITY: New Ireland, Papua New Guinea.

Description - Plants erect, up to 30 cm high, lubricous and slippery to the touch, composed of a supple foliose frond arising from a discoid holdfast, medium red; stipe short, less than 1 cm long, expanding abruptly in a flattened blade; blade irregularly cleft up to 5 orders, resulting in straps 4-20 mm in width and ca 600 μ m thick; apices acute and the surface covered with acute proliferations, which may develop into new axes. Internal structure composed of a pseudoparenchymatous cortex and a filamentous medulla; cortex 60-80 μ m thick, 6-8 cells thick, arranged in anticlinal rows; medullary filaments 8-12 μ m in diameter, with relatively abundant inner-cortical refractive ganglionic cells. Tetrasporangia scattered over the thallus surface, cruciately or decussately divided, 14-20 μ m long and 12-15 μ m wide.

Ecology - Epilithic in the subtidal, between 1 and 4 m depth, mostly in lagoons.

Distribution - Indian Ocean and tropical Pacific Ocean.

Fig. 161. *Halymenia durvillei*. A. Habit; B. Detail of a blade.



Polyopes ligulatus (Harvey ex Kützing) 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 μ m 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.).

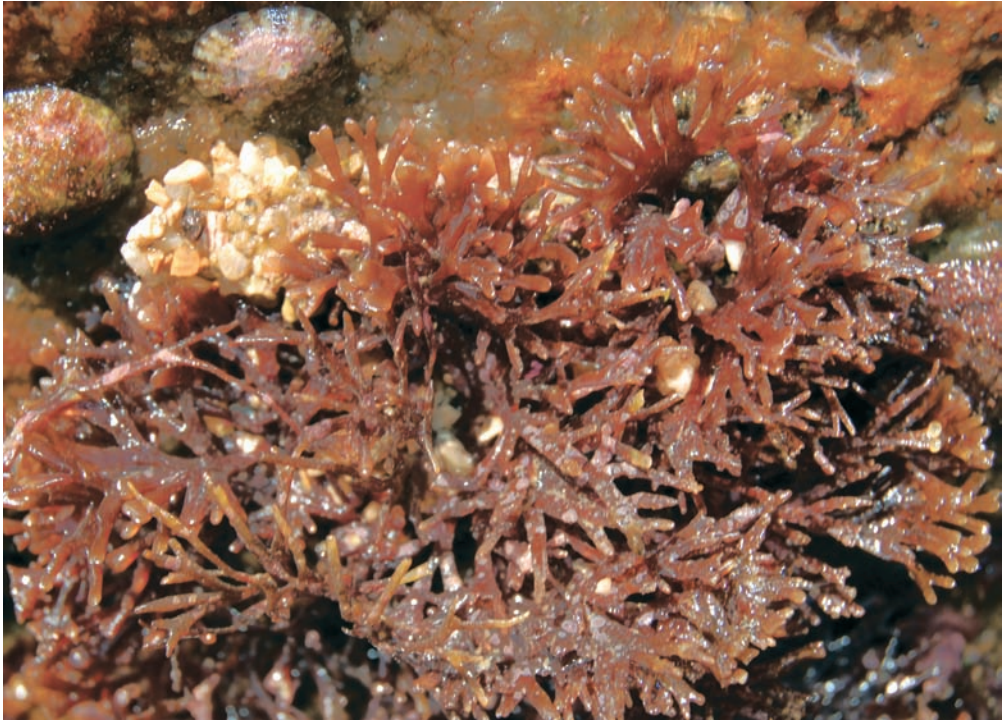
TYPE LOCALITY: Madras, India.

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 intricately 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 forcpitate, 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.



Ceramiu 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 involucrel 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. *Ceramiu 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.

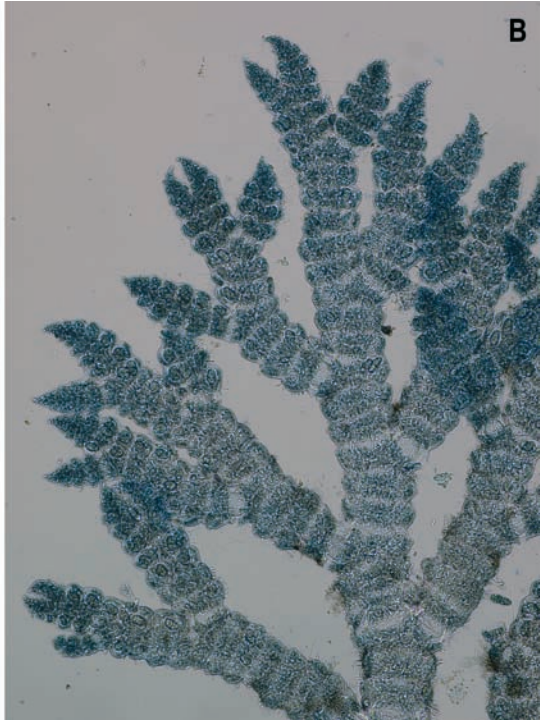
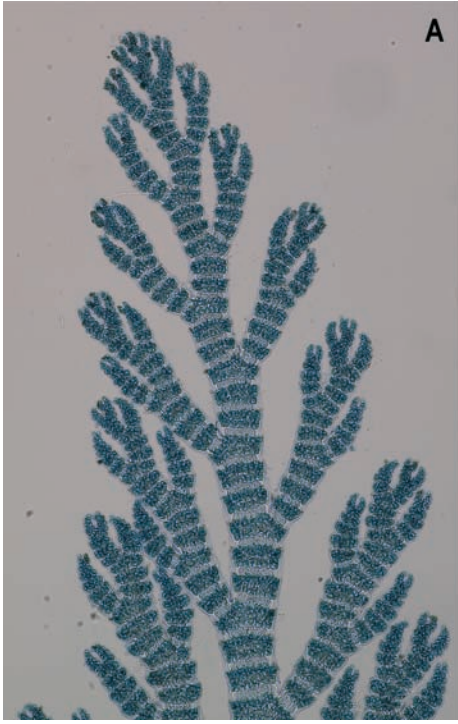
Ceramiu sp.

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* (Kützing) 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 *Ceramiu* 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. *Ceramiu 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.

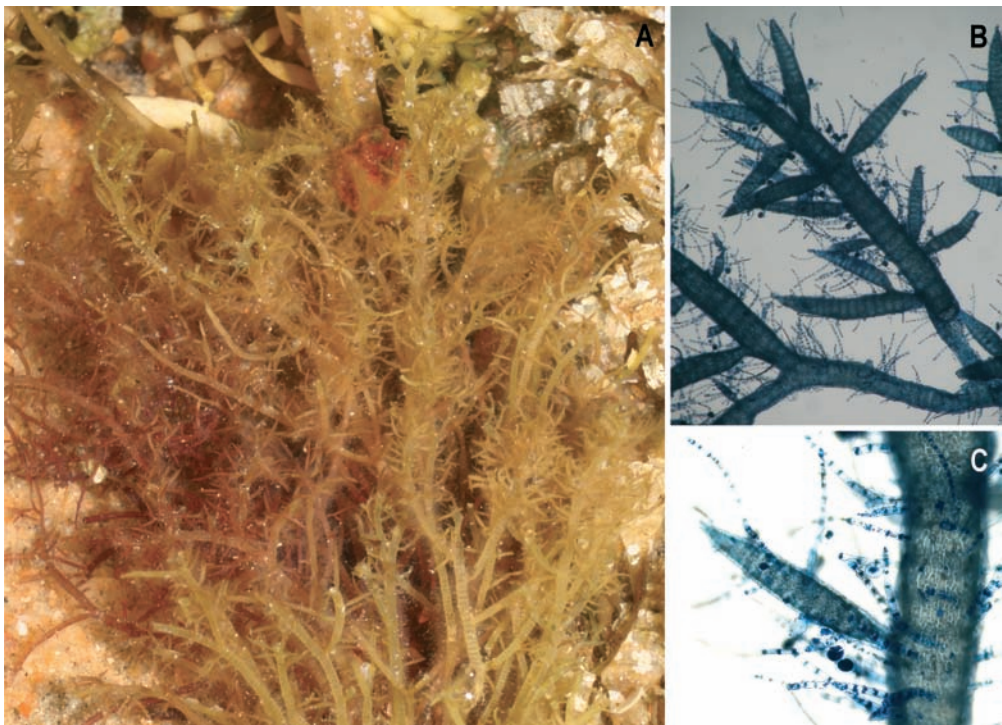
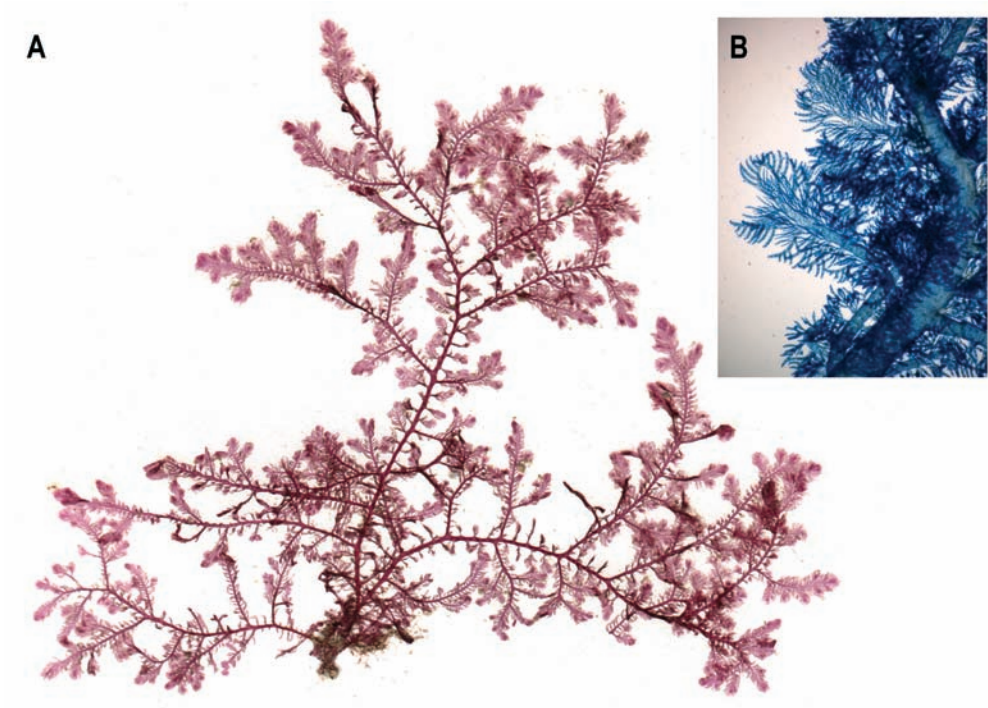
Description - Plants gregarious, forming isolated tufts, erect, 5-10 cm long, bright pinkish red; attachment by well-developed stolonoidal structures; all axes cylindrical, the side branchlets markedly fusiform; basal parts of the main axes (almost) bare, about 1 mm in diameter, the upper parts more densely branched, in some specimens even becoming densely intricately branched, 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.



***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).

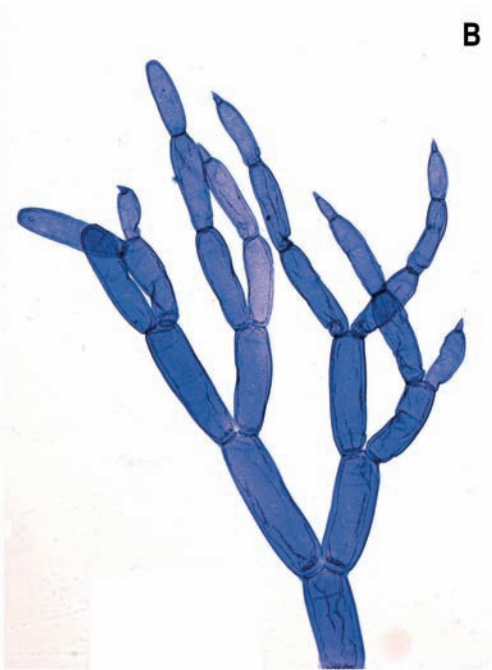
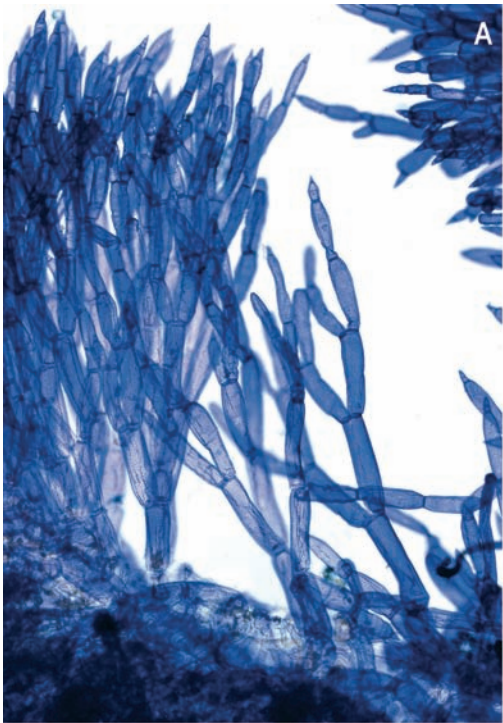
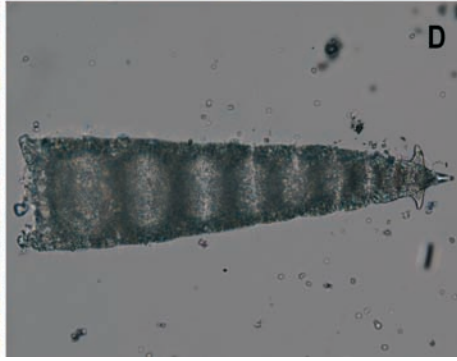
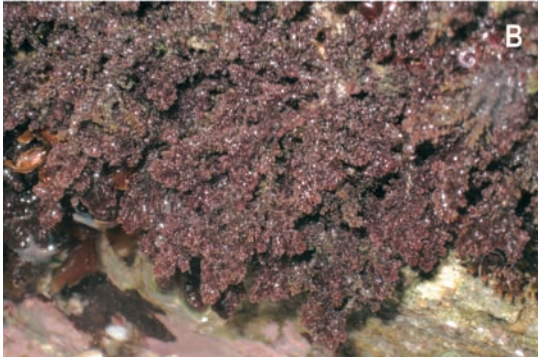
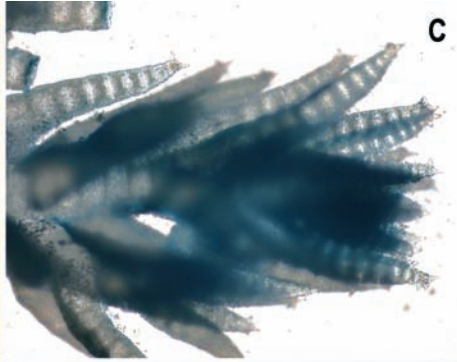
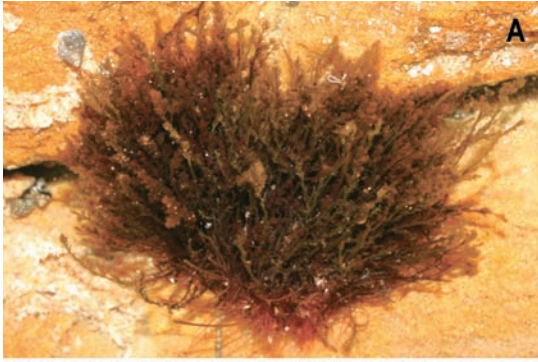
TYPE LOCALITY: Roque del Gando, Islas Canarias.

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-Vincent
in Bélanger et Bory de Saint-Vincent 1834: 170-171, pl. 15: fig. 2 Fig. 174

REFERENCES: 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 leprieurii (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).

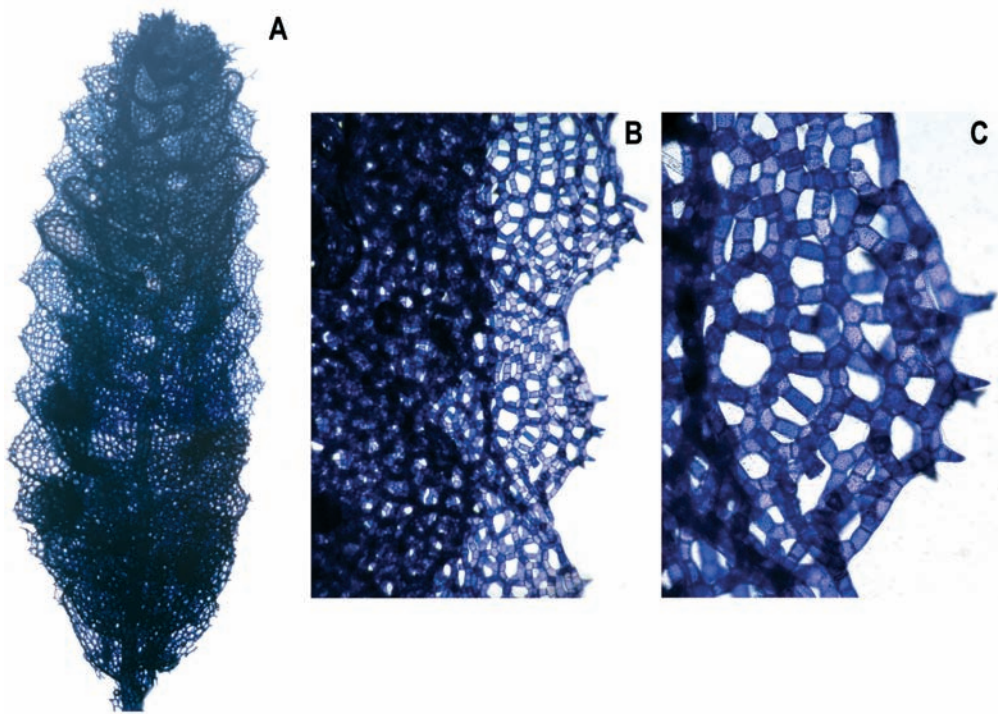
TYPE LOCALITY: Near Cayenne, French Guiana.

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 leprieurii*.



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.

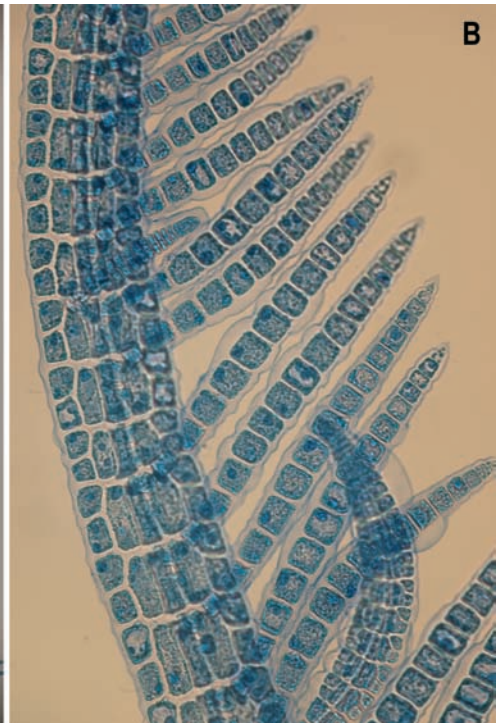
Description - Plants growing in isolated, very delicate tufts, composed of erect, radially placed, extremely supple filamentous-looking narrow straps, 3-4 cm long; purplish iridescent. Prostrate parts terete, polysiphonous with 4 pericentral cells, attached by rhizoids with pads at the tips; erect parts 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).

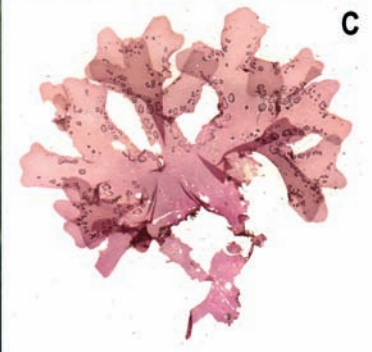
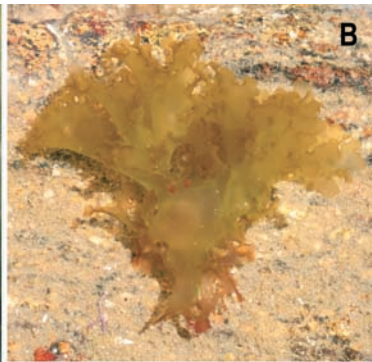
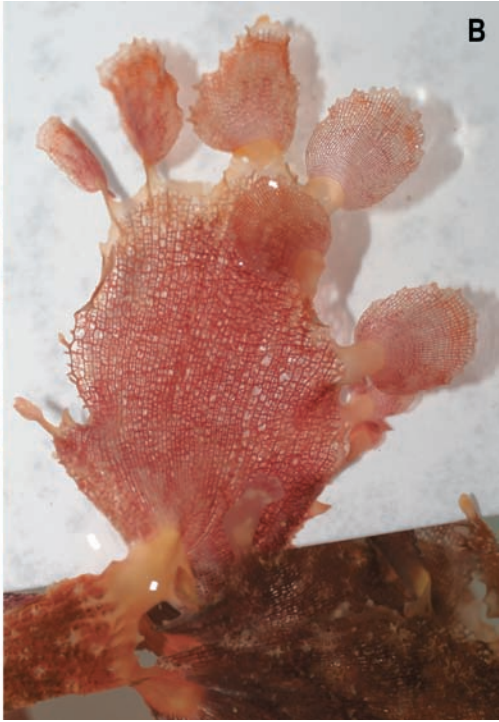
TYPE LOCALITY: Sri Lanka.

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* (Kützting) 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.

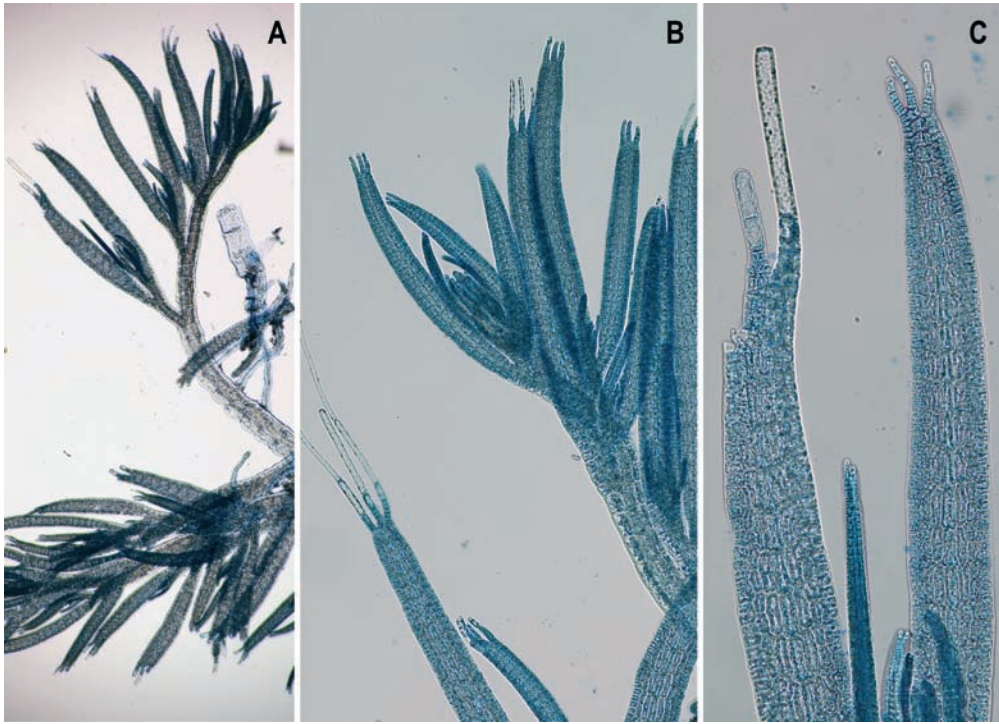
Description - Plants stiff-crispy, to 3 cm tall, dark red with some bluish iridescence, consisting of a sessile, coarse, net-like frond, frequently horizontally placed and downwardly bent like a watchglass or irregularly contorted; attachment by pad-like structures, at the base and where the thallus 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.



***Acanthophora spicifera* (Vahl) Børgesen**

1910: 44

Figs 26A; 182

REFERENCES: Tseng (1984: 142, pl. 74, fig. 2), Lewmanomont & Ogawa (1995: 90, + fig.), Cribb (1996: 65, middle fig. p. 64), Calumpong & Meñez (1997: 167, + fig.), Trono (1997: 255, fig. 159), Abbott (1999: 355, figs 102D-E), Huisman (2000: 154, + fig.), Payri *et al.* (2000: 270, fig. p. 271), Littler & Littler (2003: 142, bottom fig. p. 143), Oliveira *et al.* (2005: 126, + figs), Huisman *et al.* (2007: 139, + figs), Ohba *et al.* (2007: 120, + figs), Skelton & South (2007: 170, figs 455-458).

TYPE LOCALITY: St. Croix, Virgin Islands.

Description - Plants gregarious, erect, about 10 cm high, stiff-brittle, greenish to purplish red; thalli attached by digitate holdfasts that may produce rhizomatous branches; main branching irregular, from sparse to dense, axes cylindrical, 2-3 mm in diameter; determinate branches spirally arranged, bearing spirally arranged spine-like laterals; branch apices pyramidal with branched trichoblasts which are fugacious. Structure seemingly pseudoparenchymatous but in fact polysiphonous, with 5 pericentral cells covered by a thick cortex; outer cortical cells rectangular and longitudinally oriented. Lenticular thickenings in walls of pericentral and inner cortical cells may occur. Reproductive structures borne on the short, spine-like branchlets; tetrasporangial branchlets swollen, very spiny, without trichoblasts; 1 tetrasporangium per fertile segment, developing in tiers in the 'stichidium'.

'Loose-lying' specimens in the lagoon of Chilaw are ball-like, up to 30 cm in diameter, with much more slender and supple branches which are less branched.

Ecology - Best developed in the subtidal, on dead coral heads or coral fragments on sand, in lagoons; smaller, tougher and more densely branched specimens in low intertidal pools.

Distribution - Pantropical.

Fig. 182. *Acanthophora spicifera*.

***Bostrychia tenella* (J.V. Lamouroux) J. Agardh**

1863: 869-871

Figs 16E; 183

REFERENCES: Tseng (1984: 144, pl. 75, fig. 3), Lewmanomont & Ogawa (1995: 96, + fig., as *B. binderi*), Cribb (1996: 71, top fig. p. 70), Trono (1997: 259, fig. 161, as *B. binderi*), Calumpong & Meñez (1997: 159, 160, + figs), Huisman (2000: 156, + fig.), De Clerck *et al.* (2005b: 248, fig. 250), Oliveira *et al.* (2005: 128, + figs p. 129), Skelton & South (2007: 169, figs 451-454).

TYPE LOCALITY: St. Croix, Virgin Islands.

Description - Plants prostrate, forming mats up to 40 cm in diameter, dark purple to brown; attached by rhizoids developing from the ventral side of the prostrate axes, associated with bifurcations of the axes; axes cylindrical, to 500 µm in diameter; up to 3-4 orders alternately branched, from every to every fourth axial cell. Internal structure polysiphonous except for ultimate and penultimate branches; composed of an axial filament surrounded by 5-7 pericentral cells; major axes covered by a cortex 2-3 cells thick; pericentral cells dividing transversely, resulting in 2 tiers of pericentral cells per axial cell. Tetrasporangia formed in series in inflated ultimate branchlets (stichidia), produced in whorls of 4 and covered by (2-)3 cover cells, tetrahedrally divided, 30-70 µm in diameter.

Ecology - On shaded vertical and overhanging walls, upper intertidal zone (supralittoral fringe).

Distribution - Pantropical.

Fig. 183. *Bostrychia tenella*. A. Habit *in situ*; B. Detail of a herbarium specimen with various branch morphologies.



***Bryocladia thwaitesii* (Harvey ex J. Agardh) De Toni**

1903: 968

Figs 23E; 184

REFERENCES: Durairatnam (1961: 70, pl. xviii, figs 1-3).

TYPE LOCALITY: Sri Lanka.

Description - Plants growing as almost continuous, monospecific populations of isolated tufts; individual plants composed of intricately branched, prostrate axes, attached by unicellular rhizoids with pad-like tips and erect branches, 3 to 5 cm long, having a percurrent axis with few secondary axes. Stolons ramified and bending upwards at their apices, giving rise to the erect thalli; all axes ecorticate, densely clothed with isolated groups of short, determinate, spine-like, upwardly directed, exogenous, polysiphonous branchlets, spirally arranged, and with a variable number of pericentral cells (up to 11 in vigorous specimens). Secondary, endogenous branchlets bearing trichoblasts, adventitiously formed in axils of some spine-like branchlets on upright axes. Reproductive structures borne on secondary, endogenously derived branchlets. Tetrasporangia single in a segment, in a straight series, stichidia in clusters on short axes.

Ecology - On (frequently sand-covered) rocks, close to the sandy substratum at about low tide level; sometimes together with *Grateloupia lithophila*.

Distribution - India, Sri Lanka.

Fig. 184. *Bryocladia thwaitesii*. A. Habit *in situ*; B. Microscopic detail of apical part; C. Cystocarp.

***Chondria armata* (Kützting) Okamura**

1907: 69-71, pl. XVI, figs 9-19

Figs 22H; 185

REFERENCES: Tseng (1984: 144, pl. 75, fig. 4), Cribb (1996: 75, middle fig. p. 74), Calumpong & Meñez (1997: 166, + fig. p. 167), Trono (1997: 260, fig. 162), Huisman (2000: 157, + fig.), Littler & Littler (2003: 144, bottom fig. p. 145), De Clerck *et al.* (2005b: 248, fig. 251), Oliveira *et al.* (2005: 130, + fig. p. 131).

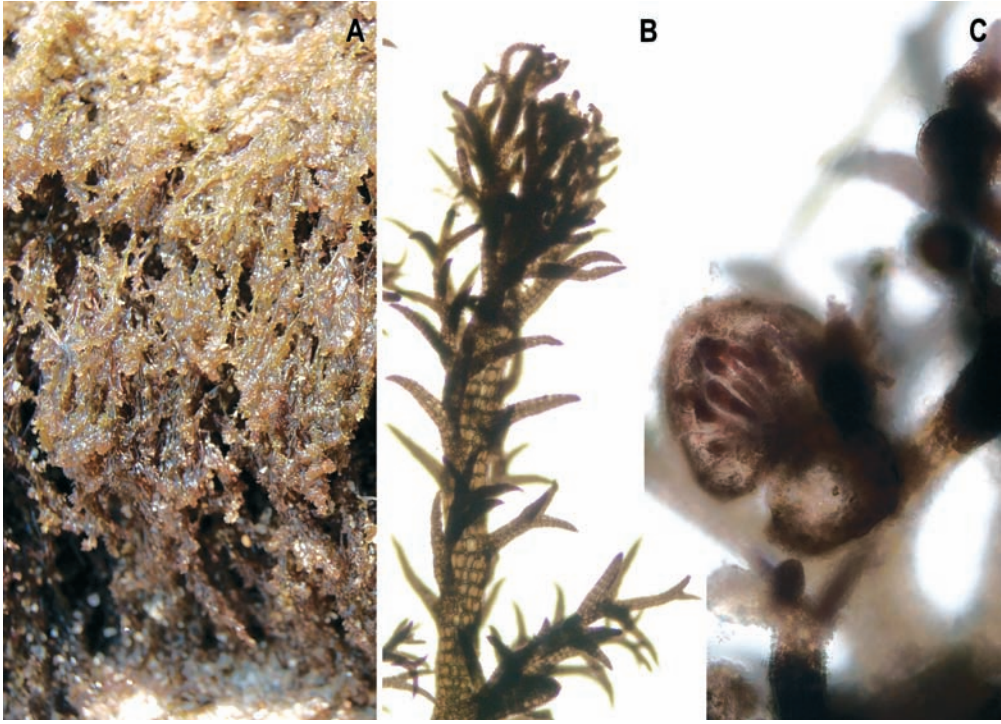
TYPE LOCALITY: Wagap, New Caledonia.

Description - Plants generally gregarious, more rarely isolated, up to 4 cm high, the basal parts rather stiff, the upper parts more supple, all axes being cylindrical; pinkish red, sometimes with creamy tips, turning dark brown upon drying; very well attached by thick, fleshy discoid holdfasts; individual thalli composed of irregularly branched prostrate axes, up to 1.5 mm in diameter bearing closely placed perennial upright axes, ca 1 mm in diameter near the base, gradually tapering to the apex, bearing markedly thinner, annual branches, provided with radially placed side branches of rather uniform length; these ultimate branchlets 3-5 mm long and 400 µm in diameter, not tapered proximally; apices acute, with a prominent apical cell, not depressed; trichoblasts caducous, but present in the distal thallus parts. Internal structure composed of an axial filament surrounded by 5 pericentral cells which remain discernable throughout the thallus, and a medulla composed of isodiametric cells decreasing in size toward the periphery; cortical layer cells 20 µm in diameter wide and 60-80 µm long. Tetrasporangia formed in ultimate branchlets, tetrahedrally divided, ca 100 µm in diameter.

Ecology - Epilithic, just above low water level, along surf-exposed coasts and thus continuously wave-swept.

Distribution - Widespread in the Indian Ocean and the tropical western Pacific Ocean.

Fig. 185. *Chondria armata*.



Laurencioids

Fig. 186

Recently, several papers have been published on representatives of the *Laurencia*-complex. Morphological and anatomical characters as well as molecular data led to the description or resurrection of three additional genera (*Chondrophyucus*, *Osmundea* and *Palisada*) and the subsequent transfer of many species formerly placed in *Laurencia*. As an example, *Laurencia papillosa* (C. Agardh) Greville was transferred to the genus *Chondrophyucus* by Garbary & Harper in 1998. In 2006, Nam transferred it to the genus *Palisada*. Most of these studies were based on specimens from a given area or selected specimens worldwide, not including material from Sri Lanka. Awaiting a thorough study of Sri Lankan representatives of the *Laurencia*-complex, we are using tentative identifications for some entities and illustrate some unidentified representatives.

Silva *et al.* (1996: 503-521) mention 13 species of *Laurencia* as being reported from Sri Lanka (some of which with several varieties), but many more from India.

***Laurencia natalensis* Kylin**

1938: 24, pl. 8: fig. 21

Figs 11D; 22I; 186E

This is the most abundant *Laurencia*-species just above low tide level, growing in extensive vegetations with the basal parts being greenish and the apices orangy-red. The Sri Lankan specimens agree morphologically with the description and illustration of *L. natalensis* in De Clerck *et al.* (2005: 256, fig. 263). This taxon has been recorded from South Africa (type locality), Mozambique, Kenya and Mauritius. Additional research is needed to ascertain conspecificity of the Sri Lankan specimens with the *L. natalensis* from southern Africa.

***Laurencia* sp.**

Fig. 186D

This representative has only been collected on deep water rock boulders, between 18 and 20 m depth. The specimens agree well with material from Papua New Guinea housed in GENT, identified as *Laurencia pediculariodes* Børgesen (see Millar *et al.* 1999: 573, fig. 6D and Coppejans & Millar, 2000: 333). Interestingly, a recent study of the species by Furnari *et al.* (2004) indicates that our specimens may after all not belong to this taxon.

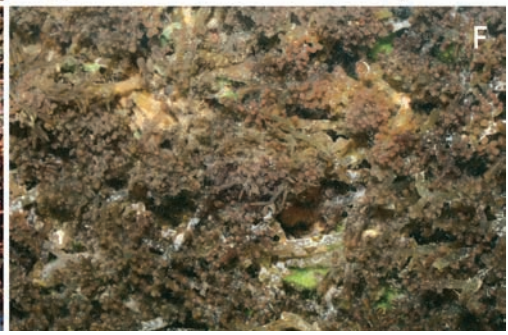
***Palisada papillosa* (C. Agardh) K.W. Nam**

2007: 54

Fig. 186F

Our specimens grossly resemble typical specimens of this taxon, but they are smaller and rather repent than erect.

Fig. 186. Laurencioids (*Chondrophyucus* / *Laurencia* / *Osmundea*-complex). A. Prostrate cushion-like Laurencioid; B. Iridescent, coarse cushion-like Laurencioid; C. Laurencioid with long, perpendicularly placed side branches; D. Deepwater Laurencioid; E. *Laurencia natalensis*; F. *Palisada papillosa*.



Chondrophyucus ceylanicus (J. Agardh) M.J. Wynne, Serio, Cormaci
et G. Furnari 2005: 499, figs 1-4

Fig. 187

REFERENCES: Svedelius (1906: fig. 2, 8, as *Laurencia ceylanica*), Durairatnam (1961: 74, pl. xvii, figs 6, 7, as *Laurencia ceylanica*), Wynne *et al.* (2005: 499, figs 1-4).

TYPE LOCALITY: Sri Lanka.

Description - Thalli gregarious, composed of densely arranged robust, rigid, cartilaginous, compressed axes arising from aggregated discoid holdfasts, 3-5 cm high, dark red; axes 3-4 mm wide and 2.2-2.4 mm thick, irregularly ramified (up to two orders), bearing upwardly directed, alternate and distichous to sub-opposite branches and branchlets. Axes and branches often provided with short wart-like branchlets. Epidermal cells not secondarily pit-connected, radially arranged in palisades on transverse section, 24-26 μm long by 5-8 μm broad; no lenticular thickenings on the medullary cells; two pericentral cells per axial cell.

Ecology - Epilithic just above low water mark, on rocks exposed to severe surf.

Distribution - Indian Ocean and western tropical Pacific Ocean.

Note - Numerous species of *Chondrophyucus* and *Laurencia* occur along the Sri Lankan coasts. They are actually under study.

Fig. 187. *Chondrophyucus ceylanicus*.

Leveillea jungermannioides (Hering et G. Martens) Harvey
1855: 539

Fig. 188

REFERENCES: Tseng (1984: 156, pl. 81, fig. 3), Lewmanomont & Ogawa (1995: 129, + figs), De Clerck & Coppejans (1996: 265, figs 127-128), Calumpong & Meñez (1997: 165, + fig.), Abbott (1999: 396, figs 116A-D), Huisman (2000: 173, + fig.), Oliveira *et al.* (2005: 140, + fig. p. 141), Skelton & South (2007: 181, figs 480-484).

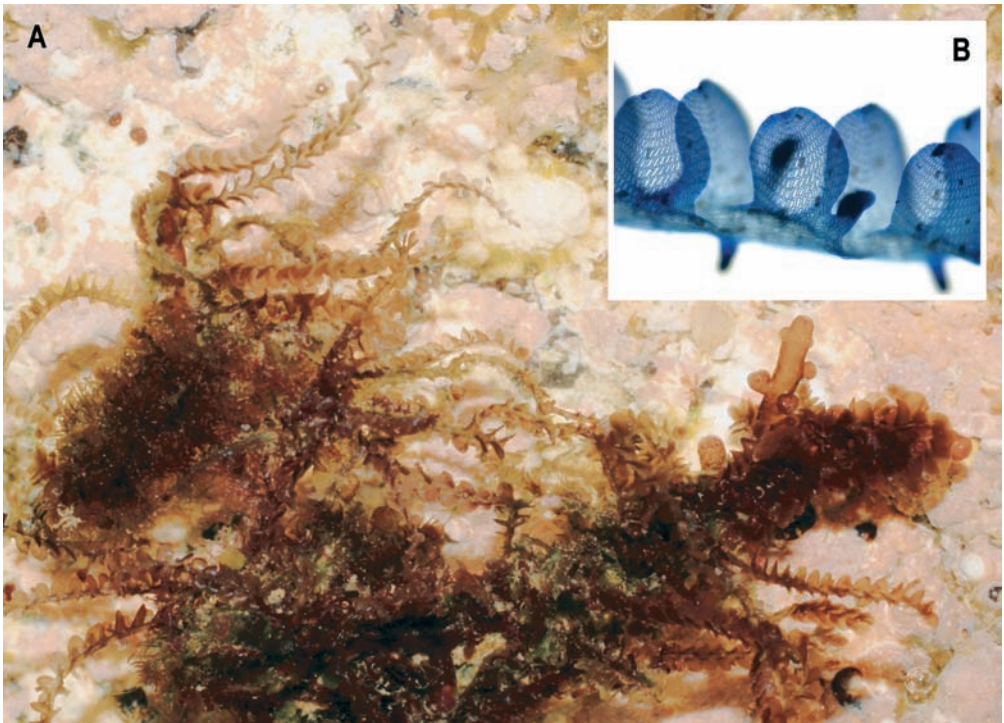
TYPE LOCALITY: Tor, Sinai Peninsula, Egypt.

Description - Plants prostrate, up to 5 cm long, blackish red, composed of branched axes bearing 2 rows of erect, broadly ovate, membranous branches; thallus decumbent, with cylindrical main axes with inrolled apices cutting off alternate indeterminate side axes with similar morphology; these axes with 4 pericentral cells in the juvenile parts and 7 pericentral cells in mature parts; attachment at intervals by groups of multicellular rhizoids with well-adhering terminal pad-like structures; prostrate axes bearing bilaterally arranged, erect, asymmetrical, broadly ovate, monostromatic (except midrib) bladelets, 650-800 μm broad and 500-1000 μm high, arranged in an alternate sequence, partly overlapping one another and bearing colourless, deciduous trichoblasts at the apices; cells of these bladelets more or less arranged in vertical and horizontal rows. Four to eight tetrasporangia formed in short, curved, stichidia-like branchlets that replace indeterminate branches; each tetrasporangium in own 'chamber' demarcated by vertical elongate cells and surrounded distally by 2-3 cover cells: only 4-6 tetrasporangia mature.

Ecology - Epiphytic, mostly on *Sargassum* in low intertidal rock pools. Mostly overlooked as a result of its small size and similar colour to the phorophyte.

Distribution - Widespread in the Indian Ocean and western tropical Pacific Ocean.

Fig. 188. *Leveillea jungermannioides*. A. Habit, epiphytic on *Laurencia* sp.; B. Microscopic detail.



***Murrayella periclados* (C. Agardh) Schmitz**

1893: 227 footnote

Figs 16F; 189

REFERENCES: Littler & Littler (2000: 222, top figs p. 223), Oliveira *et al.* (2005: 142, + fig. p. 143), Skelton & South (2007: 184, figs 488-492).

TYPE LOCALITY: Mahé Island, Seychelles.

Description - Thalli forming densely felted coverings in which the individual filamentous plants are not recognizable with the naked eye; dull dark red-brown. Filaments composed of a prostrate system giving rise to erect filaments to 2 cm tall; attachment by rhizoids produced by the ventral periaxial cells, terminating into a disc; main axes polysiphonous, dichotomous below, alternate higher up, with 4 periaxial cells, slightly corticated near the base, ecorticate above; spirally placed branchlets monosiphonous, originally one per segment, deciduous, slightly upcurved, very thin (25-30 µm) and slender, unbranched or branched at their basis.

Ecology - Epilithic on shaded vertical and overhanging walls of fossil coral platforms at high water level, just under the *Bostrychia*-zone.

Distribution - Pantropical.

Fig. 189. *Murrayella periclados*. A. Whole plant; B. Detail of branching pattern.

***Tolypocladia calodictyon* (Harvey ex Kützing) P.C. Silva**

1952: 308

Fig. 190

REFERENCES: Oliveira *et al.* (2005: 147), Ohba *et al.* (2007: 124, + figs).

TYPE LOCALITY: Tonga.

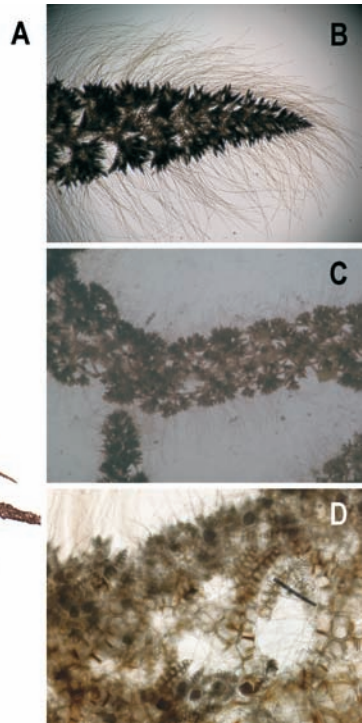
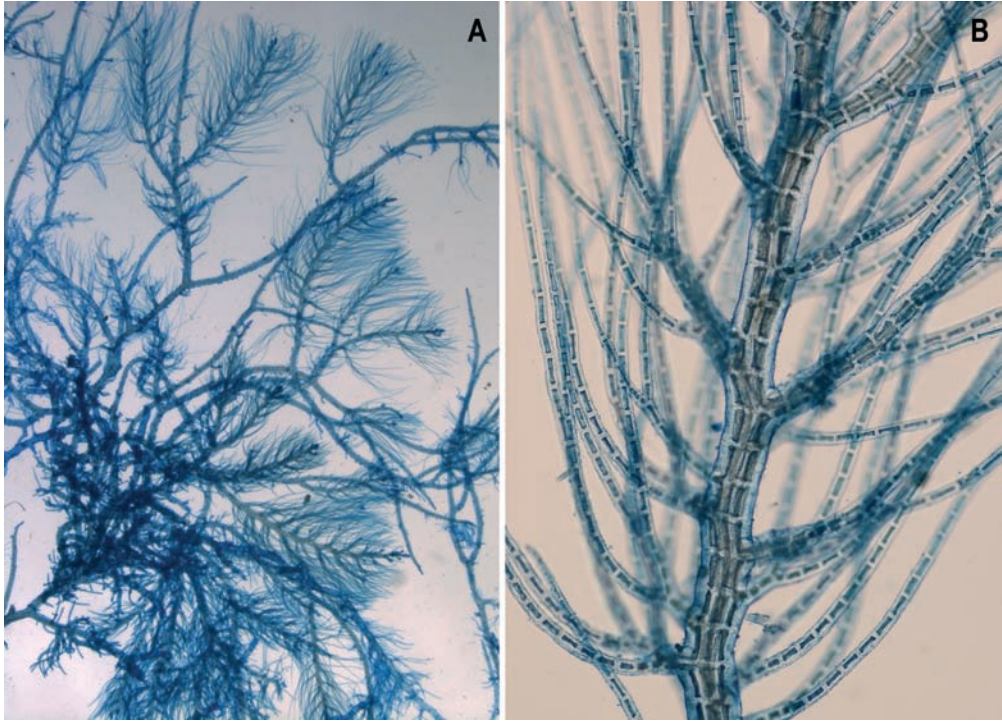
Description - Plants forming hemispherical tufts of up to 20 cm in diameter, composed of radially placed, entangled, supple, spongy branches; dark red, becoming black upon drying; main axes irregularly branched, longer and shorter indeterminate side branches mixed; total diameter of the branches at the basis up to 5 mm, gradually tapering towards the pointed apices; all axes polysiphonous, with 4 pericentral cells, devoid of any cortication; segments shorter than wide; axes and indeterminate branches densely clothed with numerous determinate, branchlets, perpendicularly placed on the axes; branchlets exogenously formed on most segments in a 1/4 spiral sequence, dichotomously branching at wide angles, the distal ends being divided 1-2 (or more) times into 1-several short spine-like branchlets; unbranched trichoblast borne on branchlet in early stages, young cells of trichoblast pigmented, later becoming colourless and deciduous; apices of a determinate branchlet anastomosing with those of the previous and following determinate branchlet, resulting in a three-dimensional network and a spongy texture in the major part of the thallus, but some thinner indeterminate branches of the same thallus with isolated (non-anastomosing) determinate branchlets.

Ecology - Epiphytic on seagrasses (mainly *Halodule wrightii*) just under low water level on a sandbank in Puttalam lagoon; locally abundant.

Distribution - Indian Ocean and western tropical Pacific Ocean.

Note - In *T. calodictyon* most of the determinate side branchlets are anastomosing whereas they remain completely free in *T. glomerulata* (C. Agardh) F. Schmitz. Skelton & South (2007: 191) state that the features used to distinguish the four species of *Tolypocladia* are yet to be properly tested. Falkenberg (1901) already suggested they may all be conspecific, belonging to *T. glomerulata*.

Fig. 190. *Tolypocladia calodictyon*. A. Habit (herbarium specimen); B. Apex with numerous hairs; C. Intercalary portion with anastomoses; D. Branch with tetrasporangia.



11. Glossary

abaxial: away from the axis

abutting: lying adjacent or bordering on

acropetal: in the direction from the base toward the apex

acuminate: tapering gradually to a point

acute: with a sharp angle; ending in a point

adaxial: towards the axis

adherent: (well) attached or sticking

adventitious (branching): supplementary to the normal (branching) pattern

air bladder = aerocyst: air-filled vesicle in several brown algae

algal turf: short vegetation mats composed of several intricate seaweed species

alpha diversity: or local diversity, is the species diversity within a site

alternate-distichous: branches on two rows but the individual branches of both rows on different levels, not opposite to each other

anastomosing: locally (regularly or irregularly) united, resulting in a network

anastomosis: point of junction of two branches

annular: ring-like

anticlinal(ly): perpendicular to the surface or periphery of a structure

apex (apices): tip, summit

apical: at or near the summit

apiculate: with a short, abrupt point

arcuate: like an arch of a bridge, bent or curved like a bow

articulated: jointed; composed of stiff parts attached to each other by (more or less) flexible parts

ascending: basal part horizontally spread, apical part upwardly directed (= decumbent)

aseptate: without transverse walls

assimilator: in *Caulerpa* used as the upright frond

auriculate: with ear-like appendages

axis (axes): main stem or major branch (theoretically with infinite growth)

basipetal: from the apex downward toward the base

beta diversity: or species turnover, the change in species composition from site to site

bifurcate: divided into two branches; forked

bilocular: composed of two parts (cells, compartments or lobes)

bipinnate: with two opposite rows of branches which again bear two opposite rows of branchlets

blade: a relatively broad, thin part of the thallus; leaf-like (or foliar) portion of an alga (sometimes also called lamina)

branch: main side structure on the axes (with limited growth)

branchlet: smaller side structure on the branches (with limited growth)

bulbous holdfast: rhizoids getting densely intricated and holding large amounts of sand, resulting in (sub-)cylindrical structures submerged in the sand

bullose: markedly inflated

bushy: densely branched, forming small bushes

caducous: falling off easily

caespitose: forming a dense, short turf; matted

calcareous: with obvious calcification

capitate: having a globular or spherical apical part

carpogonial branch: the short, specialised branch bearing the female reproductive cell (carpogonium) in red algae

carpogonium: female reproductive cell, egg cell in red algae

carposporangium: sporangia producing diploid carpospores, developed after the fertilisation of the carpogonium in red algae

carpospore: diploid spore formed in carposporangia, by the carposporophyte

carposporophyte: the diploid generation developing on the female gametophyte after fertilisation of a carpogonium and producing diploid carpospores

cartilaginous: firm, tough but flexible

cauline leaves: blade-like structures in juveniles, or on stolons and the basal portion of the stipe of fully grown specimens of *Sargassum* spp. and *Turbinaria* spp. They (mostly) have a different morphology than the 'adult' leaves

cerebriform: in the shape of brains

cervicorn: resembling the antlers of a deer; dichotomous branching where repeatedly one branch of the dichotomy is less developed on the same side of the main axis which can become recurved

circalittoral: continuously submerged part of the coastal zone, from the lower limit of seagrass development down to the lower limit of seaweed growth

classification: delimitation of natural groups of organisms (taxa) which are placed in a category of a hierarchic system (species, genus, family, order, class, division)

clavate: club-shaped

coenocytic: possessing a cell or a filament without septa between the numerous nuclei

complanate: strongly flattened (with parallel sides in transverse section)

complanate branching: branching in a single plane

compressed: slightly flattened (oval in transverse section)

conceptacle: a hollow structure or a cavity enclosing reproductive structures

conduplicate: folded together lengthwise

constriction: contraction, narrower part

contiguous: touching, adjoining, neighbouring

contorted: sinuous, with numerous bends

convolute: twisted and rolled up longitudinally

coralline (alga): calcified red alga

corrugated: undulated

cortex: outer tissue layers of algae

crenate: margin with shallow, rounded or blunt teeth

crenulate: (margin) provided with small teeth

cruciate (division): with transverse walls perpendicular to each other; in the same plane, resulting in a cross-like appearance

crustose: forming a crust

cryptic diversity: organisms with a similar morphology appear to belong to different taxa, based on their DNA-information

cryptic species: different species on a molecular basis, but morphologically and anatomically (almost) indistinguishable

cuneate: wedge-shaped; broad at one end, tapering by nearly straight lines to the tip

cylindrical: circular in transverse section

cystocarp: the complex structure resulting from fertilization in red algae, composed of the internal gonimoblast and the enveloping sterile involucre branches or the pericarp

cystolith: an isolated calcified cell

deciduous: falling off easily; not permanent

decumbent: lying flat and loose on the substratum, with an upright apical part (= ascendent; ≠ prostrate: flat and well attached)

decussate division: a sporangium with alternating pairs of sporangia, crossing at right angles to the next pair above or below

dentate: toothed, with rather large, sharp teeth directed outwards (\neq crenate: blunt teeth)

determinate (lateral, - branch): lateral or branch with a limited growth, fixed in length

diagnosis: description of a new species in Latin (mainly including which are the characters of this species, distinguishing it from other species of the same genus)

dichotomous: forked into two similar parts as a result of the equal division of the apex

digitate: branching like the fingers on a hand, with numerous branches radiating from the same point

dioecious: unisexual; male and female reproductive structures produced on separate individuals

diploid: with two homologous sets of chromosomes in each nucleus ($2n$)

discoid: having the form of a disc, being flat and circular

distal: away from the place of attachment; towards the apex

distichous: on two opposite rows and therefore in one plane; the branchlets of both rows can then either be opposite or alternate

distromatic: having two cell layers

divaricate: branching at wide angles, widely divergent

emarginated: shallowly notched (generally at the apex)

encrusting: forming a crust

endemic: a species only occurring in a single region

endogenous: originating from the internal part of the thallus, not from the surface

entire: with a smooth margin

epilithic: growing attached to rocks and stones (including corals)

epiphytic: growing on another plant (seaweed, seagrass, mangrove), but not as a parasite

epipsammic: growing on sand

epithet: last part of a scientific name of a species, of a variety and of a forma

epizoic: growing on animals (barnacles, shells of gastropods, ...)

eradication: uprooting

erect: upright

estipitate: without a stipe, sessile

eulittoral: see intertidal

euryhaline: tolerant of changing salinity

eurynomic: tolerant of changing concentrations in ions

euritherm: tolerant of changing temperatures

exsiccata: a set of dried specimens, usually provided with printed labels

falcate: branch system curved like a sickle

fasciculate: arranged in small clusters or bundles

fastigiate: with numerous branches spreading from a compactly clustered point of origin; when the branches are parallel and all point upward

felt: densely intricated mass of thin filaments

fertile: being or containing a reproductive structure

fibrous: consisting of structures resembling fibers (holdfast)

filamentous: thin, elegant, supple threadlike structure composed of a single or a few rows of cells

filiform: thread-like

flabellate: fan-shaped

labellum: fan-shaped part of the thallus

foliose: leaf-like

forcipate: markedly incurved, like a forceps or pincers

fragmentation: some branches break off from the mother plant, stay alive, attach to the substratum and go on growing to new plants

frond: erect (upright), mostly compressed part of an alga

fusiform: spindle-shaped, thicker centrally and tapering to both ends

gametangium (-angia): structure from or in which the gametes (sexual reproductive cells) are formed

gamete: a sexual reproductive cell having the haploid number of chromosomes, e.g. a sperm or an egg cell

gametophyte: the gamete-producing phase of a plant

gamma diversity: or regional diversity, is the diversity of a landscape, or of all sites combined

ganglionic cell: a darkly staining cell in certain red algae (e.g. *Halymenia*, *Cryptonemia*) characterized by a central swelling and long and slender arms

gelatinous: with large amounts of jelly, gluey

geniculum (-ula): the uncalcified joint(s) between segments (intergenicula) of coralline algae

glabrous: smooth, containing no hairs or projections

gland cell: a small cell with highly refractive content in red algae

globose: (sub-)spherical, rounded

gonimoblast: diploid structure, developed after fertilization of the carpogonium, composed of branched filaments producing carposporangia

gregarious: growing in groups; clustered

haploid: with only one set of chromosomes in each nucleus (n)

hapters: branched, multicellular attachment structures

heteromorphic: with a different morphology, often used with regard to gametophytic and sporophytic phases in a life cycle

hirsute: covered with stiff, long, straight hairs

holdfast: basal attachment structure

holocarp: when the entire cytoplasmic content of a thallus is being transformed in gametes

holotype: the single specimen on which an author based the description of a new taxon

hue: tinge, colour

hyaline: colourless, transparent

hydrophyte: plant growing (partly) submerged in water

incurved: bent towards the main axis

indeterminate (- lateral, - branch): lateral or branch with a (theoretically) unlimited growth

infralittoral: subtidal

infralittoral fringe: coastal zone between mean and spring low tide levels

infraspecific epithet: scientific name for a variety or a forma

intercalary: between the basis and the apex

interdichotomy: part of the thallus between two dichotomies

intergeniculum (-ula): the calcified segments of articulated coralline algae; parts between the uncalcified joints

internodium: part of a stem or rhizome between 2 nodes

intertidal: the coastal zone between mean high and mean low tide levels

involute (involucrum): radially arranged and generally incurved filaments surrounding reproductive structures in red algae

iridescence: glowing or shining; reflecting an interplay or rainbow-like colours as when seen from different angles

isodiametric: with (approximately) equal dimensions in two or more directions

isomorphic: with the same (or similar) morphology; often used with regard to gametophytic and sporophytic phases in a life cycle

isotype: duplicate specimen of the holotype

juvenile: young specimen

lacerate: irregularly divided by deep incisions

lateral (adj.): on the side of

lateral (subst.): a side axis or side branch

leathery: tough, but still flexible

lectotype: a specimen or illustration designated from the original material as the nomenclatural type if no holotype was indicated at the time of publication, or if it is missing, or if it is found to belong to more than one taxon

lenticular: looking like a lens, double convex

ligulate: strap-shaped, relatively broad when compared to its length

linear: narrow, with parallel sides and several times longer than broad, like a grass-leaf

lobed: with rounded (fan-shaped) parts or margins

lubricous: smooth and slippery

lumen: central cavity in a cell or a thallus

macroalgae: algae visible with the naked eye, as opposed to microalgae for which a microscope is needed for their observation

maculate: speckled, spotted, with darker or lighter dots on a lighter versus darker background

mangrove: evergreen forest growing in the upper intertidal in estuaries or coastal zones

medulla: inner tissue, the central region of the thallus, internal to the cortex; the pith

meiosis: nuclear division by which the number of sets of chromosomes is reduced from two ($2n$) to one (n)

membranous: (membranaceous), forming a thin blade or membrane

midrib: a central, longitudinal thicker part of a (mostly strap-like) blade

moniliform: resembling a string of beads

monoecious: bisexual; male and female reproductive structures produced on a single individual

monosiphonous: composed of a single tubular structure

monospecific: composed of a single species

monostromatic: composed of a single layer of cells

morphology: form

mucronate: abruptly ending in a short, stiff point

multinucleate: with numerous nuclei

muricate: rough, provided with short and hard tubercles

nemathecium (-cia): an elevation on the thallus surface containing reproductive structures

node: place of the axes where laterals or branches arise; in *Ceramium*: where the pericentral cells are placed around the central axis

nomenclature: giving a name to an organism; this happens according to rules which have been internationally recognized. For Algae the International Code of Botanical Nomenclature applies

notched: with marginal indentations (angular cuts)

opposite: a type of branching in which there are two structures (branchlets) at the same level

orbicular: circular and flat

ostiolum: a narrow pore-like opening (in a reproductive structure as e.g. a conceptacle)

ovoid: egg-shaped in outline

palmate: divided in the manner of an outspread hand

parasite: an organism that lives and grows at the expense of a host organism

paraphyse: sterile filament between or around reproductive cells

pectinate: with closely packed side branchlets on one side, like the teeth of a comb

pedicel: short stalk

pedicellate: provided with a short stalk

peg-like: like a pin, a nail

peltate: umbrella-shaped, horizontal disc with a perpendicular stalk attached at the center

pendulous: hanging down from a vertical wall or an overhang

penicillate: like an artist's paint brush

penultimate: before last

percurrent: extending through the entire length

perforated: presenting holes

periaxial cell: a cell cut off from an axial cell but shorter and orientated obliquely or at right angles to it (e.g. *Ceramium*)

pericarp: a sterile envelope surrounding the gonimoblast in a cystocarp

pericentral cell: a cell cut off from an axial cell and remaining similar in size and orientation to it (e.g. *Polysiphonia*, *Dasya*)

perithallus: the upper layer of tissue of a crustose alga

phaeophycean hair: a filament (without phaeoplasts) of uniseriate cells developing from a basal meristem

phorophyte: plant that carries epiphytes

phycobilins: water soluble, accessory pigments in the red algae, mainly phycoerythrin (red) and phycocyanin (blue)

phycologist: scientist studying macroalgae (as opposed to protistologist, studying microalgae)

phycology: the study of macroalgae (as opposed to protistology, the study of microalgae)

pinna(e): a compressed to complanate side branch

pinnate: feather-like, with a main axis and branchlets on two opposite rows in one plane

pinnule: a lateral (branchlet) of a pinnate branch

pitted: provided with small depressions

plastid: cell organelle in which photosynthesis takes place

plumose: like a plume, feather-like

pluricellular: composed of several cells

plurilocular: many-celled, each cell containing a single spore

pneumatophore: a (mangrove) root growing vertically and upwardly

polychotomous: dividing in several (sub)equal parts from a single point

polygonal: a plane geometric figure with numerous sides

polyphyletic: descended from several, unrelated ancestors

polysiphonous: axes composed of a central axis surrounded by a series (at least 3) pericentral cells (eventually covered by a cortex), visible on a transverse section. In surface view, those algae without a cortex, seem to be composed of several, closely packed filaments ('siphons')

primitive plant body: with a relatively simple structure

procumbent: horizontally spread over the substratum but only attached at the basis

prokaryotic: organism lacking a nuclear membrane around the chromosomes

proliferation: a branchlet (or bladelet) formed as irregularly offshoots, smaller than side branches; frequently formed after grazing or erosion of the original branch (or blade)

propagule: branchlet with a special morphology, detaching from the mother plant and each of them producing a new juvenile; typical in *Sphacelaria*

prostrate: lying down on and tightly adhering to the substratum

protrusion: protuberance; bulging part

proximal: nearest to the point of attachment

pseudolateral: a lateral branch derived from a displaced apex

pyramidal: shaped like a pyramid

pyrenoid: an intracellular refractive cytoplasmic body associated with plastids in many algae (e.g. *Ulva*), associated in starch formation in green algae

pyriform: pear-shaped, with the broadest part toward the top end

quadrangular: with four corners

rachis: mainly used in *Caulerpa*; the main axis of the erect frond (assimilator)

radial: radiating (or developing uniformly) from a central point or from an axis

ramelli (or **ramuli**): (last order) branchlets

receptacle: swollen part of a branch bearing reproductive structures

recurved: bent away from the main axis (frequently = bent downwards to the substratum)

reniform: kidney-shaped

repent: creeping along the substrate

reproduction: the formation of new individuals by sexual or non-sexual means

resupinate: thallus horizontally spreading from a vertical wall

reticulate: in the form of a two- or threedimensional net-like structure

reticulum: a two- or threedimensional network

rhizine: an unbranched filament with small diameter and very thick cell wall, resulting in a very small central opening (lumen); strongly refractive on transverse section

rhizoid: a single- or few-celled attachment structure of an alga

rhizome: a creeping (mostly cylindrical) structure from which erect branches arise

rhizophore: an aerial root of a mangrove tree, starting from the basal part of the stem or a branch, bending downwardly and reaching the bottom

rosette: (bladelets) arranged around a central point

rufous: brownish red

sand-dwelling: attached in the sandy substratum

segment: 1. in calcified algae: the large calcified part between the non-calcified joints; 2. in (some) red algae: one central cell and surrounding pericentral cells (if present) and cortex (if present)

segregative cell division: a form of cell division in which a multinucleate protoplast divides into several, rounded daughter protoplasts, which subsequently become surrounded by a wall. The newly formed cells are either released after rupture of the mother cell (*Valonia ventricosa*), remain in situ and form parenchymatic thalli (*Dictyosphaeria*), or rupture old parental walls and form branches (*Struvea*, *Siphonocladus*)

septate: with transverse walls

serrate: saw-edged, with sharp teeth pointing forwards

sessile: not stalked; attached directly to the axis or to a substratum

sinuous: irregularly curving in and out in one plane (a filament or a blade margin)

siphon: aseptate, tubular structure

sorus (sori): a well demarcated surface patch containing a group or cluster of reproductive structures

species: a basic unit of classification; a set of organisms with similar characteristics and which can breed with each other

speckled: with darker (lighter) dots on a lighter (darker) background

spermatangium (-gia): the cell producing the male reproductive cell (spermatium) in red algae

spermatium (-a): non-motile male reproductive cell in red algae

spindle-shaped: thicker centrally and tapering to both ends (= fusiform)

spinose: bearing spines; provided with stiff, sharp-pointed projections

spinulose: bearing small spines

spiralized: coiled

sporangium: a cell producing one or several spores

spore: asexual cell able to germinate into a new plant

sporophyte: the spore-producing phase of a plant

stellate: star-shaped

stenohaline: tolerant only for a narrow range of salinity

stenoionic: tolerant only for a narrow range of ion concentration

stenotherm: tolerant only for a narrow range of temperature

stichidium (-dia): a specialized, generally inflated branch producing tetrasporangia

stipe: stalk; part between the holdfast and the frond

stipitate: provided with a stalk

stolon: a creeping (mostly cylindrical) structure from which erect branches arise

stoloniferous: bearing stolon-like structures

strap-shaped: ribbon-like or girdle-like

stupose: having a tuft of matted filaments

subspherical: almost spherical

subtidal: coastal area under low water level, down to the circalittoral = lower limit of development of seagrasses

subtidal fringe: between mean and spring low tide levels; a narrow zone with some typical organisms

succulent: full of juice or sap

supralittoral: the coastal zone above high tide level

supralittoral fringe: the coastal zone between mean and spring high tide levels

sympodial: branching of an axis where the apex is continually replaced by a lateral from below (alternately left and right of the axis), resulting in a zigzag aspect

syntype: any one of two or more specimens cited in the original description when no holotype was designated or any one of two or more specimens simultaneously designated as type

tapering: gradually narrowing toward a point

taxonomy: the principles and methods for the classification of living organisms

tenacular cell: specialized cell achieving attachment with adjacent cells or filaments

tetrahedral: cells contiguously placed as at the tips of a four-sided pyramid; - crystal: pyramid-shaped crystal

tetrasporangium (-gia): cell in which four spores are formed by meiosis

tetraspore: haploid spore, formed by meiosis (therefore mostly grouped by four) on the diploid tetrasporophyte

tetrasporophyte: diploid plant in red algae originating from the diploid carpospore, in which meiosis will take place resulting in the haploid tetraspores

thallus: the relatively undifferentiated multicellular plant body of a non vascular plant (e.g. an alga)

tomentose: thickly and evenly covered with hairs

trabecular spine: a spine-like projection of cell wall material in the cell

tribuliform: inverted triangular in surface view, with rounded upper angles and a small bulge in the middle of the upper side

trichoblast: a colourless, usually (dichotomously) branched, hair-like appendage, produced near branch apices in Rhodophyta

trichotomous: dividing in three (similar) parts

trifurcate: with three forks or branches

trilobate: presenting three lobes

tristromatic: composed of three cell-layers (visible on cross section)

truncate: cut off rather abruptly at the tip

tubular: apparently a cylindrical figure and hollow

turbinate: obconical; as an inverted cone

turf algae: short, mat-forming, densely intricated seaweeds

type locality: the place where the type specimen of a taxon has been collected

type specimen: specimen after which the original description of an organism is based (remark: this does not mean that this specimen is 'typical')

undulate: being wavy, regularly curving up and down in a three-dimensional way (margin of a blade)

unilateral: along a single side of an axis

unilocular: one-chambered

uniseriate: composed of a single linear row of cells; a filament

unistratose: composed of a single layer

utricle: swollen end of siphons forming a palisade-like surface layer in *Codium* and various Udoteaceae (e.g. *Halimeda*)

vein: series of larger cells (mostly longer as compared to the neighbouring ones) forming longitudinal rows within a smaller-celled tissue

ventral: at the lower side

verticil: whorl

verticillate: in whorls; whorled

vesicular: bladder-like

whorl: structures arranged in a circle or vertical around the axis

xanthophylls: brown accessory pigments in the brown algae

zonate: with the cross walls parallel to each other; in a tetrasporangium resulting in the four tetraspores being in a series of four

zygote: diploid cell, formed after fertilisation of an egg cell

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14. Photographic credits

The pictures were made during numerous stays in Sri Lanka between 1998 and 2008. Most habit pictures were taken *in situ* in February 2008 by O. Dargent. High magnification details were photographed after formalin preserved specimens by F. Leliaert and O. De Clerck, either using a dissecting microscope or a light microscope provided with a digital camera in the laboratory in Ghent. The material was first stained, green algae with methylene blue, red algae with aniline blue. The herbarium specimens were scanned.

Coppejans Eric: 2A-D; 3A-F; 5E; 6A-H; 7B; 8B, C; 9A, E; 11A; 12C, E, F; 13A-D, F; 15A, B, D-F; 16A, C, E, F; 17B-H; 22A-C, F, I; 23B, C; 26A, C; 28A-F; 29A-G; 32A; 33D, F; 37A; 42A; 46A, C, D, F, G; 47A-G; 48A-F; 49A-G; 67A; 69; 70A; 125A; 129A, B; 145A, B; 151A, B; 161A, B; 171B.

Dargent Olivier: 2E; 4A-G; 5A-D; 7A, C-E; 9B-D; 8A; 10A-F; 11B-D; 12A, B, D; 13E; 14A-D; 15C; 16B, D; 17A; 18A-D; 19A-F; 20A-F; 21A-G; 22D, E, G; 23A, D-F; 24A-F; 25A-D; 26B, D-F; 27A-H; 30A-D; 31A, B; 32B-H; 33A-C, E; 34B-F; 35A-C, E, G-I; 37B-G; 39A, B, D; 40A-G; 41A, C-H; 42B-F; 44E, F, I; 45E, F, J; 46B, E; 50A-C; 51-63; 64A; 65; 68; 71-87; 90-103; 106-108; 110; 111A, B; 112A; 113A, B; 114A; 115A; 116-118; 120-124A; 126-128, 130-144; 146-148A; 149; 152-154A; 155-160; 162-166A, B; 168A; 170A; 171A; 174, 175; 177, 178A, B; 180A; 181; 182A; 183A; 184; 185.

De Clerck Olivier: 31C-E; 35D, F-H; 39E; 44A-D, G, H; 45A-D, G-I; 105; 109; 111C, D; 112B; 113C; 114B.

Leliaert Frederik: 34A; 36A-F, J; 39C; 41B; 64B; 66; 67B; 70B, C; 88; 89; 104; 115B; 119A, B; 124B; 125B; 145C, D; 148B; 150; 154B; 166C; 167A, B; 168B, C; 169; 170B, C; 172; 173; 176; 178C; 179; 180B; 182B; 183B, C.

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16. Appendix 1 – Taxonomic index

Taxa described in this book are **bold**, taxa illustrated (but not described) are underlined, taxa only mentioned in the text are in normal font, recent synonyms only discussed in relation to identification and to names of species are in smaller font. Species epithets, as well as infraspecific epithets, are followed (between brackets) by genus and/or species names. Numbers in bold indicate the page the taxa are described.

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17. Appendix 2

Table 1. The Tansley scale for indication of species abundance in a quadrat (quantitative sampling) or larger area (semi-quantitative sampling).

Tansley scale	
d	dominant
c	co-dominant
a	abundant
f	frequent
o	occasional
r	rare
s	sporadic

Table 2. The Braun-Blanquet's sociability scale for the indication of a species' life form.

Braun-Blanquet's sociability scale	
1	solitary
2	in small groups or tufts
3	in larger groups, cushions or humps
4	in mats or very large groups
5	covering approx. the entire quadrat

Table 3. Braun-Blanquet cover-abundance scale.

Braun-Blanquet scale	Range of cover
r	< 5 %; very few individuals
+	< 5 %; few individuals
1	< 5%; numerous individuals
2	5 – 25 %
3	25 – 50 %
4	50 – 75 %
5	75 – 100 %

Sri Lankan Seaweeds

Methodologies and field guide to the dominant species

Abc Taxa

Seaweeds are macroalgae that are important primary producers in coastal zones. The many species belong to different and unrelated groups of organisms, classified as the red, green and brown algae. These colours are of relevance, because they reflect their different photosynthetic pigments. Nice colour photographs of seaweeds in these different groups are included in the present work. Professor Coppejans and his team, however, have, amongst others, also elaborated on survey methodologies, seaweed communities, seasonality and zonation. These important chapters are richly illustrated and as such provide an apt entry point to marine phycological research. These chapters are of great importance in capacity building in research on seaweeds. For more experienced phycologists the descriptions and photographs of the different species form certainly the backbone of the book. Next to generously illustrated taxonomic information, this work also provides additional insight on ecology and distribution of the treated taxa.

This book will serve the phycological community well as collected material will become readily identifiable thanks to the concise descriptions and the appropriately chosen pictures. As also stressed by the authors, this work covers only a fraction of the rich marine flora of Sri Lanka, but it will form a solid fundament on which future studies can be built. It is certain that the present book will be of great help during these so necessary future studies. And not only for Sri Lanka, but for all surrounding maritime countries that can use this book as an agreeable addition to the possibility to identify their often so colourful and splendid seaweeds.

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