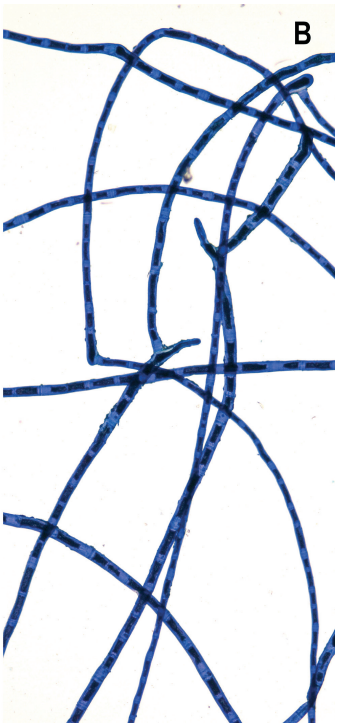

A


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.

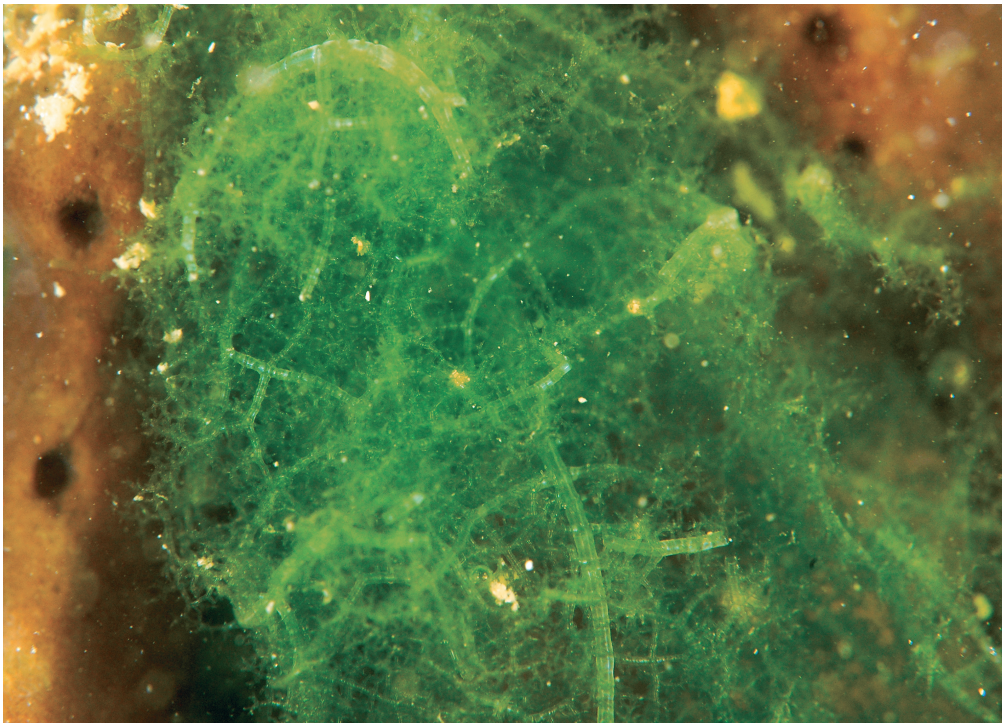
Description - Thalli forming compact, spongy cushions or moss-like mats, firmly attached to the substratum, often sand and sediment-trapping, 2-7 cm across (occasionally up to 15 cm), 1-1.5 cm thick, composed of strongly entangled branch systems, light to medium green. Attachment to the substratum by 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).

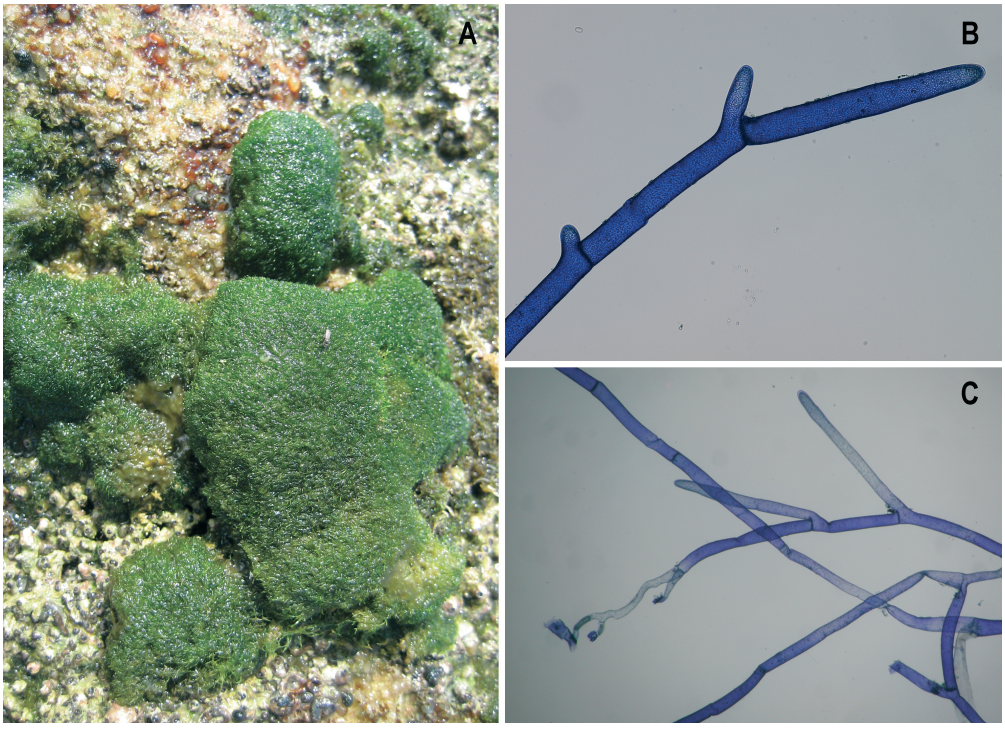
Ecology - Horizontal, sand-covered rock substratum in the intertidal, air-exposed at low tide but continuously wave-swept.

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).

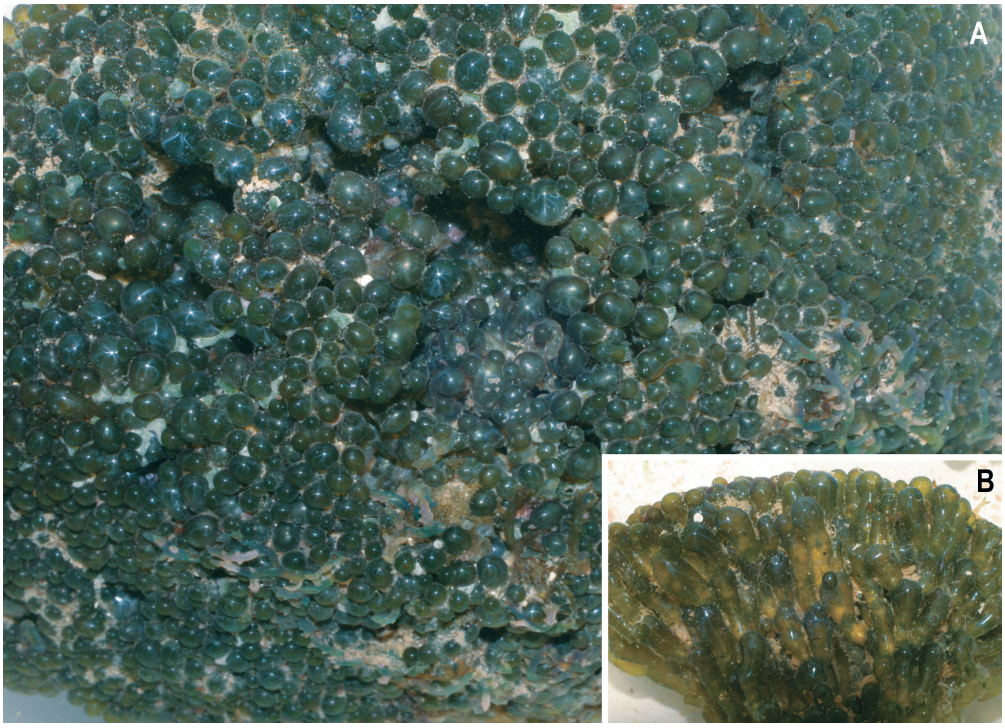
TYPE LOCALITY: Mediterranean Sea.

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.

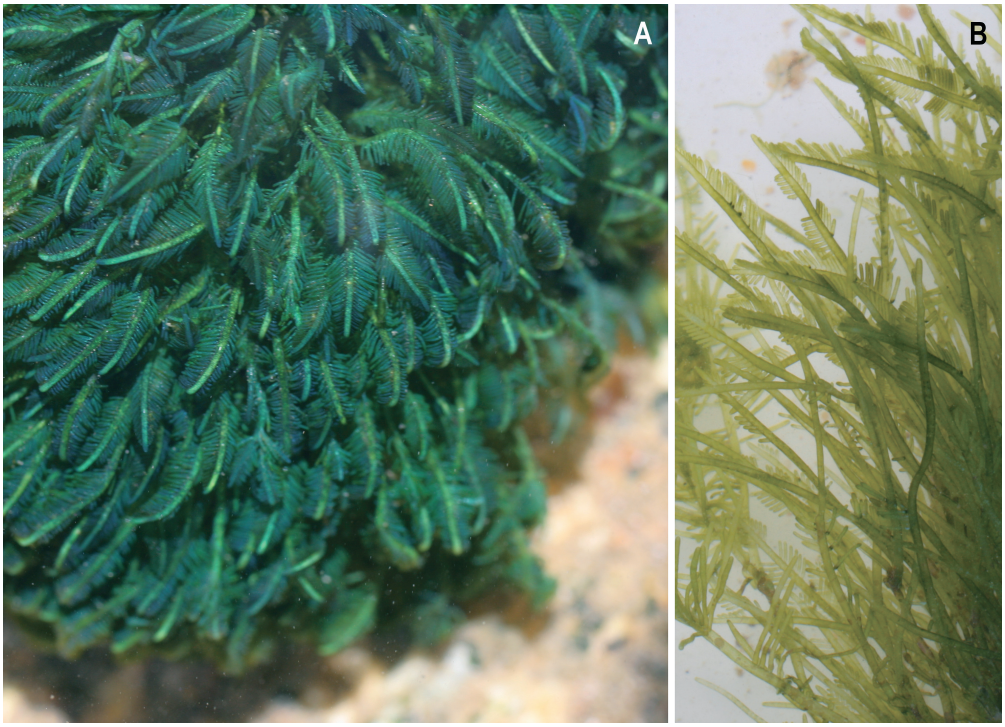
Ecology - Epilithic, at about spring low water level, exposed to strong surf.

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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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.

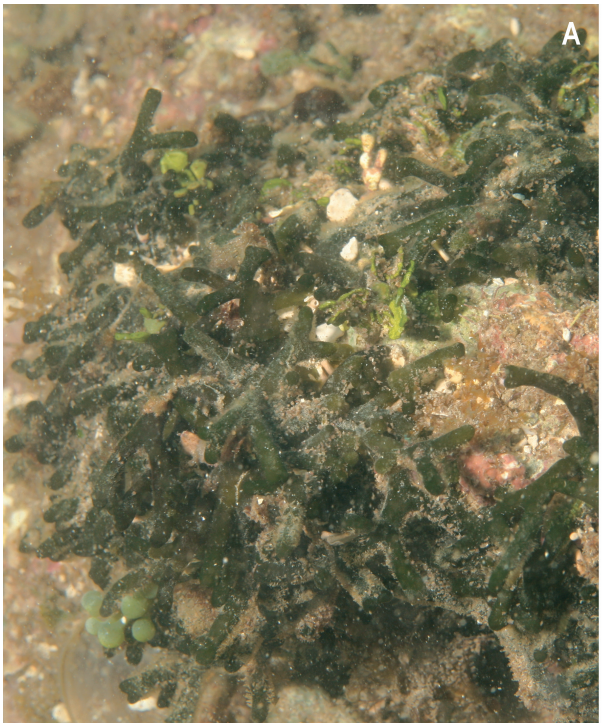
Description - Thallus repent, frequently with downwardly directed apices but other plants ascendant or even erect; branching dense, irregularly divaricately (sub)dichotomous (sometimes trichotomous); branches cylindrical, anastomosing, about 3 mm in diameter, repeatedly attached to the substratum by 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.

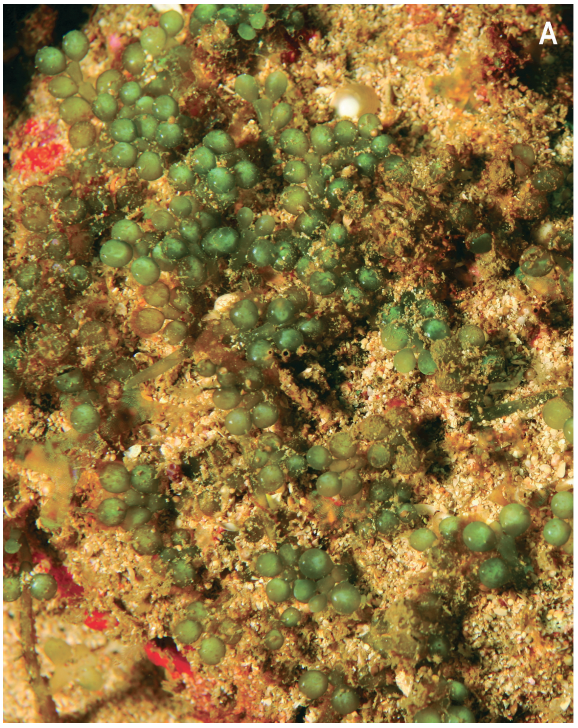
Description - A very delicate, dark green species; stolons thin, up to 0,2 mm in diameter, branching, covered by small, inconspicuous, sharply pointed spines with some developing to form rhizoids, resulting in a rather good attachment to the substratum. Assimilators peltate, the thin, vertically placed 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.

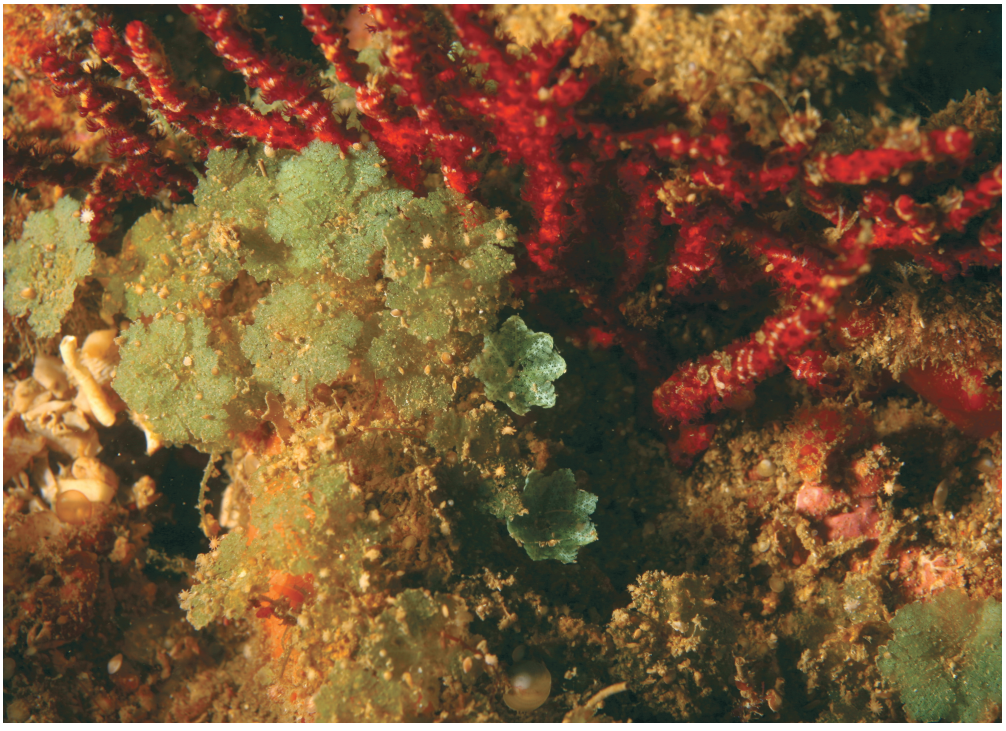
Distribution - Indian Ocean: Andaman Islands, India, Tanzania; Pacific Ocean: Fiji, Papua New Guinea.

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.

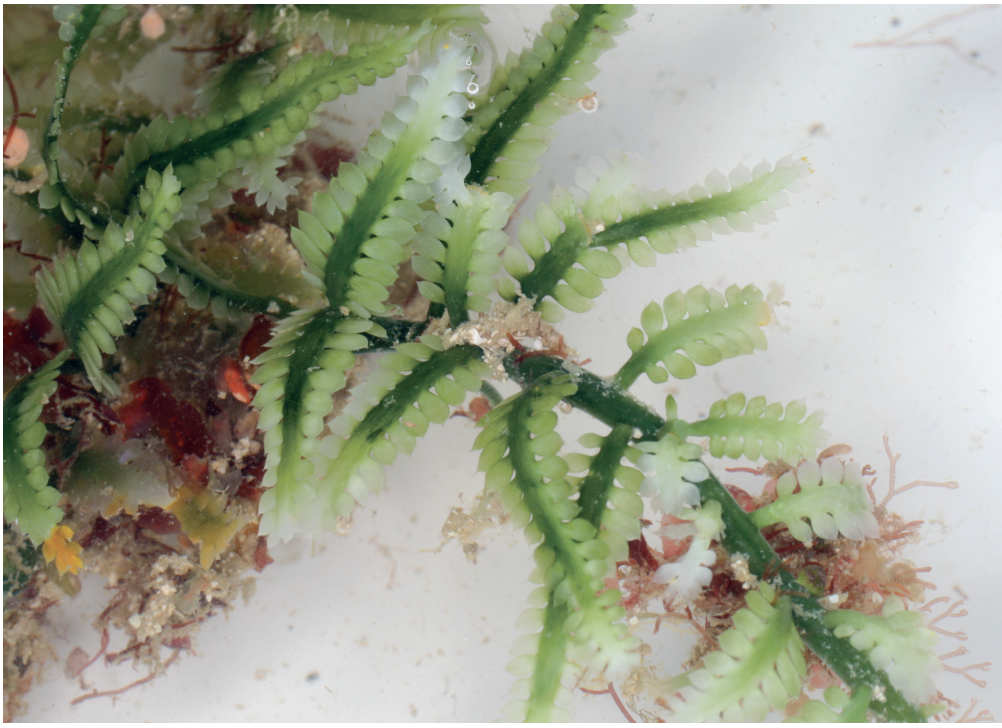
Description - Plants extremely densely intricated and prostrate, forming extremely well adhering, mat-like, fleshy plants; dark, slightly bluish green; stolons richly branched, with numerous rhizoidal holdfasts; uprights composed of single, peltate, fleshy branchlets, 1-2 mm in diameter or by several 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

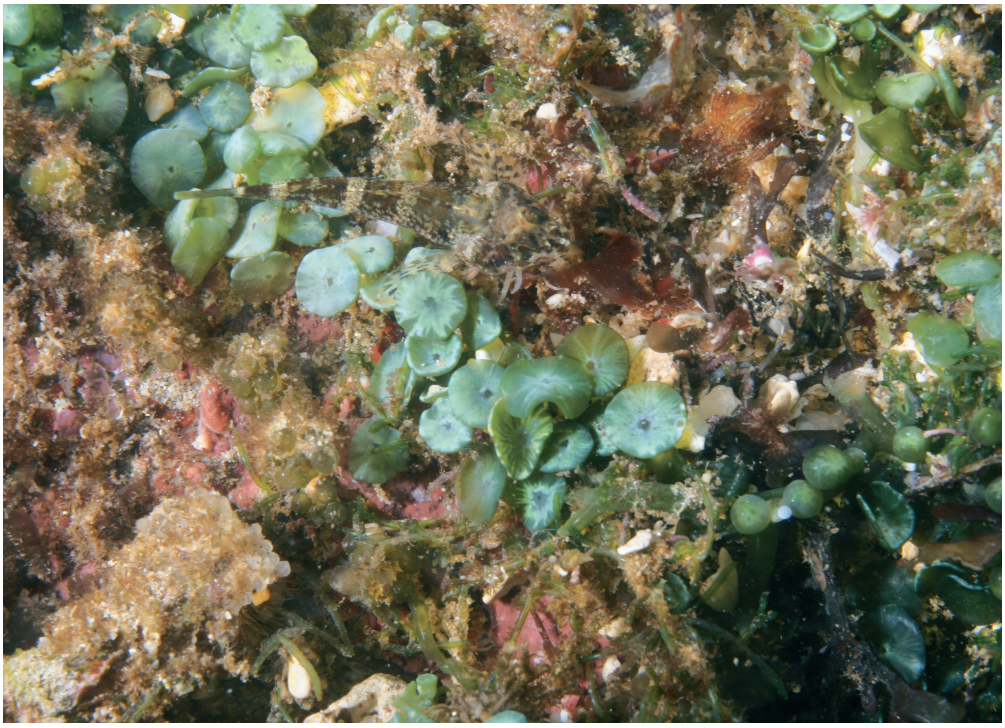
REFERENCES: Svedelius (1906: 132, fig. 34, as *C. peltata* f. *ad claviferam*); South & N'Yeurt (1993: 131, fig. 24, as *C. racemosa* var. *turbinata*), Littler & Littler (2003: 228, bottom fig. p. 229, as *C. racemosa* var. *peltata*; 236, middle fig. p. 237 and top fig. backpage, as *Caulerpa* sp.),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

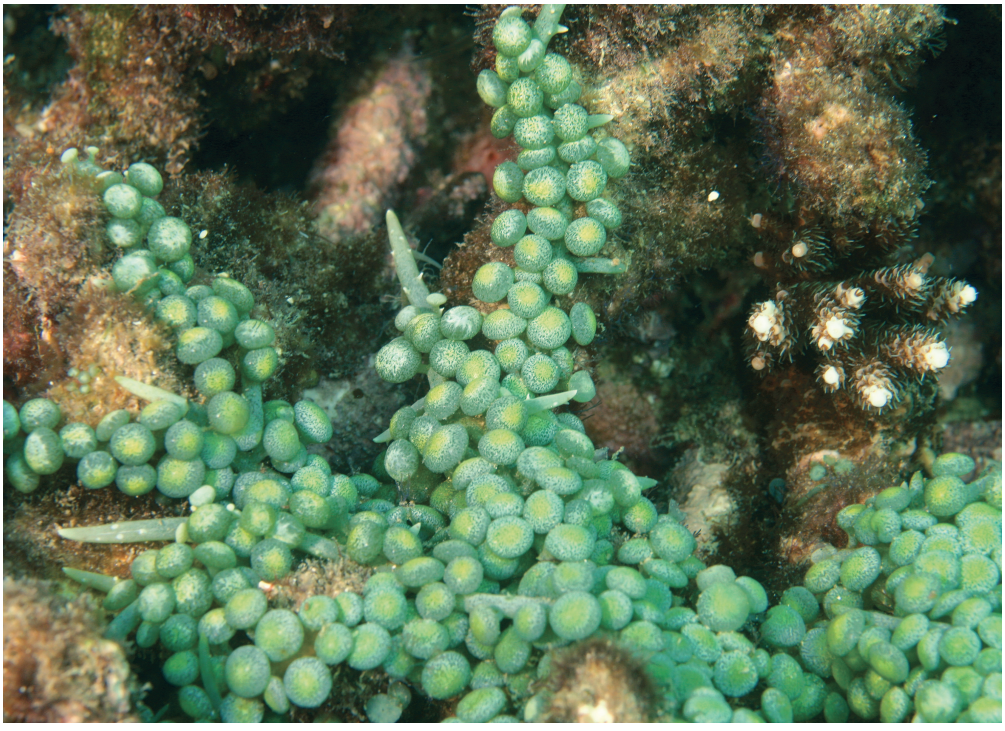
Description - Plants fleshy and rather stiff, repent, very well attached to the substratum by numerous rhizoidal branchlets, bluish green with creamy spots or veins; stolons 2 mm thick, with a percurrent axis and several shorter side axes; branchlets individually placed on the stolon or in small groups 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*.