

***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: Tafaaf 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).

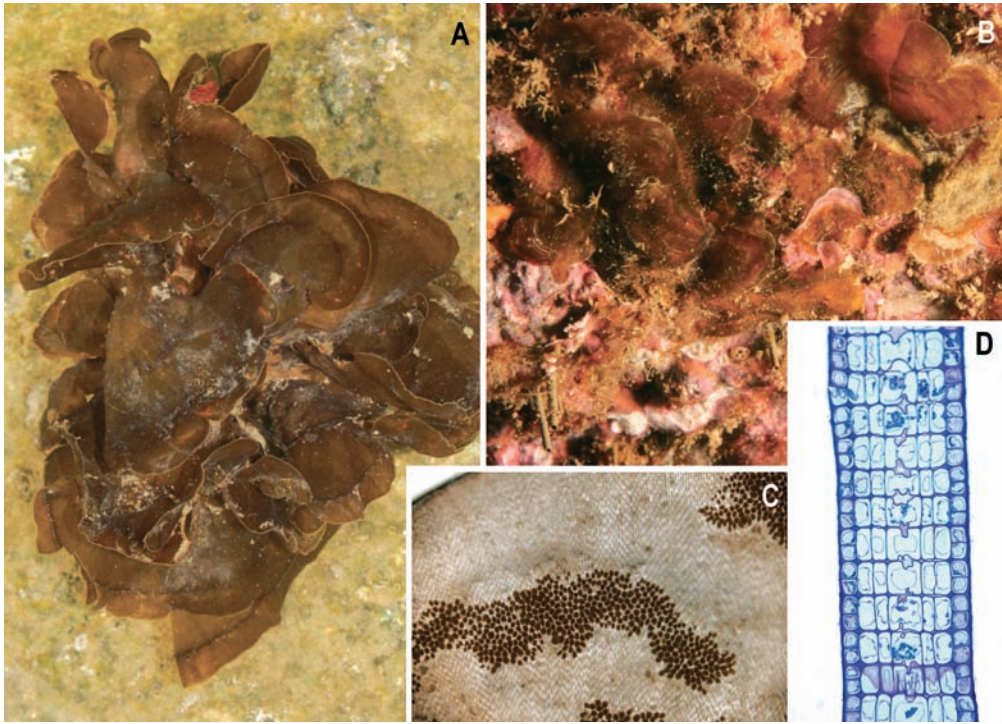
Description - Plants erect, between 4 and 17 cm tall, composed of fan-shaped blades with a distinctive inrolled distal margin; blade surface often appearing concentrically corrugated; larger, older specimens with deeply split blades and rufous patches of rhizoids in the basal parts; upper surface calcified, 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.

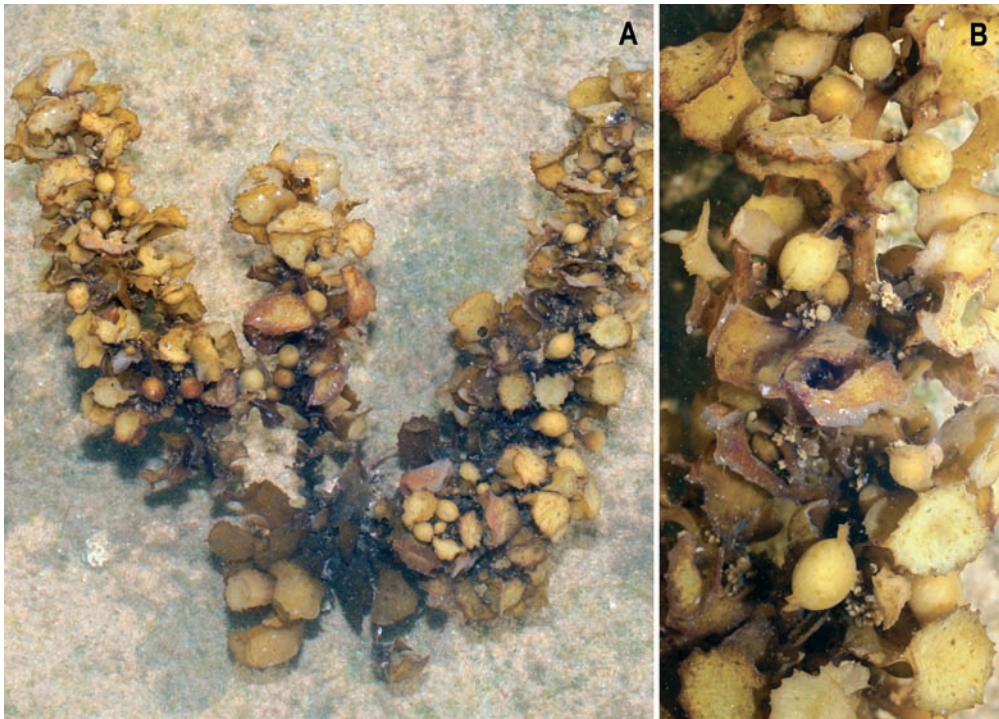
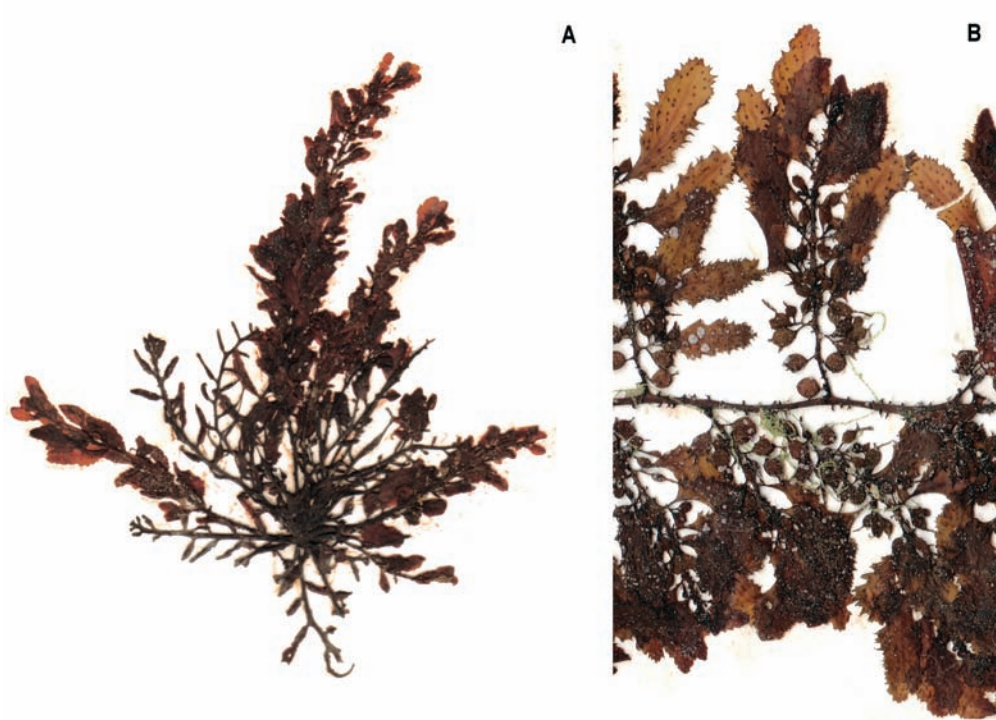
Description - Fully grown plants about 10-20 cm long, attached by a dicoid holdfast from where several erect axes arise. Main axis (sub)cylindrical and smooth, unbranched in small specimens, bearing short (1-2 cm), radially arranged side branchlets. Leaves fleshy and rigid, 0.75 to 15 mm long and 10 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).

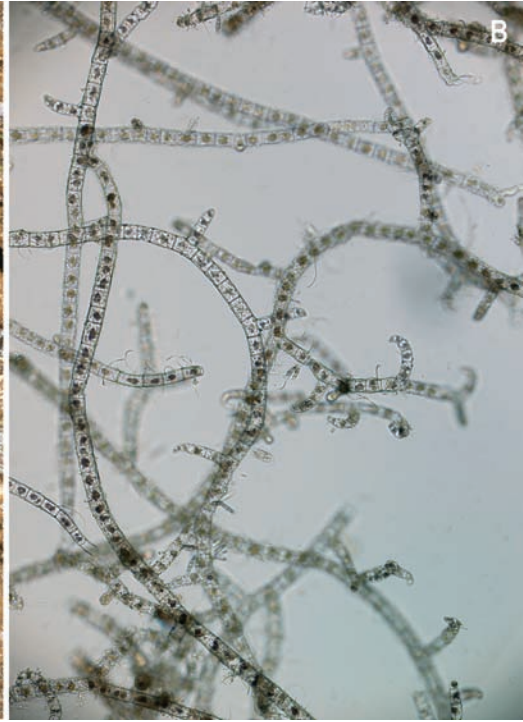
TYPE LOCALITY: San Agustín, Oaxaca, Mexico.

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.



10.3. Rhodophyta - Red algae

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

For the classification of the red algae we follow Schneider & Wynne (2007), except for the Ceramiaceae (sensu lato) where we follow the more recent paper by Choi *et al.* (2008) who propose a splitting of the family.

Bangiophyceae

BANGIALES

Bangiaceae

Porphyra suborbiculata Kjellman 158

Florideophyceae

NEMALIALES

Galaxauraceae

Actinotrichia fragilis (Forsskål) Børgesen 158

Galaxaura filamentosa Chou 160

Galaxaura rugosa (Ellis et Solander) J.V. Lamouroux 160

Liagoraceae

Dermonema virens (J. Agardh) Pedroche et Ávila Ortíz 162

Liagora ceranoides J.V. Lamouroux 162

GELIDIALES

Gelidiaceae

Gelidium spp. 164

Gelidiellaceae

Gelidiella acerosa (Forsskål) J. Feldmann et G. Hamel 166

Pterocladaceae

Pterocladia caerulescens (Kützinger) Santelices et Hommersand 166

GRACILARIALES

Gracilariaceae

Gracilaria canaliculata Sonder 168

**Gracilaria corticata* (J. Agardh) J. Agardh 168

Gracilaria corticata var. *ramalinoides* J. Agardh 170

**Gracilaria hikkaduwendensis* Durairatnam 170

Gracilaria salicornia (C. Agardh) Dawson 172

BONNEMAISONIALES

Bonnemaisoniaceae

Asparagopsis taxiformis (Delile) Trevisan 172

CORALLINALES

Corallinaceae

Amphiroa foliacea J.V. Lamouroux 174

Amphiroa fragilissima (Linnaeus) J.V. Lamouroux 174

Amphiroa sp. 176

Jania adhaerens J.V. Lamouroux 176

<i>Jania cultrata</i> (Harvey) J.H.Kim, Guiry et H.-G. Choi	178
<i>Jania intermedia</i> (Kützinger) P. Silva	178
<i>Jania unguolata</i> (Yendo) Yendo	180
GIGARTINALES	
Cystocloniaceae	
<i>Hypnea charoides</i> J.V. Lamouroux	180
<i>Hypnea pannosa</i> J. Agardh	182
<i>Hypnea spinella</i> (C. Agardh) Kützinger	182
Gigartinaceae	
<i>Chondracanthus acicularis</i> (Roth) Fredericq	184
Peyssonneliaceae	
<i>Peyssonnelia</i> sp.	184
Phyllophoraceae	
<i>Ahnfeltiopsis pygmaea</i> (J. Agardh) P.C. Silva et DeCew	186
Rhizophyllidaceae	
<i>Portieria hornemannii</i> (Lyngbye) P.C. Silva	186
<i>Portieria tripinnata</i> (Hering) De Clerck	188
Solieriaceae	
* <i>Euryomma platycarpa</i> Schmitz	188
PLOCAMIALES	
Sarcodiaceae	
<i>Sarcodia montagneana</i> (J.D. Hooker et Harvey) J. Agardh	190
HALYMENIALES	
Halymeniaceae	
<i>Carpopeltis maillardii</i> (Montagne et Millardet) Chiang	190
<i>Grateloupia lithophila</i> Børgesen	192
<i>Halymenia durvillei</i> Bory de Saint-Vincent	192
* <i>Polyopes ligulatus</i> (Harvey ex Kützinger) De Toni	194
RHODYMENIALES	
Champiaceae	
* <i>Champia ceylanica</i> Harvey	194
Lomentariaceae	
<i>Gelidiopsis repens</i> (Kützinger) Weber-van Bosse	196
<i>Gelidiopsis variabilis</i> (J. Agardh) Schmitz	196
Rhodymeniaceae	
<i>Botryocladia skottsbergii</i> (Børgesen) Levring	198
CERAMIALES	
Ceramiaceae	
<i>Centroceras clavulatum</i> (C. Agardh) Montagne	198
<i>Ceramium marshallense</i> Dawson	200
<i>Ceramium</i> sp.	200
Callithamniaceae	
* <i>Euptilota fergusonii</i> Cotton	202

Spyridiaceae	
<i>Spyridia fusiformis</i> Børgesen	202
<i>Spyridia hypnoides</i> (Bory de Saint-Vincent) Papenfuss	204
Wrangeliaceae	
<i>Wrangelia argus</i> (Montagne) Montagne	204
Dasyaceae	
<i>Dictyurus purpurascens</i> Bory de Saint-Vincent	206
Delesseriaceae	
<i>Caloglossa leprieurii</i> (Montagne) G. Martens	206
* <i>Claudea multifida</i> Harvey	208
<i>Cottoniella amamiensis</i> Itono	208
* <i>Martensia fragilis</i> Harvey	210
* <i>Nitophyllum marginale</i> (Kützing) J. Agardh	210
<i>Taenioma perpusillum</i> (J. Agardh) J. Agardh	212
* <i>Vanvoorstia coccinea</i> Harvey ex J. Agardh	212
Rhodmelaceae	
<i>Acanthophora spicifera</i> (Vahl) Børgesen	214
<i>Bostrychia tenella</i> (J.V. Lamouroux) J. Agardh	214
* <i>Bryocladia thwaitesii</i> (Harvey ex J. Agardh) De Toni	216
<i>Chondria armata</i> (Kützing) Okamura	216
<i>Laurencioids</i> (<i>Chondrophyucus/Laurencia/Osmundea/Palisada</i> -complex)	218
<i>Laurencia natalensis</i> Kylin	218
<i>Laurencia</i> sp.	218
<i>Palisada papillosa</i> (C. Agardh) K.W. Nam	218
* <i>Chondrophyucus ceylanicus</i> (J. Agardh) M.J. Wynne, Serio, Cormaci et G. Furnari	220
<i>Leveillea jungermannioides</i> (Hering et G. Martens) Harvey	220
<i>Murrayella pericladus</i> (C. Agardh) Schmitz	222
<i>Tolypocladia calodictyon</i> (Harvey ex Kützing) P.C. Silva	222

***Porphyra suborbiculata* Kjellman**

1897a: 10-13, pl. 1: figs 1-3, pl. 2: figs 5-9, pl. 5: figs 4-7

Fig. 126

REFERENCE: Tseng (1984: 48, fig. 3, p. 49).

TYPE LOCALITY: Goto-retto, Nagasaki Prefecture, Japan.

Description - Plants membranous, gregarious, greenish purple; attached by small rhizoids; blade monostromatic, ovate to reniform, 3-4 cm in diameter; margin undulate, with small, spinulose processes which are not in the same plane as the blade; presence of a minute basal stipe. Cells in surface view angular with rounded corners, isodiametric in transverse section, 28-35 µm in diameter, slightly higher than broad, containing a stellate plast with central pyrenoid. Plants monoecious, sori of deep red carpogonia and yellowish spermatangia in irregular patches (sori) arranged along the margin of the frond; after fertilisation 32 carpospores being produced per carpogonium

Ecology - Epilithic in the supralittoral fringe of rock outcrops exposed to extreme surf; only present in the wet season.

Distribution - Mentioned from scattered localities in the tropical Indian, Pacific and Atlantic Oceans and also from the Canary Islands.

Note - Four additional species of *Porphyra* are mentioned from Sri Lanka by Silva *et al.* (1996: 91-94): *P. ceylanica* J. Agardh, *P. laciniata* (Lightfoot) C. Agardh, *P. purpurea* (Roth) C. Agardh and *P. umbilicalis* (Linnaeus) Kützing.

Fig. 126. *Porphyra suborbiculata*. A. Group of thalli *in situ*; B. Detail of blade margin with tiny teeth.

***Actinotrichia fragilis* (Forsskål) Børgesen**

1932: 6

Fig. 127

REFERENCES: Jaasund (1976: 65, fig. 131), Magruder & Hunt (1979: 57, fig. 2, p. 56), Cribb (1983: 25, pl. 8, fig. 1), Tseng (1984: 58, pl. 32, fig. 1), Verheij & Prud'homme van Reine (1993: 439, pl. 14, fig. 1), Lewmanomont & Ogawa (1995: 91, + fig.), Calumpang & Meñez (1997: 150, bottom fig. p. 93, top fig. p. 151), Trono (1997: 171, fig. 172), Abbott (1999: 64, figs 7A-C), Huisman (2000: 37, + figs), Payri *et al.* (2000: 160, bottom fig. p. 161), Littler & Littler (2003: 62, top fig. p. 63), Oliveira *et al.* (2005: 47, + fig), Huisman *et al.* (2007: 69, + figs), Ohba *et al.* (2007: 90, + figs), Skelton & South (2007: 16, figs 14-15, 780).

TYPE LOCALITY: Mokha, Yemen.

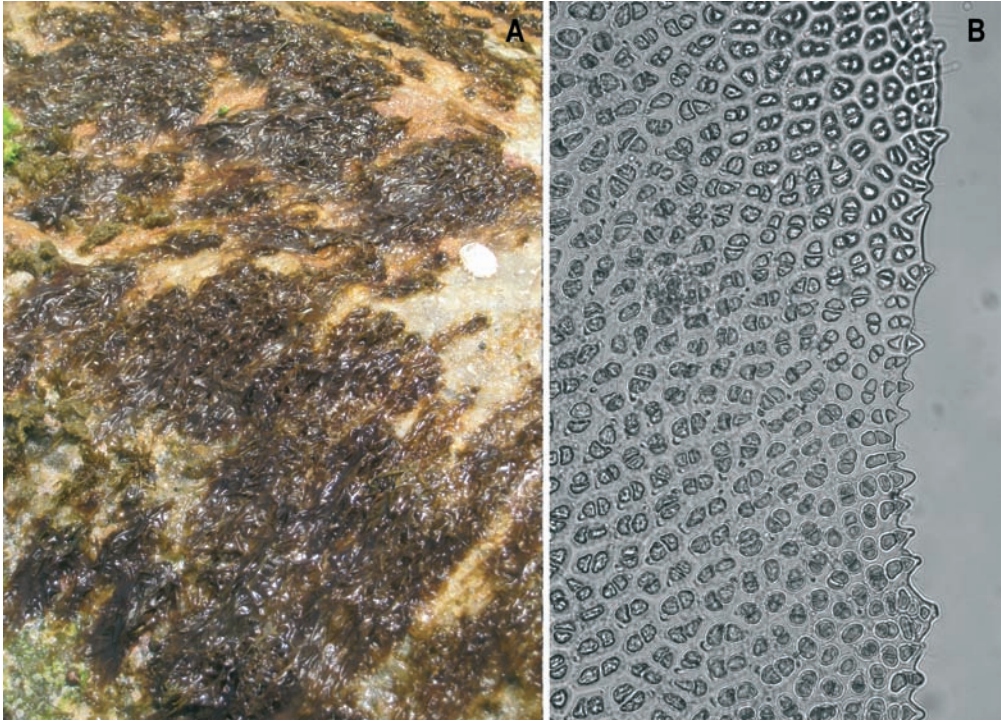
Description - Plants forming rigid, pinkish red to orangy, hemispherical plants of up to 5 cm in diameter, composed of intricately, calcified, cylindrical, stiff axes, repeatedly dichotomously branched in different planes, with wide axils; a single, centrally placed holdfast from where the branches start more or less radially; interdichotomies 0.5-3 cm long, diameter less than 1 mm, blunt apices; presence of typical verticils of tough, unbranched, pigmented hairs, perpendicularly placed on the branches, 0.5 mm long and verticils 0.5 mm apart.

Ecology - Horizontal rock, -2 m, sheltered part behind surf-exposed rock outcrops.

Distribution - Indian Ocean, tropical Pacific Ocean.

Note - With age, the verticils of hairs break off, leaving annular scars; the plant then becomes greyish and its general appearance is then similar to *Amphiroa fragilissima*.

Fig. 127. *Actinotrichia fragilis*.



Galaxaura filamentosa Chou

in W.R. Taylor 1945: 139

Fig. 128

REFERENCES: Chou (1945: 39, pl. I, figs 1-6, pl. VI, fig. 1), Magruder & Hunt (1979: 67, lower fig. p. 66), Tseng (1984: 58, pl. 32, fig. 4), Abbott (1999: 67, fig. 7F), Payri *et al.* (2000: 164, top fig. p. 165), Skelton & South (2007: 21, fig. 17).

TYPE LOCALITY: Isla Clarión, Islas Revillagigedo, Mexico.

Description - Plants isolated but growing in open populations; individual specimens more or less spherical, up to 10 cm in diameter; very well attached by a single discoid holdfast; all branches cylindrical, dichotomous in different planes, slightly calcified and rather supple, tomentose, extremely densely covered by supple, bordeaux-red filaments of uniform length (about 4 mm), resulting in a very woolly aspect when submerged.

Ecology - Epilithic in a mid intertidal rockpool, continuously wave-swept even at low tide; mostly on the vertical walls.

Distribution - Scattered locations in the tropical Indian, Pacific and Atlantic Oceans.

Notes - Some specimens of one collection are densely covered by the green alga *Cladophora socialis*. *G. filamentosa* is morphologically very similar to *G. fasciculata* Kjellman, but the latter has long and short filaments mixed and a ring of calcification in the axes, whereas the former exclusively bears long filaments and lacks the calcified ring.

A new record for Sri Lanka.

Fig. 128. *Galaxaura filamentosa*.

Galaxaura rugosa (Ellis & Solander) J.V. Lamouroux

1816: 263

Fig. 129

REFERENCES: Abbott (1999: 68, figs 8A-E), Littler & Littler (2003: 66, top and middle figs p. 67), De Clerck *et al.* (2005b: 140, fig. 103), Oliveira *et al.* (2005: 50, + fig.), Huisman *et al.* (2007: 71, + figs).

TYPE LOCALITY: Jamaica.

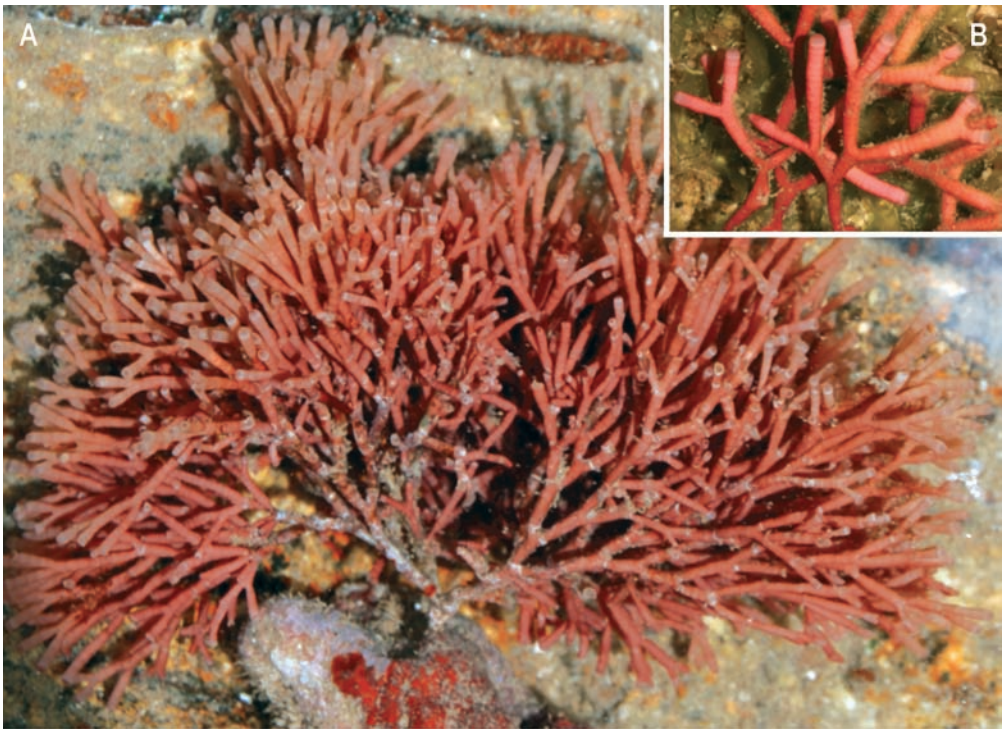
Description - Thallus erect, up to 8 cm high, forming dense, stiff, pinkish to orangy, hemispherical tufts, composed of radially arranged, dichotomously branched, unsegmented, cylindrical axes; axes heavily calcified and brittle, certainly in fully grown specimens, 1-2 mm in diameter with truncated apices; a single attachment point. Gametophytes are glabrous, sometimes with a hirsute basis which then becomes brownish red; apices mostly bleached and with a typical fine transverse striation or annulations. Tetrasporophytes completely covered by rather stiff hairs, evenly and densely placed or verticillate, resulting in darker (more brownish) plants. The internal structure is composed of a central filamentous medulla and a cortex composed of 3-4 layers of large, rounded cells in the gametophytes, the two innermost cortex layers are colourless; sporophytes without the pseudoparenchymatous cortex but with radially arranged, contiguous assimilatory filaments.

Ecology - Subtidal, epilithic in lagoons from -30 cm down to a few meter.

Distribution - Tropical seas.

Note - The Australian representatives of the genera *Galaxaura* and *Tricleocarpa* were studied anatomically by Huisman & Borowitzka (1990). More recent molecular conclusions were published in Huisman *et al.* (2004).

Fig. 129. *Galaxaura rugosa*. A. Fully grown specimen; B. Part of a juvenile specimen.



***Dermonema virens* (J. Agardh) Pedroche et Ávila Ortíz**

1996: 77

Figs 9E; 13E; 42A; 130

REFERENCES: Durairatnam (1961: 47-48, pl. 28, fig. 1, as *D. frappieri*), Tseng (1984: 50, pl. 28, fig. 4, as *D. frappieri*), Payri *et al.* (2000: 158, top figs p. 159).

TYPE LOCALITY: San Agustín, Oaxaca, Mexico.

Description - Thallus erect, 5 (-7) cm high, brownish-red, becoming orangy or even greenish towards the apices upon ageing; soft and lubricous and rubbery in texture; gregarious, fixed by a large discoid holdfast; base stipitate, bearing axes which are laxly or densely, repeatedly dichotomous and more or less radially arranged; the dichotomies are perpendicular on each other, and more dense towards the periphery, resulting in a (hemi-)spherical habit; the branches cylindrical and gradually decreasing in diameter towards the apices, about 2 mm in diameter near the base. Medulla composed of loosely interwoven filaments, surrounded by a cylinder of peripheral thick-walled cells.

Ecology - High intertidal on surf-exposed rocky outcrops. Very abundant in the wet season, forming a monospecific zone; almost disappearing in the dry season.

Distribution - Scattered localities in the Indian Ocean, widespread in the western tropical Pacific Ocean and Mexico.

Note - Used as food in China. Svedelius (1939) richly illustrates this taxon (as *D. gracile* Weber-van Bosse).

Fig. 130. *Dermonema virens*. A. A monospecific vegetation; B. Detail of a thallus.

***Liagora ceranoides* J.V. Lamouroux**

1816: 239

Fig. 131

REFERENCES: Tseng (1984: 54, pl. 30, fig. 1), Lewmanomont & Ogawa (1995: 130, + fig.), Cribb (1996: 103, middle fig. p. 102), Calumpong & Meñez (1997: 153, + fig.), Trono (1997: 166, fig. 104), Abbott (1999: 84, figs 13I-M), Payri *et al.* (2000: 158, bottom figs p. 159), Littler & Littler (2003: 58, bottom fig. p. 59), De Clerck *et al.* (2005b: 142, fig. 105), Oliveira *et al.* (2005: 52, + fig. p. 53), Huisman *et al.* (2007: 63, + figs), Skelton & South (2007: 24, figs 22-23).

TYPE LOCALITY: St. Thomas, Virgin Islands.

Description - Plants solitary, but growing in open populations, erect, 4-7 cm high, with a lobed, sub-spherical appearance, extremely supple, lubricous-slippery, pinkish white *in situ* (the branches are more whitish as a result of stronger calcification, the tips more pinkish), becoming greyish upon drying; a single, discoid holdfast; all axes cylindrical, of similar diameter (1 mm) all over the thallus; wide-angled dichotomous branching dense from the basis onwards (interdichotomies about 5 mm at the basis, 2 mm towards the periphery of the thallus), in different planes; older plants presenting basal branches with a rough surface and provided with short unbranched or singly dichotomous proliferations all over the thallus, obscuring the original dichotomous branching of the main axes; apical branchlets frequently recurved, apices rounded to blunt. Medullary filaments of uniform diameter throughout, bearing cortical, assimilatory filaments forming fascicles, nearly moniliform except the basal cells which are subcylindrical; terminal cells often with hairs. Spermatangia stalked, in small clusters on the outer cortical cells. Hemispherical cystocarp with well-developed involucrel filaments.

Ecology - Subtidal, on coral rubble in sand-covered reef channels, at 3 m depth.

Distribution - Pantropical.

Fig. 131. *Liagora ceranoides*. A. Small specimen *in situ*; B. Detail.



***Gelidium* J.V. Lamouroux**

1813: 128

Figs 18A; 132

Over 130 taxa are currently recognized worldwide, although many are in need of re-assessment. The genus is characterised by bilocular cystocarps with evenly developed locules (on both surfaces of the blades), but the infrequency of reproductive plants means that most specimens can only provisionally be identified, based on morphological characters. On the other hand, it is known that vegetative characters vary greatly with ecological parameters. Their variability is so big that it is even difficult to separate *Gelidium* from related genera. In the absence of reproductive structures in type material, this genus might still be one of the most confused ones in the red algae.

Freshwater *et al.* (1995) and Shimada *et al.* (1999) have shown a clustering of species into several monophyletic clades, many of which correspond to specific geographical regions.

Based on data from literature, Silva *et al.* (1996) mention four species from Sri Lanka: *Gelidium amansii* (J.V. Lamouroux) J.V. Lamouroux, *G. corneum* (Hudson) J.V. Lamouroux, *G. micropterum* Kützinger, *G. pusillum* (Stackhouse) Le Jolis. *G. heteroplatos* Børgesen, mentioned by Durairatnam (1961: 50) has been transferred to the genus *Pterocladia*. It is not to be excluded that more species of *Gelidium* are present on the island.

Representatives of *Gelidium* in Sri Lanka are generally small to tiny, gregarious plants (rarely up to 2 cm high) with cylindrical prostrate axes, very well attached to the substratum by groups of rhizoids; erect plants cartilaginous, supple but tough, partly cylindrical (towards the basis) or completely compressed, variously branched, mostly distichously in one plane; a single, lens-shaped apical cell. In transverse section the axes show small, thick-walled rhizines among the pseudoparenchymatous cells of the medulla. Cruciate divided terasporangia in sori occupying the central part of lateral branchlets.

Figs 132A-E. *Gelidium* spp.



***Gelidiella acerosa* (Forsskål) J. Feldmann et G. Hamel**

1934: 533

Figs 10C; 133

REFERENCES: Tseng (1984: 64, pl. 35, fig. 4), Lewmanomont & Ogawa (1995: 105, + fig.), Cribb (1996: 83, bottom fig. p. 82), Calumpong & Meñez (1997: 170, + fig.), Trono (1997: 179, fig. 113), Abbott (1999: 202, figs 53A-C), Huisman (2000: 42, + figs), Payri *et al.* (2000: 170, top fig. p. 171), Littler & Littler (2003: 56, top fig. p. 57), De Clerck *et al.* (2005b: 156, fig. 121), Oliveira *et al.* (2005: 59, + fig.), Huisman *et al.* (2007: 107, + figs).

TYPE LOCALITY: Mokha, Yemen.

Description - Plants growing from a stoloniferous holdfast, uprights 4-7 cm long, forming tufts or clumps of tough and wiry, flexible axes, brownish-black in shaded places to greenish-straw-coloured when directly exposed to sunlight; attached by peg-like haptera or terminating in multicellular rhizoids; erect axes cylindrical, certainly in the basal parts to compressed in the upper parts; to 1 mm in diameter, most often pinnately and distichously branched, more rarely radially or unilaterally branched; main axes frequently recurved, arcuate; pinnae short, 2-6 mm long, perpendicularly placed on the rachis and gradually shorter towards the branch apices; branches sometimes anastomosing, predominantly in the prostrate parts; apices acute, hairs often present. Internal structure consisting of a cortex of small, ovoid, darkly-pigmented cells, centrally grading into larger, irregularly-shaped, thin-walled medullary cells; rhizines consistently absent. Tetrasporangial sori yellowish, borne in expanded apices of lateral branchlets.

Ecology - Epilithic in shallow pools close to low water level, exposed to continuous surf; locally abundant.

Distribution - Pantropical.

Fig. 133. *Gelidiella acerosa*. A. Prostrate growth form; B. Erect growth form.

***Pterocliadiella caerulescens* (Kützting) Santelices et Hommersand**

1997: 118

Figs 10A, B; 134

REFERENCES: Abbott (1999: 197, fig. 51E), Payri *et al.* (2000: 168, bottom fig. p. 169), De Clerck *et al.* (2005b: 150, fig. 113), Huisman *et al.* (2007: 110, + figs), Skelton & South (2007: 28).

TYPE LOCALITY: Wagap, New Caledonia.

Description - Plants gregarious, erect, 3-5 cm high, composed of a stoloniferous holdfast and lanceolate uprights, bordeaux-red; attached by peg-like rhizoidal attachments; erect axes densely placed on the stolons, subcylindrical proximally, flattened and ligulate distally, up to 5 cm high and 1-1.5 mm wide, simple to irregularly bipinnate; pinnae upwardly directed, more or less in a single plane, lanceolate to ligulate, with obtuse or emarginated apices. In transverse section, internal structure consisting of a darkly pigmented outer cortex grading into larger, angular inner cortical cells; medulla consisting of thick-walled filaments; refractive rhizines concentrated in the medulla, scattered in the inner cortex.

Ecology - Epilithic on horizontal substratum at low water level, continuously wave-swept even at low tide; locally in extensive monospecific populations.

Distribution - Pantropical.

Fig. 134. *Pterocliadiella caerulescens*.



***Gracilaria canaliculata* Sonder**

1871: 56

Figs 10D; 23D; 135

REFERENCES: Durairatnam (1961: 59, pl. 14, fig.6, as *G. crassa*), Tseng (1984: 104, pl. 55, fig. 3), Calumpang & Meñez (1997: 179, + fig.), Huisman (2000: 95, + figs), De Clerck *et al.* (2005b: 158, fig. 123), Oliveira *et al.* (2005: 60, + figs p. 36, 61).

TYPE LOCALITY: Wagap, New Caledonia.

Description - Plants gregarious, decumbent, up to 10 cm tall, succulent, stiff cartilaginous and brittle, bright to dark pinkish red, sometimes greenish proximally; attached by a discoid holdfast giving rise to 1-2 arched uprights; axes cylindrical, 2-3 mm in diameter, decumbent, 4-6 times (sub)dichotomously branched, parallel to the substratum; branching angle 45-90°; branches mostly arcuate and slightly basally constricted, sometimes forming secondary attachment points at their broadly rounded apices. Internal structure consisting of 1-2 layers of small, pigmented outer cortical cells surrounding a large-celled medulla with cells of up to 300 µm in diameter; medullary cells decreasing in size toward the periphery, polygonal to spherical; cortex of proximal axes considerably thicker.

Ecology - Epilithic, on surf-exposed rocks at about low tide level, extremely well-developed in surf channels.

Distribution - Widespread throughout the Indian Ocean and western Pacific Ocean.

Note - A much used synonym of this species is *G. crassa* Harvey ex J. Agardh.

Fig. 135. *Gracilaria canaliculata*.

***Gracilaria corticata* (J. Agardh) J. Agardh**

1852: 602-603

Figs 9C; 21F, G; 41F; 45E; 136

REFERENCES: Jaasund (1976: 83, fig. 168), Moorjani & Simpson (1988: 29, pl. 59d), De Clerck *et al.* (2004: 3027, fig. 1), De Clerck *et al.* (2005b: 160, fig. 124), Oliveira *et al.* (2005: 61, + fig.).

TYPE LOCALITY: Sri Lanka.

Description - Plants gregarious, erect, 10 (-15) cm long, cartilaginous but flexible, varying from dark-purple to bright red or creamy, frequently darker in the branch axils; attached by means of a discoid holdfast from which the erect plants develop, as well as numerous stolonoidal structures; axes markedly compressed, linear, strap-like, up to 4 mm wide in the widest specimens, only 2 mm in narrower growth forms, being narrower just above the dichotomies, with smooth margins and obtuse apices, frequently branched up to 6 orders in a single plane; branching originally (sub)dichotomous, with narrow branching angles; numerous specimens bear isolated, marginal, spur-like (recurved) proliferations. Internal structure consisting of 1-3 layers of pigmented outer cortical cells surrounding a large-celled medulla with cells up to 100 µm in diameter; medullary cells decreasing in size toward the periphery, polygonal to spherical. Cystocarps numerous but isolated, hemispherical, markedly extruding on the surface of the straps.

Ecology - Extremely abundant on surf-exposed, horizontal beach rock platforms at about low tide level, where it can form large monospecific populations, but also observed in harbours.

Distribution - Widespread throughout the Indian Ocean, also mentioned from Korea and Peru (Pacific Ocean).

Fig. 136. *Gracilaria corticata*. A. Sterile plants; B. Specimens with numerous cystocarps.



Gracilaria corticata (J. Agardh) J. Agardh var. **ramalinoides** J. Agardh

1852: 602-603

Fig. 137

REFERENCE: Durairatnam (1961: 63, pl. XXX, fig. 2).

TYPE LOCALITY: India.

Description - Plants similar in habit and colour as *G. corticata*, but the axes narrower (1-2 mm), and more rigid, the distal parts of older specimens becoming more irregular as a result of palmate to cervicorn branching towards the apices; these apical branches are subcylindrical and as a result, these plants have a more "spiny" aspect than the typical variety. Fertile (cystocarpic) specimens also present numerous lateral proliferations (in the same plane as the original branching), resulting in a very dense aspect; cystocarps (mostly) produced on the adaxial side of these incurved proliferations but also present on the margins of the main axes.

Ecology - Similar to the typical variety, but less abundant; not observed in sheltered habitats (harbours).

Distribution - India, Kenya, Madagascar, Sri Lanka, Tanzania.

Fig. 137. *Gracilaria corticata* var. *ramalinoides*.

Gracilaria hikkaduensis Durairatnam

1962: 15, fig. 6

Fig. 138

TYPE LOCALITY: Hikkaduwa, Sri Lanka.

Description - Plants isolated or in small groups, growing in open populations, erect, rather stiff cartilaginous but flexible, straplike, upper parts typically greenish and as such easily recognizable in the field but some specimens completely creamy coloured; attachment by a disc; some specimens with a marked cylindrical stipe, 3-4 mm long; basal stolonoid structures (illustrated by Durairatnam, but not mentioned in his description) sometimes present; blades 4-5 (-7) cm high, straps cuneate, up to 3-4 (-5) mm wide just under the dichotomy, markedly undulated; branching subdichotomous to irregular, becoming extremely irregular and dense in older specimens as a result of the numerous proliferations; apices more or less toothed.

Ecology - Epilithic, horizontal substratum, just above low water mark, continuously wave-swept, frequently among *G. corticata*.

Distribution - Kenya, Mauritius, Sri Lanka.

Note - The morphology of our specimens agrees well with the original description and illustration of Durairatnam (1962, fig. 6) as well as with his specimen deposited in Peradeniya. It also agrees with Harvey's specimen (1857, n°96), deposited in Sydney, distributed as *Rhodymenia purpurascens* in his Ceylon exsiccata. According to Silva *et al.* (1996: 177), *Gracilaria srilankia* (Chang & B Xia) Withell, Millar & Kraft would be the correct name of Harvey's specimen. Further study should make clear if *G. hikkaduensis* and *G. srilankia* are the same or different taxa.

Fig. 138. *Gracilaria hikkaduensis*.



***Gracilaria salicornia* (C. Agardh) Dawson**

1954: 4

Fig. 139

REFERENCES: Magruder & Hunt (1974: 73, middle fig. p. 72), Jaasund (1976: 85, fig. 171), Tseng (1984: 108, pl. 57, fig. 1), Lewmanomont & Ogawa (1995: 116, + fig.), Cribb (1996: 87, middle fig. p. 86), Calumpong & Meñez (1997: 177, + fig. p. 178), Trono (1997: 217, fig. 139), Abbott (1999: 214, figs 59D-H), Littler & Littler (2003: 100, middle fig. p. 101), De Clerck *et al.* (2005b: 162, fig. 126), Oliveira *et al.* (2005: 62, + fig. p. 63), Huisman *et al.* (2007: 114, + figs), Ohba *et al.* (2007: 93, + figs).

TYPE LOCALITY: Probably Manila, Philippines.

Description - Plants mainly prostrate, up to 10 cm long, succulent, stiff cartilaginous and brittle, orange to yellowish green; attachment by numerous, small discoid holdfasts; axes cylindrical, 1.5-2 mm in diameter, with a few, irregularly placed constrictions; apices straight or downwardly bent, rounded; branching (sub) dichotomous to irregular with wide branching angles.

Ecology - Epilithic on horizontal substratum close to low water level and locally growing in extensive populations, even in places which are continuously trampled by fishermen and tourists.

Distribution - Widespread in the tropical Indo-Pacific.

Note - Abbott (1999: 216) mentions that this species is used as food in Hawai'i, when there is shortage of cultured *Gracilaria* species.

Fig. 139. *Gracilaria salicornia*.

***Asparagopsis taxiformis* (Delille) Trevisan**

1845: 45

Figs 23B; 45J; 140

REFERENCES: Tseng (1984: 64, pl. 35, fig. 3), Cribb (1996: 69, bottom fig. p. 68), Calumpong & Meñez (1997: 161, + fig. p. 162), Trono (1997: 169, fig. 106), Abbott (1999: 174, figs 43A-D), Huisman (2000: 47, + figs), Payri *et al.* (2000: 160, top fig. p. 161), Littler & Littler (2003: 68, middle fig. p. 69), De Clerck *et al.* (2005b: 164, fig. 128, 129), Oliveira *et al.* (2005: 64, + figs p. 65), Huisman *et al.* (2007: 83, + figs).

TYPE LOCALITY: Alexandria, Egypt.

Description - *Gametophytic plants* erect, gregarious, forming extensive greyish pink patches, mostly 2-4, but up to 11 cm high; attached to the substratum by cylindrical, irregularly branched stolons, 1.5-2 mm in diameter; uprights plumose with a single percurrent axis forming densely branched determinate branches in all directions, with the basal part often denuded and stalk-like; in larger specimens indeterminate side branches can be present in the upper, plumose part; branchlets divided to several orders, the divisions becoming progressively finer so plants are soft and silky. *Tetrasporangial plants* ('*Falkenbergia*' stage) forming isolated pinkish-red tufts, 1-3 cm in diameter, consisting of radially placed, finely branched polysiphonous filaments, 30-40 µm in diameter, composed of a central axial filament surrounded by 3 pericentral cells; each of these cells containing a single, markedly refringent, iodine containing cell inclusion; segments at maturity 65-80 µm long. Tetrasporangia one per segment in short series, 35-40 µm in diameter, tetrahedrally divided.

Ecology - Gametophyte: Mostly epilithic in the subtidal (-3/-4 m) where it locally forms extensive vegetations together with *Portieria hornemannii*. More rarely observed in the infralittoral fringe. Tetrasporophyte: often entangled among other algae or attached to algal turf in intertidal pools and the shallow subtidal.

Distribution - Pantropical and warm temperate regions.

Note - When taken out of the water, the plants have a very strong iodine smell. Abbott (1999: 175) mentions that this species probably is the most favoured (and expensive) seaweed food for Hawaiians.

Fig. 140. *Asparagopsis taxiformis*. Gametophytes among *Halimeda*.



***Amphiroa foliacea* J.V. Lamouroux** in Quoy et Gaimard
1824: 628, pl. 93: figs 2, 3

Figs 22A; 141

REFERENCES: Tseng (1984: 86, pl. 46, fig. 1), Lewmanomont & Ogawa (1995: 93, + fig.), Abbott (1999: 178, figs 44C, 45B), Littler & Littler (2003: 26, top fig. p. 27), Ohba *et al.* (2007: 104, + figs), Skelton & South (2007: 40, figs 47-51, 796).

TYPE LOCALITY: Mariana Islands.

Description - Plants gregarious, horizontally spread from a central point from which different specimens spread out; heavily calcified and brittle, pink; individual plants up to 5 cm long, branching irregular, some segments not branching, others di- or trichotomous; a single basal, cylindrical segment (intergeniculum); other segments markedly compressed, 3-4 mm long, 2-3 mm wide, and all in the same (or parallel) plane(s); in some specimens the proximal segments with raised central rib; segments extremely variable in morphology, mostly bi- or trifurcate, frequently with a (sub-)apical lateral lobe; the supple joints (genicula) are very obvious dark brown and surrounded on both sides by auricular outgrowths of the supporting and/or the upper segment; fertile specimens with very numerous, contiguous conceptacles on both faces of the intergenicula, but more numerous on the upper surface, not strongly elevated, with a single ostiolum each.

Ecology - Epilithic, from just under low water mark down to 2 m depth, locally abundant in continuously wave-swept gulleys parallel with the sea and in direct contact with the open sea.

Distribution - Tropical Pacific and Indian Ocean.

Note - Abbott (1999: 178) states that the taxonomy and nomenclature of *A. foliacea* need study. Moreover it may be that *A. foliacea*, *A. tribulus* (Ellis et Solander) J.V. Lamouroux and *A. misakiensis* Yendo represent a single polymorphic species.

Fig. 141. *Amphiroa foliacea*. A. Specimen from just under low water mark; B. Specimen from a lagoon, 2 m depth; C, D. Details.

***Amphiroa fragilissima* (Linnaeus) J.V. Lamouroux**
1816: 298

Fig. 142

REFERENCES: Magruder & Hunt (1979: 59, middle fig. p. 58), Lewmanomont & Ogawa (1995: 92, + fig.), Payri *et al.* (2000: 182, top fig. p. 183), Littler & Littler (2003: 26, middle fig. p. 27), Ohba *et al.* (2007: 105, + figs).

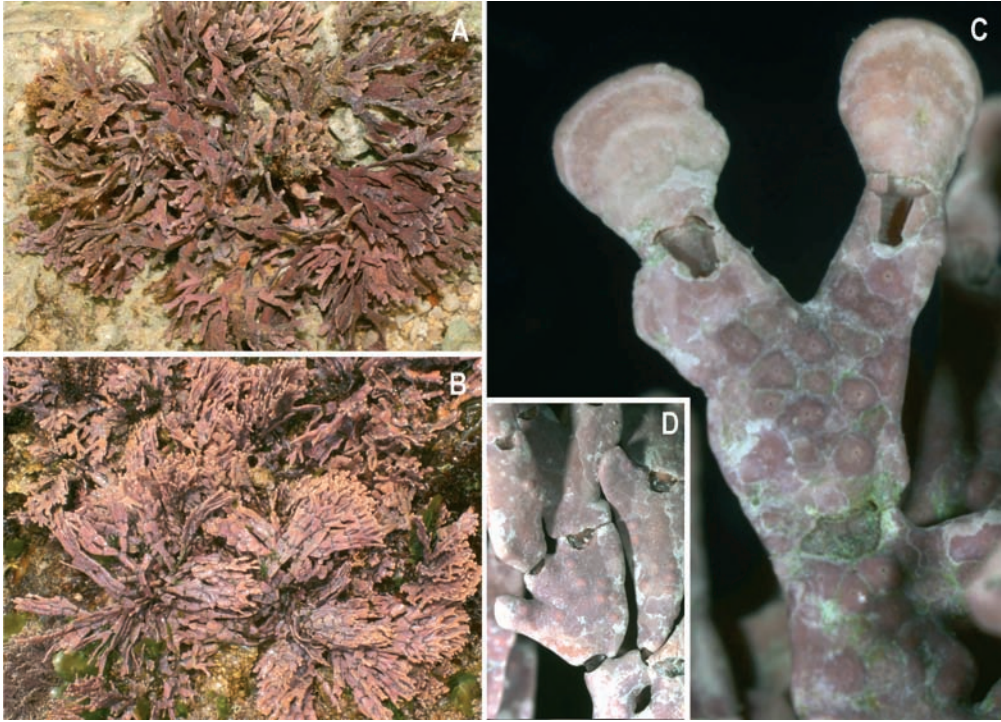
TYPE LOCALITY: Jamaica.

Description - Plants forming hemispherical tufts to more elongated cushions, composed of radially arranged, calcified and brittle branches, pinkish grey to yellowish white; all branches cylindrical, intergenicula extremely thin (100-500 μm), up to 1 cm long, branching divaricately dichotomous (Y-shaped, rarely trichotomous) at the genicula, more lax in sheltered, subtidal habitats, more dense in pools in the intertidal. Conceptacles small but conspicuous, as raised hemispherical projections, lateral on the intergenicula.

Ecology - Best developed in the subtidal of lagoons, frequent between seagrasses; somewhat coarser, more dense specimens in intertidal pools.

Distribution - Pantropical and Mediterranean Sea.

Fig. 142. *Amphiroa fragilissima*.



***Amphiroa* sp.**

Fig. 143

Description - Plants forming hemispherical, stiff and brittle tufts, 3-5 cm in diameter, pinkish red, composed of radially placed intergenicula, dichotomous in various planes, straight, calcified; attachment by a stoliferous holdfast; branching angles small, resulting in closely packed branches, (almost) contiguous at the basis of the thallus; intergenicula cylindrical, smooth, diameter uniform throughout, 250-750 μ m in diameter, 5-10 mm long; genicula uncalcified, small and not obvious. No reproductive structures observed.

Ecology - On horizontal, slightly sand-covered rock substrate close to low water mark along rather sheltered coasts; tufts frequently containing small shell fragments.

Fig. 143. *Amphiroa* sp. A. Surface view; B. Longitudinal section of a hemispherical tuft.

***Jania adhaerens* J.V. Lamouroux
1816: 270**

Figs 14C; 144

REFERENCES: Tseng (1984: 90, pl. 48, fig. 2), Cribb (1996: 97, bottom fig. p. 96), Calumpong & Meñez (1997: 149, + fig.), Abbott (1999: 187, fig. 48A), Littler & Littler (2003: 32, bottom fig. p. 33), De Clerck *et al.* (2005b: 176, figs 147, 148), Oliveira *et al.* (2005: 79, + figs), Skelton & South (2007: 45, figs 66-69).

TYPE LOCALITY: Mediterranean Sea.

Description - Plants forming lax, delicate, irregularly lobed (sub)spherical tufts; individual plants 2-4 cm in diameter, greyish pink with more whitish tips, attached by basal discs; all branches very thin (90-120 μ m, somewhat thicker at the basis), branching divaricate ($>45^\circ$), dichotomous to irregular in various planes, resulting in a very intricated aspect; some intergenicula not branching (number of unbranched ones larger in the basal parts, but also variable among specimens); intergenicula cylindrical, 300-700 μ m long; secondary adhesion discs present. Conceptacles in amphora-shaped intergenicula which are markedly broader than vegetative intergenicula and mostly bearing two short branchlets at the upper angles; pore in the middle of the upper margin of the conceptacle.

Ecology - Mostly epiphytic on other seaweeds (as *Sargassum*), or on stolons of seagrasses, in deep intertidal pools and the subtidal; locally in large quantities on submerged boat ropes in lagoons.

Distribution - Pantropical and warm temperate; widespread.

Note - Skelton & South (2007: 46) state that specimens from Pacific Islands, previously identified as *J. capillacea* Harvey and *J. micrarthrodia* are indistinguishable from *J. adhaerens*, and therefore most probably are referable to that taxon.

Fig. 144. *Jania adhaerens*. A. *In situ* habit; B. Detail of a secondary attachment pad.



Jania cultrata (Harvey) J.H. Kim, Guiry et H.-G. Choi
2007: 1317

Fig. 145

REFERENCES: Trono (1997: 191, fig. 122, as *Cheilosporum cultratum*), De Clerck *et al.* (2005b: 170, figs 138, 139, as *Cheilosporum cultratum*).

LECTOTYPE LOCALITY: Durban, South Africa.

Description - Plants decumbant, up to 2 cm tall, usually densely branched and caespitose, rarely sparsely branched, chalky pink to greenish- or brownish-pink; holdfast composed of entangled stolons with cylindrical to compressed, unlobed intergenicula 200-500 μm in diameter; axes complanate, dichotomously branched every few segments, in a single plane, articulated with calcified intergenicula; adventitious branching from intergeniculum surface rare; branch apices rounded, bleached; intergenicula near the base cylindrical, 0.3-0.8 mm long, 0.3-0.5 mm in diameter; intergenicula in the upper parts compressed, bilobed to winged, 0.6-1 mm long, 1.5-2(-3.5) mm wide between lobe apices; lobes strongly developed with acute apices, lobe angle ca 30-40(-50) $^{\circ}$, upper margin up to 1.5 mm long; genicula appearing as hairline cracks, composed of a single tier of medullary cells up to 240 μm long. Reproductive conceptacles swollen, borne adaxially on lobes with pore opening on the upper edge of intergenicula.

Ecology - Epilithic at about low tide level, on rocks exposed to strong surf.

Distribution - Reported from several localities in the Indian Ocean and western Pacific Ocean.

Note - Kim *et al.* (2007) studied the phylogenetic relationships within the tribe Janieae based on molecular and morphological data and came to a reappraisal of the genus *Jania*. They conclude that the genus *Cheilosporum* should be included in the genus *Jania*.

Fig. 145. *Jania cultrata*.

Jania intermedia (Kützting) P. Silva
in Silva *et al.* 1996: 242

Figs 17D; 146

REFERENCE: De Clerck *et al.* (2005b: 176, fig. 149).

TYPE LOCALITY: 'Cape of Good Hope', South Africa.

Description - Plants growing in extensive populations, but as isolated tufts, 2-3 cm long, hanging down along the sloping rocks; attachment by a basal disc, all intergenicula cylindrical, about 100-150 μm in diameter and 200-400 μm long, dichotomous but unbranched segments are present; branching angle small, resulting in a global fasciate aspect with rounded periphery, all axes being parallel to each other. Greyish pink in the wet season, becoming bleached whitish in the beginning of the dry season and largely dying off when the sea is becoming smooth.

Ecology - Growing in large, rather dense, (almost) monospecific populations (several m^2) on vertical and sloping surfaces in the mid to low intertidal, exposed to extreme surf.

Distribution - South Africa, Mozambique.

Note - This is the most abundant intertidal *Jania* species along the coast of Sri Lanka. In the absence of reproductive structures and awaiting the results of ongoing molecular study of the genus, we tentatively identify this taxon as *J. intermedia*, as the material from Sri Lanka very well corresponds to that from Kwazulu-Natal. *Jania natalensis* var. *tenuior* was distributed by Harvey in his Ceylon exsiccata (1857: n $^{\circ}$ 25). According to Silva *et al.* (1996: 245) this name was used, without a description. They also state that this taxon apparently lies within the circumscription of *Jania verrucosa*, but it might even be that *J. intermedia* and *J. natalensis* var. *tenuior* have to be reduced to synonymy. Durairatnam (1961: 51) very briefly describes it (without giving any dimensions of the intergenicula), adding that he did not find any reproductive structures 'in spite of careful examination'.

Fig. 146. *Jania intermedia*. A. Population; B. Detail.



Jania ungulata (Yendo) Yendo

1905: 38

Fig. 147

REFERENCES: Littler & Littler (2003: 36, top fig. p. 37), Oliveira *et al.* (2005: 80, + fig.).

SYNTYPE LOCALITIES: Japan: Wakasa Province (Fukui Prefecture) and Misaki, Kanagawa Prefecture.

Description - Plants forming small, spherical tufts, 1 cm in diameter, whitish pink; branching divaricately dichotomous, some intergenicula not branching; branches composed of an alternation of calcified, cylindrical intergenicula, 80-120µm in diameter, and uncalcified genicula. The most typical character of this species is the presence of compressed, wedge- to hoof-shaped terminal intergenicula.

Ecology - Epiphytic on submerged seaweeds and on submerged ropes.

Distribution - Tropical and subtropical Indian and Pacific Ocean.

Fig. 147. *Jania ungulata*.

Hypnea charoides J.V. Lamouroux

1813: 132, pl. 10, figs 1-3

Fig. 148

REFERENCES: Abbott (1999: 119, fig. 25F, as *H. valentiae*), Littler & Littler (2000: 78, middle fig. p. 79, as *H. valentiae*), Yamagishi & Masuda (2000: 31, figs 10-15).

TYPE LOCALITY: "Novae Hollandiae".

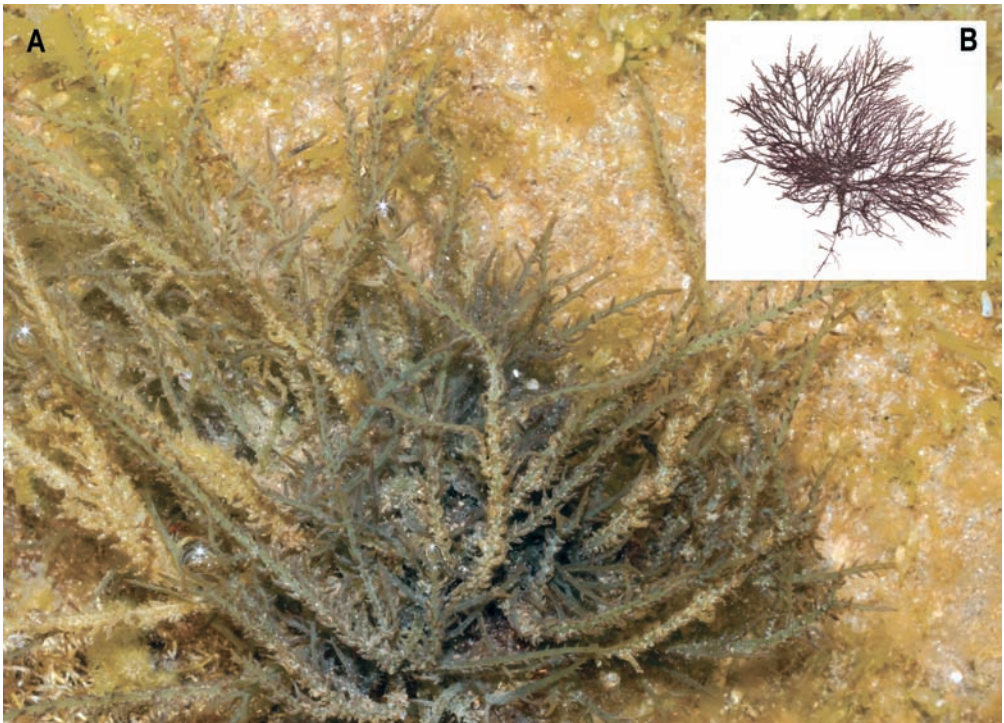
Description - Plants gregarious, growing as isolated tufts, 4-7 cm high, subcartilaginous, cylindrical all over, greenish- to brownish red; original discoid holdfast mostly unclear because of the presence of numerous, entangled, creeping branches forming secondary discoid holdfasts; erect branches with marked percurrent, straight axes being longer than any lateral branches which are also straight, upwardly directed and up to 3-4 orders; main axes and side branches of lower order very densely set with very short, acute, adventitious branchlets (1-2 mm long); these are unbranched or branched one time, upwardly directed, abruptly curved in the adaxial direction to become parallel to the bearing branch. No lenticular wall thickenings visible on transverse sections.

Ecology - Epilithic in mid- to low intertidal, shallow rock pools, continuously wave-swept.

Distribution - Tropical Indian and Pacific Ocean.

Notes - Durairatnam (1961: 56) includes this taxon in *H. valentiae*, but mentions that 'I have some specimens which agree with *H. charoides* ... but I have placed them under *H. valentiae*'. Yamagishi & Masuda (2000) studied the *H. charoides-valentiae* complex in Japan, concluding that *H. charoides* have tufted thalli with an entangled base, whereas this is not the case in *C. valentiae*. The absence of lenticular cell wall thickenings on transverse sections of medullary cells in the basal portion of the thallus distinguishes *H. charoides* from *H. boergesenii* that has a similar gross morphology.

Fig. 148. *Hypnea charoides*. A. Habit *in situ*; B. Herbarium specimen.



***Hypnea pannosa* J. Agardh**

1847: 14

Figs 10C; 20A; 32F; 149

REFERENCES: Tseng (1984: 100, pl. 53, fig. 1), Lewmanomont & Ogawa (1995: 125, + fig.), Cribb (1996: 95, middle fig. p. 94), Trono (1997: 238, fig. 150), Abbott (1999: 117, fig. 25A), Huisman (2000: 78, + fig.), Payri *et al.* (2000: 222, bottom fig. p. 223), Littler & Littler (2003: 76, top fig. p. 77), Oliveira *et al.* (2005: 90, + figs p. 91), Skelton & South (2007: 57, figs 100-102, 769, 770).

TYPE LOCALITY: San Agustín, Oaxaca, Mexico.

Description - Plants forming stiff-brittle prostrate clumps, 5-10 cm in diameter, 2-3 cm thick, composed of densely entangled and frequently anastomosing branches, greenish to purplish red, but mostly with a pronounced bluish iridescence; all axes subcylindrical to compressed, up to 1.5 mm wide at their basal part, gradually tapering to acute tips; branching irregular; presence of numerous short side branchlets, resulting in a spiny aspect. Anatomy parenchymatous, with prominent axial cells, 12-30 µm in diameter, surrounded by medullary cells, 40-70 µm in diameter and cortical cells, 15-25 µm in diameter; no lenticular cell wall thickenings. Tetrasporangial sori in mid to lower parts of fertile branchlets, initially on the abaxial side, later sometimes encircling the branchlet; tetrasporangia zonate, 10-20 µm in diameter, 25-40 µm long.

Ecology - Locally extremely abundant on horizontal beachrock, in the low intertidal, continuously wave-swept and attached in crevices; in the shallow subtidal, frequent between coral (*Acropora*) branches. Some specimens have been heavily grazed on.

Distribution - Indian Ocean and tropical Pacific Ocean.

Note - Molecular research indicates that different entities are comprised in *H. pannosa* s.l. In Sri Lanka two morphologically different entities can be easily distinguished: one with the typical acute apices (Figs 10C; 20A; 32F; 149) and one with rounded apices (Fig. 32G).

Fig. 149. *Hypnea pannosa*.

***Hypnea spinella* (C. Agardh) Kützing**

1847: 23

Fig. 150

REFERENCES: Magruder & Hunt (1979: 79, top fig. p. 78, as *H. cervicornis*), Tseng (1984: 98, pl. 52, fig. 2), Cribb (1996: 97, top fig. p. 96), Abbott (1999: 117, figs 25B-E, 113, fig. 24A, as *H. cervicornis*), Huisman (2000: 79, + figs), Payri *et al.* (2000: 224, bottom fig. p. 225), Littler & Littler (2003: 76, middle fig. p. 77), Huisman *et al.* (2007: 86, + fig., as *H. cervicornis*).

SYNTYPE LOCALITIES: Brazil, Mauritius, Mexico, West Indies.

Description - Plants growing just above low water level and being continuously wave-swept form rather stiff, red to yellowish green cushion-like clumps of intricately branched, up to 3 cm high from where a few erect branches are poking out; specimens from deeper intertidal pools and lagoons form laxly branched, supple, yellowish, entangled erect plants, up to 20 cm long. In both growth forms secondary attachment points are possible, all axes are cylindrical, branching (sub)dichotomous, without main axes, widely divaricate, the two divergent branches sometimes horizontally spread before bending upward or curling downward, resulting in the characteristic entangled plants; in the *spinella* ecomorph, the diameter at the basis is markedly larger than in the upper parts whereas in the *cervicornis* ecomorph the diameter is more homogeneous in a single plant, but can be rather different between populations, from 0.5 mm in slender specimens up to 1.5 mm in coarser ones; mostly presence of numerous short (1-2 mm) branchlets, perpendicularly placed, mostly simple, bifurcate or more rarely branched 2 to 3 times; branchlets more frequent in the basal parts of the plants.

Ecology - The *spinella* ecomorph close to low water level and continuously wave-swept; the *cervicornis* ecomorph in deeper intertidal pools and lagoons.

Distribution - Pantropical.

Notes - This species is edible, boiled in coconut milk, being eaten in several parts of the Pacific Ocean. Although Haroun & Prud'homme van Reine (1993) synonymized *H. cervicornis* J. Agardh with *H. spinella* because of the existence of numerous intermediates, some authors prefer to keep both entities separate (Abbott, 1999).

Fig. 150. *Hypnea spinella*. A. Habit *in situ*; B. Detail of some branches.



***Chondracanthus acicularis* (Roth) Fredericq**
in Hommersand *et al.* 1993: 117

Figs 33E; 151

REFERENCES: Abbott (1999: 131, figs 31A-D), Oliveira *et al.* (2005: 87, + fig. p. 86).

LECTOTYPE LOCALITY: Adriatic Sea.

Description - Plants growing in loosely intricated, prostrate tufts up to 10 cm in diameter, with typical rubbery texture; dark brownish red, but some collections with a very marked transversely striped creamy iridescence; attachment by a discoid holdfast from which several axes start; all branches decumbent, with secondary attachment points, cylindrical, 0.5-1 mm in diameter, with irregular branching in different planes, but side branchlets mostly perpendicular on the main branches and with acute apices; branches sometimes anastomosing. Medulla composed of delicate, often cobwebby anastomosing filaments; cortex formed by anticlinal rows of small, oval to spherical cells.

Ecology - Epilithic on horizontal substratum in the low intertidal; locally in quite large populations.

Distribution - Pantropical and temperate regions.

Note - Abbott (1999: 131) mentions that the report of this temperate species in the tropics is questionable. Skelton & South (2007: 56) state that *C. tenellus* (Harvey) Hommersand and *C. acicularis* appear to be at opposite ends of a fairly broad morphological spectrum. The branches of *C. tenellus* are markedly compressed, of a smaller diameter (0.35-0.5 mm) and present opposite laterals.

Fig. 151. *Chondracanthus acicularis*.***Peyssonnelia* sp.**

Figs 37G; 152

Most species of *Peyssonnelia* are prostrate or resupinate, composed of tightly adherent to loosely attached, horizontally spread (rarely erect) lobes, either with concentric zones or with radially arranged stripes on the upper surface, calcified on the lower surface between the rhizoids. Basal layer of the thallus (hypothallus) composed of radially aligned, contiguous filaments, producing uni- or multicellular rhizoids downwardly and upcurved, contiguous, branching filaments (the perithallus) becoming vertical towards the upper surface. In some species calcified cells (cystoliths) can be present in these filaments. Tetrasporangia in sori; sexual reproductive structures rare.

Worldwide, over 60 species have been reported but many of them have to be critically studied to determine the variability of characters. According to Silva *et al.* (1996: 209-214), only *P. rubra* (Greville) J. Agardh has been mentioned from Sri Lanka so far, but in our collections we definitely have several entities. Awaiting more detailed studies of the material we refrain from identifying the illustrated one to species level.

Fig. 152. *Peyssonnelia* sp.

