Dictyosphaeria Decaisne, 1842

CLADOPHORALES, SIPHONOCLADACEAE

Thallus composed of pseudoparenchymatous cushion of polygonal cells; monostromatic or polystromatic; solid or button shaped, 1-5 cm, or hollow and spherical or cup shaped, 1 to many cm. Cells 300-500 µm diameter. Growth diffuse. Well-developed rhizoidal system absent; basal cells in contact with the substratum provide attachment. Structural reinforcement of cell cushion by many uniform rows of minute determinate, simple or furcate, tenacular cells formed between appressed surfaces of all cells. Tenacular cells occasionally functioning as adventitious rhizoids. Cell division exclusively by segregative cell division, sensu stricto. Cells multinucleate; chloroplasts numerous per cell and discoid, with single pyrenoid surrounded by starch sheath and divided into two to multiple portions by traversing thylakoids.

Dictyosphaeria widely distributed throughout the tropics in shallow intertidal habitats, often in coral rubble areas.

D. cavernosa and *D. versluysii* best known species.

- 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 17 August 2021.

Species reported from Sri Lanka

Dictyosphaeria cavernosa (Forsskål) Børgesen 1932 [Dur 1961: 29]
- Silva et al, 1996
- Mallikarachchi, 2004: 143, Photo 14; Coppejans et al, 2009: 96, Fig. 71

Dictyosphaeria versluysii Weber-van Bosse, 1905
- Coppejans et al, 2009: 96, Fig. 72; Mallikarachchi, 2004: 143, Photo 15; Mallikarachchi, 2013: 36, Fig. 2F.

Description of species

Dictyosphaeria cavernosa (Forsskål) Børgesen 1932

Morphology Bright grey-green or light green, shiny, firm, lobulated nodules attached to rocky substrates by short rhizoid-like processes from the underside. Thalli forming irregular, gregarious clumps that are solid or hollow. The hollow ones are one-cell thick, the larger ones rupture forming cup-shapes. Young nodules are solid and become hollow with age as they enlarge (Sartoni, 1992). Cells visible to the naked eye, 1-1.5-2 mm, the upper surface of older thalli fissured and irregular with 0.5 cm rounded nodules and 1 - 1.5 cm ruptured, one-cell thick sacs. With a hand lens the cells seen to be domed.

Anatomy The thallus consists of cells clustered together forming solid nodules when young, becoming hollow when older and eventually rupturing forming craters on the surface. The cells 0.5 - 1.0 mm diameter at the surface, becoming larger to 2 mm below. Attachment to the substrate is by means of down growths from the lowermost cell layer, 0.4 - 0.7 mm thick, 1 -2 mm long, unbranched, tapering at

the very end to a rounded tip. The outermost layer of cells are pigmented, including the attaching processes, the inner cells colourless. The cells are firmly attached to their neighbours by means of tenacula (haptera) that line the cell walls, placed alternately, originating from each cell.

Ecology Beruwela, Barberyn reef; epilithic on the walls of intertidal pools facing east on the reef flat, drying out at low tide but wave wetted or submerged in pools. Associated with *Valonia utricularis* and *Boergesenia forbesii.*

Discussion

Material examined

HMF 160, 240799, Beruwela, Barberyn reef, Intertidal, exposed locations of reef flat, Bright, grey-green, shiny, firm, solid, lobulated nodules attached to rocky substrate by short rhizoids.

HMF 509, 280805, Beruwela, Barberyn Reef, Large, irregular clumps. Gregarious. Lobed, nodular, the nodules hollow, one-cell thick, the larger ones ruptured.

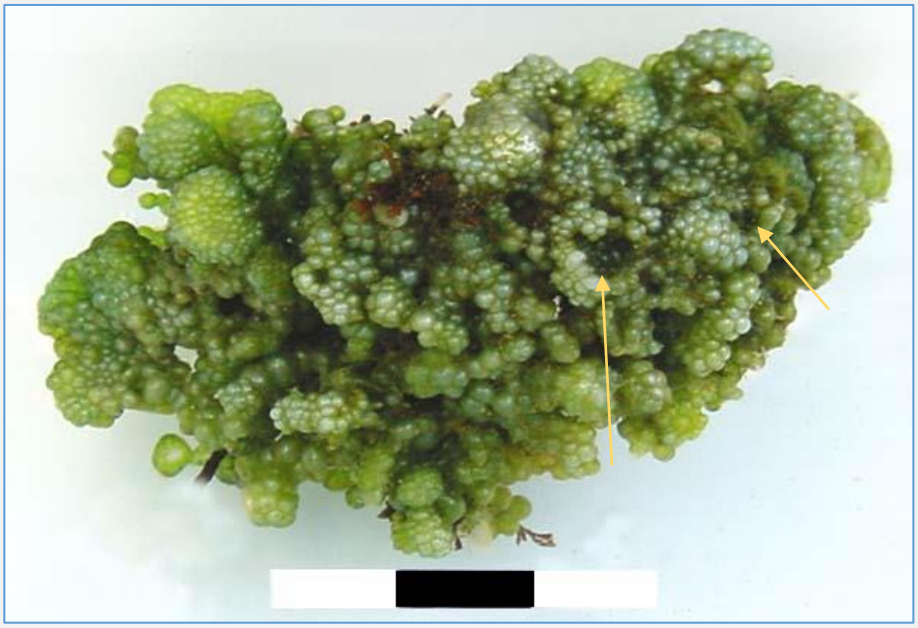
DRW245 is a small sheet attached to DRW97 showing rupturing.

HMF 346, 080401, Beruwela, Barberyn reef, Intertidal, epilithic, Syn. D. favulosa (C. Ag.) Decaisne ex Endlicher, 1843

References

Silva et al, 1996: 794.
Lewmanomont & Ogawa p. 27

Dictyosphaeria cavernosa (Forsskål) Børgesen 1932

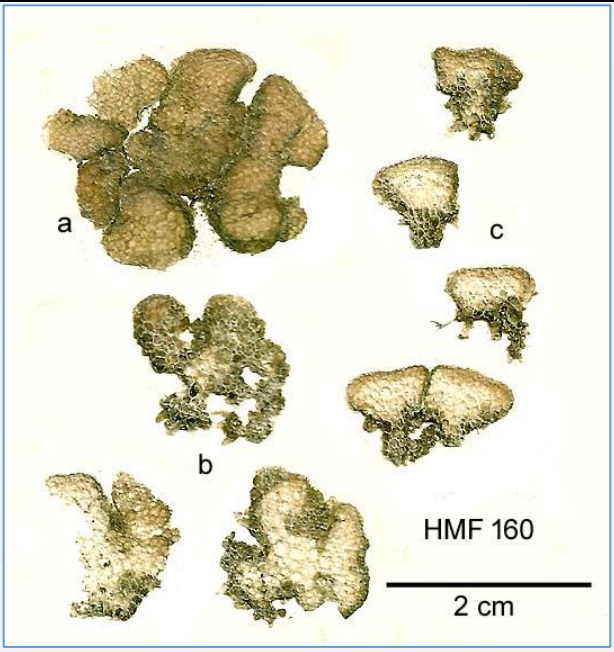


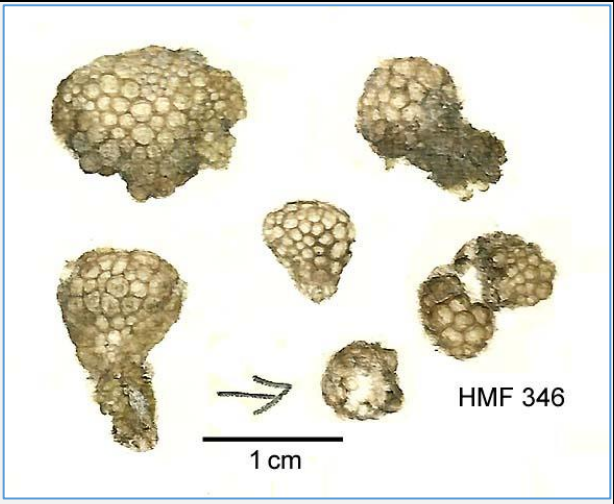
Ex-situ image of a freshly collected thallus of *Dictyosphaeria cavernosa*.

Berberyn Reef, Beruwela, 28.8.2005.

Viewed from above, the irregular, lobulated surface contrasts with the smooth surface of *D. versluysii*. The lobules are made up of cells attached to each other by structures called tenacular. They are often hollow, and sometimes rupture forming cup-shaped forms (arrowed).

Scale bar = 3 cm





Herbarium scans of collections from Barberyn Reef, Beruwela

HMF 160 - mounted slices of the entire thallus

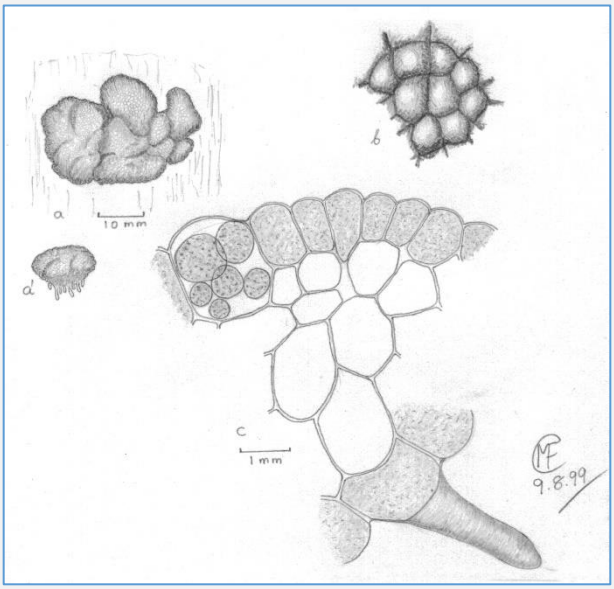
a) Showing the upper surface.

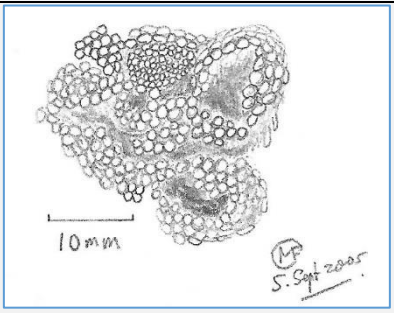
b) The lower surface above, two horizontal slices through the middle below.

c) Vertical slices showing the exterior side view above, through the middle below. The rhizoid-like attaching extensions of the lowermost cells project downwards.

HMF 346

Arrowed is a slice showing the hollow centre of this collection. The other mounted slices show the exterior.





Drawing of HMF 509, 28.8.2005

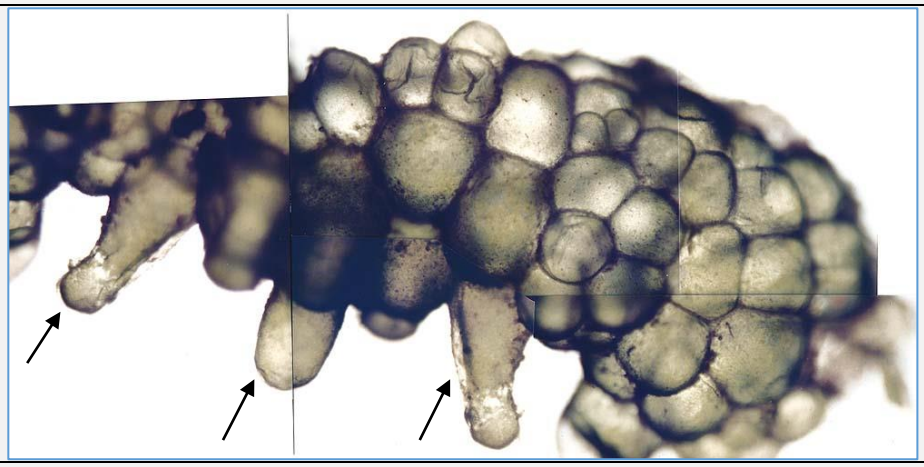
Shows cup-shaped craters of ruptured thalli.

Drawing of HMF 160, 24.7.1999

a, a[1]) Habit, thallus on rock face, in-situ, from above and from the side after removal.

b) Surface view of the thallus magnified, showing bulging cells.

c) Vertical section of thallus under magnification. At the top is a cell undergoing segregative cell division, where the cell contents divide into small collections that then proceed to form cell walls around each collection. Below is a partial section through the rhizoidal process of a cell on the undersurface that provides attachment.



Microscope montage of HMF 160

View of the external surface shows cells and downward extensions from cells of the lower surface forming attaching structures (arrowed).

Dictyosphaeria versluysii Weber-van Bosse 1905

Morphology Bright green, solitary or gregarious, solid, tough, flattened cushions, discoid, or irregularly oval, 1 - 4 cm across; easily prised off the substrate. Not lobulated. Some attached to dead patches of live corals (*Galaxea* fascicularis), others epilithic.

Anatomy Thallus consists of cells joined side-to-side by tenacula (haptera). Cells in surface view polygonal, rounded or elongate, 750 - 550 µm to 1500 - 750 µm. Cell walls 62.5 µm apart, the space filled in by haptera 37.5 µm wide, mostly bifid.

Ecology On sublittoral reefs at Trincomalee, 3-4 m deep, amongst live corals and other algae. On hard substates—rock or dead coral.

Mallikarachchi (2013a), has collected the species at Sallimundal and Passikuda on coral platforms, lower intertidal, exposed to heavy surf.

Discussion This species has been collected by us from the east coast. Coppejans et al (2009) have also collected it, but the location is not stated. It is readily identified underwater by its appearance. It resembles a colonial encrusting tunicate, but the firm nature to touch of the thallus distinguishes it. The smooth, unlobulated surface and regular margin distinguishes this from *D. cavernosa*.

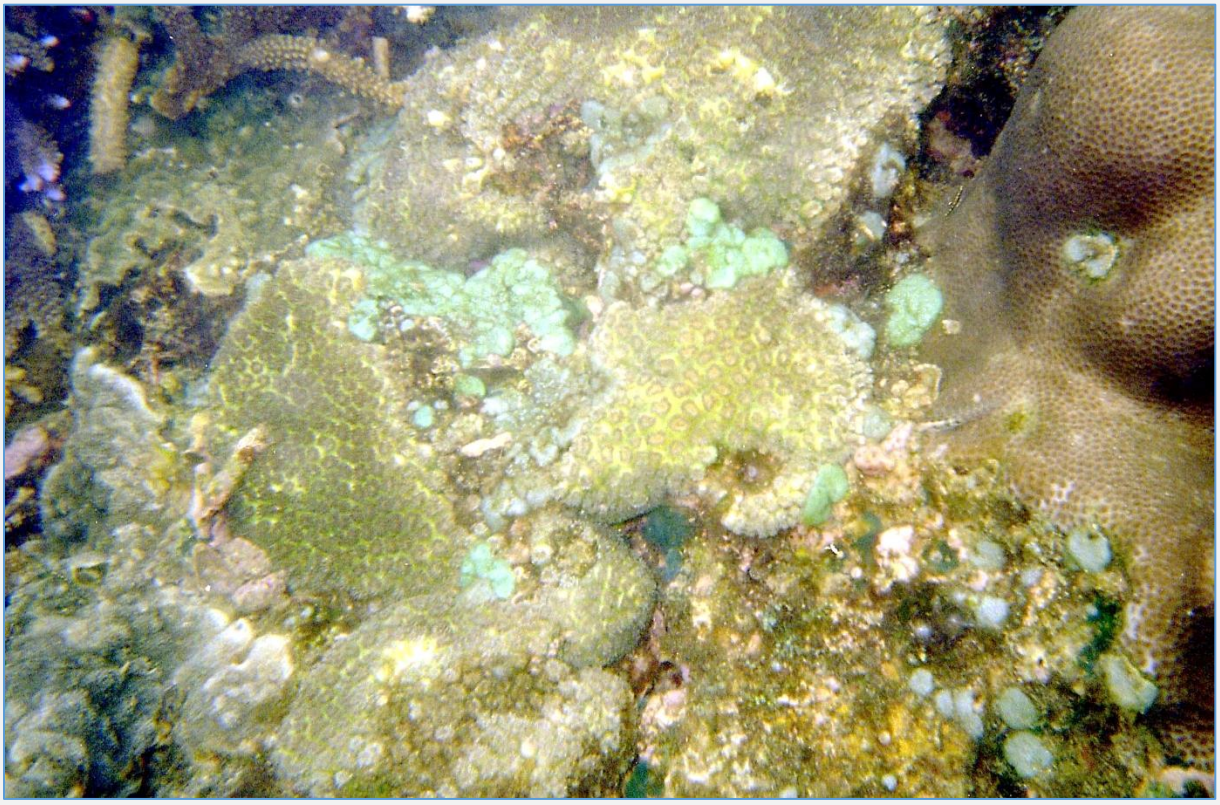
Material examined

HMF 422, 24.9.2003, Trincomalee, Erakkandy, Coral Island.
HMF 426, 26.9.2003, Trincomalee, Dutch Bay, 3-4 m., epilithic on rock or dead coral.

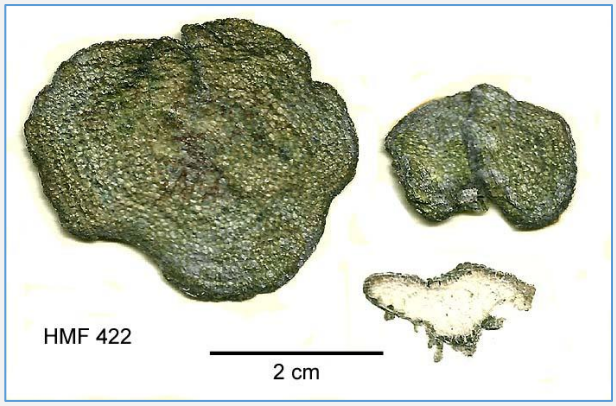
References

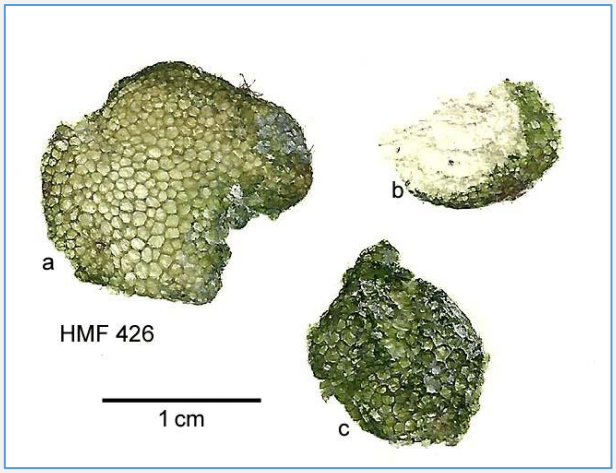
Allen & Steene (1994): 20 - colour photo.
Sartoni (1992): 319-322.

Dictyosphaeria versluysii Weber-van Bosse, 1905



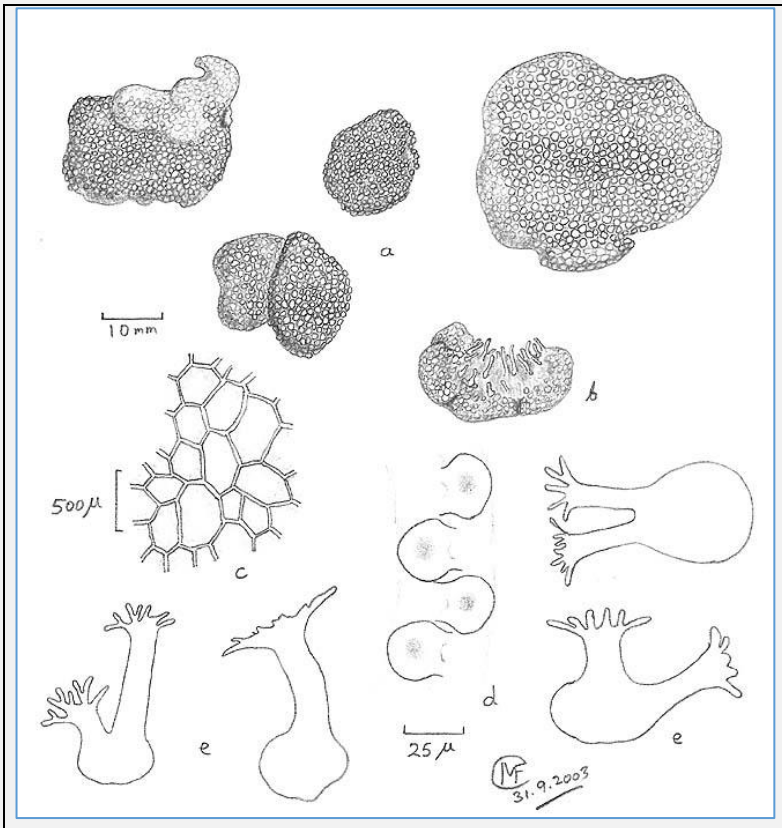
Dutch Bay, 15.5.2005, 3-4 m deep. *D. versluysii* amongst the hard coral *Galaxea fascicularis*.
- Underwater image by Malik Fernando.





Herbarium scans of *Dictyosphaeria versluysii*

HMF 422, Trincomalee, Erakkandy, Coral Island
Two entire cushions and a vertical section showing the solid nature with attaching downgrowths from the lower surface.
HMF 426 Trincomalee, Dutch Bay, 3 - 4 m.
a) A horizontal slice showing the individual cells of the upper surface.
b) A slice from the middle showing the solid nature of the cushion.
c) A slice showing the under surface.



Drawing of
HMF 422, 24.9.2003

a) Habit, four thalli viewed from above.
b) Lateral view of a thallus, underside uppermost, showing the attaching structures.
Upper surfaces flat, the undersurface curved to conform to the substrate.
c) View of the upper surface cells.
d) Magnified view of the boundary between cells, showing tenacula alternating on either side.
e) Individual tenacula, mostly bifid, some simple.

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