HOLLOW BROWN ALGAE SHAPED LIKE BUBBLES, BALLOONS OR THIN TUBES, 3ND EDITION

Brown Algae: Classification is based on detailed reproductive features and life cycles. Many species unrelated reproductively have similar vegetative form or shape, making identification very difficult if the technical systematic literature is used.

This key: Fortunately, we can use this apparent problem to advantage - common shapes or morphologies will allow you to sort ***some*** algae directly into the level of Genus or Family and so shortcut a systematic search through intricate and often unavailable reproductive features. The pictured key below uses this ***artificial*** way of starting the search for a name. It's designed to get you to a possible major group in a hurry. .

Scale: The coin used as a scale is 24 mm or almost 1" wide.

Artefacts: Microscope images of algae are usually blue stained, or have a black background.

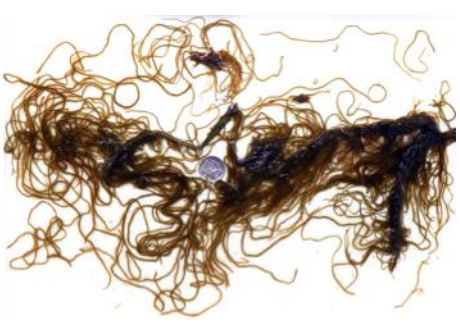
This key looks only at plants that

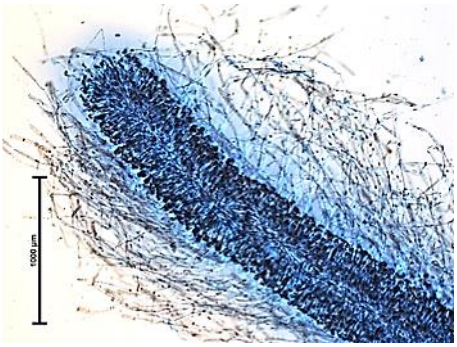
- are relatively small, < 1 m tall
- have branches ≈ 4-20 mm wide
- have a relatively soft texture

It ***excludes***

- very small, thread- or worm-like, slimy, tufted, turf and fouling brown algae. (see Figs 1, 2). These can be found in the "Pictured keys ..... Turf and fouling algae: I-III"
- algae with stiff and wiry branches usually ending in prominent hair tufts (see Figs 3-5). These can be found in "Pictured keys ..... algae with wiry or stiff cylindrical main branches"
- large plants, with tough main branches (see Figs 7-10). These can be found in "Pictured keys ..... large brown algae". There are also separate keys for *Cystophora* and *Sargassum*, two of the major genera in this category.
- plants with flat blades (see Fig. 6). These can be found in "Pictured keys .... ribbon and strap-like brown algae"

Unavoidably, many steps in the key require microscope investigation, including cross sections of branches.





Figs 1, 2: *Polycerea*, slimy, worm-like, fouling brown alga - ***excluded*** from this key

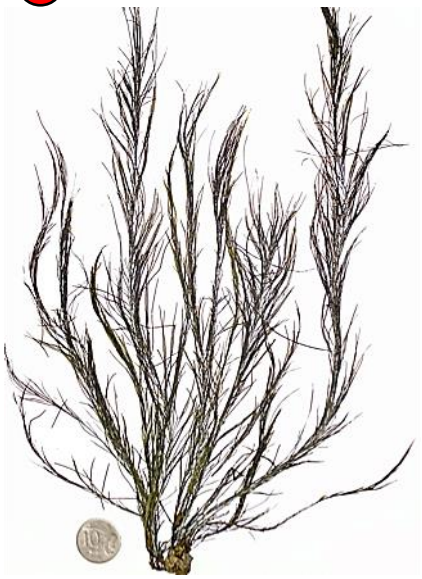


Fig. 3: *Perithalia caudata*, wiry plant - ***excluded*** from this key

Fig. 4: *Sporochnus*, wiry plant - ***excluded*** from this key

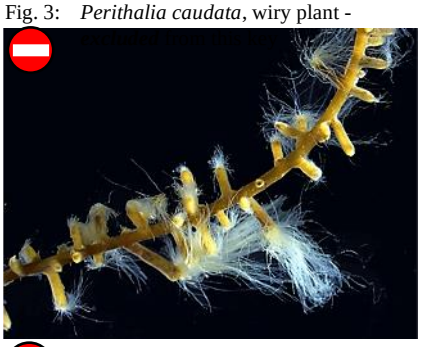


Fig. 5: *Sporochnus*, detail of hair tufts at tips - ***excluded*** from this key

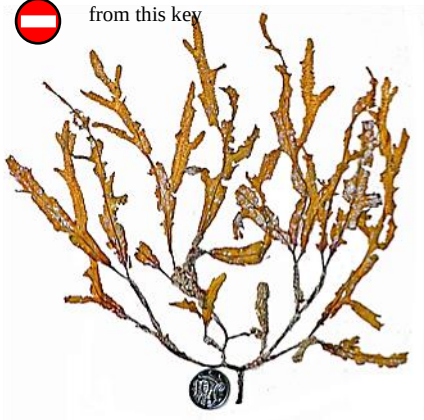
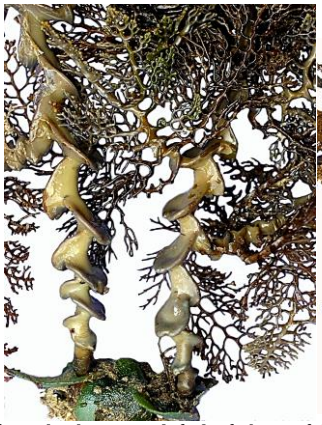


Fig. 6: *Myriodesma*, strap-like blades - ***excluded*** from this key



Figs 7-10: large brown algae - ***excluded*** from this key. Far left: leafy base of *Sargassum*. Left: downward pointing stubs and side branches of *Cystophora*. Right: root-like base, flexible stalk and divided leafy blade of *Ecklonia*. Far right: bead-like *Hormosira*

Baldock, R.N. (2024). Hollow brown algae shaped like bubbles, balloons or thin tubes. 3rd edition. 5 pages. *Algae Revealed*.

PICTURED KEY

1a. plants ***bubble-shaped***, stalkless, surfaces ***crisp***, sometimes tearing and exposing the hollow centres ..... 2.

1b. plants club-shaped, balloon- shaped, cylindrical ***or*** narrow and tubular ..... 4.

⚠ fertile plants needed for step #2

2a. spore patches occur as surface ***spots*** (under the microscope, the spores encircle tufts of colorless hairs). Figs 11-14. ..... *Colpomenia sinuosa*

2b. spore patches spreading or irregular in shape (under the microscope hair tufts are separate from the spore patches) ..... 3.

3a. spore patches extensive (under the microscope, minute, ***single-celled***, club-shaped brown structures accompany the spore sacs). Figs 15-18. ..... *Colpomenia peregrina*

3b. spore patches irregular (***1-2 celled***, minute, club-shaped brown structures accompany the spore sacs). Figs 19-21. ..... *Colpomenia ecuticulata*

Fig. 11: *Colpomenia sinuosa*, freshly collected

Fig. 12: *Colpomenia sinuosa*, dried specimen

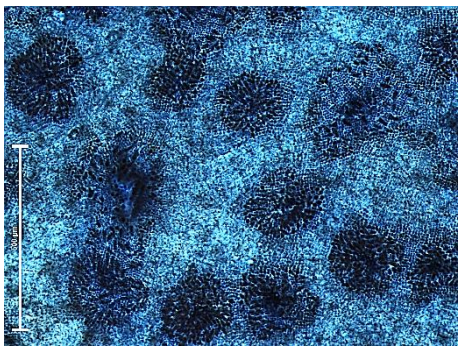
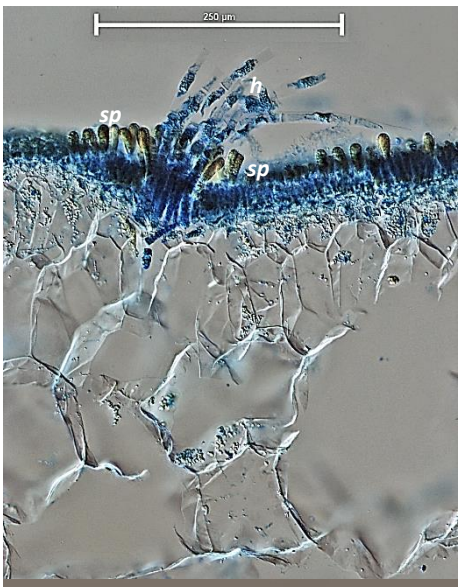


Fig. 13: *Colpomenia sinuosa*, stained surface view of fertile spots

Fig. 14: *Colpomenia sinuosa*, cross section of the surface layer, spores (***sp***) surrounding a hair-tuft (***h***)



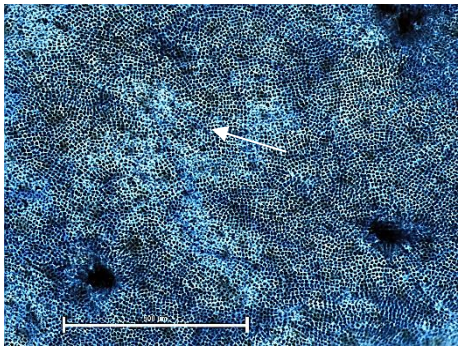


Fig. 16: *Colpomenia peregrina*, stained surface view of extensive spore patches (arrowed)

Fig. 17: *Colpomenia peregrina*, cross section of the surface layer, single-celled structure (arrowed) accompanying the spores

Fig. 15: *Colpomenia peregrina*, mass of fresh plants on the stem of a sea grass stem

Fig. 18: *Colpomenia peregrina*, dried, pressed specimen

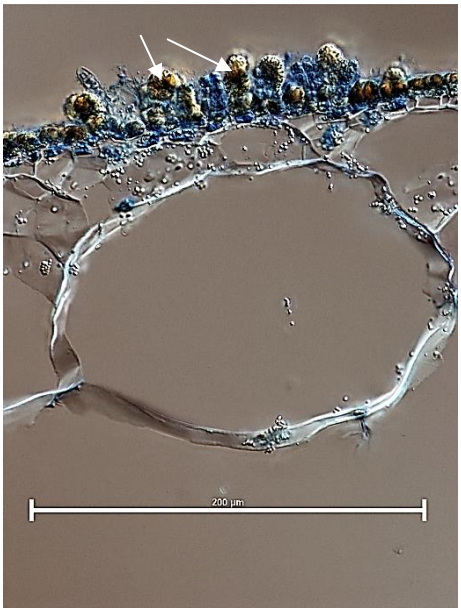


Fig. 20: *Colpomenia ecuticulata*, cross section of the surface layer, 2-celled structures (arrowed) accompanying the spore-sacs

Fig. 19: *Colpomenia ecuticulata*, dried, pressed specimen

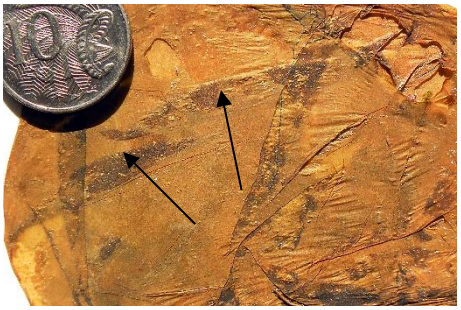


Fig. 21: *Colpomenia ecuticulata*, surface view of scattered, dark spore patches (arrowed)

4a. main branches cylindrical or sausage-shaped, ***wrinkled***, filled with mucilage; shorter side branches arise at right angles. Plants grow in the intertidal on crystalline rocks and rough conditions. Figs 22-24.
…….….. *Splachnidium rugosum*

4b. not as above ……....…..….. 5.

5a. plants long and narrow, 1-10 mm wide, stringy or narrow and ribbon shaped, branches basally bunched .....6.

5b. plants club- or balloon-shaped with a small, solid, cylindrical basal stalk ..... 7.

6a. plants tubular, or flattened and only partly hollow, (appearing solid when dried and pressed); branches often irregularly constricted; common in winter and massed in the intertidal. Figs 26-27.
.....*Scytosiphon lomentaria*

6b. plants to 10 mm in diameter, often growing on seagrass stems, plant body flimsy, widening ***gradually*** from a short basal stalk. Figs 28-30.
..... *Asperococcus fistulosus*

Figs 22-24: *Splachnidium rugosum*, (above) on granite, mixed with dark green lozenges of *Calothrix*; (right, above) preserved specimen showing basal bunching, side branches at right angles; (below right) dried, (shrunken) pressed plant

Fig. 26: *Scytosiphon lomentaria*, plants with branches of differing width

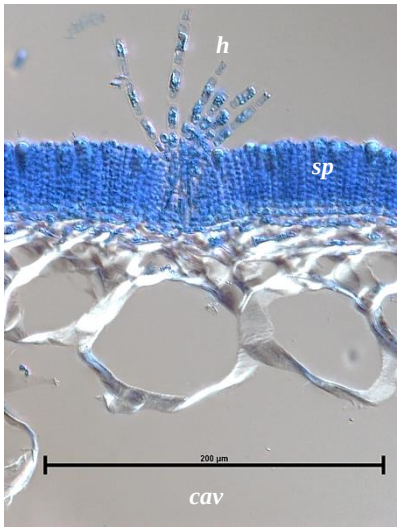


Fig. 27: *Scytosiphon lomentaria*, cross section, patch of spores (***sp***), hair tuft (***h***), central cavity (***cav***)

Figs 29, 30: *Asperococcus fistulosus*, single plants removed from their seagrass substrate, showing the gradual widening from a short stalk

Figs 28-30: *Asperococcus fistulosus*, many separate plants growing on a seagrass stem

7a. plants club-shaped, plant body widening ***gradually*** from a short basal stalk; spore-sacs minute, about 12-18 µm wide. Figs 31-34.
..... *Adenocystis utricularis*

7b. plants ribbon-shaped, easily crumpled when mature, (although when young, some plants are lollipop-shaped); plant body widening ***rapidly*** from a short basal stalk, spore sacs about 30-40 µm wide. Figs 35-38.
..... *Asperococcus bullosus*

Fig. 31: *Adenocystis utricularis*, cluster of plants

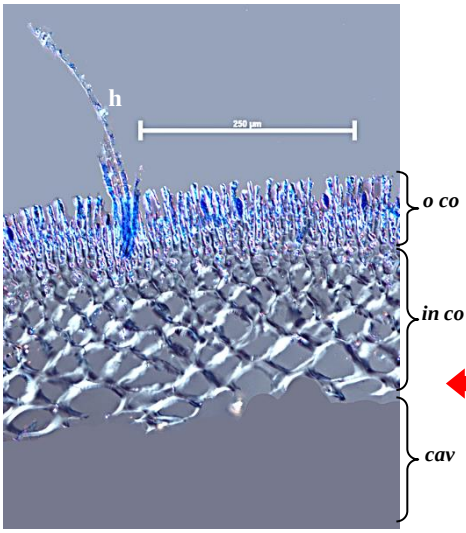


Fig. 33: *Adenocystis utricularis*, cross section, hair-tuft (***h***), outermost chains of small cells (outer cortex, ***o co***), inner larger cells (inner cortex, ***in co***) central cavity (***cav***), initially with fine threads, but filled with mucilage in mature

Fig. 32: *Adenocystis utricularis*, single plants, with surface hair-tufts apparent

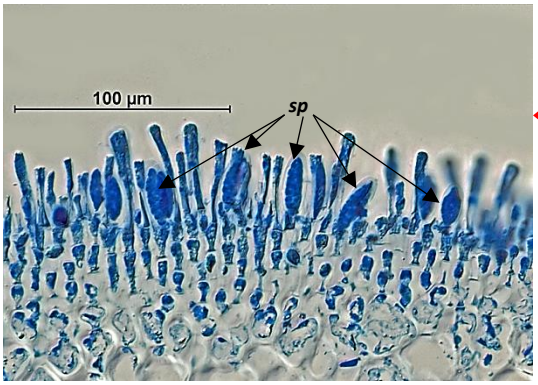
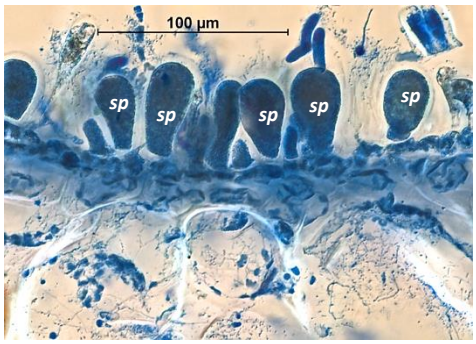


Fig. 34: *Adenocystis utricularis*, cross section, detail of outer cortex, minute elongate spore-sacs (***sp***) amongst hairs (compare with Fig 35, *Asperococcus*, below)

Fig. 35: *Asperococcus bullosus*, cross section, detail of outer cortex with larger spore-sacs (***sp***) amongst hairs



Figs 35-38: *Asperococcus bullosus*, (above) lollipop-shaped young plants on the blade of a seagrass; (right) mature plants on the blade of a seagrass; (far right) detail of the plant base widening rapidly from the basal stalk

SPECIES IN THE KEY

species	author(s)	page
Adenocystis utricularis	(Bory) Skottsberg	4
Asperococcus bullosus	Lamouroux	4
Asperococcus fistulosus	(Hudson) J W Hooker	3
Colpomenia ecuticulata	M J Parsons	2
Colpomenia peregrina	Sauvageau	2
Colpomenia sinuosa	(Mertens *ex* Roth) Derbès & Solier	2
Scytosiphon lomentaria	(Lyngbye) Link	3
Splachnidium rugosum	(Linnaeus) Greville	3