Rhizoclonium africanum Kützing
1853: 21, pl. 67: fig. II — Figs 16D; 67

REFERENCES: Egerod (1974: 135-136, figs 10-12), Sartoni (1986: 361, fig. 3C; 1992: 305, fig. 7A), Lawson & John (1987: 80, pl. 5, figs 2-3), Cribb (1996: 35, top fig. p. 34), Payri *et al*. (2000: 70, top fig. p. 71), Abbott & Huisman (2004: 82, fig. 25A), Kraft (2007: 56, figs 22F-H), Skelton & South (2007: 241, figs 650-658).

TYPE LOCALITY: "Senegambien" (Senegal or Zambia).

Description - Forming woolly structures as a result of the intertwined, unbranched, curled filaments; light green; extremely well attached to the substratum by basal and intercalary hapteroidal holdfasts; filaments 70-85 µm in diameter, cells 2-3 times as long as wide with a stratified wall, 12-15 µm thick; remarkable are the abrupt changes in growth direction (frequently perpendicular) often after an enlarged cell.

Ecology - Crevices of eroded fossil coral platforms or beach sandstone, above high tide level (higher than the *Bostrychia* level and just under the lowermost terrestrial plants); not covered by seawater for long periods; accumulating terrestrial debris; mostly along vertical walls, the tips of the filaments hanging like beard-like structures out of the crevices, but also in small cavities of the horizontal surface where the plants form woolly tufts.

Distribution - Widespread in tropical regions.

Fig. 67. *Rhizoclonium africanum***.** A. Habit *in situ***;** B. Microscopic detail.

Boergesenia forbesii (Harvey) J. Feldmann
1938: 1503-1504 — Fig. 68

REFERENCES: Jaasund (1976: 15, fig. 31), Tseng (1984: 272, pl. 135, fig. 3), Sartoni (1992: 306, fig. 7b), Lewmanomont & Ogawa (1995: 27, + fig.), Cribb (1996: 11, bottom fig. p. 10), Calumpong & Meñez (1997: 92, fig. p. 93), Trono (1997: 21, fig. 10), Leliaert *et al*. (1998: 184, fig. 13), Huisman (2000: 237, + fig.), Littler & Littler (2003: 202, middle fig. p. 203), Oliveira *et al*. (2005: 198, + fig.), Ohba *et al*. (2007: 18, + figs), Skelton & South (2007: 249, fig. 669).

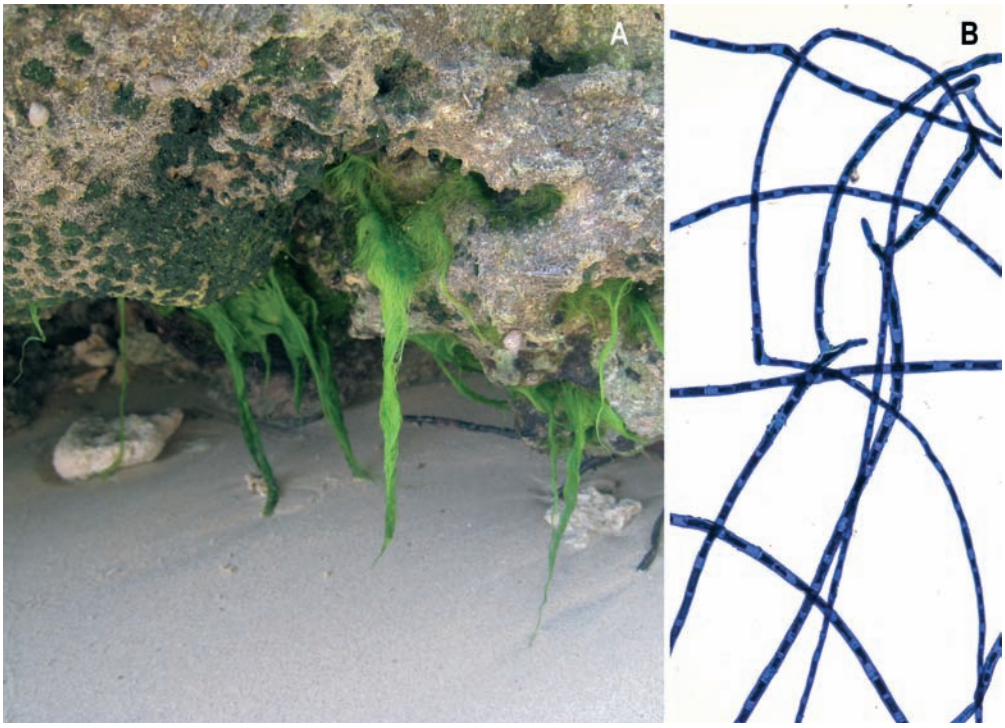
SYNTYPE LOCALITIES: Ryukyu-retto, Japan; Sri Lanka.

Description - Plants mostly gregarious, radially arranged, more rarely solitary; thalli composed of a single, inflated, club-shaped and curved cell (at least at the basis), 2-4 cm long, 10-15 mm in diameter at the widest part, bright light green; presence of basal annular constrictions differentiating them from *Valonia*-species; attachment by small pad-like structures but clustered cells connected with each other by a septate stoloniferous rhizoidal system.

Ecology - Epilithic in the mid-intertidal, air-exposed at low tide but continuously wave-swept. Not frequently observed along the studied Sri Lankan coast.

Distribution - Widespread in the tropical Indo-Pacific.

Fig. 68. *Boergesenia forbesii*.


A
B

Boodlea composita (Harvey) Brand
1904: 187-190 Figs 35G; 69

REFERENCES: Jaasund (1976: 11, fig. 23), Magruder & Hunt (1979: 17, top fig. p. 16), Tseng (1984: 276, pl. 137, fig. 1), Lewmanomont & Ogawa (1995: 26, + fig.), Cribb (1996: 13, top fig. p. 10), Calumpong & Meñez (1997: 110, + fig.), Trono (1997: 22, fig. 11), Huisman (2000: 238, + figs), Littler & Littler (2003: 200, top fig. p. 201), Abbott & Huisman (2004: 85, figs 26A-B), Coppejans *et al*. (2005: 52, fig. 21), Oliveira *et al*. (2005: 198, figs. p. 199), Kraft (2007: 94, pl. 3C, fig. 39), Leliaert & Coppejans (2007), Ohba *et al*. (2007: 19, + figs), Skelton & South (2007: 249, figs 670-672).

TYPE LOCALITY: Mauritius.

Description - Plants forming light green, spongy cushions, 3-5 cm across, composed of tightly interwoven filaments, forming a three-dimensional network; attachment by rhizoids and tenacular cells, produced in any part of the thallus; branching rather sparse in the basal portions, more abundant above; side branches originally in one plane, opposite, resulting in fanshaped structures; later side branchlets are formed in planes, perpendicular on the orginal net-like blade; reinforcement of the thallus by tightly interweaving curved branch systems and attachment of adjacent branches by tenacular cells, borne singly on the tips of the apical cells. Main axes up to 350 µm in diameter, terminal branchlets 75-125 µm. Plants breaking up in small fractions after squeezing, possibly representing a mode of vegetative reproduction.

Ecology - Attached at the basis of other algae or on algal turf in low intertidal pools and in the shallow subtidal; rather rare.

Distribution - Widespread in all tropical to subtropical waters.

Fig. 69. *Boodlea composita*.

Cladophoropsis sundanensis Reinbold
1905: 147 Fig. 70

REFERENCES: Børgesen (1935: 10-11, fig. 1), Egerod (1974: 141, figs 32-36; 1975: 46, figs 8-10), Jaasund (1976: 11, fig. 24), Tseng (1984: 274, pl. 136, fig. 1), Payri *et al.* (2000: 72, fig. p. 63), Leliaert *et al.* (2001: 452, figs 6-8), Abbott & Huisman (2004: 88, fig. 28B), Oliveira *et al*. (2005: 201, fig. p. 201), Leliaert & Coppejans (2006: 666, figs 40-46), Kraft (2007: 110, fig. 47), Skelton & South (2007: 252, figs 673-675).

LECTOTYPE LOCALITY: Kangean, Indonesia.

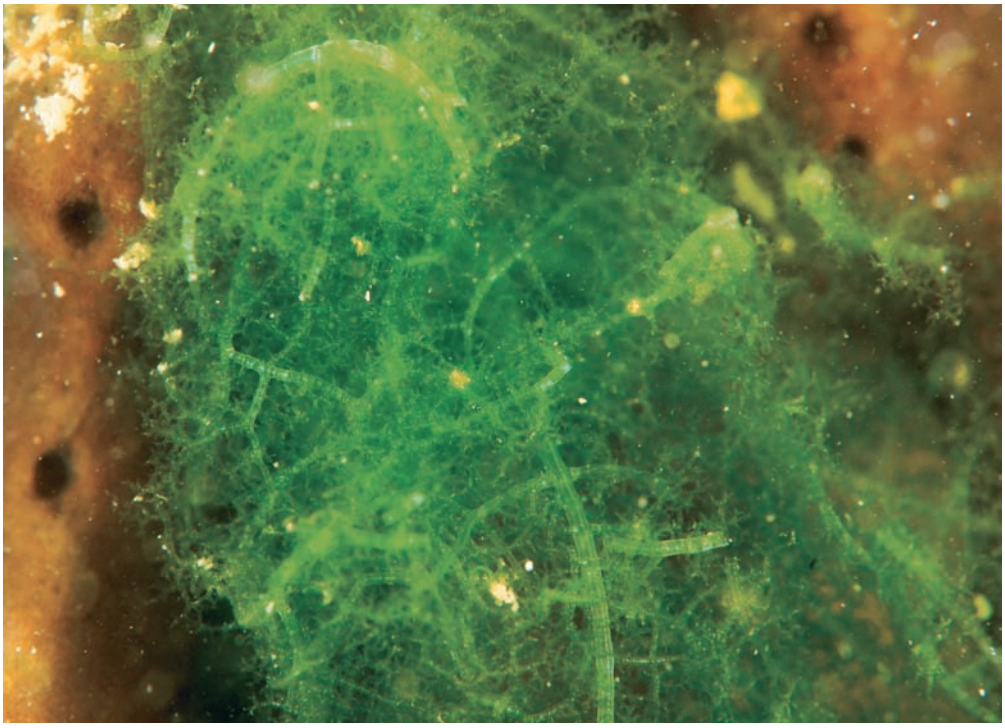
Description - Thalli forming compact, spongy cushions or moss-like mats, firmly attached to the substratum, often sand and sediment-trapping, 2-7 cm across (occasionally up to 15 cm), 1-1.5 cm thick, composed of strongly entangled branch systems, light to medium green. Attachment to the substratum by branched, multicellular rhizoids arising from the proximal pole of the basal cells and other cells in the basal region. Growth by apical and intercalary cell division, followed by cell elongation and limited cell enlargement; apical cells frequently dividing more or less simultaneously into 3-7 cells followed by the development of laterals (mostly a single one per cell, more rarely an opposite pair); laterals not displacing the main axis; cross wall formation at the base of the laterals usually delayed; side branches mostly unilaterally arranged in the terminal branch systems, more irregularly lower down. Structural reinforcement of the thallus by interweaving of the filaments and by anastomosis of the cells by hapteroid rhizoids and tenacular cells. Apical cells (sub)cylindrical, with rounded tip, slightly curved or sinuous, (40-) 60-120 (-140) µm in diameter, length up to 6 mm; cells of terminal branch systems straight or slightly curved, 80-140 µm in diameter (l/w ratio 3-40).

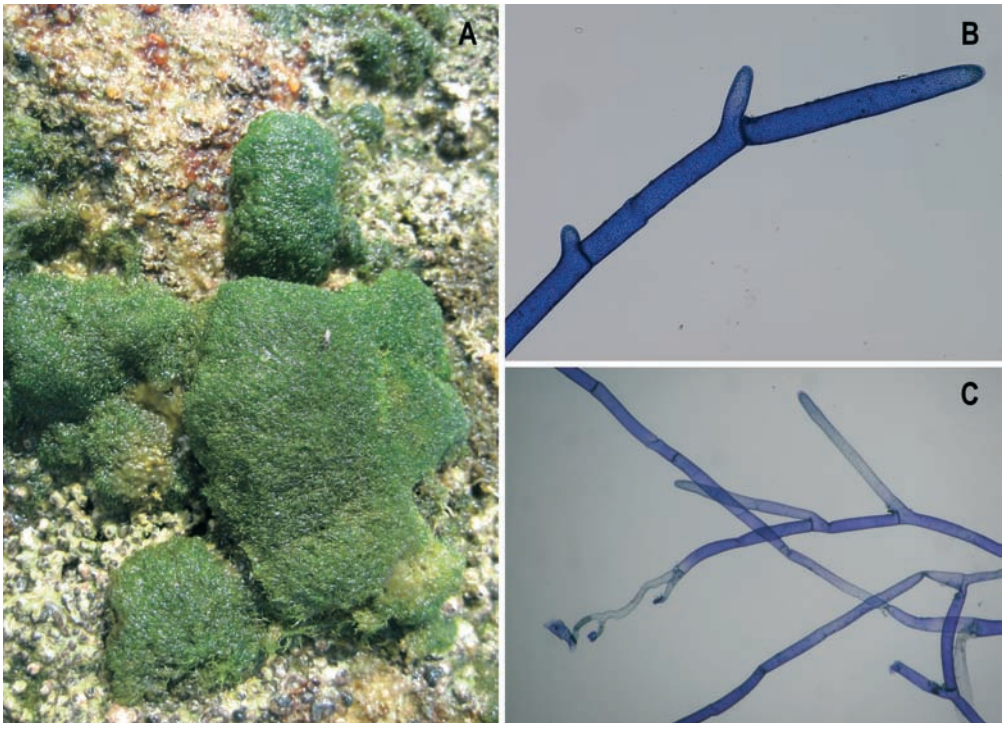
Ecology - Horizontal, sand-covered rock substratum in the intertidal, air-exposed at low tide but continuously wave-swept.

Distribution - Widely distributed in the Indo-Pacific.

Notes - *C. sundanensis* closely resembles *C. membranacea* (Hofman Bang ex C. Agardh) Børgesen, also present along the Sri Lankan coast, from which it differs by the larger cell diameter of the latter (70-) 110-290 (-340) µm. The genus *Cladophoropsis* has recently been reassessed by Leliaert & Coppejans (2006), who recognized six species, only two of which (*C. membranacea* and *C. sundanensis*) occur in Sri Lanka.

Fig. 70. *Cladophoropsis sundanensis* A. Habit *in situ*; B. Microscopic detail of apical growth; C. Apex with secondary attachment structures.




A
B
C

Dictyosphaeria cavernosa (Forsskål) Børgesen 1932: 2

Figs 20E; 40B; 71

REFERENCES: Egerod (1952: 350-351, figs 1b-f, 2f-g), Jaasund (1976: 15, fig. 32), Magruder & Hunt (1979: 27, fig. 1, p. 26), Tseng (1984: 268, pl. 133, fig. 5), Moorjani & Simpson (1988: 15, pl. 24), Sartoni (1992: 319, fig. 13A), Lewmanomont & Ogawa (1993: 48, + fig.), Cribb (1996: 29, top fig. p. 28), Calumpong & Meñez (1997: 98, fig. p. 99), Leliaert *et al.* (1998: 188, figs 30-33), Huisman (2000: 240, + fig.), Kraft (2000: 578, figs 27A-B), Littler & Littler (2000: 332, bottom fig. p. 333), Payri *et al.* (2000: 76, fig. p. 77), Littler & Littler (2003: 202, bottom fig. p. 203), Abbott & Huisman (2004: 89, fig. 29A), Coppejans *et al*. (2005: 54, fig. 23), Oliveira *et al*. (2005: 202, figs p. 203), Huisman *et al*. (2007: 173, + figs), Kraft (2007: 118, pl. 4E, fig. 49), Ohba *et al.* (2007: 21, + figs), Skelton & South (2007: 253, figs 737, 792).

SYNTYPE LOCALITIES: Red Sea (Saudi Arabia, Yemen).

Description - Thalli forming stiff-brittle, hollow structures composed of large, polygonal cells (visible with the naked eye), arranged in a monostromatic layer, dark green; young specimens spherical, 1-2 cm across, later becoming convoluted and ruptured when the 'roofs' disappear, looking like bowls, up to 6 cm across; in old specimens large clumps of several hollow and bowl-like structures are combined. Attachment by numerous, minute hapteroidal cells produced by the basal cells in contact with the substratum. Cells isodiametric, polygonal in surface view, 1-2.8 mm in diameter; margins of the cells joined by rows of contiguous, minute, tenacular cells arising alternately from the two opposing cells; inner cell walls without trabecular spines.

Ecology - Epilithic in the lower part of the intertidal zone, more frequent on sloping and vertical walls on the landward side of beachrock platforms; air-exposed at low tide but continuously wave-swept.

Distribution - Pantropical.

Note - Leliaert *et al*. (2007) showed that the pantropical *D. cavernosa* consists of several cryptic species, with *D. versluysii* (which differs from *D. cavernosa* by the formation of solid thalli) being more closely allied to Indian Ocean representatives of *D. cavernosa* than to *D. cavernosa* from the Pacific Ocean.

Fig. 71. *Dictyosphaeria cavernosa*.

Dictyosphaeria versluysii Weber-van Bosse 1905: 144

Figs 19B; 72

REFERENCES: Egerod (1952: 351, 354-355, figs 1a, 2h-k), Jaasund (1976: 15, fig. 33), Magruder & Hunt (1979: 27, fig. 2, p. 26), Tseng (1984: 270, pl. 134, fig. 2), Moorjani & Simpson (1988: 15, pl. 24), Sartoni (1992: 319-321, figs 13B, 14A,B), Cribb (1996: 29, middle fig. p. 28), Leliaert *et al.* (1998: 188, 190, figs 37-39), Littler & Littler (2000: 334, middle fig. p. 335), Payri *et al.* (2000: 76, bottom fig. p. 77), Skelton & South (2002: 162, figs 23C-D), Littler & Littler (2003: 200, bottom fig. p. 201), Abbott & Huisman (2004: 89, fig. 29B), Coppejans *et al*. (2005: 56, fig. 24), Oliveira *et al*. (2005: 202, fig. p. 203), Huisman *et al*. (2007: 173, + fig.), Kraft (2007: 117, pl. 4F, fig. 48), Ohba *et al*. (2007: 22, + figs), Skelton & South (2007: 254, figs 738, 791).

SYNTYPE LOCALITIES: 'Plusieurs récifs dans l'Archipel Malaisien'.

Description - Thallus, forming isolated or clustered, solid, tough, button-shaped cushions, 1-2.5 cm across, composed of polygonal cells; when several specimens are clustered, they sometimes have a jigsaw morphology; light grey-green. Attachment by basal, rhizoidal cells in contact with the substratum; the thallus tissue is formed by diffuse segregative cell division with daughter cells maturing in many planes; adjacent cells held together by rows of contiguous, minute, bi- or trifurcate tenacular cells arising alternately from the two opposing cells. Inner cell walls producing simple or bifurcate trabecular spines; cells 0.8-1.2 µm in diameter.

Ecology - On horizontal to sloping rock substratum in middle to low intertidal, in crevices, more frequent on the wave-exposed, seaward side of beachrock platforms; air-exposed at low tide but continuously wave-swept.

Distribution - Widespread in the Indo-Pacific. Also reported from the Caribbean Sea.

Fig. 72. *Dictyosphaeria versluysii*.

Valonia fastigiata Harvey ex J. Agardh
1887: 101 Figs 22C; 73

REFERENCES: Jaasund (1976: 15, fig. 30), Leliaert *et al.* (1998: 192, figs 42-44), Payri *et al*. (2000: 78, bottom fig. p. 79), Littler & Littler (2003: 206, middle fig. p. 207), Oliveira *et al*. (2005: 204, figs p. 204), Ohba *et al*. (2007: 23, + figs), Skelton & South (2007: 258, figs 688, 793-794).

SYNTYPE LOCALITIES: Sri Lanka, Tonga.

Description - Thallus forming a hemispherical dome or a more flattened solid cushion, glossy translucent dark green, 5-15 cm across, composed of densely packed, erect, radially arranged vesicle-like, cylindrical cells, sometimes slightly inflated at the apical part; anchored by small, aseptate rhizoids; daughter vesicles produced by small lenticular cells; main branching regularly di- to polychotomous at the distal end of the parent cells; when a cushion is broken up, concentric layers of vesicles are visible; small lateral branchlets can also be formed. Cells subcylindrical to clavate, (5-) 8-15 (-22) mm long, diameter 2,5-5 mm, l/w ratio 2-3,5 (-4,5); adjacent cells cohering by circular clusters of tenacula. Septa without trabeculae.

Ecology - At about low water mark; air-exposed at low tide but continuously wave-swept.

Distribution - Widespread in the Indo-Pacific.

Notes - *Valonia fastigiata* is very similar in outer morphology to *Valonia aegagropila* C. Agardh, but the main branching in the latter is more irregular (not markedly di- or polychotomous, no concentric layers of cells), with numerous lateral, smaller branchlets.
Many workers have commented on the lack of clarity of species concepts within the genus (Børgesen, 1905, 1912, 1913; Egerod, 1952; Olsen & West, 1988) and this was recently reflected in a molecular phylogenetic study, which revealed convergence of morphological characters in the genus *Valonia* (Leliaert *et al*. 2007).

Fig. 73. *Valonia fastigiata***.** A. Superficial view; B. Transverse section.

Valonia utricularis (Roth) C. Agardh
1823: 431 Fig. 74

REFERENCES: Tseng (1984: 270, pl. 134, fig. 4), Leliaert *et al.* (1998: 192, fig. 45), Littler & Littler (2003: 208, top fig. p. 209), Skelton & South (2007: 260, fig. 689).

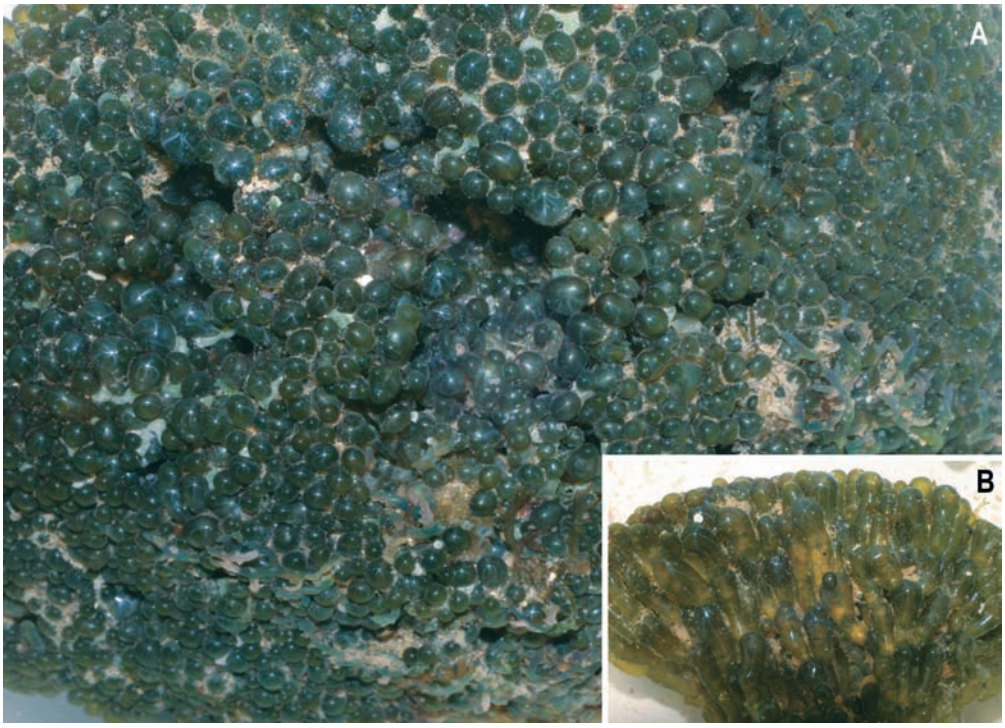
TYPE LOCALITY: Mediterranean Sea.

Description - Thallus forming succulent, stiff-brittle, compact or diffuse repent structures, 7-14 cm across, composed of vesicular cells, dark green with a bluish sheen. Branching irregular, di- polychotomous, distal or lateral. Cells horizontally arranged, clavate, arcuate or irregularly shaped (3-) 5-20 (-30) mm long, diameter (3-) 4-6 (-8) mm, l/w ratio 1-4. Adjacent cells laterally cohering by tenacula which are randomly arranged along the cell walls.

Ecology - In wave-swept, low intertidal pools or on vertical walls in the shallow subtidal.

Distribution - Widespread in tropical to warm-temperate regions.

Fig. 74. *Valonia utricularis***,** partly covered by crustose corallines.


A
B

Valoniopsis pachynema (G. Martens) Børgesen
1934: 10-16, figs 1, 2 Figs 10A, B; 11E; 19A; 20D; 35B, E; 42D; 75

References: Jaasund (1976: 13, fig. 26), Tseng (1984: 272, pl. 132, fig. 2), Sartoni (1992: 323, fig. 14D), Cribb (1996: 37, middle fig. p. 36), Coppejans *et al.* (2005: 58, fig. 27), Oliveira *et al.* (2005: 205, fig. p. 205), Kraft (2007: 126, fig. 52).

Syntype localities: Bengkulu and Pulau Tikus, near Bengkulu, Sumatra, Indonesia.

Description - Thallus forming stiff and crisp hemisherical to more flattened and elongated mats, about 2-3 cm thick and up to 20 cm in diameter, composed of branched, interwoven cylindrical filaments, erect in the central part of the cushion, radially downwardly arcuate, the branchlets at the surface of the cushions being contiguous; dark-green. Attachment to the substratum by irregularly branched and septate basal rhizoids or by downwardly growing, gradually attenuated branch tips in contact with the substratum forming adventitious rhizoidal cells. Branches initiated from lenticular cells, up to 7 from the apex (resulting in typical apical hand-shaped structures), and laterally. Filaments 310-950 µm in diameter, apical cells up to 1150 µm in diameter.

Ecology - Extremely abundant on beachrock platforms, just above low water mark.

Distribution - Widespread in the Indo-Pacific; also occuring in the Caribbean Sea.

Note - *Valoniopsis pachynema* can be confused with *Cladophora herpestica* from which it can be distinguished by its lenticular cells and thicker filaments (310-950 µm vs. 120-450 µm in diameter) and the palmate apical branch systems.

Fig. 75. *Valoniopsis pachynema***.** A. Superficial view of several plants; B. Detail of apical branching.

Bryopsidales – Bryopsidaceae **Bryopsis** J.V. Lamouroux 1809a: 333

Bryopsis pennata J.V. Lamouroux
1809a: 333 Figs 32B; 36G; 76

References: Dawson (1954: 393, fig. 11b), Lawson & John, (1987: 92, pl. 10, fig. 5), Lewmanomont & Ogawa (1993: 28, + fig.), Coppejans & Van den Heede (1996: 52-54, figs 8, 9, 12, 16, 20), Littler & Littler (2000: 342, fig. p. 343), Payri *et al.* (2000: 82, top fig. p. 83), Skelton & South (2002: 163, fig. 24E), Littler & Littler (2003: 208, middle fig. p. 209), Abbott & Huisman (2004: 98, figs 33B-C), Coppejans *et al.* (2004: 2976, figs 3-5), Huisman *et al*. (2007: 179, + figs), Skelton & South (2007: 263, figs 690-691).

Type locality: Antilles, West Indies.

Description - Thalli gregarious, frequently in dense tufts, (2-) 3-10 (-15) cm high; main axis generally unbranched, length of the naked part ("stipe") variable; plumule linear-lanceolate, with an acute apex, distichous, 1.5-2 (-3) cm long, 2-5 (-7) mm broad; dark green, sometimes with a bluish iridescence. Diameter of the main axis increasing towards the base, 200-690 µm; pinnules acropetally directed, with a rather constant length (1-3 mm), resulting in the linear aspect of the plumule, and a diameter of (90-) 155-185 (-295) µm, constricted at their base (38-75 µm) and with a truncated apex. Plumule distichous, but position of the ramuli either on 2 opposite, single, straight rows, or on a single and a double row or on 2 opposite double rows. Plastids rounded, oval or irregular, 3.5-11.5 µm long, each one with a single pyrenoid.

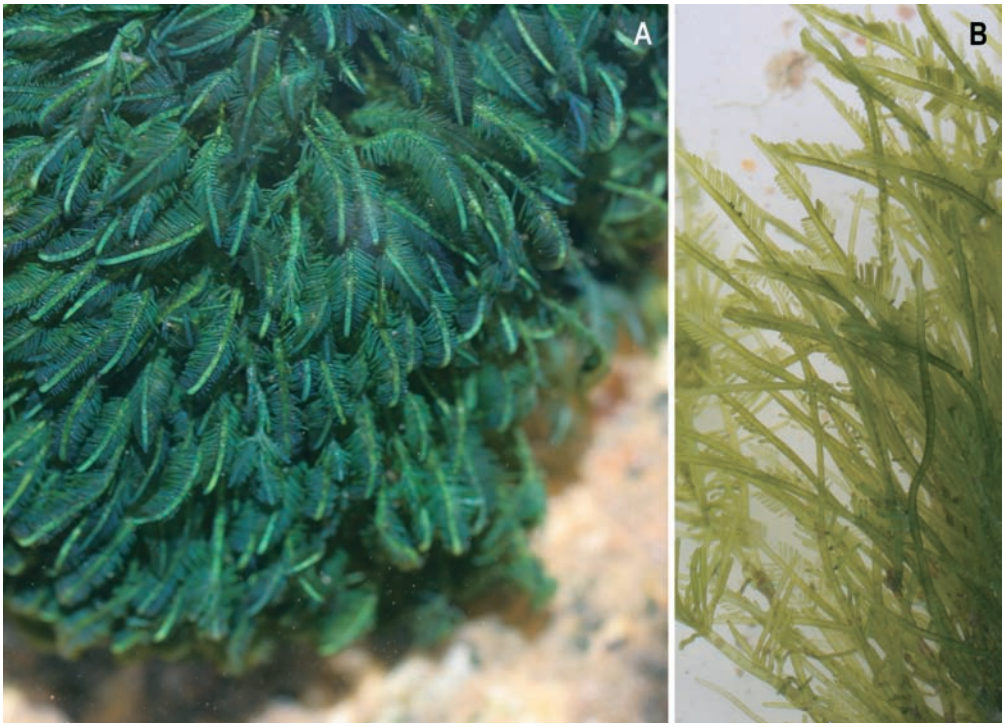
Ecology - Epilithic, at about spring low water level, exposed to strong surf.

Distribution - Widespread in tropical to warm-temperate regions.

Notes - *Bryopsis* is a large genus with a worldwide distribution in tropical to temperate marine waters. More than 50 species are currently accepted. The genus has been studied in the Indian Ocean by Coppejans & Van den Heede (1996).
Some collected tufts, dominated by *B. pennata* var. *pennata* with typical plumules, also contain specimens with unilaterally bent branchlets, corresponding with *B. pennata* var. *secunda* (Harvey) Collins et Hervey, and specimens with bare parts along the rachis (interrupted plumules), corresponding to *B. pennata* var. *leprieurii* (Kützing) Collins et Hervey. Some even have the combination of unilaterally bent and interrupted branchlets. We therefore follow Skelton & South (2007: 264) in not distinguishing these varieties as these growth forms can occur together in the same tuft.

Fig. 76. *Bryopsis pennata***.** A. Whole tuft with densely pinnate axes (var. *pennata*); B. Detail with some axes with interrupted side branchlets (var. *leprieurii*).


A
B


A
B

Codium arabicum Kützing
1856: 35, pl. 100, fig. II — Figs 18D; 25C; 77

REFERENCES: Jaasund (1976: 33, fig. 66), Magruder & Hunt (1979: 25, fig. 1, p. 24), Tseng (1984: 296, pl. 147, fig. 2), Lewmanomont & Ogawa (1995: 46, + fig.), Calumpong & Meñez (1997: 118, fig. p. 119), Trono (1997: 45, fig. 28), Payri *et al*. (2000: 102, top fig. p. 103), Littler & Littler (2003: 210, bottom fig. p. 211), Abbott & Huisman (2004: 102, figs 35A-B), Oliveira *et al.* (2005: 217, figs p. 217), Huisman *et al*. (2007: 186, + fig.), Kraft (2007: 146, pl. 5B, fig. 54), Skelton & South (2007: 270, figs 700, 706-710).

TYPE LOCALITY: Tor, Sinai Peninsula, Egypt.

Description - Thallus crustose, firm, with superficial knobs when young, developing irregular, contorted, upright lobes with age and thus becoming convoluted; up to 10 cm long, tightly adherent to the rocky substratum; olive to dark green. Thallus dissecting out into large clusters of utricles varying greatly in size among plants and from the margin to the center of individual specimens; large primary utricles (sub)cylindrical to clavate (75-) 150-250 (-350) µm in diameter, (400-) 500-900 (-1100) µm long; secondary utricles arising as buds from the lower part of primary utricles, (sub)cylindrical to capitate, markedly more elegant than the primary utricles. Utricular wall slightly (6 µm) to markedly (15 µm) thickened at the rounded to truncate apices, pitted, at least in the central portions of the plants. Hairs or hair scars common on older utricles (max. 20 per utricle), borne in the zone 55-155 µm below the apex. Gametangia fusiform, elliptical to oval, shortly pedicellate, on both primary and secondary utricles.

Ecology - Epilithic, mostly on horizontal substratum, but also observed on vertical walls, in the shallow subtidal (from low water level down to 50 cm depth; locally extremely abundant.

Distribution - Common in the Indian Ocean and western Pacific Ocean; also mentioned from Chile.

Note - The genus *Codium* is distributed throughout the world's seas, and contains about 150 species. *Codium* thalli can spread out over hard surfaces as mats, form spheres or grow upright, either unbranched and finger-like, or branched, with cylindrical or flattened branches. The taxonomy of the genus has been studied by Silva (1959, 1960) and Silva & Womersley (1956). Species boundaries and phylogenetic relationships within the genus have been studied by Verbruggen *et al*. (2007).

Fig. 77. *Codium arabicum*.

Codium geppiorum O.C. Schmidt
1923: 50, fig. 33 (*'geppii'*) — Fig. 78

REFERENCES: Jaasund (1976: 33, fig. 67), Tseng (1984: 300, pl. 149, fig. 1), Lewmanomont & Ogawa (1993: 47, + fig., as *C. geppei*), Cribb (1996: 27, top fig. p. 26, as *C. geppii*), Calumpong & Meñez (1997: 119, fig. p. 120, as *C. geppii*), Payri *et al*. (2000: 102, bottom fig. p. 103), Oliveira *et al*. (2005: 218, fig. p. 218), Kraft (2007: 153, pl. 5G, fig. 57), Skelton & South (2007: 273, figs 701, 711-715).

SYNTYPE LOCALITIES: Kai Islands and Celebes, Indonesia.

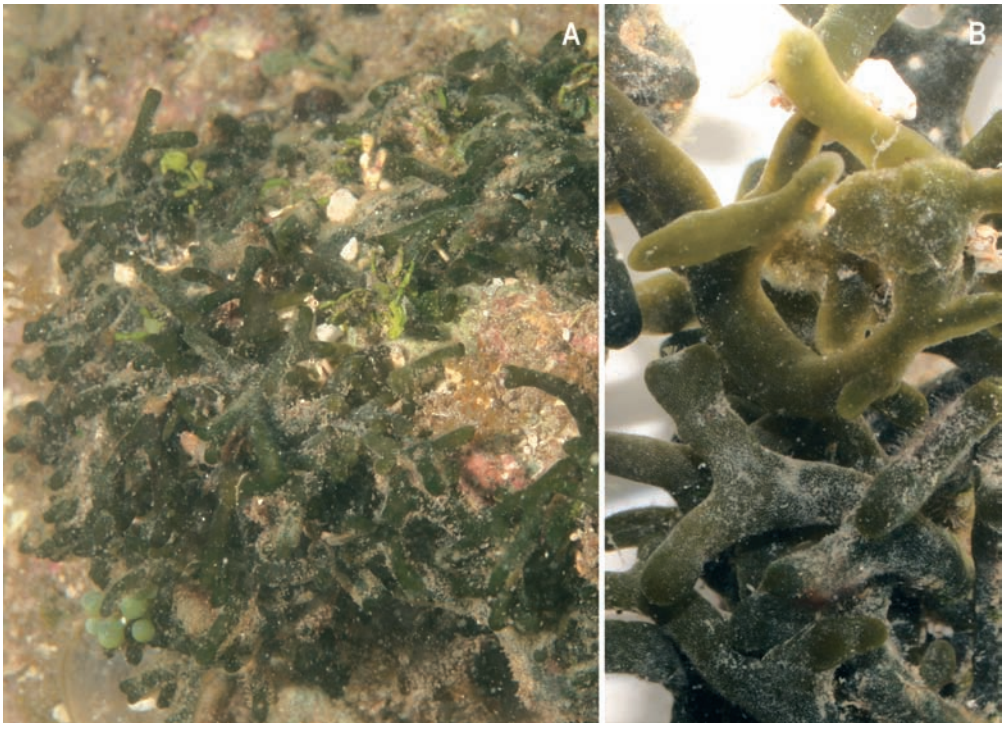
Description - Thallus repent, frequently with downwardly directed apices but other plants ascendant or even erect; branching dense, irregularly divaricately (sub)dichotomous (sometimes trichotomous); branches cylindrical, anastomosing, about 3 mm in diameter, repeatedly attached to the substratum by means of indiscriminately placed rhizoids; olive- to dark green. Thallus dissecting out into individual utricles; these clavate, elongate pyriform or (sub)cylindrical; mature utricles (50-) 150-225 (-320) µm diameter and (300-) 500-750 (-900) µm long; apices rounded or more rarely truncate; utricular wall 2 µm thick all over, without any ornamentation. Hairs or hair scars in small numbers, borne in the zone just below the apex. Gametangia fusiform (with or without a nozzle) to ellipsoidal, 50-75 µm in diameter, 230-300 µm long, generally 1 per utricle, each borne on a short pedicel (4 µm).

Ecology - Mostly in sand-covered, sheltered habitats such as lagoons, from a few cm under low water level down to 1 m depth and frequently growing in extensive populations. More rarely observed in sand-covered low intertidal pools.

Distribution - Reported worldwide in tropical to warm-temperate seas (but see note).

Note - Verbruggen *et al.* (2007) showed that *C. geppiorum* consists of at least five cryptic species, with the Sri Lankan representatives being more closely related to *C. isthmocladum* than to *C. geppiorum* from other geographical regions (Red Sea, SE Africa, Pacific Ocean and Caribbean Sea).
Slender growth forms of *C. repens* (Crouan) Vickers are morphologically very similar to *C. geppiorum*; they can be distinguished from the latter by the presence of inflated pyriform utricles, being slender pyriform in *C. geppiorum.* Several other species of cylindrical *Codium* species have been collected along the Sri Lankan coast.

Fig. 78. *Codium geppiorum*. A. General view; B. Detail with numerous attachment points.


A
B

Caulerpa fergusonii G. Murray
1891: 212, pl. LIII: figs 1, 2 Fig. 79

REFERENCES: Svedelius (1906a: 140, fig. 51), Coppejans & Prud'homme van Reine (1992: 690, figs 1D-E, 13A-B), Littler & Littler (2003: 218, middle fig. p. 219).

TYPE LOCALITY: Sri Lanka.

Description - Stolons 1.5-2 mm in diameter in shallow-water specimens, only 1 mm in deep-water plants, densely branched in central parts of the former, almost unbranched in the latter, attached by numerous tufts of rhizoids at the tips of downwardly growing rhizoidal branchlets; uprights composed of slightly compressed, mostly unbranched rachis, 3 (-4) cm high in the former, only 1-2 cm high in the latter, slightly constricted above the implantation of the laterals; each segment widening towards the apical part; some uprights with a single or several constriction(s) in the bare, basal part, especially in the shallow-water populations, the other uprights being without bare basal part, with 5-7 (-10) pairs of laterals in shallow-water plants, 2-5 pairs in the deep-water specimens; laterals subspherical, being somewhat dorso-ventrally compressed, roundish to oval in surface view, about 3 mm in diameter, upwardly directed; dark green.

Ecology - Shallow-water plants on vertical rock walls, just under low water; deep-water specimens between 20 and 23 m depth, on partly sand-covered coral rubble.

Distribution - Indian Ocean: India, Indonesia, Malaysia, Sri Lanka; Pacific Ocean: Fiji, Japan, Papua New Guinea.

Note - *Caulerpa* is a common genus of (sub)-tropical coastal waters throughout the world. The *Caulerpa* plant body shows a complex external morphology, differentiated into creeping stolons, rhizophores with rhizoid clusters, and erect assimilators. The assimilators usually bear numerous branchlets termed ramuli. The genus includes about 75 species worldwide, with numerous varieties, forms or ecads, which are primarily defined on the basis of their assimilator morphology (Weber-van Bosse 1898, Coppejans & Meinesz 1988, Coppejans 1992, Coppejans & Prud'homme van Reine 1992). Taxon boundaries and phylogenetic relationships within *Caulerpa* have recently been studied by Famà *et al*. (2002), de Senerpont Domis *et al*. (2003) and Stam *et al*. (2006).

Fig. 79. *Caulerpa fergusonii***.** A. Small specimens *in situ* at great depth; B. Large specimens from shallow water (herbarium).

Caulerpa filicoides Yamada var. ***andamanensis*** W.R. Taylor
1966: 154-156, fig. 1 Figs 27G; 80

REFERENCES: Coppejans & Meinesz (1988: 184, figs 12-14), Littler & Littler (2003: 218, bottom fig. p. 219), Kraft (2007: 176, pl. 6B, figs 65A-D), Ohba *et al*. (2007: 28, + figs).

TYPE LOCALITY: Andaman Islands.

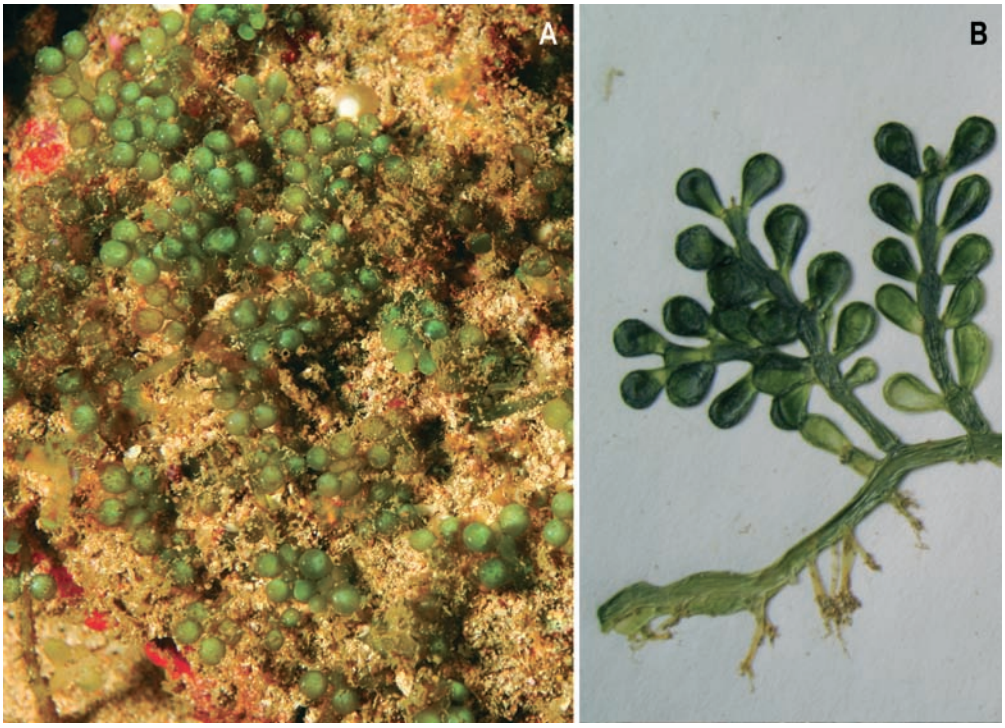
Description - A very delicate, dark green species; stolons thin, up to 0,2 mm in diameter, branching, covered by small, inconspicuous, sharply pointed spines with some developing to form rhizoids, resulting in a rather good attachment to the substratum. Assimilators peltate, the thin, vertically placed stipe 5-15 mm long, mostly simple, more rarely branched, terminally bearing a single, horizontally placed whorl of 6-8 branchlets with the general outlook of a snow crystal; each branchlet dichotomous at the base, alternately branched higher up, with acute apices.

Ecology - Abundant on coral rubble and rock boulders at 19-25 m depth.

Distribution - Indian Ocean: Andaman Islands, India, Tanzania; Pacific Ocean: Fiji, Papua New Guinea.

Notes - The var. *filicoides*, with several, superposed whorls of more funnel-shaped, but morphologically similar branchlets as in var. *andamensis* was collected in shallow lagoons.
New record for Sri Lanka.

Fig. 80. *Caulerpa filicoides* var. *andamanensis*.


A
B

Caulerpa imbricata G. Murray
1887: 37-38 Figs 10E, F; 20C; 81

Reference: Svedelius (1906a: 134-136, figs 37-39).

Type locality: Galle, Sri Lanka.

Description - Plants mostly growing in very dense bluish green clumps, with intricated fleshy stolons and a stiff-fleshy texture; erect branches very densely set, in such a way that they are contiguous, 1-2 (-3) cm high, unbranched, completely and very densely set by radially placed side branchlets of similar morphology over the whole length of the rachis which is not visible in these smaller specimens; plants of some collections are less dense and taller (3-5 cm high), the rachis sometimes branched once, with less densely placed side branchlets in the taller specimens, where the rachis becomes visible; side branchlets roughly trumpet-shaped, upwardly directed, shortly stalked, the inflated apical part being typically asymmetrically (tilted apically) compressed (turbinate with a convex tip) to almost complanate (peltate); light green.

Ecology - Epilithic in the low intertidal and shallow subtidal.

Distribution - Sri Lanka and tropical Atlantic Ocean (Brazil, Florida, Lesser Antilles, Mexico).

Note - The branchlets are most typically inflated and asymmetrically compressed, less frequently peltate and then rarely as thin as in *C. peltata* var. *peltata* or *C. racemosa* var. *peltata* where the stipes of the peltate discs are also very slender; the branchlets are of similar morphology from the base to the apex of the rachis as opposed to *C. peltata* var. *laetevirens* (also present in our collections from Sri Lanka), where the basal branchlets are cylindrical, median ones clavate and top ones turbinate. Taylor (1960) considers this entity as *Caulerpa peltata* f. *imbricata* (G. Murray) Weber-van Bosse. Morphologically, this taxon also resembles *Caulerpa racemosa* var. *chemnitzia* (Esper) Weber-van Bosse. Molecular research should indicate if this is really an individual species or a variety, form or growth form of *C. peltata* or *C. racemosa*.

Fig. 81. *Caulerpa imbricata.*

Caulerpa lentillifera J. Agardh
1837: 173 Figs 20F; 82

References: Jaasund (1976: 25, fig. 49), Coppejans & Meinesz (1988: 184, figs 39-41), Moorjani & Simpson (1988: 13, pl. 13), Coppejans & Beeckman (1989: 383, figs 1-3), Coppejans & Prud'homme van Reine (1992: 690, figs 4E-F, 14A, B), Lewmanomont & Ogawa (1995: 31, + fig.), Cribb (1996: 17, fig. p. 16), Calumpong & Meñez (1997: 114, fig. p. 115), Trono (1997: 33, fig. 19), Huisman (2000: 253, + fig.), Littler & Littler (2003: 220, middle fig. p. 221), Abbott & Huisman (2004: 118, fig. 43D), Oliveira *et al*. (2005: 210, fig. p. 211), Kraft (2007: 186, pl. 6C, figs 68A-C), Ohba *et al*. (2007: 29, + figs).

Type locality: Eritrea.

Description - Stolons terete, irregularly branched (branching density variable), 1-1.5 (-2) mm in diameter; erect fronds rather densely set, up to 3 cm long and unbranched in rather exposed habitats, up to 12 cm long and rather frequently branched in sheltered habitats; rachis terete, completely and densely covered by (sub)spherical ramelli of 1 (-2) mm in diameter, frequently placed on 5-8 longitudinal rows or more irregularly and imbricately placed, supported by pedicels, clearly constricted at the basis of the spherical part; very dark bluish green. The larger growth forms can locally have a naked rachis over a few mm at the basis. Chloroplasts with a single pyrenoid.

Ecology - Mainly on vertical or overhanhanging rock walls at about low water mark, air-exposed at low tide but continuously wave-swept.

Distribution - Tropical Indian and Pacific Ocean.

Note - This species is very similar to *C. microphysa* (Weber-van Bosse) J. Feldmann, but the latter lacks the constrictions between the pedicels and the spherical part of the branchlets, although this character seems to be variable.

Fig. 82. *Caulerpa lentillifera*.

Caulerpa mexicana Sonder ex Kützing f. ***exposita*** (Børgesen) Coppejans *in Coppejans et al*. 2004: 2983 Fig. 83

References: Børgesen (1954: 8, figs 1, 2), Littler & Littler (2003: 216, top fig. p. 217, as *C. crassifolia* f. *exposita*)

Type locality: Riambel, near Souillac, Mauritius.

Description - Plants rather stiff; stolons densely branched and very well attached by numerous rhizoid-bearing branchlets; uprights short (1-1.5 cm long), alternately placed obliquely upwards (V-shaped) and downwardly curved, rachis compressed, bearing pinnately placed compressed branchlets, broadly spindle-shaped, perpendicularly placed on the rachis and upwardly curved in their apical part, acuminate; the successive branchlets overlap each other in their middle part; light green *in situ*, darkening upon drying.

Ecology - On coral rubble between healthy coral boulders, -3 m.

Distribution - Indian Ocean: Mauritius, Rodrigues, Sri Lanka; South Pacific.

Fig. 83. *Caulerpa mexicana* f. *exposita*.

Caulerpa parvula Svedelius 1906a: 136, figs 43, 44 Fig. 84

Syntype localities: Pamban, Tamil Nadu, India; Beruwela, Sri Lanka.

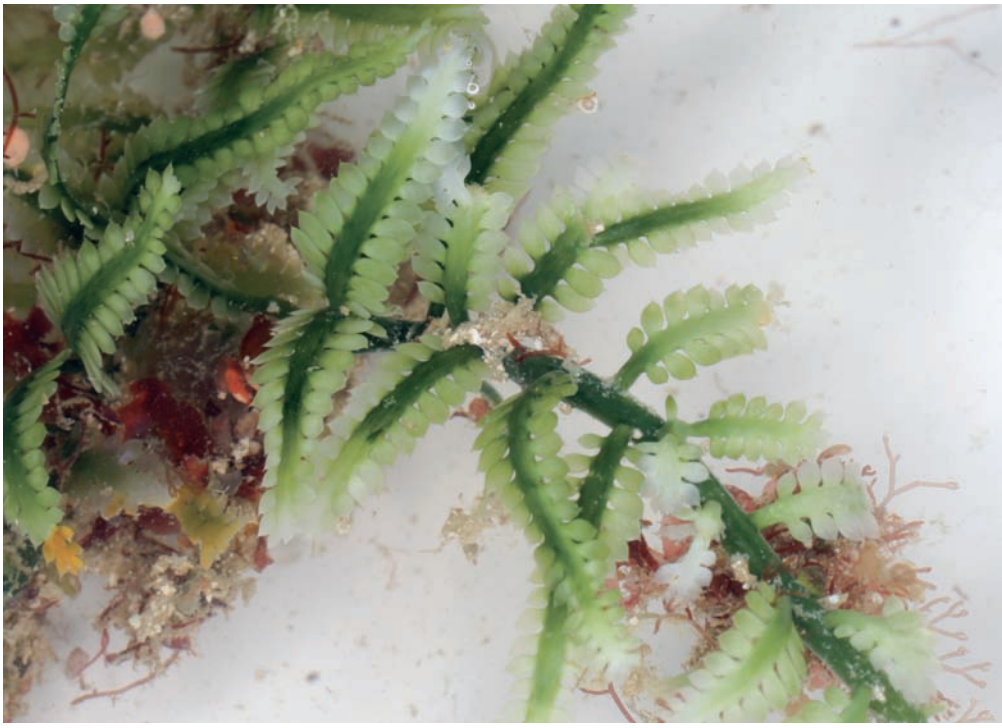
Description - Plants extremely densely intricated and prostrate, forming extremely well adhering, mat-like, fleshy plants; dark, slightly bluish green; stolons richly branched, with numerous rhizoidal holdfasts; uprights composed of single, peltate, fleshy branchlets, 1-2 mm in diameter or by several of these, radially arranged on very short rachis; peltate structures extremely densely placed, forming contiguous mats.

Ecology - Epilithic on horizontal beachrock at about low water mark at surf-exposed sites, air-exposed at low tide, but continuously wave-swept.

Distribution - Only known from India, Indonesia and Sri Lanka.

Note - A few branches of HEC 11809 are taller and look like small *Caulerpa imbricata*, possibly indicating that *C. parvula* might just be a dwarf growth form from surf-exposed sites of the former.

Fig. 84. *Caulerpa parvula*.



Caulerpa peltata var. ***peltata*** J.V. Lamouroux 1809a: 332

Fig. 85

References: Jaasund (1976: 27, fig. 53), Tseng (1984: 282, pl. 140, fig. 3), Coppejans & Beeckman (1989: 388; figs 27-29, as *C.* var. *peltata*), Coppejans & Prud'homme van Reine (1992: 696, 17B, as *C. racemosa* ecad *peltata*), Coppejans (1992: 401), Lewmanomont & Ogawa (1993: 36, + fig., as *C. racemosa* var. *peltata*), Payri *et al*. (2000: 92, top fig. p. 93), Littler & Littler (2003: 228, bottom fig. p. 229, as *C. racemosa* var. *peltata*), Coppejans *et al*. (2005: 68, fig. 38, as *C. nummularia*), Ohba *et al*. (2007: 34, + figs), Kraft (2007: 171, figs 64A-C), Skelton & South (2007: 265, fig. 692).

Type locality: Antilles, West Indies.

Description - Thallus prostrate; stolons thin (about 0.5 mm in diameter), variably branched; erect fronds as isolated, thin peltate discs of up to 3 mm in diameter, born on unbranched, erect stipes, 5-10 mm long; margin of the discs smooth; bluish green.

Ecology - Shallow subtidal, mostly somewhat shaded, under overhangs.

Distribution - Pantropical.

Notes - *Caulerpa* specimens with peltate discoid branchlets, radially arranged around longer erect rachis are here being identified as *C. racemosa* var. *peltata*.

Fig. 85. *Caulerpa peltata* var. *peltata* next to some *Caulerpa microphysa* (Weber-van Bosse) J. Feldmann (left under).

Caulerpa peltata var.

Figs 11C; 86

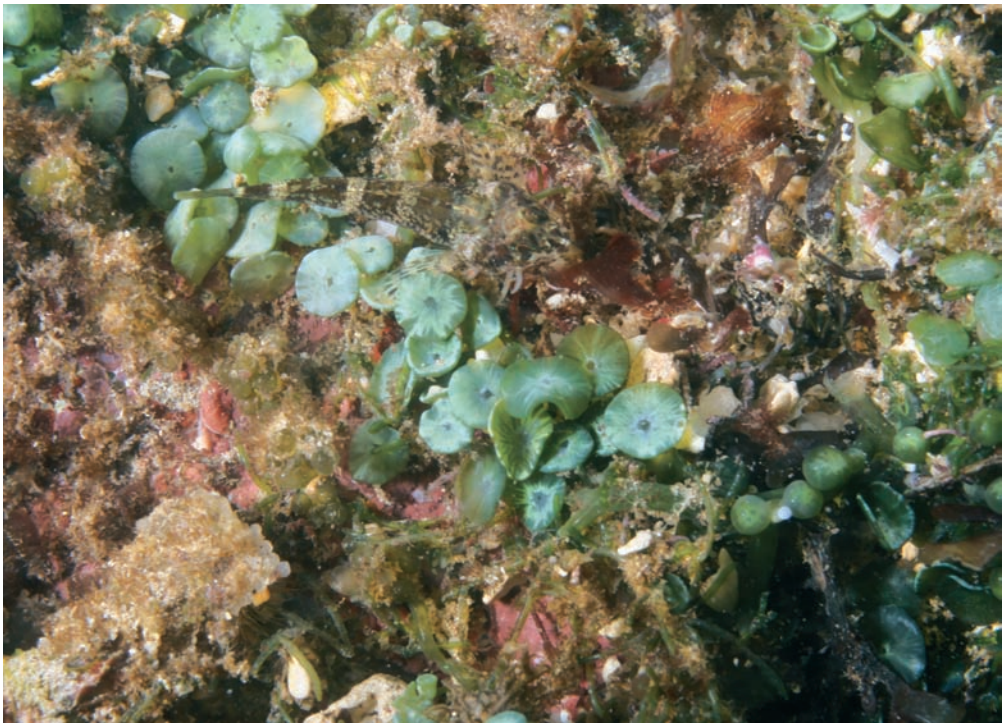
References: Svedelius (1906: 132, fig. 34, as *C. peltata* f. *ad claviferam*); South & N'Yeurt (1993: 131, fig. 24, as *C. racemosa* var. *turbinata*), Littler & Littler (2003: 228, bottom fig. p. 229, as *C. racemosa* var. *peltata*; 236, middle fig. p. 237 and top fig. backpage, as *Caulerpa* sp.), N'Yeurt & Payri (2007: 43, fig. 61).

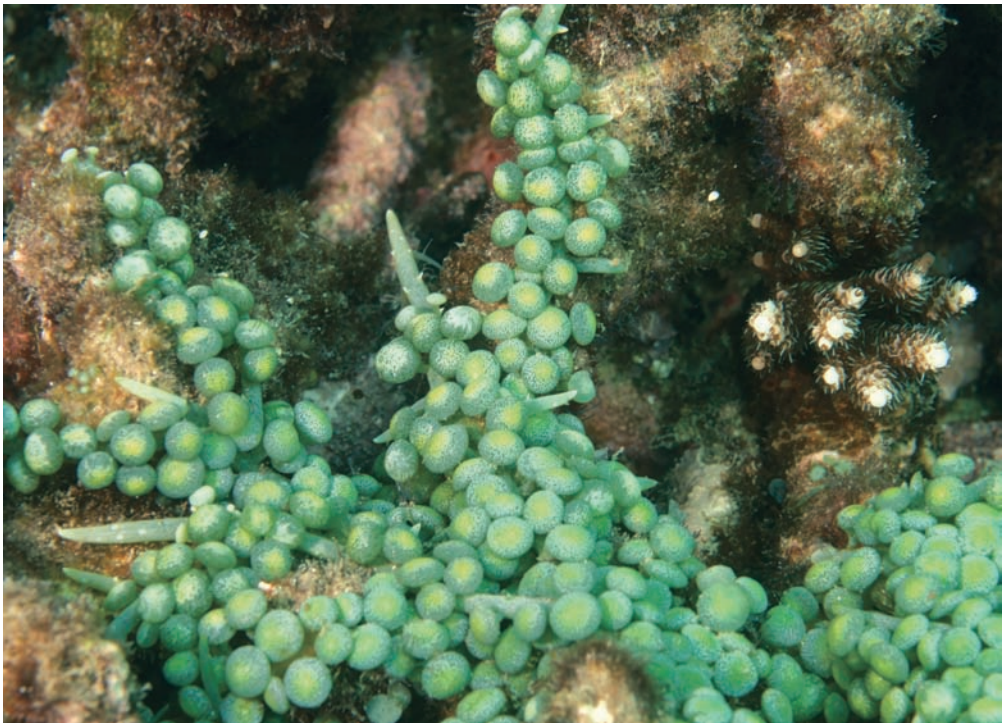
Description - Plants fleshy and rather stiff, repent, very well attached to the substratum by numerous rhizoidal branchlets, bluish green with creamy spots or veins; stolons 2 mm thick, with a percurrent axis and several shorter side axes; branchlets individually placed on the stolon or in small groups on a very short rachis, very densely set, contiguous, stipitate, the heads typically 'mushroom-shaped', with a flat (to somewhat funnel-shaped) lower part and umbonate, rounded upper part.

Ecology - On coral rubble between living coral heads, 1 m deep.

Notes - Peterson (1972) and Ohba & Enomoto (1987) have experimentally shown that light and temperature greatly influence the morphology of clonal grown specimens of *Caulerpa racemosa*. They both illustrate similar growth forms (ecads) to our specimens described above, although somewhat more slender.
Awaiting further (molecular) research, we prefer to distinguish this taxon from others, but not to assign it to a described one.

Fig. 86. *Caulerpa peltata* var.





Caulerpa racemosa var. ***racemosa*** (Forsskål) J. Agardh 1873: 35-36 Figs 10D, F; 12D; 44I; 87

References: Magruder & Hunt (1979: 19, fig. 1, p. 18), Tseng (1984: 282, pl. 140, fig. 4, as var. *clavifera*), Coppejans & Meinesz (1988: 191, fig. 23, as var. *clavifera*), Coppejans & Prud'homme van Reine (1992: 698, figs 18A, B), Coppejans (1992: 401, figs 4C, D), Lewmanomont & Ogawa (1993: 35, + fig.), Cribb (1996: 17, bottom fig. p. 16), Calumpong & Meñez (1997: 115, + fig.), Littler & Littler (2003: 226, middle fig. p. 227), Payri *et al.* (2000: 94, top fig. p. 95), Oliveira *et al.* (2005: 212, fig. p. 213, left under), Skelton & South (2007: 267, figs 694-696, 790).

Type locality: Suez, Egypt.

Description - Thallus forming intricated coverings because of the richly ramified, 2 mm thick stolons, very well fixed to the substratum by numerous, well developed rhizoidal holdfasts; erect parts densely grape-like: rachis short: up to 2 cm, bearing irregularly, closely packed, pearshaped to subspherical, shortly stipitate branchlets with a diameter of (2-) 3 mm and rounded apex, generally resulting in a single layer of contiguous round branchlets, completely hiding the rachis; stalks of the branchlets shorter than the spherical part; bright yellowish green in strongly insolated pools, darker green in subtidal biotopes, where the rachis becomes slightly longer and the number of vesicular branchlets on them are more numerous, but are still very densely packed; young thallus parts becoming brownish after drying.

Ecology - Epilithic on horizontal substratum, from high intertidal pools along surf-exposed coasts to the shallow subtidal, where it frequently develops between coral branches.

Distribution - Pantropical.

Fig. 87. *Caulerpa racemosa* var. *racemosa*.

Caulerpa racemosa var***. racemosa*** f. ***macrophysa*** (Sonder ex Kützing) Svedelius 1906a: 120-122, fig. 13 Fig. 88

References: Coppejans & Beeckman (1989: 384; fig 4, as var. *clavifera* (Turner) Weber-van Bosse f. *macrophysa* (Kützing) Weber-van Bosse), Littler & Littler (2000: 362, bottom fig. p. 363, as *C. macrophysa* (Sonder ex Kützing) G. Murray), Payri *et al.* (2000: top fig. p. 95 as *C. racemosa*), Littler & Littler (2003: 220, bottom fig. p. 221, as *C. macrophysa*), Abbott & Huisman (2004: 120, fig. 43E, as *C. macrophysa*).

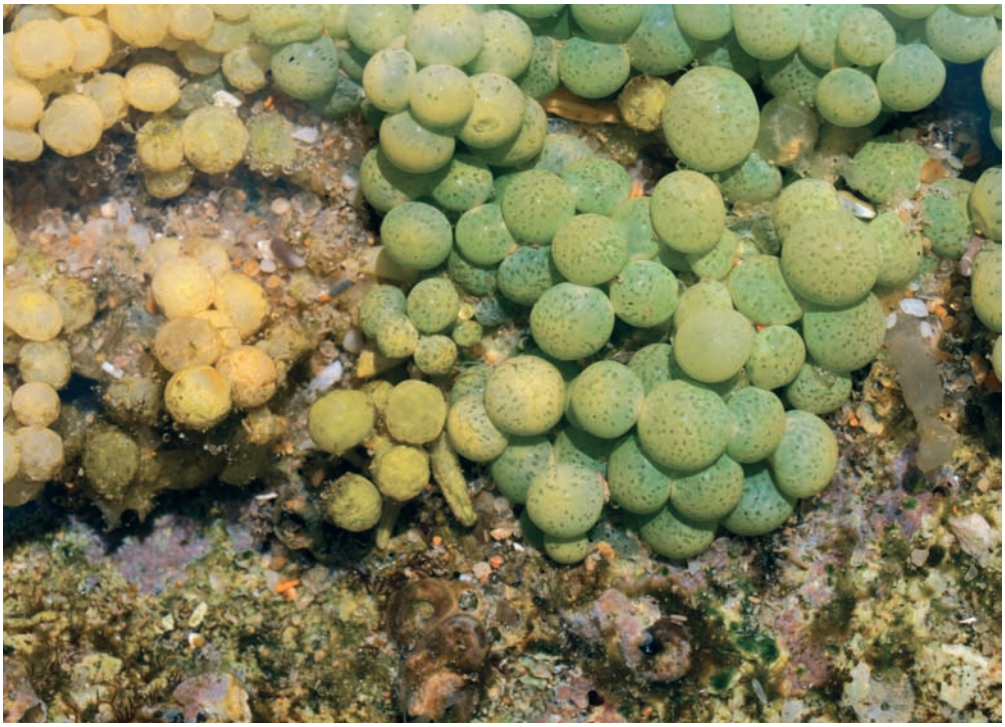
Type locality: Central America.

Description - Stolons thick and fleshy, spreading, very well attached to the substratum by numerous tufts of rhizoids on the rhizoidal branchlets; uprights composed of either single, very shortly stipitate, vesiculate structures up to 5 mm in diameter or of small, almost sessile, clustered groups of such vesicles; creamy to light green, branchlets frequently mottled (according to Littler & Littler, 2000: 486), prior to going reproductive.

Ecology - Mostly in shallow, low intertidal pools, where it can form extensive, monospecific vegetations, but also present on horizontal as well as vertical walls at about low tide level, being partly air-exposed at low tide (but then continuously wave-swept) and in the shallow subtidal.

Distribution - Indian Ocean, tropical Pacific and tropical western Atlantic Ocean.

Fig. 88. *Caulerpa racemosa* var. *racemosa* f. *macrophysa*.



Caulerpa racemosa var. ***racemosa*** f. ***remota*** (Svedelius) Coppejans comb. nov. Fig. 89

BASIONYM: *Caulerpa clavifera* (Turner) C. Agardh f. *remota* Svedelius 1906a: 120-121, fig. 14.

TYPE LOCALITY: Galle, Sri Lanka.

Description - Very similar to var. *racemosa*, but the upright branches are separated by long intervals on the stolons, the rachis are longer (3-4 cm or even longer in deeper populations), the inflated branchlets are more separated (not completely hiding the rachis) and the stalks of the spherical branchlets are also longer (as long as or longer than the diameter of the spheres), resulting in a less dense, more slender aspect than the typical var. *racemosa*.

Ecology - Epilithic in the subtidal (deeper/more sheltered than the typical variety).

Distribution - Sri Lanka.

Note - In some way this taxon is similar to what some authors are calling *C. racemosa* var. *occidentalis* (J. Agardh) Børgesen (Børgesen (1907: 379, figs 28-29), Coppejans & Meinesz (1988: fig 23), Coppejans & Beeckman (1989: p. 384, pl. 2, figs 5-6), Coppejans (1992: 399, fig. 4B), Skelton & South (2007: 267, figs 694, 696, 790).

Fig. 89. *Caulerpa racemosa* var. *racemosa* f. *remota* (herbarium specimen).

Caulerpa racemosa var. ***cylindracea*** (Sonder) Verlaque, Huisman & Boudouresque f. ***laxa*** (Greville) Weber-van Bosse 1898: 367, pl. XXXIII, fig. 22 Fig. 90

REFERENCES: Svedelius (1906: 124-127, fig. 19, as *C. laetevirens* f. *laxa*), Cribb (1958: 218, pl. 3, fig. 4, as *C. racemosa* var. *laetevirens* f. *cylindracea* (Sonder) Weber-van Bosse), Coppejans & Beeckman (1989: p. 386, pl. 4, fig. 23, as *C. racemosa* var. *laetevirens* f. *cylindracea*).

TYPE LOCALITY: Eastern India.

Description - Plants growing in open populations, sand submerged parts whitish, light exposed parts bright to dark green; stolons thin (1 mm in diameter), rather scarcely branched, extremely well attached to the rock substratum by numerous tufs of rhizoids; assimilators placed at relatively large intervals (1-2.5 cm), 1-3 (-5) cm high, extremely supple and swinging around by the wave action; rachis cylindrical and thin, sometimes branched (especially the taller ones); branchlets radially placed around the rachis, morphologically variable: mostly cylindrical, sometimes clavate (especially the upper ones), or even somewhat laterally compressed and incurved (bean-shaped); some intercalary parts of the rachis can be naked (devoid of branchlets), but otherwise it can also produce new stolons higher up (after that the basal part becomes sand-covered?) which in their turn can form new assimilators.

Ecology - On sand-covered, horizontal rock substratum, -0,5/-1 m under low water mark, exposed to strong underwater wave action and sand scourching.

Distribution - India, Sri Lanka; Mediterranean Sea (introduced?).

Note - According to Silva *et al.* (1996: 830) this taxon lies within the circumscription of *Caulerpa peltata*, but has not yet been transferred or reduced to synonymy. We prefer to wait for the results of molecular analysis before suggesting taxonomic transfers.

Fig. 90. *Caulerpa racemosa* var. *cylindracea* f. *laxa* (herbarium specimens).

Caulerpa serrulata (Forsskål) J. Agardh
1837: 174 Fig. 91

REFERENCES: Jaasund (1976: 23, fig. 48), Magruder & Hunt (1979: 19, fig. 2, p. 18), Tseng (1984: 284, pl. 141, fig. 1), Coppejans & Beeckman (1989: 120; figs 24-25), Coppejans & Meinesz (1988: 191, figs 25-26), Moorjani & Simpson (1988: 13, pl. 16), Coppejans & Prud'homme van Reine (1992: 701, fig. 20B), Lewmanomont & Ogawa (1995: 37, + fig.), Cribb (1996: 19, bottom fig. p. 18), Calumpong & Meñez (1997: 116, + fig.), Trono (1997: 39, fig. 23), Huisman (2000: 257, + fig.), Littler & Littler (2000: 372, figs p. 373), Payri *et al*. (2000: 94, bottom fig. p. 95), Littler & Littler (2003: 230, figs p. 231), Abbott & Huisman (2004: 123, fig. 45A), Coppejans *et al*. (2005: 70, fig. 41), Oliveira *et al*. (2005: 214, figs p. 215), Huisman *et al*. (2007: 182, + fig.), Kraft (2007: 177, pl. 6F, figs 65E-G), Ohba *et al*. (2007: 38, + figs), Skelton & South (2007: 268, figs 697-698, 776, 788).

TYPE LOCALITY: Mokha (Yemen).

Description - Stolons 1.5-2 mm thick, from sparsely to richly branched, with numerous well developed rhizoid-bearing branchlets. Assimilators, (1-) 2-3 (-4) cm high, shortly stipitate (2-5 mm), stipe terete; blade narrow straplike, dichotomous, only slightly (HEC 11850) or even not (HEC 12554) spirally twisted, stiff, with markedly serrate margins, dark green.

Ecology - Epilithic, from just under low water mark, down to -25 m.

Distribution - Tropical Indo-Pacific.

Note - The smaller, not spirally twisted form, with thinner stolons is sometimes considered as a separate variety, *C. serrulata* var. *hummii* (Diaz-Piferrer) Farghaly, but intermediates exist, casting doubt on the value of this variety.

Fig. 91. *Caulerpa serrulata* together with *Halimeda* sp.

Caulerpa sertularioides (S.G. Gmelin) M.A. Howe
1905: 576 Figs 17H; 41B; 92

REFERENCES: Jaasund (1976: 23, fig. 47), Magruder & Hunt (1979: 19, fig. 3, p. 18), Tseng (1984: 284, pl. 141, fig. 2), Lawson & John (1987: 90, pl. 8, fig. 2), Moorjani & Simpson (1988: 13, pl. 17), Coppejans & Beeckman (1990: 120; figs 26-27), Coppejans & Meinesz (1988: 192, fig. 29), Coppejans & Prud'homme van Reine (1992: 704, fig. 21A), Lewmanomont & Ogawa (1993: 38, + fig.), Cribb (1996: 21, top fig. p. 20), Huisman (2000: 258, + fig.), Littler & Littler (2000: 374, figs p. 375), Payri *et al*. (2000: 96, top fig. p. 97), Littler & Littler (2003: 232, middle fig. p. 233), Abbott & Huisman (2004: 124, figs 45B-C), Oliveira *et al*. (2005: 214, + fig.), Huisman *et al*. (2007: 182, + figs), Kraft (2007: 175, pl. 6G, figs 64F-G), Ohba *et al*. (2007: 39, + figs).

TYPE LOCALITY: "in coralliis americanis".

Description - Uprights feather-like with cylindrical ramuli, light to dark green. Two extreme growth forms occur along the Sri Lankan coast: a small, very intricate one (form 1), and a larger, more elegant and less dense one (form 2), but intermediates have also been collected.

Form 1 (forma *brevipes* (J. Agardh) Svedelius). Stolons thin (0.25-0.5 mm), richly branched, forming rather dense, intricate, rather stiff tufts; upright branches 1-2 cm high, 3-5 mm wide, main axis mostly unbranched, naked at the base (2-3 mm), provided with pinnately disposed branchlets; pinnae cylindrical, not contracted at the base, elegantly upcurved, with mucronate tips.

Form 2 (forma *longiseta* (Bory de Saint-Vincent) Svedelius). General aspect less dense and markedly more supple and elegant than form 1; stolons 1-1.5 mm thick, sparsely branched; upright branches up to 10 cm high and 10 mm wide, rachis simple or irregularly to subdichotomously branched once or twice. Pinnae as in form 1 but longer.

Some specimens, mainly of form 2 show repeated regrowth (longer pinnae being formed after gradually shorter ones), resulting in a Christmas-tree-like aspect (forma *umbellata* (Weber-van Bosse) Svedelius).

Ecology - Form 1: Growing in surf-exposed intertidal areas or in the small cascades between intertidal pools. Form 2: Subtidal in sheltered lagoons or harbours.

Distribution - Tropical Indo-Pacific and tropical eastern Atlantic Ocean.

Note - Several forms have been described in literature but as intermediates are frequently observed we prefer to consider them merely as growth forms (ecads).

Fig. 92. *Caulerpa sertularioides*.

Caulerpa taxifolia (Vahl) C. Agardh
1817: XXII — Figs 22E; 93

REFERENCES: Jaasund (1976: 23, fig. 46), Magruder & Hunt (1979: 21, fig. 1, p. 20), Tseng (1984: 284, pl. 141, fig. 3), Coppejans & Beeckman (1990: 122; figs 36-39), Lawson & John (1987: 90, pl. 8, fig. 3), Coppejans & Prud'homme van Reine (1992: 706, figs 6B, 22B), Coppejans (1992: 406, figs 8A-B), Lewmanomont & Ogawa (1993: 39, + fig.), Cribb (1996: 21, middle fig. p. 20), Huisman (2000: 258, + fig. p. 259), Littler & Littler (2000: 376, top fig. p. 377), Payri *et al*. (2000: 98, top fig. p. 99), Littler & Littler (2003: 234, top fig. p. 235), Abbott & Huisman (2004: 124, figs 46A-B), Huisman *et al*. (2007: 183, + figs), Kraft (2007: 177, pls 6D, 7C-D, figs 66A-C), Ohba *et al*. (2007: 41, + figs).

TYPE LOCALITY: St. Croix, Virgin Islands.

Description - Uprights feather-like with markedly compressed ramuli, dark green. Stolons densely branched, bearing numerous downward growing branchlets with terminal groups of rhizoids and mostly closely packed, pinnate erect fronds, varying from 10-20 (-25) cm high, (5-) 7-10 mm wide; rachis slightly compressed, 0,5-1 mm wide, only exceptionally and irregularly branched up to two orders, naked at the base (3-10 mm) resulting in a stipitate aspect; pinnae 2-5 mm long, closely placed on 2 opposite rows in a single plane, almost perpendicular on the rachis, dorso-ventrally compressed, upwardly curved in their upper part, slightly constricted at the base, with parallel sides and gradually tapering to the acuminate apex; pinnae very densely set, but not overlapping.

Ecology - The typical (tall) growth form locally develops in large, almost monospecific vegetations between rock boulders, in the lagoon, from just under low water mark down to 1 m depth; the small growth form (f. *asplenioides*) somewhat deeper (-3 m).

Distribution - Pantropical (and Mediterranean Sea, introduced).

Note - Some collections are composed of plants with less branched stolons, short (1-2 cm high), horizontally curved uprights which are placed on two upwardly directed oblique rows and short ramelli; this form has been described as *C. taxifolia* f. *asplenioides* (Greville) Weber-van Bosse. Some specimens of this form show the same repeated regrowth as described in *C. sertularioides*, which Svedelius (1906a: 113, fig. 6) called *C. taxifolia* f. *interrupta*.

Fig. 93. *Caulerpa taxifolia*.

Caulerpa verticillata J. Agardh
1847: 6 — Figs 22D; 36H; 94

REFERENCES: Tseng (1984: 284, pl. 141, fig. 4), Coppejans & Beeckman (1990: 124; figs 28-32), Coppejans & Prud'homme van Reine (1992: 708, fig. 21B), Lewmanomont & Ogawa (1995: 40, + fig.), Trono (1997: 44, fig. 27), Littler & Littler (2000: 376, middle figure p. 377), Littler & Littler (2003: 234, bottom fig. p. 235), Abbott & Huisman (2004: 125, fig. 46C), Oliveira *et al*. (2005: 214, + fig), Ohba *et al*. (2007: 43, + figs).

TYPE LOCALITY: Not specified (West Indies).

Description - Growing in dense, extremely soft and slender, very dark green tufts. Stolons thin (up to 250 µm in diameter), very densely branched, well fixed by very numerous groups of rhizoids; upright branches densely set, 1-2 (-3) cm high, with a naked base and conspicuous whorls of determinate branchlets higher up; (1-2) 3-5 (-10) superposed whorls, 2-3 (-4) mm in diameter, 2-3 mm apart; ramelli tubular, branching dichotomously 4-6 times, not constricted at the dichotomies, approximately 80 µm in diameter at the base, tapering to 25 µm at the rounded apices.

Ecology - Either on sand-covered rock substratum in shallow lagoons, or on the vertical, lagoon side of the beachrock platform; at about or just under low water level.

Distribution - Indian Ocean, tropical Pacific Ocean and Caribbean Sea.

Fig. 94. *Caulerpa verticillata*.

Halimeda discoidea Decaisne
1842: 102 Figs 22B; 24C; 95

REFERENCES: Jaasund (1976: 31, fig. 62), Magruder & Hunt (1979: 29, fig. 1 p. 28), Hillis-Colinvaux (1980: 136-139, fig. 41), Tseng (1984: 288, pl. 143, fig. 2), Cribb (1996: 31, middle fig. p. 30), Calumpong & Meñez (1997: 105, fig. p. 106), Littler & Littler (2000: 400, bottom fig. p. 401), Payri *et al.* (2000: 108, top fig. p. 109), Littler & Littler (2003: 244, middle fig. p. 245), Oliveira *et al*. (2005: 219, fig. p. 219), Huisman *et al*. (2007: 190, + fig.), Kraft (2007: 202, figs 72E-L), Ohba *et al*. (2007: 45, + figs).

TYPE LOCALITY: Stated as Kamchatka, but highly improbable; true provenance not known.

Description - Plants mostly growing in isolated, limited populations, only locally forming huge, monospecific vegetations. Thallus erect, generally bushy, mostly 5-10 cm high, but up to 18 cm, attached by a generally well-developed felty structure; branching mainly di- trichotomous mostly in a single plane but also polychotomous from large segments and then in several planes, resulting in a dense habit; segments only slightly calcified, mostly thick and fleshy, without ribs or inflated upper rim, morphologically variable (even within a single specimen): the basal one(s) (sub)terete, resulting in a stipitate aspect, the upper ones most typically rounded, but frequently reniform or cuneate, flat, 15-22 mm broad, 10-15 (-20) mm long; bright green.

Ecology - Epilithic, mostly in lagoons from low water mark down to 1 m depth. Around Kalpityia, huge (several hundreds of square meters), monospecific populations are present with erect, contiguous plants, all directed in the same direction, all moving together with the waves.

Distribution - Indian Ocean, tropical Pacific Ocean, eastern Atlantic Ocean.

Note - *Halimeda* is characterized by thalli composed of calcified green segments and occurs throughout the tropics and subtropics. Important taxonomic studies include the monographs of Barton (1901), Hillis (1959) and Hillis-Colinvaux (1980). Phylogenetic relationships and species boundaries within the genus have been studied in detail by Kooistra *et al*. (2002) and Verbruggen (2005). For correct identification on species level, anatomical analysis is needed.

Fig. 95. *Halimeda discoidea*.

Halimeda gracilis Harvey ex J. Agardh
1887: 82 Figs 12C; 24A, B; 42C; 96

REFERENCES: Hillis-Colinvaux (1980: 144; figs 44a-b), Littler & Littler (2000: 402, middle fig. p. 403), Littler & Littler (2003: 246, middle fig. p. 247), Coppejans *et al*. (2005: 84, figs 57-58), Kraft (2007: 204, figs 73A, B, D, I), Ohba *et al*. (2007: 47, + figs).

TYPE LOCALITY: Sri Lanka.

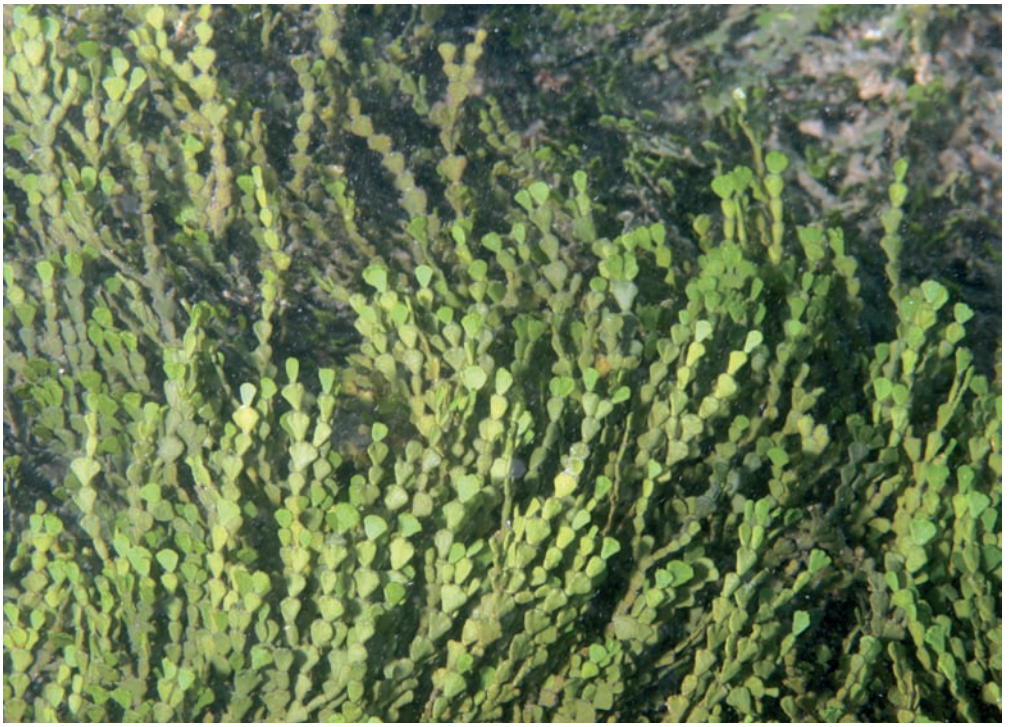
Description - Plants mostly in large, densely intricated populations forming thick cushions on the substratum. Thallus ascendant, 20 (-25) cm long, lax; the basal parts rather stiff, the upper parts being supple and moving along with the waves, white (in the basal parts) to bluish green; branching sparse but some segments supporting 4 to 5 branches; attachment by groups of rhizoids at several places where the sprawling thallus contacts the substratum; segments strongly calcified and brittle, in most populations small, cuneate, flabellate, diamond-shaped to somewhat rounded or subterete, smooth, 2-3 (-5) mm long and 2-3 mm wide. Other populations (f. *triloba*) have wider (up to 5 mm broad) trilobed segments with radial ribs

Ecology - Epipsammic, extremely abundant on the sandy substratum of sheltered lagoons or sheltered depressions in submerged reefs (Bar Reef), from 1 to 4 m depth; frequently growing mixed to seagrasses (Fig. 12C). As a result of sand fixation between the sprawling branches, bumps develop on the lagoon bottom with the more supple branch tips being radially arranged and swaying around with the waves.

Distribution - Indian Ocean, tropical Pacific Ocean, Caribbean Sea.

Note - This *Halimeda* species is the most abundant one along Sri Lankan coasts, especially in lagoons. Along some Sri Lankan shores the substratum is mainly composed of loose segments of decayed specimens of *H. gracilis* (Figs 2D, E).

Fig. 96. *Halimeda gracilis*.



Halimeda opuntia (Linnaeus) J.V. Lamouroux
1816: 308 Figs 22F; 97

REFERENCES: Jaasund (1976: 33, fig. 65), Magruder & Hunt (1979: 29, fig. 2, p. 28), Hillis-Colinvaux (1980: 110-112, figs 19, 51, 92), Tseng (1984: 290, pl. 144, fig. 2), Moorjani & Simpson (1988: 15, pl. 26, right), Lewmanomont & Ogawa (1993: 52, + fig.), Cribb (1996: 33, top fig. p. 32), Calumpong & Meñez (1997: 103, fig. p. 104), Payri *et al*. (2000: 114, bottom fig. p. 115), Oliveira *et al*. (2005: 220, fig. p. 221), Huisman *et al*. (2007: 190, + fig.), Kraft (2007: 220, pl. 8G, figs 77H-L), Ohba *et al*. (2007: 54, + figs).

LECTOTYPE LOCALITY: Jamaica.

Description - Plants forming very dense, stiff-brittle, hemispherical clumps, 10-15 cm in diameter, or more extensive mounds, exceeding 20 cm in diameter, with numerous points of attachment, whitish in the clump, light to dark green at the periphery. Branches radially arranged, segments reniform (sometimes even auriculate) to trilobate, 3-4 mm long, 5-7 mm broad, sometimes ribbed, old ones strongly calcified and brittle, successive segments not in a single plane, sometimes even at right angles with each other; branching extremely dense, in all directions, resulting in a radial growth of the extremely intricate clumps.

Ecology - From shallow rock pools of the lower intertidal to the shallow subtidal of sheltered lagoons and bays.

Distribution - Pantropical.

Note - The absence of a well defined, single attachment point, the dense, cushion-like growth form and the strongly calcified segments distinguish this species from the others in Sri Lanka.

Fig. 97. *Halimeda opuntia*.

Avrainvillea amadelpha (Montagne) A. Gepp et E. Gepp
1908: 178-179, pl.23: fig. 20, pl. 24: figs 21, 22 Figs 25B; 41C; 98

REFERENCES: Olson-Stojkovich (1985: 36-38, fig. 19), Coppejans & Prud'homme van Reine (1989: 121, pl. 1, figs 1-17), Littler & Littler (2003: 236, bottom fig. p. 237), Abbott & Huisman (2004: 137, fig. 51A), Huisman *et al*. (2007: 192, + fig.), Ohba *et al*. (2007: 57, + figs).

TYPE LOCALITY: Agalega Islands.

Description - Plants gregarious, in dense clusters, arising from an extensive felted holdfast; stipes cylindrical in the basal part, becoming compressed towards the blades; in most collections stipes 0.5 to 1 cm long, more rarely up to 2 cm widening up to the fan- to wedge-shaped blades, 2-3 (-4) cm long and wide, soft and spongy, with a smoothly rounded margin, more rarely ragged or composed of loose filaments, dark green; intertwined filaments of the blades dichotomous, markedly constricted at the dichotomies, 18-25 µm in diameter. In some specimens the blade filaments are really loosely entangled, resulting in spongy, obconical structures.

Ecology - In rock crevices just under low water mark; locally abundant.

Distribution - Indian and tropical Pacific Ocean.

Note - *Avrainvillea* includes about 25 species, which are distributed in tropical waters. The genus has been monographed by Littler & Littler (1992) (tropical western Atlantic) and Olson-Stojkovich (1985).

Fig. 98. *Avrainvillea amadelpha*.

Avrainvillea erecta (Berkeley) A. Gepp et E. Gepp 1911: 29-32, pl. X: fig. 89 Fig. 99

REFERENCES: Tseng (1984: 286, pl. 142, fig. 1), Coppejans & Prud'homme van Reine (1989: 123, pl. 2, figs 18-37, as *A. erecta-A. obscura*), Trono (1997: 66, fig. 43), Payri *et al*. (2000: 118, top fig. p. 119), Littler & Littler (2003: 238, top fig. p. 239), Oliveira *et al*. (2005: 222, figs p. 222), Ohba *et al*. (2007: 58, + figs).

TYPE LOCALITY: Philippines.

Description - Plants generally solitary, but mostly growing in open populations; in some cases a few, closely gathered specimens anastomose laterally; fully grown thalli consisting of a flabellate (more rarely reniform), spongy-felted blade that can be longitudinally undulated, up to 3 cm high and 4.5 cm wide, dirty dark green, supported by a very short, stout, unbranched stalk (5-10 mm long, 5-8 mm in diameter); plants attached by a well-developed more or less cylindrical, bulbous holdfast, up to 9 cm long and 15 mm in diameter; blade siphons loosely intricated, from greenish orange to yellowish brown (under microscope), 30-50 µm in diameter, cylindrical with deeply constricted equal dichotomies and rounded apices. Juvenile specimens only forming a small, hemispherical tuft of radially arranged loose filaments on top of a very short stipe; young plants forming a more or less cylindrical flabellum; only fully developed specimens are 'typically' flabellate.

Ecology - Close to the beach in a sheltered lagoon; in the seagrass vegetation and the beach-side channel (20 cm deep); continuously submerged plants flabellate; air-exposed specimens at low tide very small and like shaving brushes.

Distribution - Indian and tropical Pacific Ocean.

Fig. 99. *Avrainvillea erecta* partly sticking out of the water at extreme low tide.

Boodleopsis pusilla (Collins) W.R. Taylor, Joly et Bernatowicz 1953: 105-106 Fig. 100

REFERENCES: Leliaert *et al*. (2001: 455, figs 17-21); Oliveira *et al*. (2005: 222, + fig.).

TYPE LOCALITY: West Indies.

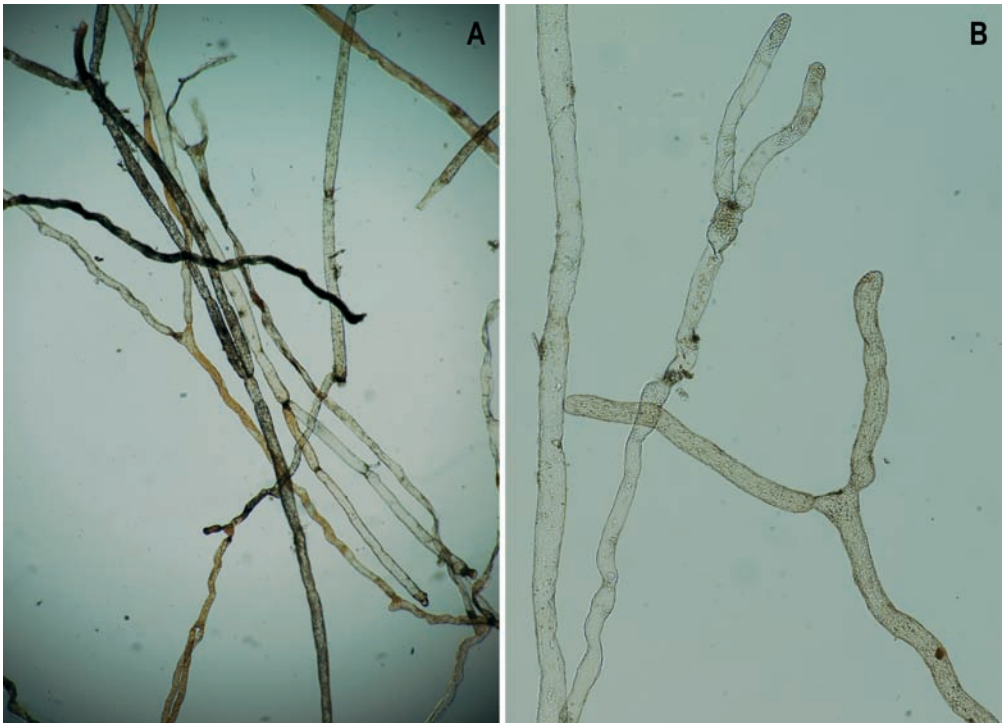
Description - Plants forming silty bumps from where the dark green tips of the filaments radially stick out; basal part composed of loosely interwoven siphonous filaments, 75-105 µm in diameter in the middle parts, 75-90 µm in the apical parts, repeatedly branching (sub-)dichotomously with a wide angle; branching angle rounded to flat; constrictions present just above the dichotomies but also between succeeding dichotomies; some filaments markedly sinuous; basal filaments almost colourless, filament tips very dark green; attachment by thinner, more densely and pseudodichotomously to irregularly branched, colourless rhizoids developing throughout the plant; rhizoids with a marked smaller diameter (10-30 µm) than the siphons.

Ecology - On horizontal rock substratum in a shaded crevice at about low tide level, continuously submerged.

Distribution - Pantropical.

Note - *Boodleopsis* species are separated mainly on filament diameter, but as West (1991) stated, this a variable character highly influenced by environmental factors.

Fig. 100. *Boodleopsis pusilla***,** microscopic details.


A
B

Chlorodesmis caespitosa J. Agardh
1887: 49-50 Fig. 101

REFERENCES: Ducker (1967: 157; pls 3, 12-14, 19), Coppejans *et al.* (2001: 420, figs 11-14).

TYPE LOCALITY: Colombo, Sri Lanka.

Description - Thallus composed of erect, gregarious, bright green filaments 2-6,5 cm long, (125-) 270 (-585) µm diameter; branching dichotomous, mainly apical, resulting in a fastigiate appearance; segment supporting the dichotomy truncate and sometimes even slightly swollen at the distal end; both filaments arising from a dichotomy constricted at the same level; intercalary constrictions possible but not frequent. Needle-shaped crystals always present in the photosynthetic filaments and locally abundant. Rhizoids hyaline, with dense dichotomous branching.

Ecology - On horizontal, sand-covered rocks just above low water mark, continuously wave-swept.

Distribution - Indian Ocean, tropical Pacific Ocean.

Note - *Chlorodesmis*, including about 11 species, is widely distributed in tropical marine waters. The genus has been monographed by Ducker (1967). Several species occur along Sri Lankan coasts.

Fig. 101. *Chlorodesmis caespitosa*: A. *In situ* view; B. Supradichotomic constrictions; C, D. Crystals in the siphons.

Rhipidosiphon javensis Montagne
1842a: 15 Fig. 102

REFERENCES: Jaasund (1976: 29, fig. 60, as *Udotea javensis*), Tseng (1984: 294, pl. 146, fig. 2, as *Udotea*), Coppejans & Prud'homme van Reine (1989: 139, pl. 10, figs 3-9, as *Udotea*), Trono (1997: 77, fig. 52, as *Udotea*), Payri *et al*. (2000: 120, bottom fig. p. 121), Littler & Littler (2003: 254, middle fig. p. 255), Oliveira *et al.* (2005: 224, fig. p. 224), Huisman *et al*. (2007: 191, + figs), Kraft (2007: 233, fig. 83), Skelton & South (2007: 289, figs 739-740, 795).

TYPE LOCALITY: Leiden Island (Nyamuk besar), Java, Indonesia.

Description - Thalli erect, 5-10 mm high, isolated, but more frequently growing in open populations, composed of hyaline rhizoids, and a slightly calcified stipe and flabellum; green to greyish green (depending on the degree of calcification). Stipe monosiphonous, unbranched, smooth, 1-4 mm long, 100 µm diameter; flabellum cuneate to flabellate, 2-6 mm wide, 4-6 mm long, unistratose, composed of parallel, contiguous, dichotomous (rarely trichotomous) filaments, radiating from the stipe to the margin, 45-60 µm diameter, with unequal constrictions above the dichotomies, without lateral appendages, kept together by the calcification; crystals sometimes present in the blade siphons.

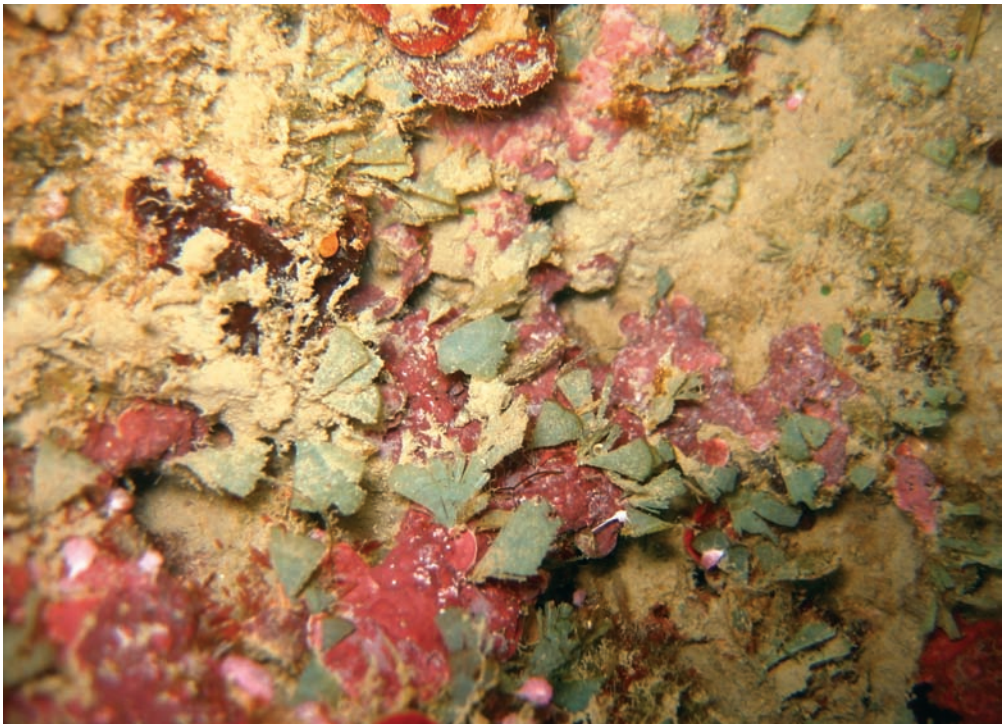
Ecology - On vertical rock wall, -20 m.

Distribution - Indian Ocean, tropical Pacific Ocean.

Note - *Rhipidosiphon* is a small tropical genus, including only two species: *R. javensis*, occurring in the Indo-Pacific and *R. floridensis* Gepp et Gepp, which is only known from the Caribbean Sea. The genus has been studied by Gepp & Gepp (1904), Littler & Littler (1990) and Vroom *et al.* (2001).

Fig. 102. *Rhipidosiphon javensis*.


A
B
C
D



10.2. Phaeophyceae - Brown algae

Taxonomic overview of the species included in this guide. Taxa indicated with an asterisk have their type locality in Sri Lanka.

Ralfsia ceylanica Harvey ex Barton
1903: 477-478, pl. 13: figs 1-4 Figs 16C; 40D; 103

Type locality: Sri Lanka.

Description - Young specimens form well-attached, circular crusts, a few cm in diameter, on the rocky substratum; older ones become contiguous, confluent, resulting in irregularly lobed crusts, medium brown when wet, becoming darker upon drying; slippery surface when wet; the radially arranged, creeping filaments adjacent, about 15 µm in diameter, upwardly curving, still adjacent and becoming vertical and 10 µm in diameter.

Ecology - Epilithic on surf-exposed rocks in the upper intertidal zone and supralittoral fringe, mostly among *Chnoospora minima* and *Dermonema virens*.

Distribution - India, Laccadive Islands, Pakistan, Sri Lanka.

Note - Further studies should determine if this species is really different from other *Ralfsia* species.

Fig. 103. *Ralfsia ceylanica*.

Sphacelaria novae-hollandiae Sonder
1845: 50 Fig. 104

References: Tseng (1984: 202, pl. 102, fig. 4), Keum *et al.*, (2003: 113-124), Abbott & Huisman (2004: 189, figs 72A-B), Oliveira *et al*. (2005: 155 + figs), Huisman *et al.* (2007: 211, + fig.), Skelton & South (2007: 204, figs 562-565), Littler *et al.* (2008: 143 + figs).

Type locality: Western Australia (probably Fremantle).

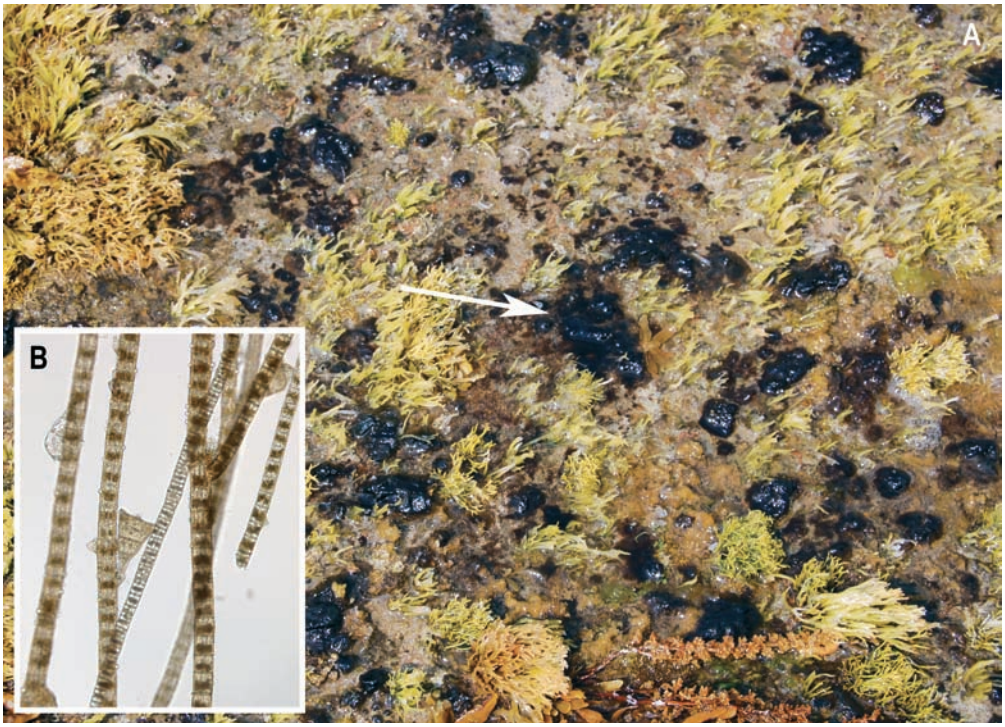
Description - Plants gregarious, in discrete hemispherical stiff tufts, with radially placed rather straight branchlets, 1-2.5 cm long, 35-60 µm in diameter near the base, dark brown; attachment by stoloniferous filaments; branching of erect, straight filaments relatively sparse with laterals similar to or somewhat thinner than the parent filaments, all filaments growing to an equal height; segments L/W 0.75-1 and showing 2-4 longitudinal walls; secondary transverse walls absent; phaeophycean hairs common but soon breaking off. Propagules tribuliform with obscure horns, 120-140 µm long and 110-120 µm at the distal end, borne on a 1-3 celled pedicel; the apical cells of the horns cut off by a straight cross wall; presence of a small lenticular cell midway between the horns. Uni- or plurilocular sporangia not observed.

Ecology - Epilithic on the bottom of a very shallow intertidal rock pool on the beachrock platform.

Distribution - Tropical and warm temperate waters.

Notes - According to Keum *et al*. (2006: 122) the closest allie of *S. novae-hollandiae* is *S. novae-caledoniae* Sauvageau. The latter, that has only been reported from New Caledonia and southern Australia, has more slender filaments (21-34 µm) and the propagules are composed of smaller rectangular cells. In *S. californica* Sauvageau ex Setchell et Garner, the propagules are considerably larger in almost all measurements than in S. *novae-hollandiae*. The other *Sphacelaria*-species with tribuliform propagules (*S. brachygona* Montagne, *S. plumula* Zanardini and *S. tribuloides* Meneghini) are characterized by propagules with more pronounced horns.
A new species for Sri Lanka.

Fig. 104. *Sphacelaria novae-hollandiae*. A. Tufts *in situ* (the dark brown tufts, arrow); B. Microscopic details with propagules.


A
B

Canistrocarpus crispatus (J.V. Lamouroux) De Paula et De Clerck *in* De Clerck *et al*. 2006: 1285 Fig. 105

REFERENCES: Jaasund (1976: 39, fig. 78, as *Dictyota bartayresii* J.V. Lamouroux sensu Vickers; 39, fig. 79 as *D. friabilis* Setchell), Lewmanomont & Ogawa (1993: 69, + fig., as *D. bartayresiana*), De Clerck (2003: 66-75, figs 20-22, as *Dictyota crispata* J.V. Lamouroux), Littler & Littler (2000: 262, bottom fig. p. 263, as *D. crispata*), Oliveira *et al*. (2005: 160, fig. p. 159, as *D. bartayresiana*, fig. p. 161), Tronchin & De Clerck (2005: 102, fig. 73, as *Dictyota*).

TYPE LOCALITY: Caribbean Sea, Antilles.

Description - Thallus ascending with a small prostrate base giving rise to several stiff and crisp, erect straps which are somewhat harsh to the touch, 9-20 cm long; rhizoids limited to the lower part of the thallus; pale to dark brown, not iridescent; width of the straps constant over a single plant, or slightly widening towards the apices; average width: 5-10 mm; apices typically apiculate to rounded; the apical segments often with strongly rounded axils; branching anisotomous dichotomous, especially in the upper part of the thallus where the central straps are longer than the peripheral ones, possibly resulting in an alternate branching; branching angle broader towards the base (50-70°), than near the apical parts (30-50°). Margins smooth, sometimes appearing dentate but this because of submarginal surface proliferations; surface proliferations abundant, evenly distributed over both surfaces. Cortex and medulla unilayered (occasionally a duplication of a medullary cell at the base of a surface proliferation). Sporangia scattered on both surfaces of the straps, single or grouped in small longitudinal sori (up to 6 sporangia), surrounded by an involucrum, supported by a single stalk cell Gametangia not observed.

Ecology - On coral fragments on the bottom of a lagoon, 3 to 4 m deep. Abundant where collected, not observed since then, not even at the same locality in the same season.

Distribution - Pantropical.

Fig. 105. *Canistrocarpus crispatus* (herbarium specimen).

Canistrocarpus magneanus (De Clerck et Coppejans) De Paula et De Clerck *in* De Clerck *et al*. 2006: 1285 Figs 32C; 106

REFERENCES: Coppejans *et al*. (2001: 23-25, pl. I, as *Dictyota magneana*), Littler & Littler (2003: 170, middle fig. p. 171, as *Dictyota magneana*).

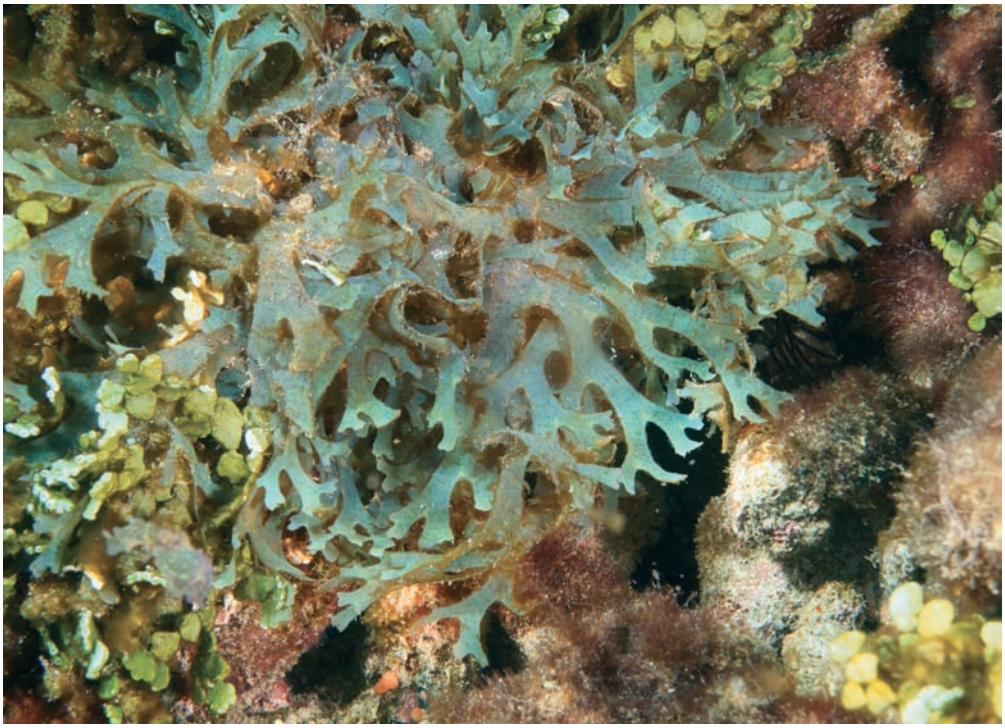
TYPE LOCALITY: Lion Island, Port Moresby, Papua New Guinea.

Description - Plants forming prostrate mats, about 20 cm in diameter, composed of interwoven, brittle straps, exhibiting a bluish iridescence in situ; straps 3-4 mm wide, attached by means of patches of marginal rhizoids present from the basal to the apical parts, lacking a conspicuous base; straps frequently attached to neighbouring ones by marginal patches of rhizoids; branching dichotomous, branching angle 50-70°; the apical segments often with one branch more developed than the other; margins smooth, possibly appearing dentate due to submarginal surface proliferations; surface proliferations, tooth-like, restricted to the margins of the upper surface of the thallus and perpendicular on the strap surface. Whole plant tristromatic, cortex and medulla unilayered. Reproductive structures not observed.

Ecology - Epilithic on horizontal dead coral, 2-3 m depth.

Distribution - Papua New Guinea, Sri Lanka.

Fig. 106. *Canistrocarpus magneanus*.



Dictyopteris delicatula J.V. Lamouroux
1809: 332, pl. 6, fig. 2B — Figs 39E; 107

REFERENCES: Jaasund (1976: 43, fig. 87), Cribb (1996: 43, top fig. p. 42), Calumpong & Meñez (1997: 129, + fig.), Littler & Littler (2000: 254, middle fig. p. 255), Payri *et al*. (2000: 128, figs p. 129), Littler & Littler (2003: 166, top fig. p. 167), Tronchin & De Clerck (2005: 98, fig. 70), Oliveira *et al*. (2005: 156, fig. p. 157).

TYPE LOCALITY: Antilles, West Indies.

Description - Plants erect to repent, up to 4 cm tall, composed of complanate strap-like axes with a distinct midrib, pale to dark brown in colour; attached by rhizoids arising from the blade margin; straps 0.7-2 mm broad, regularly dichotomously to irregularly branched; branching angle 30-90°; margins smooth; apices rounded; hairs in small tufts on both sides of midrib. Internal structure: midrib composed of a central core of small, thick-walled cells, 4-6 cells thick and 4 cells wide; wings 2 cells thick but with a distinctive submarginal vein, 3-6 cells thick. Sporangia forming a band along both sides of the midrib in the upper part of the thallus.

Ecology - Epilithic in shaded crevices close to low water level; always in small numbers.

Distribution - Pantropical.

Note - *Dictyopteris delicatula* is morphologically basically identical to *D. repens* (Okamura) Børgesen, a species reported from several localities in the western Indian Ocean. Both species are distinguished by the relative presence of a submarginal midrib (Wysor & De Clerck 2003).

Fig. 107. *Dictyopteris delicatula*.

Dictyota ceylanica Kützing
1859: 11, pl. 25: fig. 1 — Figs 23A; 33A; 38D; 108

REFERENCES: Jaasund (1976: 41, fig. 83, as *D. divaricata*, fig. 84), Payri *et al*. (2000: 134, top fig. p. 135, as *D. divaricata*), De Clerck (2003: 52-57, figs 15-16), Littler & Littler (2003: 168, top fig. p. 169), Abbott & Huisman (2004: 202, fig. 77B), Oliveira *et al*. (2005: 159, + fig., fig. p. 161, as *D. divaricata*), Huisman *et al*. (2007: 219, + fig.).

TYPE LOCALITY: Sri Lanka.

Description - Thalli within a single tuft relatively heterogenous, but generally with a rather slender appearance and supple in the typical filiform growth form, relatively crisp in the specimens with broader straps; composed of relatively small (3-4 cm) ascending plants, without a conspicuous base, basal straps procumbent to repent, becoming erect higher up; erect straps frequently filiform, resulting in an intricate appearance; sometimes forming dense, low mats; often bluish or greenish iridescent, sometimes with marked yellowish axils; repent straps attached at various points by marginal rhizoids but rhizoid patches also present higher up along the erect straps; branching isotomous dichotomous all over the thallus, but the possible presence of numerous marginal proliferations can obscure the original branching system; branch angle broadly divaricate, of (60-) 70-90 (-100)°; straps of variable width, the basal ones up to 2 mm wide, tapering gradually or abruptly to the filiform apical straps, some specimens without filiform parts other without the broad basal parts; apices of the broad straps rounded, those of the filiform branchlets acute; margins smooth; surface proliferations absent, hair tufts common; marginal proliferations common. Whole plant tristromatic, internal structure composed of a single-layered medulla and cortex; sporangia with a single stalk cell, not surrounded by an involucrum, ca 100 µm wide; gametangia not observed.

Ecology - Epilithic, as well as epiphytic (on e.g. *Gelidiopsis*) in low intertidal rock pools and above and just under low water level.

Distribution - Indian Ocean, tropical Pacific Ocean.

Note - Indian Ocean specimens traditionally attributed to *D. divaricata* J.V. Lamouroux were referred to *Dictyota ceylanica* by De Clerck (2003). Most likely, however, the latter does not represent a natural species. *Dictyota ceylanica* probably may contain several cryptic species characterized by irregular sprawling tufts composed of narrow, divaricate axes.

Fig. 108. *Dictyota ceylanica*.