

***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* Kützting**
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 involucre, 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*.



***Dictyota ciliolata* Sonder ex Kützing**

1859: 12, pl. 27: fig. 1

Fig. 109

REFERENCES: Jaasund (1970: 41, fig. 82), De Clerck (2003: 58-65, figs 17-19), Littler & Littler (2000: 262, top fig. p. 263), Abbott & Huisman (2004: 204, fig. 77C), Tronchin & De Clerck (2005: 102, fig. 74), Oliveira *et al.* (2005: 160, fig. p. 160).

TYPE LOCALITY: La Guaira, Venezuela.

Description - Plants erect, 8-15 cm long, attached by means of a single stupose holdfast giving rise to a crisp, brown frond, slightly iridescent in situ and often with transverse bands; branching dichotomous, never alternate, generally fairly regular and evenly distributed over the thallus; branch angle (30-) 35-50 (-60)°; straps 5-12 mm wide, width generally similar throughout thallus but sometimes widening towards apices; apices rounded, rarely truncate; margins dentate (sometimes smooth), degree of dentation variable but generally less conspicuous near the base, with teeth slightly to prominently directed towards the apices; teeth may give rise to marginal proliferations which grow into new straps of similar aspect and obscure the original branching pattern; hair tufts common. Internal structure composed of single-layered medulla and cortex. Sporangia scattered on both surfaces, occurring singly, most frequently in middle and subapical parts, absent from apical segments, leaving a conspicuous sterile zone near the margin when occurring in high densities, not surrounded by an involucre, about 100 µm wide. Gametangia not observed.

Ecology - On coral rubble on the lagoon bottom, 3 to 4 m deep.

Distribution - Pantropical and subtropical Atlantic Ocean (Europe).

Note - Diagnostic features of *Dictyota ciliolata* include the stupose base, the regular dichotomous outline of the thallus and the dentate margins. The margins, however, are not always dentate. Individuals with smooth margins are fairly common in the area.

Fig. 109. *Dictyota ciliolata* (herbarium specimen).

***Dictyota friabilis* Setchell**

1926: 91-92, pl. 13: figs 4-7, pl. 20: fig. 1

Figs 32D; 33C; 110

REFERENCES: Jaasund (1976: 39, fig. 79), De Clerck (2003: 89-93, figs 28-29), Payri *et al.* (2000: 132, bottom fig. p. 133), Littler & Littler (2003: 168, middle fig. p. 169), Abbott & Huisman (2004: 205, fig. 77E), Tronchin & De Clerck (2005: 104, fig. 75), Skelton & South (2007: 210, figs. 582-587).

TYPE LOCALITY: Tafaafu Point, Tahiti.

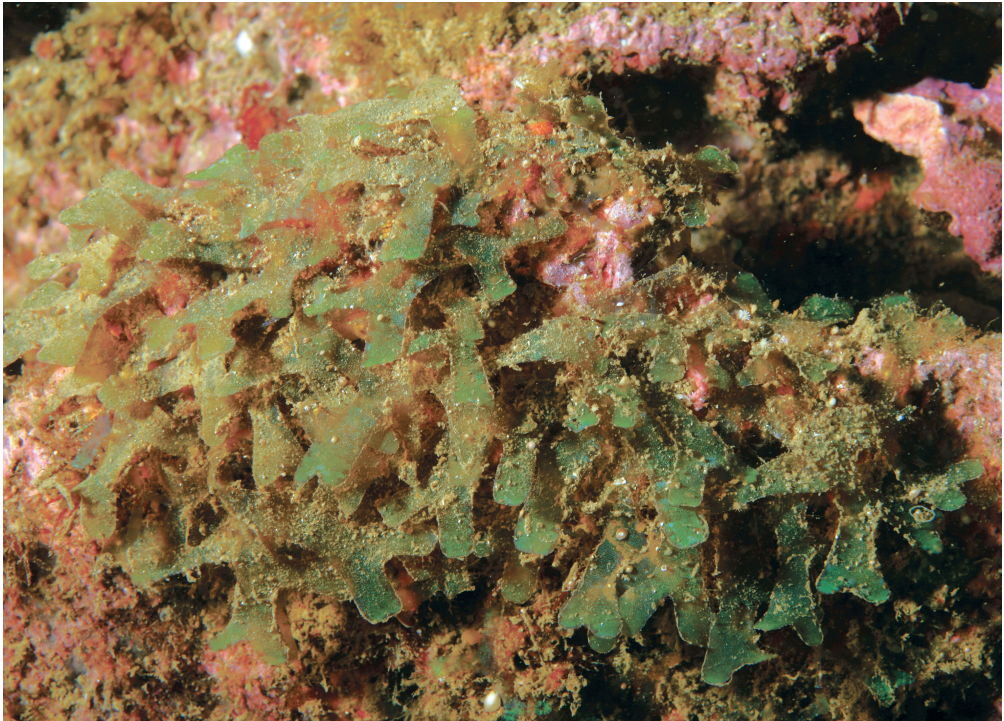
Description - Plants completely procumbent, forming dense imbricate mats composed of several layers of somewhat brittle (friable) straps, resulting in a typical jigsaw aspect, medium brown with varying iridescence (yellow-green to blue and often with small non-iridescent stripes or dots, or broader transverse non-iridescent bands); size of individual thalli ca. 3-5 cm in diameter, mats 20-30 cm in diameter; attached by marginal patches of rhizoids; branching dichotomous to somewhat irregular, evenly branched throughout with broad branching angle (60-) 70-90 (110)°, axils rounded; interdichotomies typically short and broad, on average 3.4-4.5 mm wide, 5.7-6.6 mm long, entire thallus of same width; apices rounded to obtuse (rarely acute); margins smooth, rarely with proliferations; hair tufts common. Internal structure composed of a single-layered medulla and cortex. Sporangia scattered on the upper surface, occurring singly, absent from the apical segments, not surrounded by an involucre, 95-145 µm wide.

Ecology - Mostly on horizontal rock substratum in the deeper subtidal.

Distribution - Indian Ocean, tropical Pacific Ocean.

Note - Other *Dictyota* species in our collections from Sri Lanka are: *D. dumosa* Børgesen, *D. grossedentata* De Clerck et Coppejans and *D. humifusa* Hörnig, Schnetter et Coppejans (see De Clerck 2003 for descriptions and illustrations).

Fig. 110. *Dictyota friabilis*.



Lobophora variegata (J.V. Lamouroux) Womersley ex Oliveira

1977: 217

Fig 24E; 27F; 37E; 111

REFERENCES: Tseng (1984: 196, pl. 99, fig. 2), Lewmanomont & Ogawa (1993: 74, + fig.), Cribb (1996: 49, bottom fig. p. 48), Calumpong & Meñez (1997: 128, + fig.), Trono (1997: 111, fig. 75), Huisman (2000: 193, + figs), Payri *et al.* (2000: 136, figs p. 137), Littler & Littler (2000: 268, 269, bottom fig. p. 269, figs p. 271), Littler & Littler (2003: 172, bottom fig. p. 173), Tronchin & De Clerck (2005: 110, fig. 82), Oliveira *et al.* (2005: 162, figs p. 163), Huisman *et al.* (2007: 221, + figs), Ohba *et al.* (2007: 77, + figs), Skelton & South (2007: 212, figs 595-597).

TYPE LOCALITY: Antilles, West Indies.

Description - Plants ranging from prostrate, resupinate to erect, fan-shaped to irregularly lobed blades; thalli up to 8 cm in diameter and 300 µm thick, pale to dark brown, the prostrate ones frequently radially striped; prostrate thalli attached by moniliform rhizoids arising from the ventral surface; (semi-)erect blades attached by discrete holdfasts and rhizoids, often forming rufous vein-like lines in the basal parts of the thallus; margins not inrolled; growth from a marginal meristem of apical cells, sometimes incised and longitudinally split in places; hairs usually arranged in concentric zones. Internal structure composed of a single-layered central medulla of large, rectangular cells with 2-4 layers of subcortical cells on either side with a single-layered cortex. Sporangia grouped in ovate to irregular and confluent sori, covered by an indusium, clavate, up to 110 µm long and 40 µm wide, lacking a stalk cell, containing 8 spores each.

Ecology - Small, thick, prostrate plants as undergrowth of larger seaweeds in the low intertidal; large, erect plants epilithic on coral debris in lagoons; small, thin, prostrate plants on deep subtidal rocks (20-25 m).

Distribution - Pantropical.

Note - There is molecular evidence that the different 'growth forms' are in fact different taxa.

Fig. 111. *Lobophora variegata*. A. Erect plant from shallow lagoon; B. Prostrate plant from deepwater boulders (20 m depth); C. Sori of tetrasporangia; D. Transverse section.

Padina antillarum (Kützting) Piccone

1886: 36

Fig. 112

REFERENCES: Tseng (1984: 200, pl. 101, fig. 2, as *P. tetrastromatica*), Lewmanomont & Ogawa (1995: 78, as *P. tetrastromatica*), Trono (1997: 116, fig. 80, as *P. tetrastromatica*), Wynne & De Clerck (1999: 286-289, figs 1-10), Oliveira *et al.* (2005: 164, figs p. 165, as *P. tetrastromatica*).

TYPE LOCALITY: Trinidad, West Indies (see Wynne, 1998).

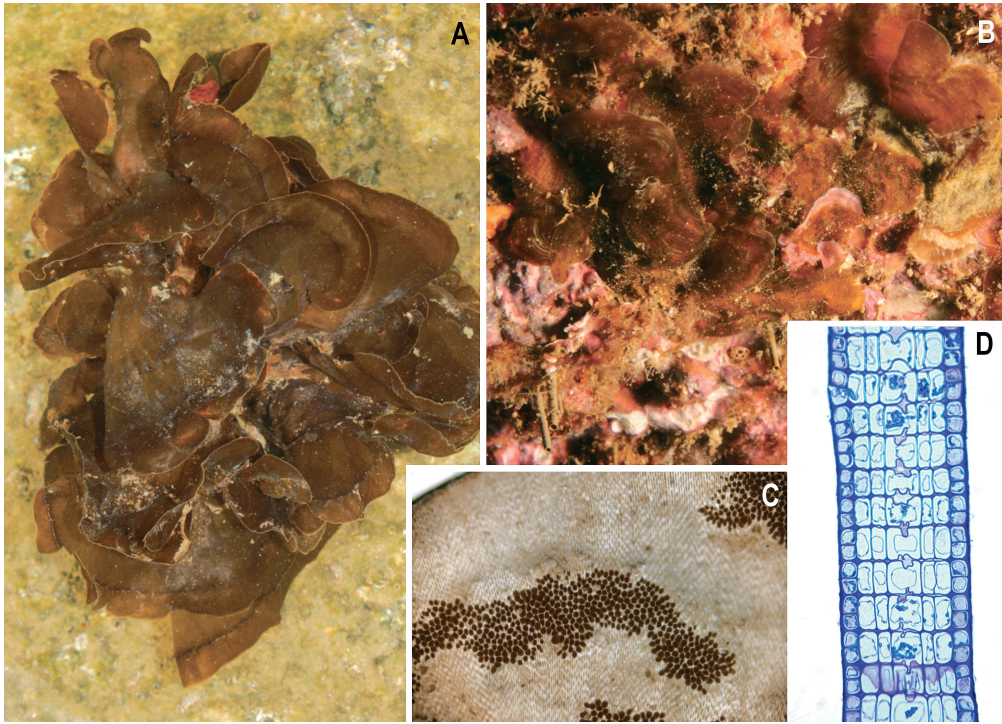
Description - Plants erect, between 4 and 17 cm tall, composed of fan-shaped blades with a distinctive inrolled distal margin; blade surface often appearing concentrically corrugated; larger, older specimens with deeply split blades and rufous patches of rhizoids in the basal parts; upper surface calcified, often with scattered tetrasporangia in the older parts of the thallus; lower surface lacking calcification but with prominent concentric bands composed of 2 tetrasporangial sori abutting both sides of a continuous line of hairs; soral bands evenly spaced at a distance of ca. 1.5-2.5 mm. In transverse section, 3-4 layers thick in the mid-region of the thallus, increasing to 6 layers near the base of the thallus. Tetrasporangia not covered by an indusium.

Ecology - Common in intertidal rock pools where thalli are usually rather small (4-7 cm). Specimens collected in the shallow subtidal are markedly larger (to 17 cm).

Distribution - Tropical and warm temperate.

Note - The species was traditionally referred to as *P. tetrastromatica* Hauck (see Wynne 1998).

Fig. 112. *Padina antillarum*. A. Habit *in situ*; B. Fertile specimen (herbarium).



Padina boergesenii Allender et Kraft

1983: 87-88, figs 6C, H, I, 7C, D

Figs 21C; 24D; 113

REFERENCES: De Clerck & Coppejans (1996: 230, figs 48, 50-51), Calumpong & Meñez (1997: 127, + fig., as *P. gymnospora*), Littler & Littler (2000: 272, figs p. 273), Muylle (2000: 84-92, pl. 15-22, tab. 3), Littler & Littler (2003: 174, top fig. p. 175), Tronchin & De Clerck (2005: 112, fig. 83), Oliveira *et al.* (2005: 164, figs p. 165, as *P. gymnospora*).

TYPE LOCALITY: Virgin Islands.

Description - Plants erect, funnel-shaped, between 6 and 20 cm tall, composed of fan-shaped blades with broad lobes and a distinctive inrolled distal margin; basal parts often with rufous patches of rhizoids; blade surface smooth, variably calcified on the upper blade surface, with concentric pale and dark transverse bands; dark bands formed by rows of hairs on the ventral as well as the dorsal blade surface, zone between successive hair bands 0.6-1.4 mm wide; holdfast fibrous, sometimes with some *Vaughaniella*-stage at the basis. Internal structure distromatic in the apical parts, 2-3 cells thick in the middle parts of the thallus, 3-4 cells thick near the base. Tetrasporangial sori produced on the ventral (lower) surface in concentric transverse bands just distal to the hair lines, lacking an indusium; gametophytes not observed.

Ecology - A common species of rocky substratum in the shallow subtidal.

Distribution - Pantropical if *Padina gymnospora* is included.

Note - The species was traditionally referred to as *P. gymnospora* (Kützinger) Sonder (Allender & Kraft 1983). It resembles *P. australis* Hauck which has also been collected in Sri Lanka, but can be distinguished by the dioecious (vs monoecious) nature of the gametophytes and the thallus which is generally 3 layers thick in the mid-regions of the thallus rather 2 layers thick in *P. australis*.

Fig. 113. *Padina boergesenii*. A. In an intertidal pool, with well-developed *Vaughaniella*-stage; B. Large subtidal specimens; C. Fertile specimen (herbarium).

Padina minor Yamada

1925: 251-252, fig. V

Fig. 114

REFERENCES: Lewmanomont & Ogawa (1995: 78, + fig.), Calumpong & Meñez (1997: 126, + fig.), Trono (1997: 115, fig. 79).

TYPE LOCALITY: Taiwan.

Description - Plants generally up to 6 cm tall, composed of erect fan-shaped blades, pale brown with a white calcified layer on the upper surface; blades flat to strongly funnel-shaped, often longitudinally split, with a distinctive inrolled distal margin; stipe up to 0.5 cm long, usually surrounded by a very well developed, conspicuous *Vaughaniella*-stage; blade up to 4 cm broad, 50 µm thick apically, up to 80 µm proximally. Internal structure invariably 2 layers thick. Tetrasporangial sori produced on the ventral (lower) surface in concentric transverse bands just distal to the hair bands, not covered by an indusium; gametophytes not observed.

Ecology - A common species in low intertidal rock pools and on rocky substratum in the shallow subtidal.

Distribution - Indian Ocean, tropical west Pacific Ocean.

Note - The species is characterized by its 2-layered thallus, with hairs restricted to the ventral surface. It does resemble *P. boryana* Thivy somewhat, which is also known from Sri Lanka, but the latter is more variably calcified and is composed of 2-3 layers of cells rather than 2.

Fig. 114. *Padina minor*. A. Habit with *Vaughaniella*-stage; B. Fertile specimen (herbarium).



***Stoechospermum polypodioides* (J.V. Lamouroux) J. Agardh**

1848: 100

Figs 24F; 38E; 115

REFERENCES: Tronchin & De Clerck (2005: 114, fig. 86), Oliveira *et al.* (2005: 166, fig. p. 167).

TYPE LOCALITY: Stated Antilles, Caribbean Sea, but most probably Red Sea or Indian Ocean (see De Clerck & Coppejans 1997).

Description - Plants erect, gregarious, up to 10 cm tall, composed of dichotomously branched strap-like blades, orangy-brown and often with distinctive, elongated darker patches (sori) of reproductive structures near the margins; attached by a matted rhizoidal holdfast, giving rise to several erect fronds with a stipe-like basal part; straps complanate, 0.7-1.5 cm wide, dichotomously branched, more or less in a single plane; straps provided with numerous tufts of hairs and with a distinctly inrolled distal margin; growth by a marginal row of meristematic cells. Internal structure composed of 4-6 layers of large medullary cells, surrounded by a single-layered, pigmented cortex; medullary cells irregularly arranged in transverse section. Tetrasporangia grouped in large sori lining the margins of the thallus, teardrop-shaped, 50-70 µm in diameter and 95-135 µm long, subtended by a single stalk cell, associated with sterile paraphyses.

Ecology - Well-developed specimens epilithic in a subtidal lagoon, -0.5 to -2 m; small plants just at low tide level.

Distribution - Widespread in the Indian Ocean.

Fig. 115. *Stoechospermum polypodioides*. A. Group of plants on *Halimeda*-sand; B. Detail of a fertile thallus with marginal sori.

***Chnoospora minima* (Hering) Papenfuss**

1956: 69-70

Figs 11A; 16A; 116

REFERENCES: Tseng (1984: 184, pl. 93, fig. 2), Lewmanomont & Ogawa (1993: 66, + fig.), Cribb (1996: 39, middle fig. p. 38), Trono (1997: 119), Payri *et al.* (2000: 142, bottom fig. p. 143), Littler & Littler (2000: 246, bottom fig. p. 247), Littler & Littler (2003: 176, bottom fig. p. 177), Tronchin & De Clerck (2005: 118, fig. 89), Huisman *et al.* (2007: 233, + figs), Skelton & South (2007: 217, figs 608-612).

TYPE LOCALITY: Port Natal (Durban), South Africa.

Description - Plants erect in the basal part, pendulous in the upper parts, up to 7(-15) cm high, gregarious, forming patches several centimetres across, medium brown; tightly adhering to the substratum by a discoid holdfast; erect axes cylindrical to compressed, 1-2 mm in diameter, 3-6 times dichotomously to irregularly branched; branching angle narrow, 30-50°; apices acute and often bifurcate; hair tufts distinctive, scattered across the entire thallus surface. Plurilocular reproductive structures clavate, up to 55 µm long, grouped in sori, often in association with hair tufts.

Ecology - Confined to extremely wave-exposed habitats in the supralittoral fringe and high intertidal; showing a marked seasonality, (almost) disappearing in the dry season.

Distribution - Widespread in the Indian Ocean, tropical Pacific Ocean and tropical Atlantic Ocean.

Note - Older plants of *C. minima* are frequently provided with spongy, epiphytic tufts of *Asteronema breviarticulatum*.

Fig. 116. *Chnoospora minima*.



***Colpomenia sinuosa* (Mertens ex Roth) Derbès et Solier**
1851: 95

Figs 25A; 117

REFERENCES: Tseng (1984: 184, pl. 93, fig. 4), Lewmanomont & Ogawa (1995: 67, + fig.), Cribb (1996: 39, bottom fig. p. 38), Calumpang & Meñez (1997: 131, fig. p. 132), Trono (1997: 119, fig. 81), Huisman (2000: 203, + fig.), Payri *et al.* (2000: 144, top fig. p. 145), Tronchin & De Clerck (2005: 118, fig. 90), Oliveira *et al.* (2005: 170, fig. p. 171), Huisman *et al.* (2007: 229, + fig.), Skelton & South (2007: 220, figs 613-614, 774).

TYPE LOCALITY: Near Cádiz, Spain.

Description - Plants forming spherical to irregularly convoluted, hollow structures, smooth and fragile, 3-5 cm in diameter, pale to medium brown; attached by rhizoids on the lower surface. In transverse section, 5-6 layers of cells bounding a hollow interior; medulla 4-5 layers thick, composed of large, thin-walled, hyaline cells gradually becoming smaller towards the cortex; cortex composed of 1-2 layers of small, pigmented, isodiametric cells, 10-13 µm in diameter; hair tufts scattered over the thallus surface, in small pits. Plurilocular sporangia forming a discrete sorus surrounding a central hair tuft, covered by an indusium, uni- or biseriate, to 50 µm long and 7 µm wide, associated with sterile, unicellular paraphyses.

Ecology - Mostly epiphytic (either on large algae as *Polyopes ligulatus* or on algal turf) or epilithic in lagoons, between 0.5 and 1 m depth.

Distribution - Widespread in tropical and temperate regions.

Fig. 117. *Colpomenia sinuosa*.

***Sargassum crassifolium* J. Agardh**
1848: 326-327

Figs 19A, E; 41G, H; 118

REFERENCES: Tseng (1984: 226, pl. 114, fig. 2), Lewmanomont & Ogawa (1995: 82, + fig.), Cribb (1996: 55, bottom fig. p. 54), Trono (1997: 131, figs 88A, B), Tronchin & De Clerck (2005: 126, fig. 97), Skelton & South (2007: 223, figs 617-619, 767).

SYNTYPE LOCALITIES: Cape of Good Hope, South Africa; New Ireland; New Zealand.

Description - Plants gregarious, erect, tough, leathery, up to 30 cm high, brown. Holdfast disc-like; main stipes one to several, smooth, bearing radially placed side branches becoming gradually shorter towards the thallus apex; blades fleshy and stiff, frequently upwardly curved, numerous, often crowded, to 1 cm wide, 1 cm long, without midvein; tips rounded, with thickened, two-edged margin; margins with coarse, irregular teeth; air bladders spherical, to 6 mm diameter, often with apical spines forming a crest. Cryptostomata (pits with hairs) as scattered dark dots on blades and air bladders. Receptacles forked, densely branching, spinose, to 5 mm long.

Ecology - Epilithic on horizontal beachrock platforms, along the surf-exposed margins, just above low water; locally forming extensive vegetations; large, more slender growth forms observed on vertical walls in the shallow subtidal.

Distribution - Widespread in the Indo-Pacific region.

Notes - In literature, confusion exists between *S. crassifolium* and *S. cristaefolium* C. Agardh (= *S. duplicatum* J. Agardh). According to Trono (1997, 131-135, fig. 88Ba), the leaves of *S. crassifolium* are coarsely dentate and the vesicles are smooth or with an apical spine (fig. 88Bb) whereas in *S. cristaefolium* the leaves are finely dentate (fig. 89Ba) and the vesicles have 2 horn-like or lateral spines or dentate wings (fig. 89Bb).

Representatives of the genus *Sargassum* are notoriously difficult to identify on species level. The characters, generally used for identification exhibit an extreme variability on several scales: temporal, intraindividual (morphology of the basal leaves different from the apical ones), interindividual, environmental and geographical next to sexual dimorphism and random phenotypic expression (Kilar *et al.* 1992). Moreover, according to Guiry & Guiry (2009), 584 species names are currently accepted worldwide (845 including the synonyms), some of which with numerous varieties. For Sri Lanka, Silva *et al.* (1996: 656-709), mention 35 species (some of which with several varieties) as being recorded in literature.

Fig. 118. *Sargassum crassifolium*. Habit of a whole plant.



Sargassum polycystum C. Agardh

1824: 304

Figs 41A; 119

REFERENCES: Tseng (1984: 236, pl.119, fig. 1), Lewmanomont & Ogawa (1995: 84, + fig.), Cribb (1996: 59, middle fig. p. 58), Calumpong & Meñez (1997: 136, + fig.), Trono (1997: 147, figs 96A-B), Littler & Littler (2003: 184, top fig. p. 185), Oliveira *et al.* (2005: 178, + fig.), Ohba *et al.* (2007: 84, + figs), Skelton & South (2007: 226, figs 624-626, 768).

TYPE LOCALITY: Sunda Strait, Indonesia.

Description - Plants erect, bushy, up to 30 cm long, dark brown. Attachment by a disc, but also presence of basal stolonoid branches, sprawling over the substratum and bearing alternately, pinnately placed small and narrow cauline leaves. Main stalks muricate with Y-shaped or spiny proliferations; blades scattered on slender main branches, crowded on shorter branchlets, ovate-oblong to narrow lanceolate, to 1 cm wide, 1-3 cm long, dentate; midrib generally extending the entire length of the blade. Air bladders often extremely abundant, small (up to 2.5 mm in diameter), apiculate; cryptostomata scattered on the blades, branches and air bladders. Receptacles crowded, filiform, forked, 6-12 mm long, clustered in the axils of the leaves; some receptacles can be foliaceous towards the apices, resembling linear leaves.

Ecology - Epilithic, mainly in intertidal pools.

Distribution - Widespread in the Indian Ocean, tropical Pacific Ocean, tropical eastern Atlantic Ocean.

Fig. 119. *Sargassum polycystum*. A. Whole thallus with basal stolons; B. Detail of the numerous, small air bladders (herbarium specimens).

Sargassum turbinatifolium Tseng et Lu

1979: 9, 12, fig. 6, pl. VII

Fig. 120

REFERENCES: Tseng & Lu (1999: 16, fig. 15).

TYPE LOCALITY: Dongdao, Xisha Islands, South China Sea.

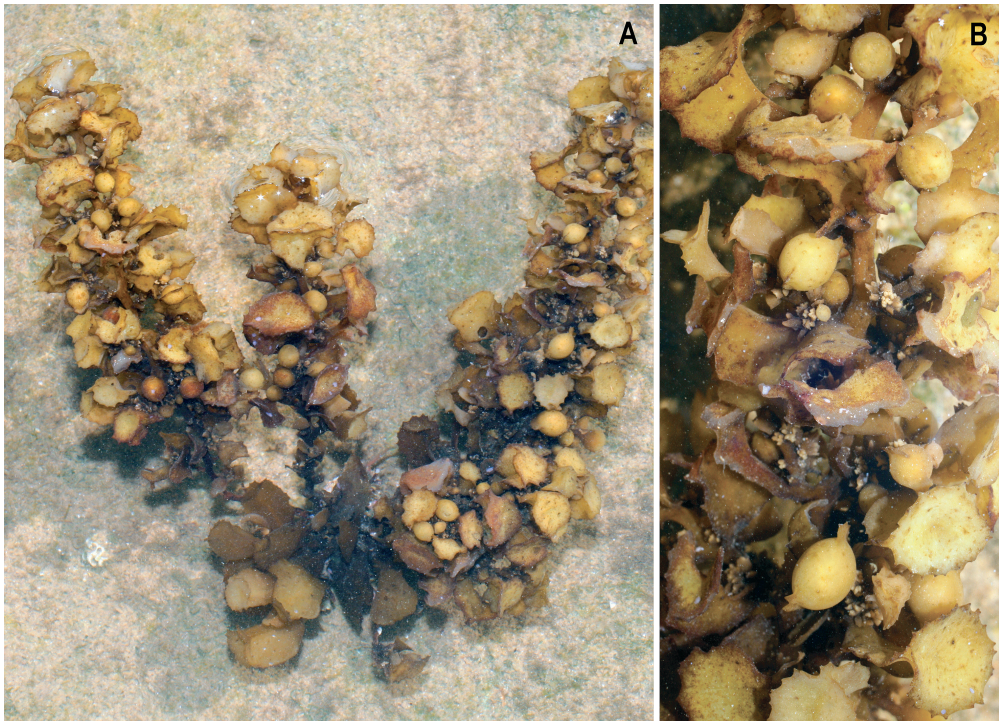
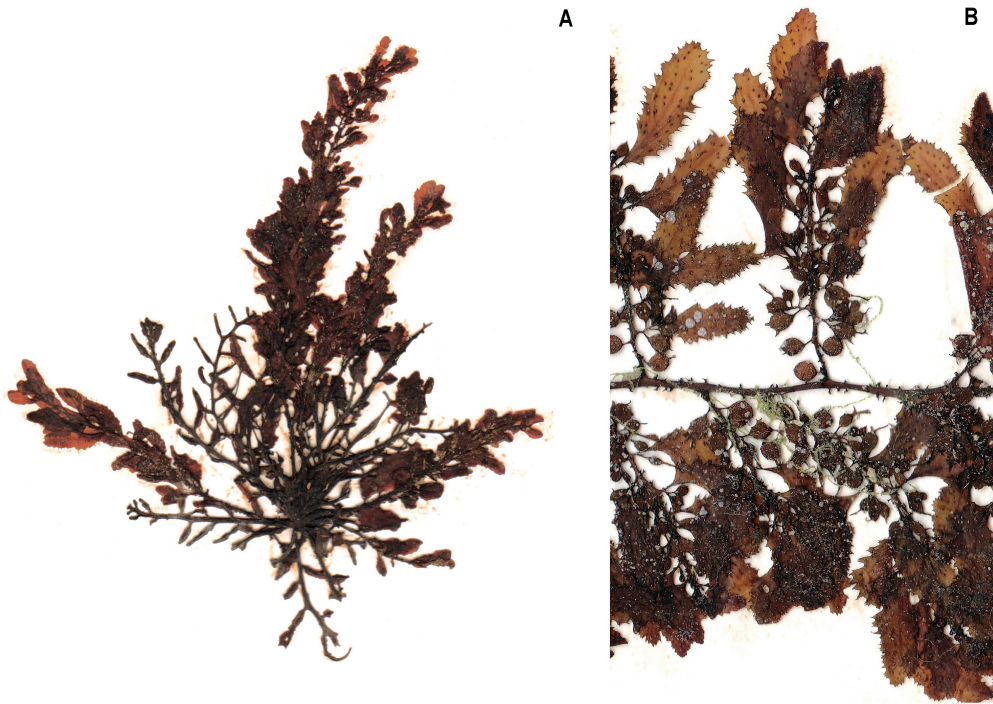
Description - Fully grown plants about 10-20 cm long, attached by a dicoid holdfast from where several erect axes arise. Main axis (sub)cylindrical and smooth, unbranched in small specimens, bearing short (1-2 cm), radially arranged side branchlets. Leaves fleshy and rigid, 0.75 to 15 mm long and 10 mm broad; basal part compressed, roughly toothed at the margin and with a midvein, upper part markedly conduplicate, with a flat to concave upper part, rounded to oval in top view and with a coarsely dentate margin. Air vesicles quite large (4-5 mm in diameter), mostly with marked dentate wings and smooth apex, the wings sometimes being more reduced; vesicles borne on short cylindrical stipes without appendages; receptacles toothed and racemously arranged; oogonia and antheridia in separate conceptacles, but within the same receptacle.

Ecology - Epilithic just above low water level, exposed to severe swell; larger specimens in wave-swept low intertidal pools.

Distribution - Indian Ocean: Comoro Islands; Pacific Ocean: China, Philippines.

Note - *S. turbinatifolium* is morphologically closely related to *S. turbinarioides* Grunow, but the latter is characterized by aerocysts being apically smooth or crowned with a small subfoliaceous apiculum whereas the aerocysts of the former are winged. According to Tseng & Lu (1999: 18), the plants of *S. turbinatifolium* are androgynous, the oogonia and antheridia being in different conceptacles but in the same receptacle.

Fig. 120. *Sargassum turbinatifolium*. A. Habit; B. Detail of blades and aerocysts.



***Sargassum* sp.**

Figs 9B; 11B; 19F; 31A; 121

Description - Plants growing in large, dense populations, horizontally spread and very flat at low tide; attachment by a disc; upright branches markedly compressed and smooth, straight or locally somewhat sinuous. Leaves 3–4 cm long, 5–7 mm wide, upwardly directed and alternately placed on the axis in one plane, resulting in very flat plants; leaves thick and stiff-cartilaginous, lanceolate to oblong with a cuneate, asymmetrical basis, basal ones dentate with an acute apex, but most leaves with an entire margin and a broadly rounded apex, straight to slightly undulated in lateral view; some with a faint midrib running up to half to two thirds of the leaf; cryptostomates present but not numerous and often distributed in one row on each side of the midrib. Vesicles not observed. Fertile plants provided with alternately placed, dense clusters of receptacles, branching 3-dimensionally.

Ecology - Extremely abundant in large, shallow pools on horizontal beachrock platforms, just above low water mark, continuously wave-swept.

Note - Taxonomists, currently working on the genus *Sargassum*, suggested that this entity does not correspond to any described taxon. It might be a new one or a growth form of an existing one.

Fig. 121. *Sargassum* sp.***Turbinaria ornata* (Turner) J. Agardh**

1848: 266

Fig. 122

REFERENCES: Tseng (1984: 242, pl. 122, fig. 1), Lewmanomont & Ogawa (1995: 87, + fig.), Cribb (1996: 63, middle fig. p. 62), Calumpong & Meñez (1997: 137, + fig.), Trono (1997: 155, fig. 100), Huisman (2000: 226, + fig.), Payri *et al.* (2000: 148, figs p. 149), Littler & Littler (2003: 186, bottom fig. p. 187), Tronchin & De Clerck (2005: 128, fig. 99), Oliveira *et al.* (2005: 180, + figs p. 181), Huisman *et al.* (2007: 237, + fig.), Ohba *et al.* (2007: 87, + figs), Skelton & South (2007: 227, figs 627, 765-766).

TYPE LOCALITY: Unknown.

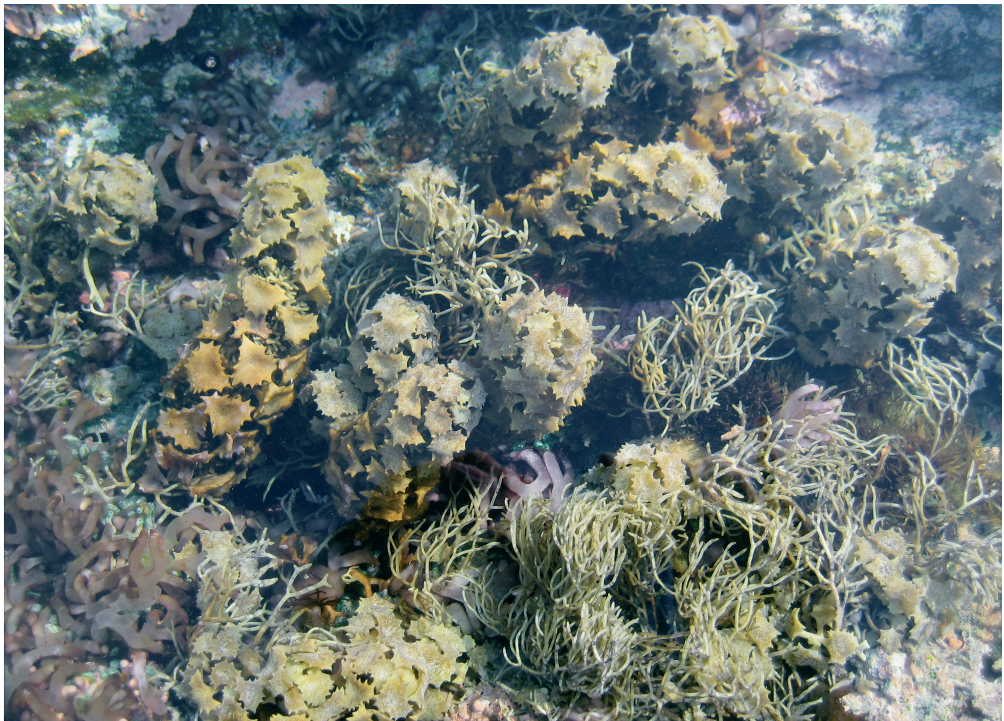
Description - Plants growing in dense populations, 10 (-17) cm high, extremely stiff and rigid, harsh to the touch, medium brown; attached by an inconspicuous conical holdfast forming mostly one, more rarely several erect axes and dichotomously branched, creeping, cylindrical stolons up to a several cm long; main axes cylindrical, unbranched or with a single, basal side branch, radially producing densely placed (contiguous) lateral branches; lateral branches peltate, very stiff, with a distinct smooth stalk without ribs and a typical triangular distal margin with rounded angles, about 6 mm wide; distal margin with a row of irregularly placed teeth and some intramarginal teeth; peltate branches often depressed in the centre where the submerged air bladder is placed; dense clusters of receptacles formed in the axils of the lateral branches.

Ecology - Along surf-exposed coasts, mainly occurring submerged in rock pools in the lower intertidal or the infralittoral fringe.

Distribution - Widespread in the Indian Ocean, tropical Pacific Ocean.

Note - In Sri Lanka, we still did not observe specimens with a complete double row of teeth, as typical for the species. Taylor (1964: 485, pl. 3: figs 7-9) described specimens without or with only a few intramarginal teeth as *Turbinaria ornata* f. *ecoronata* W.R. Taylor. Tsuda (1972) and Skelton & South (2007: 228) on the other hand, state that f. *ecoronata* might be an environmentally induced growth form.

Fig. 122. *Turbinaria ornata*.



***Turbinaria ornata* f. *evesiculosa* (Barton) W.R. Taylor**

1964: 485-486

Figs 19C, D; 41E; 44F; 123

REFERENCES: De Clerck & Coppejans (1996: 242, figs 75, 77).**TYPE LOCALITY:** Edam/Enkhuizen Shoal, near Jakarta, Java, Indonesia.

Description - Plants locally growing in large, open populations, rather small, 3-4 cm high, rigid but flexible, orangy brown; erect axes cylindrical and unbranched, bearing radially placed lateral, peltate branchlets; stolons cylindrical, dichotomous, numerous and extremely well developed, forming an extended network; the lateral branchlets are densely placed but mostly not really contiguous, peltate, with an elegant, upwardly directed, cylindrical stipe without marked ribs, 1 cm long and a stiff but relatively thin blade; blade triangular to roughly heart- or kidney-shaped in surface view and with a single marginal row of coarse teeth; air vesicles absent. Some better developed plants present a few intramarginal teeth on the blades, indicating an intermediate morphology to the typical growth form of *T. ornata*.

Ecology - Typically occurring on air exposed (at low tide) seaward margin of horizontal rock substratum, subject to extreme surf.

Fig. 123. *Turbinaria ornata* var. *evesiculosa*.***Turbinaria* sp.**

Fig. 124

Description - Plants very small, 1-2 cm high, growing in open populations, orangy brown; compressed, irregularly branched stolons of variable width dominant, forming an extended open network; stolons mainly bearing isolated *Sargassum*-like bladelets ('cauline blades') which are thick fleshy-stiff, longish elliptical, coarsely dentate, recurved or horizontally spread; they frequently apically develop into new, horizontally spread compressed stolons that get attached and produce new cauline blades; locally, isolated erect peltate blades are formed, some of which being elongated triangular (like a basally very wide cauline blade) and irregularly coarsely dentate, others being rounded, kidney-shaped or triangular; erect cylindrical and unbranched axes, bearing a few, radially placed lateral branchlets (with similar morphology as the solitary ones) are rare and very short (1-2 cm); air vesicles absent. Receptacles not observed.

Ecology - In very shallow, low intertidal rock pools.

Note - This dwarf growth form morphologically agrees with *Turbinaria* sp. as described by Ajisaka & Kilar (1990: 236-237, pl. 1). Study of the *Turbinaria* specimens, present in Leiden (L), shows that some of the young plants of *T. ornata* present similar cauline leaves. This may indicate that the taxon described here are juveniles of that species.

Fig. 124. *Turbinaria* sp.



Asteronema breviarticulatum (J. Agardh) Ouriques et Bouzon

2000: 271, figs 2-12, pl. 1

Figs 11A; 16B; 35C, D; 125

REFERENCES: Tseng (1984: 168, pl. 85, fig. 1, as *Ectocarpus*), Trono (1997: 101, as *Hincksia*), Littler & Littler (2003: 164, top fig. p. 165), Huisman *et al.* (2007: 208, + figs).

TYPE LOCALITY: San Agustín, Oaxaca, Mexico.

Description - Epilithic plants forming groups of rope-like, woolly structures, up to 2 cm long, composed of densely entangled filaments, light brown to creamy; the main filaments with irregular branching, bearing irregularly placed, spaced, hook-like, curved branchlets, perpendicular on the main filaments, keeping the filaments together, resulting in the rope-like aspect; filaments 20-25 μm in diameter, cells 50-60 μm long, containing net-like chromoplasts. Epiphytic specimens more spherical, lax and smaller. Plurilocular sporangia oval, shortly stipitate, perpendicular on the filaments, 40 μm wide and 50 μm long.

Ecology - Forming a distinct zone in the upper intertidal zone of wave-exposed rock outcrops during the wet season; also frequent as an epiphyte on *Chnoospora minima*, growing in the same habitat.

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

Fig. 125. *Asteronema breviarticulata*. A. Rope-like thalli; B. Hook-like branchlets.