

Codium Stackhouse, 1797

BRYOPSIDALES, CODIACEAE

Thallus spongy, anchored to rocks or shells by a weft of rhizoids, varying in size from 1 cm. to 10m. long. Habit varying widely applanate, pulvinate, digitaliform, globular, petaloid, membraniform, or dichotomously branched; erect or repent; branches wholly terete or variously flattened, at times anastomosing. Internal structure composed of a colourless medulla of densely intertwined siphons and a green palisade-like layer of vesicles called utricles. Utricles arise primarily by enlargement of sympodial branches of medullary siphons, secondarily by budding or by production of additional utricle-forming medullary siphons from basal portion of existing utricles. Mature utricles cylindrical or clavate, the apical wall usually thickened and often ornamented in a pattern characteristic of particular species. Rhizoidal siphons, which become buried in the medulla, also produced from basal portion of utricles. Colourless hairs, each with a basal plug, produced by utricles shortly below their apices, caducous at the plug, which remains as a prominent scar. Gametangia produced laterally by utricles, each with a basal plug above a short pedicel; fusiform to ovoid.

There are 193 species names in the database at present, as well as 92 infraspecific names. Of the species names, 144 have been flagged as accepted

- M.D. Guiry in Guiry, M.D. & Guiry, G.M. 2021. *AlgaeBase*. World-wide electronic publication, National University of Ireland, Galway. <http://www.algaebase.org>; searched on 3 October 2021.

Species reported from Sri Lanka

Codium arabicum Kützing, 1856

Codium decorticans (Woodward) Howe, 1911

Codium fragile (Suringar) Hariot, 1889 [Dur 1961a: 23, pl. iv, fig. 3]

Codium geppiorum O. Schmidt, 1923 ('geppii') [Børg 1936; Dur 1961a: 23, pl. iv, fig. 4, pl. xx, fig. 2]

Codium ovale Zanardini, 1878 [Barton, 1903b:163]

Codium repens P. Crouan & H. Crouan, 1905 [Dur 1961a: 23-24, pl. iv, fig. 5]

Codium tomentosum Stackhouse, 1797 [GM 1887; Dur 1961a: 23, pl. iv, fig. 2, pl. xx, fig. 1]

- Silva et al, 1996

Codium arabicum Kützing

Codium geppiorum O.C. Schmidt

- Coppejans et al, 2009

Codium geppiorum O. Schmidt

Codium taylorii P. Silva

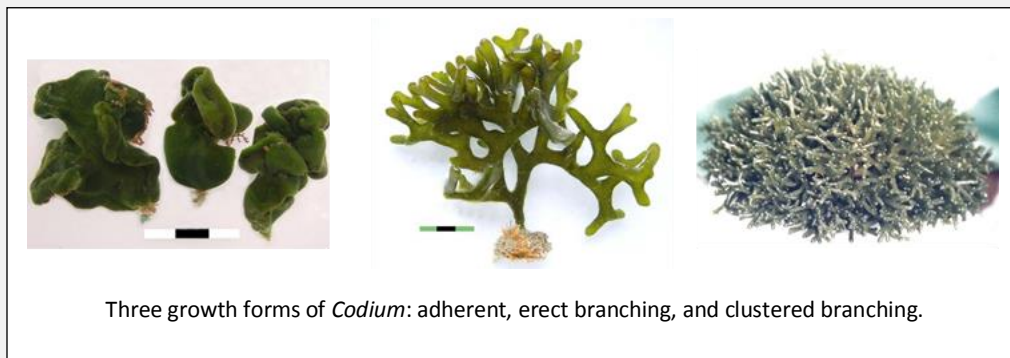
- Mallikarachchi, 2004

Codium sp.

- Mallikarachchi, 2013

Codium dwarkense Børgesen, 1947

- Fernando, 2022 - this publication



Three growth forms of *Codium*: adherent, erect branching, and clustered branching.

Description of species

Codium arabicum Kützinger, 1856

Synonyms: *Codium adhaerens* var. *arabicum* (Kützinger) P. Crouan & H. Crouan 1878
Codium coronatum Setchell 1926

Morphology Dark green, firm, tough, felt-like spongy masses. Epilithic, intertidal, of irregular shape, surface contorted with deep folds. Thalli 10 cm long and 4 cm high. Attached firmly by a wide area to substrate, penetrating irregularities in the rock. Upper surface lobed and pleated, the thallus rather flat. Also subtidal, attached to synthetic fibres of threads unravelling from boat moorings. Cushions c. 3 – 10 cm diam, discoid to irregular, with convoluted surfaces.

Anatomy Thallus tough, the utricles adherent to each other resisting teasing apart. Utricles are of various sizes: the smallest most numerous, sub-cylindrical, capitate (i.e., with swollen heads), 250 - 337.5 μm high, 42.5 - 50 μm diameter in the middle, apical dilatation 60 - 67.5 μm ; the medium sized ones 545 - 550 μm high, 125 - 137.5 μm at the apex tapering down to 50 - 55 μm at the base; giant utricles few in number, sac-shaped, 450 - 675 μm high, 150 - 250 μm at the apex tapering to 75 - 130 μm at the base.

Single hairs occur on some utricles only, protruding 200 - 250 μm above the surface, originating 1/3 of the utricle height from the apex, 17.5 μm thick, tapering at the extremity to a blunt apex.

Ecology Intertidal or subtidal, attached to rock or mooring hawsers. Either spreading over the rock and insinuating into crevices or forming medallions around unravelling synthetic cords of mooring hawsers. Exposed surfaces convoluted; the surfaces thrown into deep folds.

Discussion Coppejans et al (2009) describes "...clusters of utricles varying greatly in size..." with large primary utricles (sub-cylindrical to clavate) and secondary utricles (sub-cylindrical to capitate) arising as buds from the lower part of the primary utricles.

Material examined

HMF 226, 6.2.1993, Galle, Watering Point, Intertidal, epilithic, lower beach.

HMF 337, 12.2.2002, Tangalle, Rest house bay, driftweed.

HMF 487, 19.8.2006, Weligama, Kapparatota Anchorage, 1 m.

National Herbarium Classical Collection:

69, Harvey, in folder 'adhaerens', No data, *Codium adhaerens*, Ag.

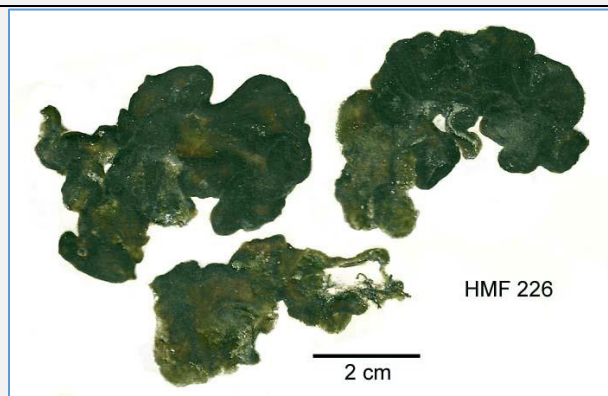
References

AlgaeBase (2021)

Coppejans et al, 2009: 102-103, fig.77.

Van den heede, C. & Coppejans, E., 1996: 391, figs. 1, 5, 7.

***Codium arabicum*, Kützting, 1856**

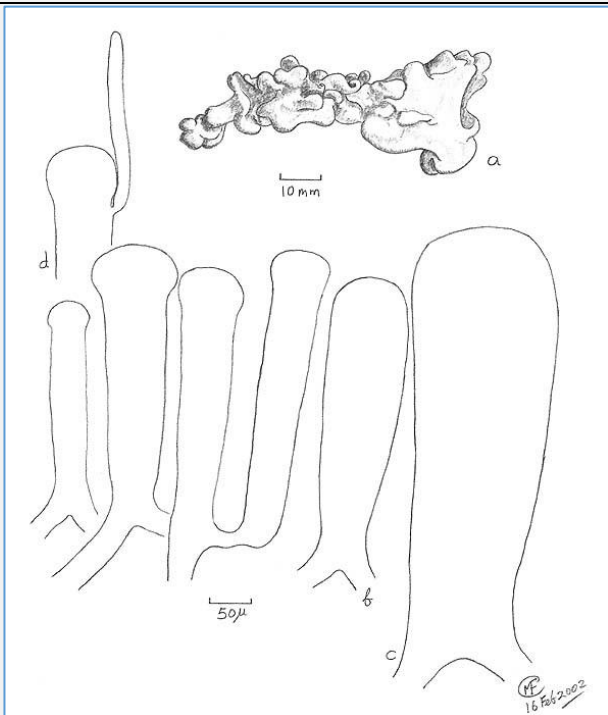


Left: Herbarium image, HMF 226 - Galle, Watering Point, intertidal rocky shore.



Right: Freshly collected specimens, ex situ, attached to threads of mooring hawsers.

Drawing, HMF 337, Tangalle, Rest House Bay.



a) Habit, thallus viewed from the side.

b) Group of small and medium sized utricles.

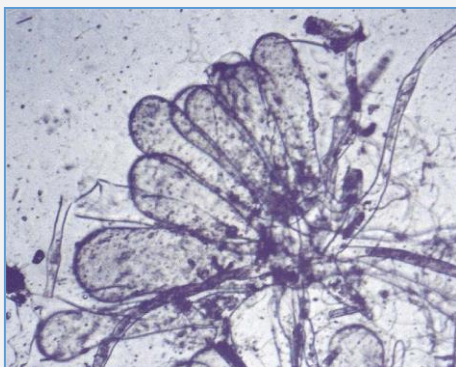
c) A large, primary utricle.

d) A utricle with a hair.

All utricles are drawn to the same scale.

Photomicrographs:

Utricles of *Codium arabicum* collected at Matara seen in squash preparations. Mostly the small sub-cylindrical forms, a few being capitate. A medium sized one seen bottom right with a cluster of small forms; a giant, primary utricle at upper right. All at the same magnification.



***Codium decorticatum* (Woodward) M. Howe, 1911**

Synonym: *Codium elongatum* (Turner) C. Agardh, 1823

Codium tomentosum var. *elongatum* (Turner) Ardissonne 1887

Morphology Thalli erect, forking, up to about 10 cm tall, olive-green underwater, dark green at the surface. Branching dichotomously a few times. Attached to substrate by a small disc, the basal portion 1.5-2 mm in diameter. Internodes terete (3-5 mm), widening before the dichotomy (8-10 mm wide) that is compressed. Terminal segments 3-4 mm diameter, apices blunt. Fringed with prominent green hairs (1-2 mm long) giving a velvety appearance to the thalli.

Anatomy Typical appearance of a *Codium* with a cortex of loosely packed utricles that vary in size from small to large. Utricles generally with flattish summits, narrow and tapering downwards (480-700 x 110-190 µm length x apex diam., narrower below), sub-cylindrical, or large and bulbous (obovate) (600-950 x 300-400 µm length x apex diam.), with intermediate sizes more triangular (see drawing). Some large utricles have secondary utricles from their summits. Surface utricles have two long hairs each, originating from the upper border, with mostly rounded apices. Medullary filaments 25-37.5 µm diam.

Ecology Small, solitary thalli attached to empty shells, pebbles, small rocks and dead coral fragments lying on sandy bottoms, 3 to 18 m deep.



Ex-situ image of *C. decorticatum* from Panadura HMF 137, 11.3.1999. The attachment disc is buried in the aquarium sand. Note the fringe of hairs.

Discussion First collected by us in 1996 off-shore from a site just south of Colombo and a few years later from further south off Panadura. These were determined as *C. elongatum* by comparison with the image of Srinivasan, 1969. On 29.9.99 these were found to resemble CA26 & No. 68 (Harvey), both determined as *Codium tomentosum* in the National Herbarium Classical Collection. There is another un-numbered specimen that also resembles these specimens. However, some other collections labelled *C. tomentosum* look more like *C. geppiorum*. (The Classical Collection contains only specimens determined as ‘*adhaerens*’ and as ‘*tomentosum*’).

A taxonomic note in Silva et al, 1996 states: “*C. decorticatum* is thought to be restricted to the warm waters of the Atlantic and Mediterranean and that many Indian records “undoubtedly will prove to apply to *C. indicum* S. Dixit (1940a 88-90, fig. 2). A probable taxonomic synonym of *indicum* is *C. iyengarii* Børgesen, 1947”

MolluscaBase (2022) accepts *Codium decorticatum* (Woodward) M. Howe with a distribution ranging from the Mediterranean, through the Atlantic, Caribbean and Indian Oceans to the Pacific Ocean. It accepts *C. indicum* as a distinct species with *iyengarii* as a synonym. A number of herbarium images are available on the internet of plants determined as *elongatum* and *indicum/iyengarii*. A final opinion on the correct identity of the Sri Lankan plants illustrated in this article will depend on the critical comparison of the utricles. Morphologically the Sri Lanka plants agree with the description of *C. elongatum* in **Seaweeds of the Central west coast of India**. Eight images from various herbaria show plants identified as *indicum/iyengarii* on the website of the **Macroalgal Herbarium Consortium** — they vary in form from few to many branches and laxly branching to clustering of branches.

Material examined

MBIOD 029, 7.4.1996, Dehiwela, Waidya Road reef lagoon, 3 m.

HMF 137, 11.3.1999, Panadura, Rudigala, 18 m.

HMF 412, 19.7.2003, Batticaloa, Kalkudah, Punnaikudah Bay, beached.

National Herbarium Classical Collection, 22.9.1999. In folder ‘*tomentosum*’:

CA 26, No data, *Codium tomentosum*, Ag. {resembles HMF *Codium* cf. *elongatum*}

68, Harvey, No data, *Codium tomentosum*, Ag. {Like a giant cf. *elongatum* - wide segments.}

26, No data, *Codium tomentosum*, Ag. ? [S. O. Gray] {2 specimens, one like a *C. cf. elongatum*, the other like a young *geppii*.}

References

Srinivasan, 1969: 43, Pl. XLIII (as *C. elongatum*)

Guiry M.D. in Guiry, M.D. & Guiry, G.M. January 18, 2021. *AlgaeBase*. World-wide electronic publication, National University of Ireland, Galway. <https://www.algaebase.org>; searched on April 29, 2022.

Macroalgal Herbarium Consortium. (Internet)

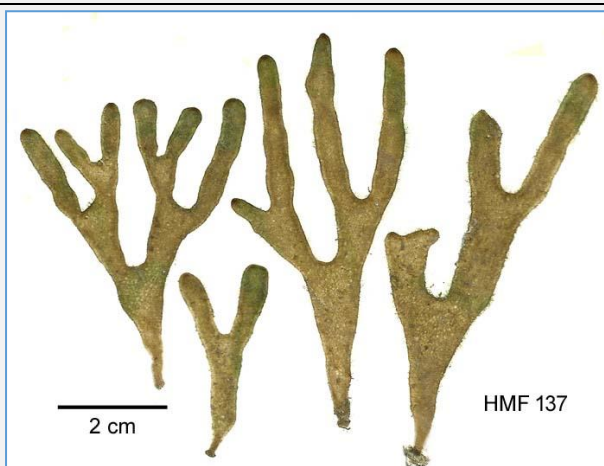
Seaweeds of the Central west coast of India. (Internet)

Codium decorticatum HMF 412

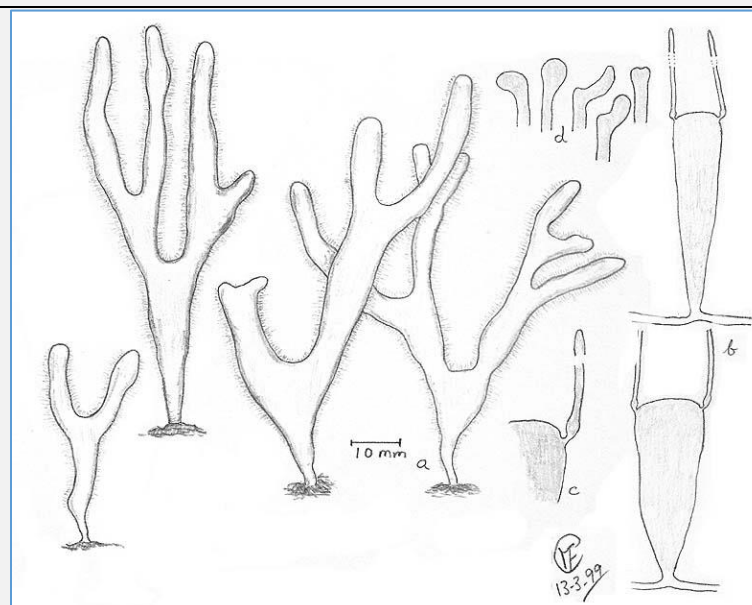
Ex-situ image of a plant washed ashore at Batticaloa, attached to a free-living solitary coral *Heteropsammia* sp.



***Codium decorticatum* (Woodward) M. Howe, 1911**

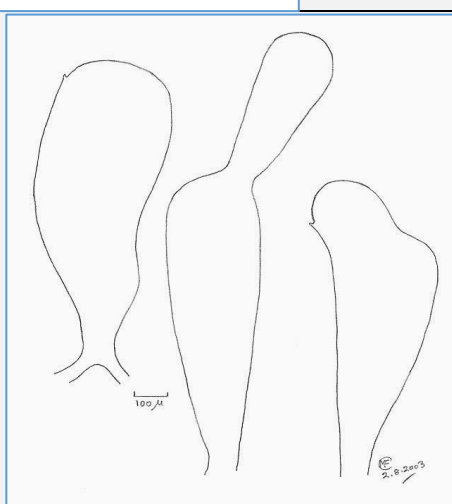
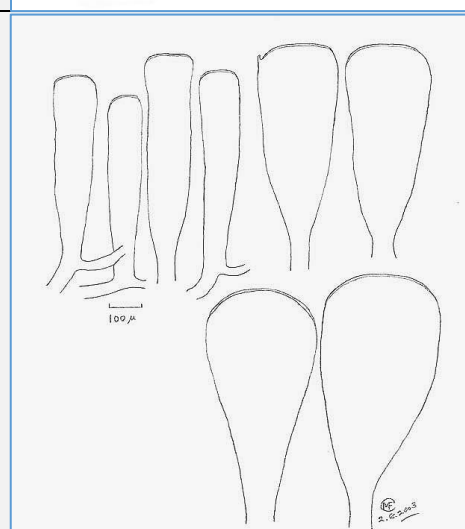


Herbarium scans: MBIOD 29, Dehiwela, off Waidya Road, lagoon, 3 m; HMF 137, Panadura, Rudigala, 18 m.



Drawing of HMF 137, Panadura, 18 m

- a) Habit - four plants.
- b) Two different utricular shapes, each with two hairs that are four times the height of the parent utricle.
- c) Hair origin at greater magnification: constricted origin followed by a bulb, tapering, rounded apex, the usual form.
- d) Other hair apex forms seen.

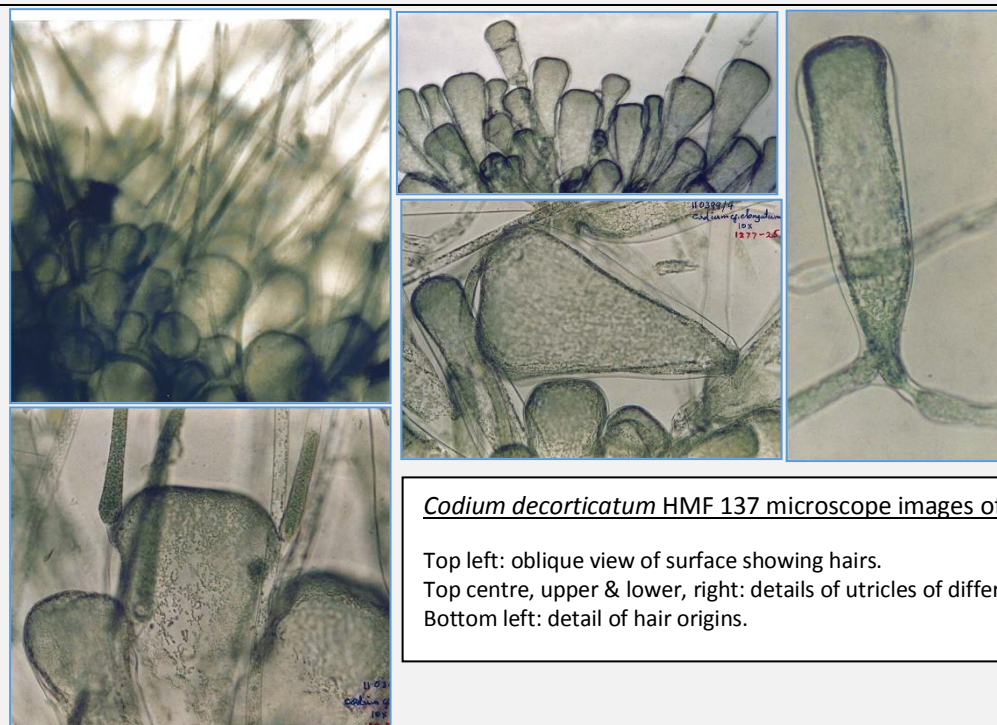


Codium decorticatum
HMF 412, utricles,
Punnaikuda, Batticaloa

Clavate with flattish apices;
obovate with rounded
apices.

Some with secondary apical
utricles.

Some show hair scars.



Codium decorticatum HMF 137 microscope images of utricles

Top left: oblique view of surface showing hairs.

Top centre, upper & lower, right: details of utricles of different sizes and shapes.

Bottom left: detail of hair origins.



***Codium geppiorum* O. C. Schmidt, 1923 (?)**

***Codium repens* P.Crouan & H.Crouan 1905 (?)**

Morphology Thalli forming clumps (12x8 - 13x9 - 25x25 - 50x35 cm) of intricate, dichotomously branching terete fronds 1-2-3 mm wide. Dark green, spongy, with surface like felt. The deepest layer repent (= 'creeping along the substrate'), where it is attached here and there to stones and other objects, upper fronds anastomosing where they cross, the surface fronds free, sub-erect and decumbent at the surface. Branching irregular, at 30°-45°, the interval between branches ranging from 3-4 mm to 15 mm, mostly 7-8 mm. Apices tapering, blunt.

Portion of a thallus from Weligama, HMF 387.

Clustered, anastomosing branches below, free sub-erect branches above.



Anatomy Utricles (500-550(-800) μm high) capitate, many with gametangia arising from a point about 1/3 the height of the utricle below the summit. The summits regularly rounded (110-200 μm wide) above a constriction, the body of the utricle sub-cylindrical (90-120-200 μm wide), tapering at the base to a narrow pedicel. Gametangia ovate in shape (200-250 x 80-90 μm), with either a rounded or tapering base, attached by a short stalk.

Ecology Of the four collections, three were either driftweed or beached specimens, the other one was attached to a mooring hawser. Coppejans et al, 2009, referring to *C. geppiorum*, say "...mostly in sand-covered sheltered habitats such as lagoons, from a few cm under low water down to 1 m depth ...".

Discussion These collections were determined as *C. geppiorum*, but a reassessment suggests that they might be *C. repens* which has been reported from Sri Lanka by Durairatnam, 1961.

A note in Coppejans et al, 2009 points out that the Sri Lanka species have been shown to be more aligned to *C. isthmocladium* than to *geppiorum*, which consists of "at least five cryptic species" - Verbruggen et al, 2007. The image of *isthmocladium* in AlgaeBase (Barbados; pl. XXVII in Vickers & Shaw (1908)) is of a quite different plant, with differently shaped utricles. Coppejans et al, 2009 describe the utricles as "clavate, elongate pyriform or (sub)cylindrical". Durairatnam, 1961 describes them as "obovateclavate or elongated fusiform". Børgesen, 1936 figures two utricles from a plant under the name *Codium* Geppei Schmidt collected at Point Pedro, in Jaffna. They are quite different to the utricles of my plant in not having the "head" seen so clearly in the plants I have examined, except one from Tangalle (see figures). The figure in Teo & Wee, 1983 shows utricles that are pyriform or obovate. Three of my collections have capitate utricles, in one they are pyriform.

Van den heede & Coppejans, 1996 describe both *C. geppiorum* and *C. repens*. Both have a repent (creeping) habit. *C. geppiorum* is described (in the identification key) as having "elongate obpyriform utricles" & "fusiform gametangia" while *C. repens* has "inflated obpyriform utricles" & "ovate gametangia". *C. repens* is described as having capitate utricles, in addition to other forms, as well as gametangia "single, ovate, elliptical or short fusiform". My specimens fit this description better than it fits that of *C. geppiorum* especially as regards the capitate utricles.

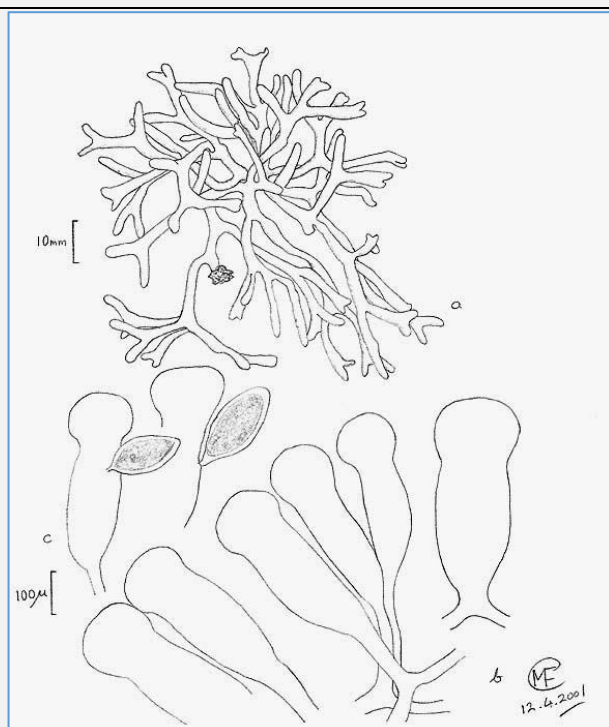
Material examined

- HMF 227, 22.10.1989, Mount Lavinia, Hotel bay, cast ashore.
- HMF 228, 13.1.1991, Tangalle, Rest house bay, driftweed.
- HMF 316, 8.4.2001, Beruwela, Barberyn reef, cast ashore.
- HMF 387, 14.8.2002, Weligama, Kapparatota anchorage, <1 m attached to mooring hawser.

References

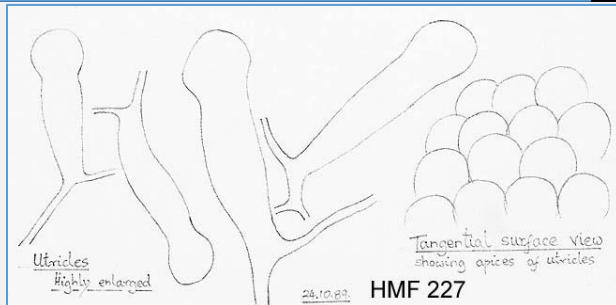
- Børgesen, 1936: 68-69, fig 8.
- Coppejans et al: 102-103, fig. 78.
- Teo & Wee, 1983: 51, fig. 50 a-c.

***Codium geppiorum* O. C. Schmidt, 1923 (?) *Codium repens* Crouan & Crouan, 1905 (?)**



Codium geppiorum / *repens* HMF 316, Beruwela

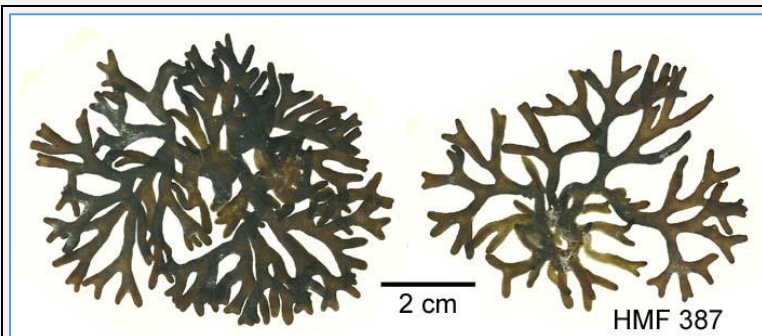
- a) Habit: portion of the thallus viewed from above, in natural position. One small stone is seen adherent to a frond.
- b) Detail of a group of utricles, of varying sizes. The utricles are all capitate—with swollen apices above a constriction.
- c) Detail of two utricles with gametangia - ovate rather than fusiform.



HMF 227 from Mount Lavinia: Capitate utricles.



HMF 228 from Tangalle: Clavate or pyriform utricles.



Herbarium image *Codium geppiorum* / *repens* HMF 387, Weligama, Kapparatota anchorage.

Microscope images Thallus washed ashore at Matara, Polhena.

Capitate utricles, many with gametangia arising from a point about 1/3 the height of the utricle below the summit. In another specimen they were attached at mid-utricle or below. The summits regularly rounded, the body of the utricle sub-cylindrical, tapering at the base to a narrow pedicel. No

hairs, or hair scars, were seen in my specimens, although shown in Børgesen, 1936 and Durairatnam, 1961.



Codium taylorii P.C. Silva, 1960

Morphology Dark green, velvety, erect thalli (c. 10 cm high), attached by a narrow base to stones in shallow water, or to mooring hawsers of anchored boats. Sessile, or a short basal pedicel branching dichotomously or irregularly above. Branches divaricate, clustered, compressed, wide and triangular with narrow terminal segments, apices blunt. Inter-dichotomies sometimes very short or non-existent. Thalli with shaggy fringes of hairs.

Anatomy Utricles slender (1000-1200 x 150-280 μm), sub-cylindrical with somewhat flattened or flat summits, the bases tapering gently. Prominent clusters of needle shaped crystals aggregated into feather-like (100-112.5 μm long) or starburst clusters present in the upper parts of the utricles. Hairs (1.5-3 mm x 20-50 μm) pigmented, branched, irregularly swollen and constricted, borne singly on some of the surface utricles. Gametangia narrowly fusiform with blunt apices and slightly wide bases attached by a narrow neck to the upper parts of utricles.

Ecology Solitary thalli, at Kapparatota, Weligama, on mooring hawsers of fishing boats and epilithic on small stones close to shore down to 1 m deep. Mallikarachchi, 2004 has collected the species from Talpe growing epilithically on subtidal coral rubble down to 1.5 m deep.

Discussion First described from Sri Lanka by Mallikarachchi, 2004 from Talpe. A distinctive plant, not likely to be mistaken for any other species in Sri Lankan waters.

Material examined

HMF 388, 14.8.2002, Weligama, Kapparatota Anchorage, <1 m, on mooring hawser.

HMF 488, 19.8.2006, Weligama, Kapparatota Anchorage, 1 m or less, epilithic on small stones, near beach.

References

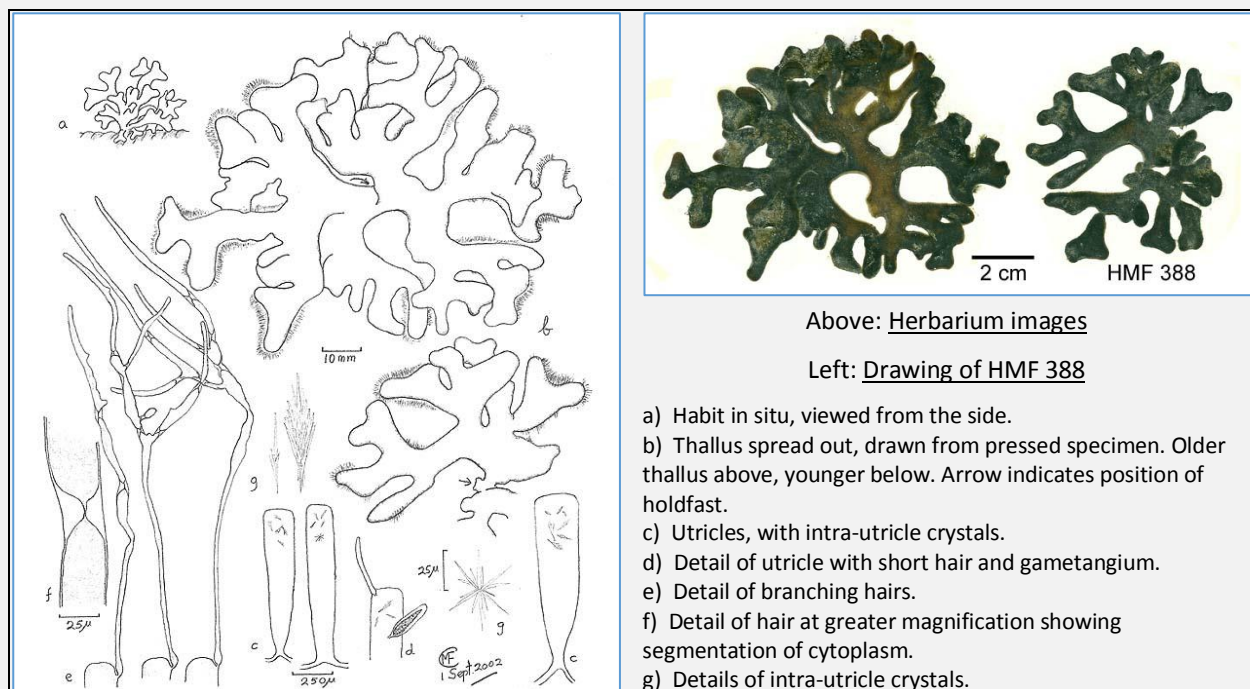
Mallikarachchi, 2004: 55, photo 37.

Van den heede & Coppejans, 1996: 410.

***Codium taylorii* P.C.Silva 1960**



Codium taylorii HMF 388, ex-situ images.



***Codium tomentosum* Stackhouse, 1797**

"*C. tomentosum*, as circumscribed by P. Silva (1955: 5569-576) is restricted to Atlantic Europe and North Africa. In general, however, the name has been applied to any terete, dichotomously branched form. The foregoing records will eventually prove to be applicable to such species as *C. bartletti* Tseng & Gilbert, *C. dwarkense* Børgesen and *C. geppiorum* O. Schmidt." - Silva et al, 1996.

Three collections of terete, dichotomously branching *Codium* are described below under the names *Codium 'tomentosum' 1*, *Codium 'tomentosum' 2*, and *Codium 'tomentosum' 3*, collected from three different localities: Kalpitiya Bar Reef, Pasikudah in Batticaloa, and Nilaveli near Trincomalee. They are macroscopically different, with differences in the utricles as well.

National Herbarium Classical Collection, folder 'tomentosum', 22.9.1999:

CA 26, No data, *Codium tomentosum*, Ag. {resembles HMF *Codium* cf. *elongatum*}
 CA 25, No data, *Codium tomentosum*, Ag. {resembles *geppeii*}
 Unnumbered, W. Ferguson, Oct. 1886, Galle, *Codium*. {resembles *geppeii*}
 68, Harvey, No data, *Codium tomentosum*, Ag. {Like a giant cf. *elongatum* - wide segments.}
 26, No data, *Codium tomentosum*, Ag. ? [S. O. Gray] {2 specimens, one like a *C. cf. elongatum*, the other like a young *geppeii*.}

25, June '69, Manaar, illegible, *Codium tomentosum* (S. O. Gray) {Erect, branching, bushy. Narrow segments, progressively narrower (2 - 3 mm to 1 mm). This plant different from others}

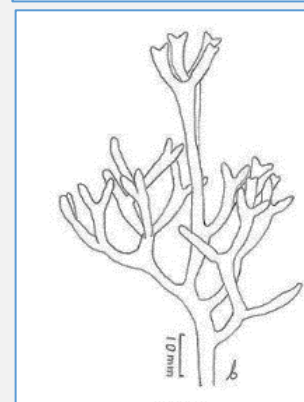
Note: The National Herbarium Classical Collection contains folders only for 'tomentosum' and 'adhaerens' under the genus *Codium*.

Codium 'tomentosum' 1

Morphology Erect, dichotomously branching thalli forming pedicellate, hemispherical clumps attached by discs to stones and empty shells on a sand bottom, 10.5 m deep. Light green underwater, dark green when pressed. Multiple erect axes arise from the attachment disc, branching thereafter in all directions.

Thallus 11 cm high, three erect axes (2-3 mm wide) from the disc that start branching 1.5 - 2 cm above attachment. Up to 9 orders of branches (main branches 3-5 mm, upper branches 2.5-3 mm, apical segments 1.5-2 mm wide, tapering to blunt points), the forks mostly dichotomous peripherally. Branches off the main axes appear secund, probably as a result of unequal development of dichotomous branches. Branches narrow at forks, widening to next fork. Forks c. 60°.

Anatomy Utricles pyriform with wide, flattish summits (550-600 μm x 200-250 μm), tapering down to axial filaments 30-40 μm wide. Long hairs (1500x18.75-25 μm) arise from the upper parts of the utricle, usually two per utricle, their bases constricted, the apices tapering to blunt points.



Ecology Kalpitiya Bar Reef (N 8° 22.935' E 79° 43.711'), 10.5 m deep, attached to small stones and empty shells on a sand bottom, away from the reef area.

Discussion This plant has not been determined. It is not *C. dwarkense*, which species has capitate utricle. It is unlikely to be *C. indicum* by comparison with internet images: this plant has segments that get narrower towards the periphery, unlike the former that have segments of equal width throughout with obtuse apices. Descriptions of the utricle have not been seen.

Material examined

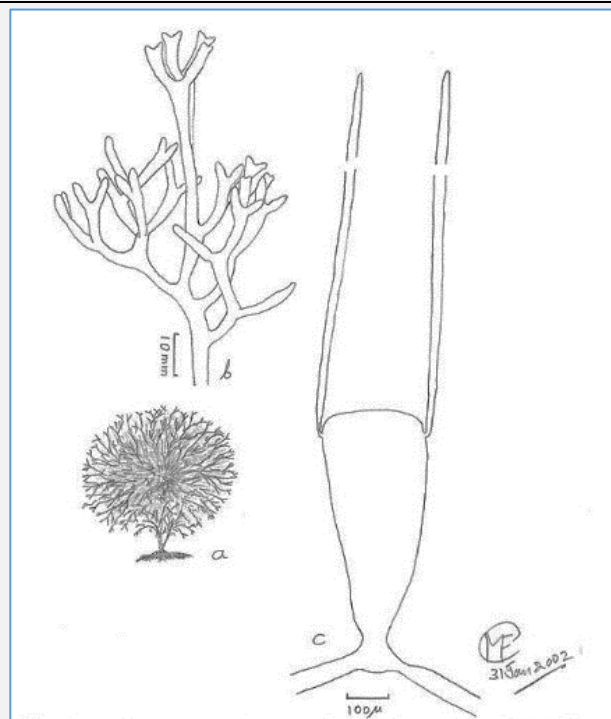
HMF 371, 16.1.2002, Kalpitiya, Bar reef, 10.5 m, sandstone reef, epilithic on stones and empty shells on sand bottom.

References

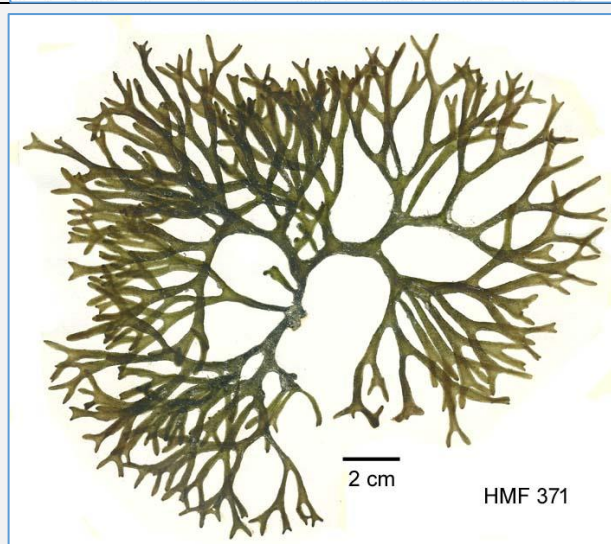
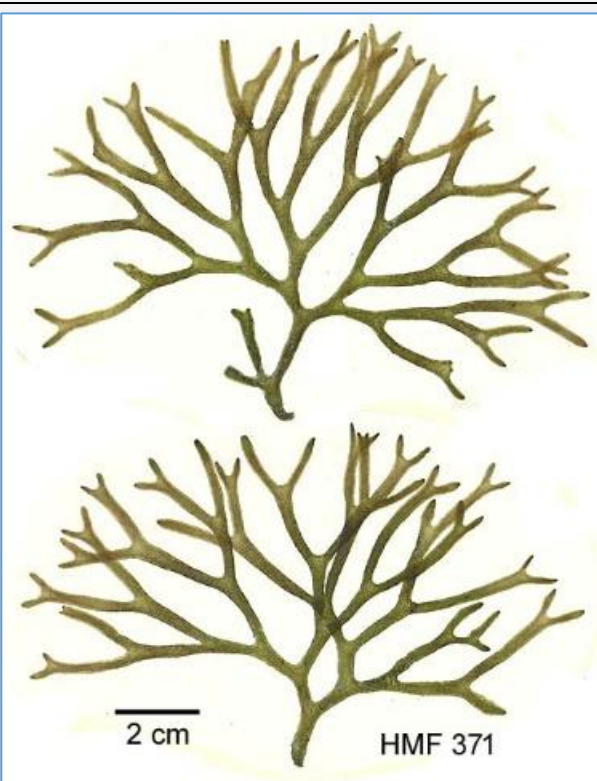
- Van den heede & Coppejans, 1996: 390, 397, figs. 4, 6, 14. (*C. dwarkense*)
 Images of *C. indicum* (*C. iyengarii*), *C. dwarkense*, *C. elongatum* available at internet sites:
 Macroalgal Herbarium Consortium, available at -
<https://macroalgae.org/portal/taxa/index.php?taxon=26804>
https://storage.idigbio.org/mich/macroalgae/00726/MICH_726012.jpg etc.

Codium 'tomentosum' 1

HMF 371, Kalpitiya Bar Reef



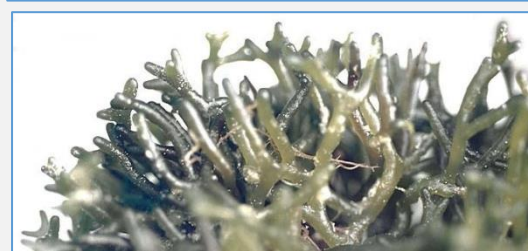
- a) Habit: a thallus viewed from the side, as seen underwater.
 b) Portion of a branch.
 c) A single utricle, with hairs.

Herbarium images*Codium 'tomentosum' 1*

Codium 'tomentosum' 2
***Codium dwarkense* Børgesen, 1947**

Morphology Thalli erect, branching dichotomously, anastomosing with neighbouring thalli to form clumps. Larger congregations forming sub-hemispherical cushions (to 15 x 10 cm) (photo right). Branches loosely intertwining and attached to each other; basal branches attached here and there to the substrate.

Branches terete (2-3-4 mm wide), irregular dichotomous branching, interdichotomies 9-18 mm, slightly wider at the forks where it is compressed. Apices blunt with no taper. Solitary thalli up to 10 cm high, with nine (9) orders of branches. Other clumps more elongated and loosely constructed with segments of irregular thickness (3-4 mm) and branching at shorter intervals.



Ex-situ image of an entire cushion (upper),
detail of peripheral branches (below)

Anatomy Utricles of various sizes and shapes, mostly capitate (430-)450-500 μ m high x (170-)180-200 μ m at the apex, (30-)40-50 μ m basally; occasional sub-cylindrical and clavate 450-460 μ m x 160-170 (-190) μ m at the apex, 40-50-60(-70) μ m basally. Large numbers of swollen obclavate utricles (450-)500-550 μ m x (210-)250-290(-320) μ m at the apex, 40-50-60 μ m basally. Axial filaments 20-25 μ m wide. Summits rounded in the sub-cylindrical and capitate utricles, truncate in the large, swollen ones. Hair scars frequent, usually only one per utricle, situated 25-40 μ m below the summit in the large utricles and 50-75 μ m below in the capitate ones.

Ecology Epilithic on sand bottom, 1 m deep, erect, dichotomous branching, forming cushions.

Discussion These plants agree with the description of *C. dwarkense* Børgesen in Van den heede & Coppejans, 1996. This would be a new species record for Sri Lanka.

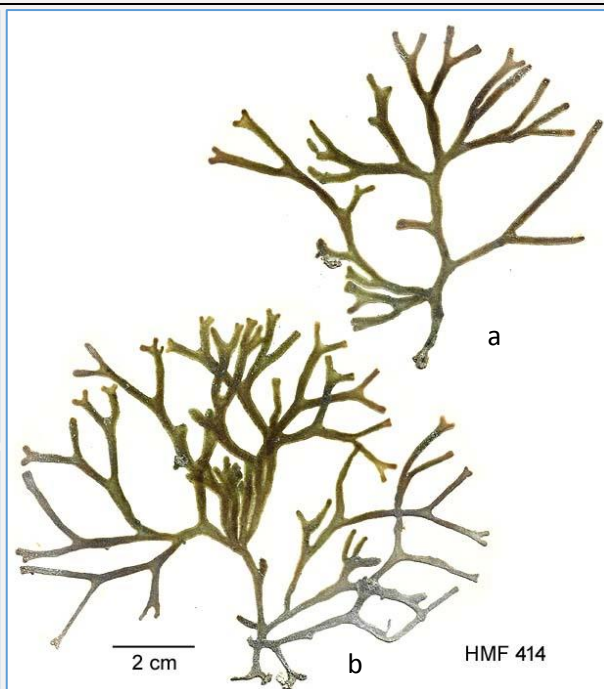
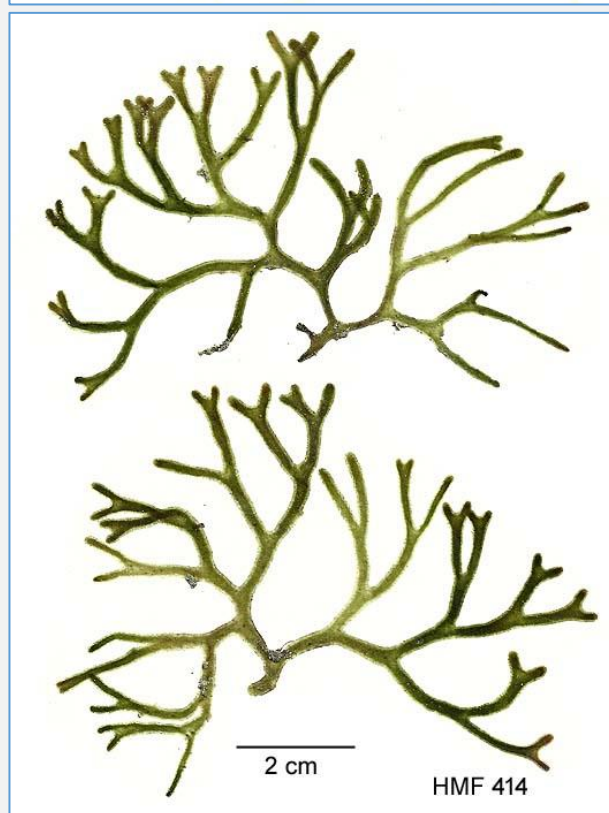
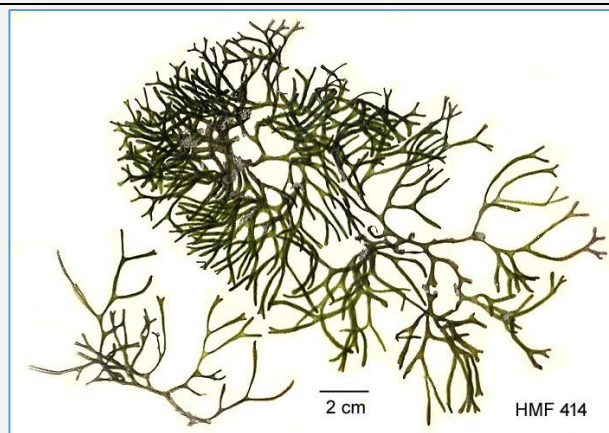
Material examined

HMF 414, 20.7.2003, Batticaloa, Pasikudah bay, 1 m.

References

Van den heede & Coppejans, 1996: 390, 397, figs. 4, 6, 14.

Codium 'tomentosum' 2 - Codium dwarkense Børgesen



Herbarium images of *C. tomentosum* 2
Batticaloa, Passikuda Bay, 20.7.2003
Codium dwarkense Børgesen

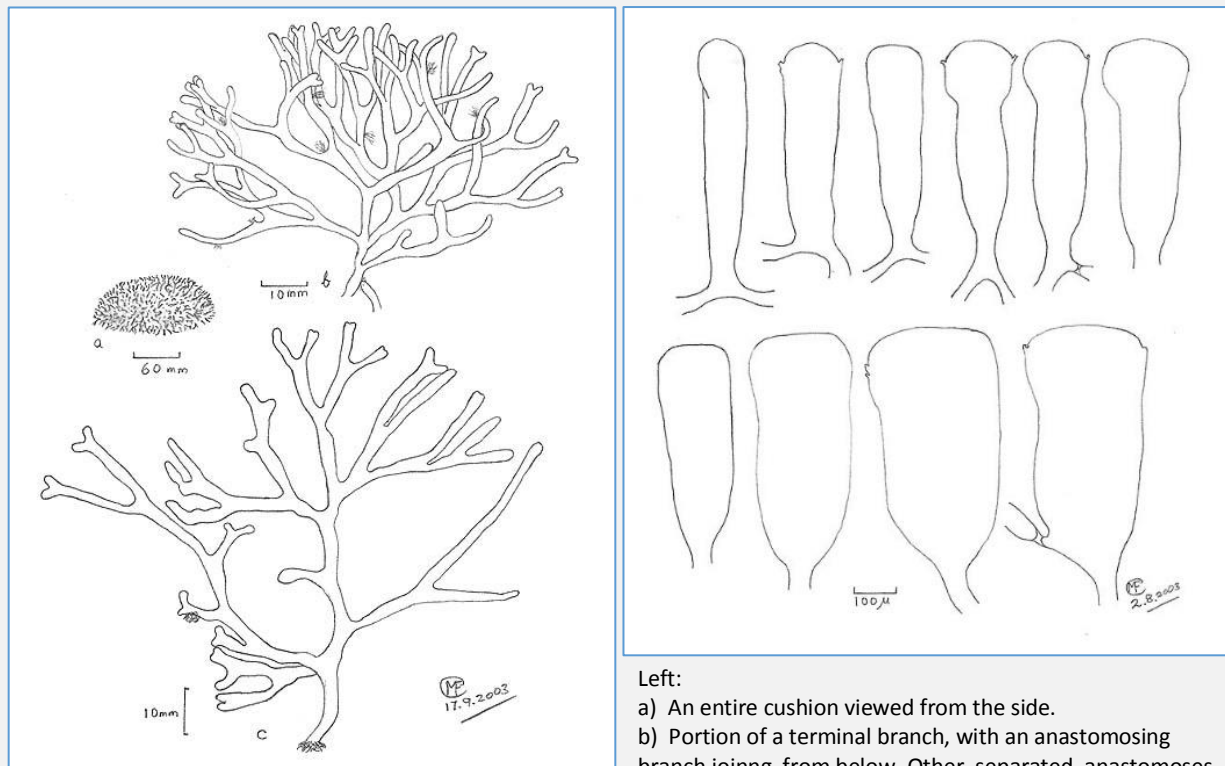
Upper left: Portion of a sub-hemispherical cushion 15 cm diameter, 10 cm high.

Left: Two peripheral branch systems.

Upper right: (a) A single solitary thallus.

(b) Two neighbouring solitary thalli anastomosing with each other.

Drawings of HMF 414 - *Codium dwarkense* Børgesen



Left:

- a) An entire cushion viewed from the side.
b) Portion of a terminal branch, with an anastomosing branch joining from below. Other, separated, anastomoses

indicated by filament leashes with adherent silt.

- c) An entire solitary thallus with its basal attachment below, and a single (separated) lateral attachment at left.

Right: The variety of utricles - sub-cylindrical, clavate, capitate and obclavate. Some with hair scars.



***Codium 'tomentosum'* 3**

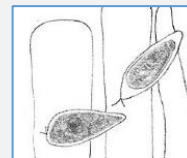
Morphology Erect, epilithic, dichotomously branching thalli (8-20 cm high), arising from attachment by a single basal segment (5 mm wide). Interdichotomies short or long leading to compact bushy plants or more lax ones. Interdichotomies somewhat compressed (5-7 mm wide), widening to the forks (10 mm wide) that are more compressed. Terminal segments terete with obtuse apices. Branching in one plane, more frequently peripherally. Hairs plentiful.

Anatomy Utricles sub-cylindrical, clavate (the majority), and obpyriform (very few), smaller sub-terminally,



larger proximally, bearing gametangia, the summits truncate or rounded. Mature utricles: sub-cylindrical, truncate summits (750-800-900 x 140-180 μm); clavate, rounded/sub-truncate summits (750-800-950 x 200-350-400 μm); obpyriform / rounded summits (950-1200 x 430-480-550 μm).

Hairs frequent, 1300 x 22.5-25 μm , apices tapering, rounded. Axial filaments 27.5-35 μm thick. Gametangia sessile, fusiform with a wider base (245-262.5 x 75-80 μm), attached approx. 1/3 of the way below the apex.



Ecology Epilithic collections at a depth of 3 m on rocks close to the shore. Gregarious thalli on horizontal surfaces as well as attached in clefts on vertical rock faces. Many dislodged and washed ashore.

Discussion These plants have not been determined. There is some resemblance to internet images of *Codium indicum* Dixit (= *C. iyengarii*) but no descriptions have been found.

Material examined

HMF 515, 13.9.2005, Trincomalee, Uppuveli, French Garden Home Reef.

References

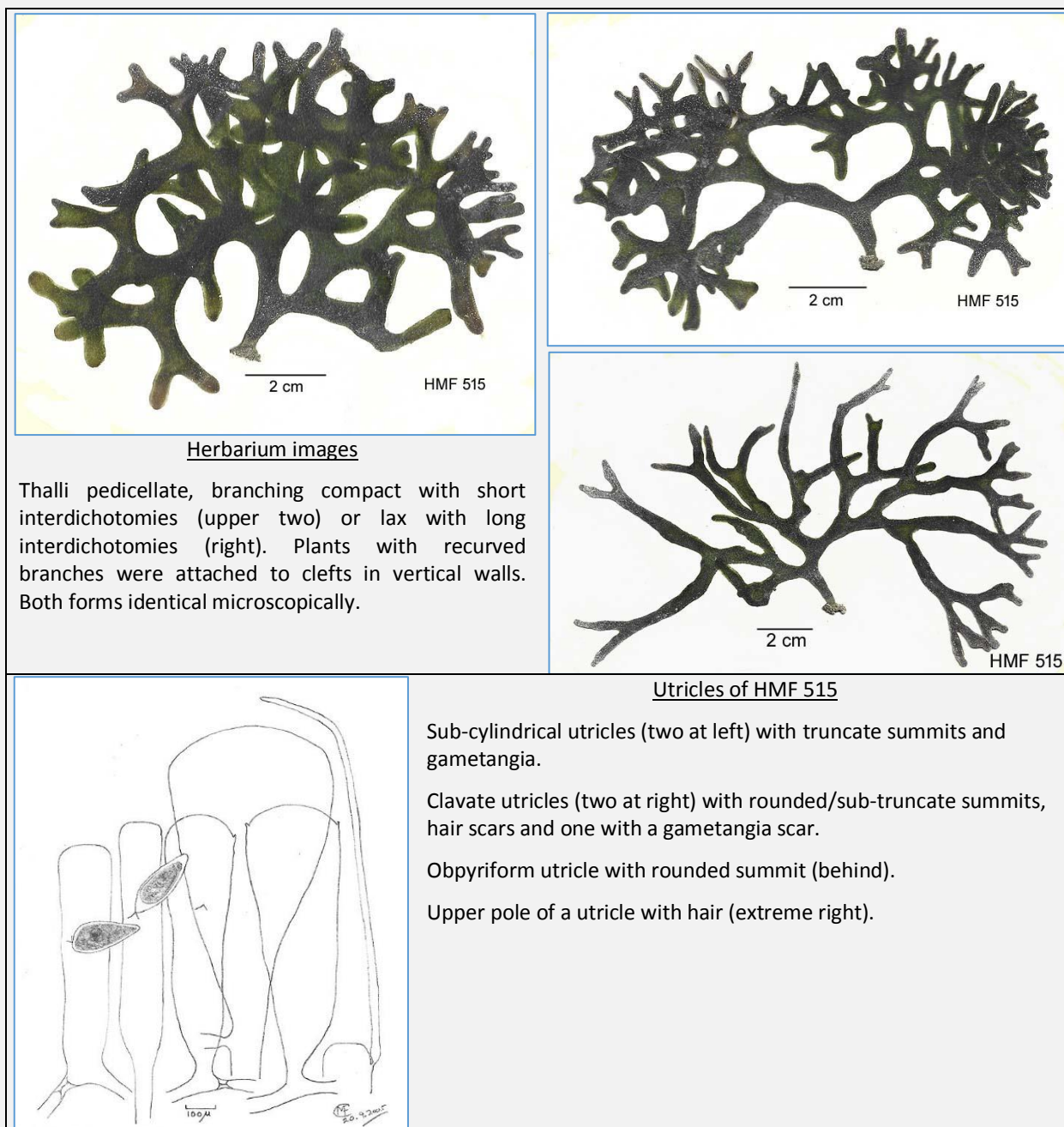
Herbarium of the University of Michigan.
Macroalgal Herbarium Consortium.

Codium 'tomentosum' 3



Ex-situ images of HMF 515, Uppuveli

(l) – Thallus growing on a horizontal surface. (r) – Thallus attached to a cleft on a vertical wall.



Herbarium images

Thalli pedicellate, branching compact with short interdichotomies (upper two) or lax with long interdichotomies (right). Plants with recurved branches were attached to clefts in vertical walls. Both forms identical microscopically.

Utricles of HMF 515

Sub-cylindrical utricles (two at left) with truncate summits and gametangia.

Clavate utricles (two at right) with rounded/sub-truncate summits, hair scars and one with a gametangia scar.

Obpyriform utricle with rounded summit (behind).

Upper pole of a utricle with hair (extreme right).



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