PICTURED KEY TO SOME COMMON ALGAE OF SOUTHERN AUSTRALIA: BROWN ALGAE WITH WIRY OR STIFF, CYLINDRICAL MAIN BRANCHES

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. Then you can proceed to the appropriate fact sheet to verify the identification.

Scale: The coin used as a scale is 23 mm or almost 1" wide.

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

Names Those marked § follow Edgar, G. (2008) *Australian Marine Life*. Sydney. New Holland

Fig.1: soft, slimy brown alga (*Cladosiphon*) – ***excluded*** from this key

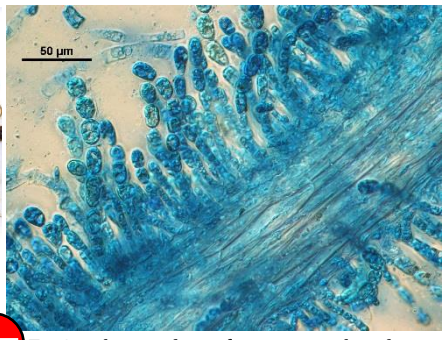


Fig 2: brown algae of interwoven threads ending in beaded chains of cells - ***excluded*** from this key

Fig. 3: brown alga (*Sphacelaria*) with stiff threads, growing on blades of seagrass – ***excluded*** from this key

Fig. 4: brown alga (*Sphacelaria*) with prominent tip cell and cell bands along threads – ***excluded*** from this key

This key looks only at plants that are

- 10-500 mm tall, often with prominent hair tufts
- plants with cylindrical branches up to 3 mm wide, with many equal-sided cells when viewed microscopically in cross section (see Fig. 40).

Most belong to the Family: Sporochnaceae.

It ***excludes***

- soft and slimy, worm-like algae with many ***threads interwoven together***, ending in beaded chains of cells (see Figs 1, 2) ***or*** thread-like algae consisting of single chains of exposed cells.
  These are covered in the key
  "Turf and fouling algae III: encrusting, thread- and worm-like brown algae"
- brown algae only about 10 mm tall, with stiff, upright threads or filaments in tufts, and, when growing actively, ***prominent tip cells*** that produce lines of cells dividing lengthwise forming ***prominent bands*** along the threads (Figs 3, 4).
  These are covered in the key
  "Pictured key to some common algae of southern Australia: *Sphacelaria* (including *Herpodiscus*)"
- algae with narrow, flat blades about 10 mm wide, that often have regularly forked branches (Figs 5-8).
  These are covered in the key
  "Pictured key to some common algae of southern Australia: ribbon and strap-like brown algae"
- hollow brown algae.
  These are covered in the key
  "Pictured key to some common algae of southern Australia: hollow brown algae shaped like bubbles, balloons or thin tubes"

Fig. 5: brown alga (*Scytosiphon*) with narrow, ribbon-like blades – ***excluded*** from this key

Fig. 6: brown alga (*Dilophus***)** with narrow, ribbon-like blades regularly forked – ***excluded*** from this key

Figs 7, 8: brown alga (*Cutleria*)**,** ribbon-like blades with split ends – ***excluded*** from this key

Baldock, R.N. (2015). Pictured key to some common algae of southern Australia: brown algae with wiry or stiff cylindrical main branches. *Algae Revealed.* 5pp. Adelaide: State Herbarium of South Australia. flora.sa.gov.au/algae_revealed

1a. plants almost black on drying, stiff, wiry, with several main branches (axes) densely covered with shorter, upright, radial side branches tipped with ***microscopic caps***, also with hair tufts if growing rapidly; plant base becoming thick and warty with age, up to 100 mm wide. Figs 9, 10. ….*Perithalia caudata* (mermaid's hair, §spiky tuft-weed)

1b. plants pale- to dark-brown, variously branched; often with prominent hair-tufts, plant bases smaller ..... 2.

2a. prominent hair-tufts at tips of numerous short, wiry or peg-shaped ***side*** branches ..... 3.

2b. hair-tufts fringe all branch surfaces ***or*** are found only at branch tips ***or*** are absent ..... 7.

3a. side branches arise from common points on main branches (axes) (like struts of an umbrella); hair-tufts at tips are large (like powder-puffs). Figs 11, 12. ..... *Bellotia eriophorum* (§ chimney-brush seaweed)

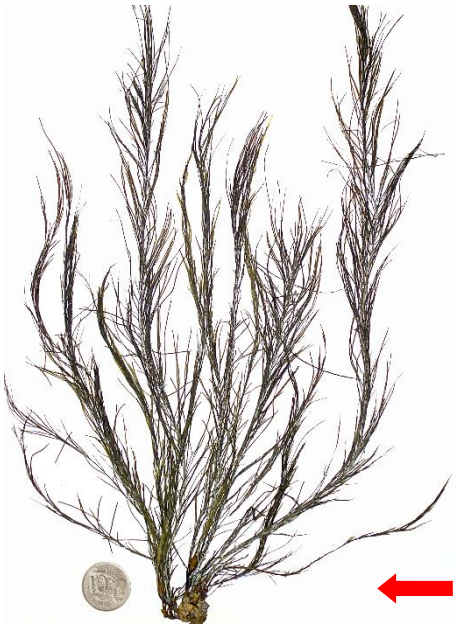
3b. side branches arise radially or in 2 rows along the axes ..... 4.

4a. plants consist of single main branches (axes) and long, spreading side branches fringed with small, wiry branchlets tipped with hair-tufts ..... 5.

4b. plants consist of several axes fringed with small branchlets tipped with hair-tufts ..... 7.

5a. plants often large (200 mm-1000 mm tall), bases often covered with a felt of hairs, branchlets, when fertile, are covered with microscopic spore-sacs in rows on one side of hairs. Figs 13-16. ..... *Encyothalia cliftonii* (§ Clifton's tuft-weed)

5b. not as above ..... 6.



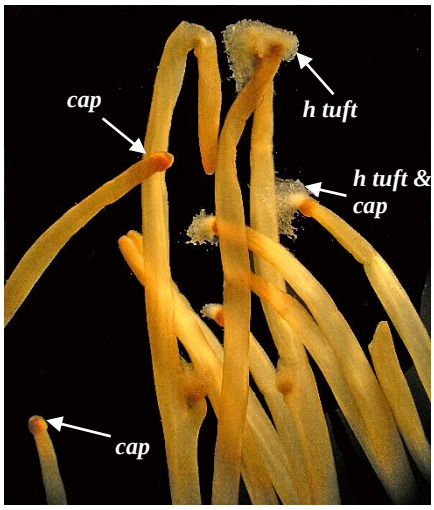


Fig. 9: *Perithalia caudata*, branch tips, tip cups, some also with hair tufts

Fig. 10: *Perithalia caudata*

Fig. 11: *Bellotia eriophorum* growing in sand, Dutton Bay, SA. Photo: D Muirhead

Fig. 12: *Bellotia eriophorum*, side branches arising from one point

Fig. 13: *Encyothalia cliftonii*

Fig. 14: *Encyothalia cliftonii*, branching pattern of wiry branchlets

Fig. 15: *Encyothalia cliftonii*, detail of wiry branchlets tipped in hair-tufts

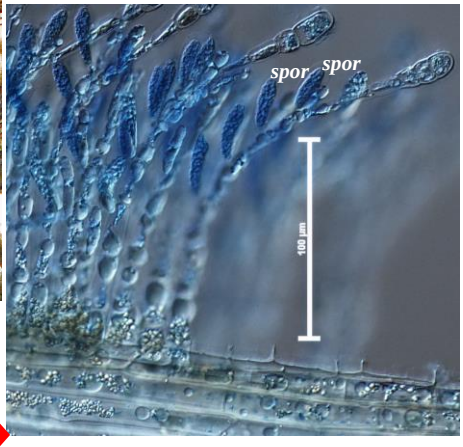


Fig. 16: *Encyothalia cliftonii*, lengthwise microscopic view of spore sacs (sporangia, ***spor***) on hairs, along the surface of a fertile branchlet

Baldock, R.N. (2015). Pictured key to some common algae of southern Australia: brown algae with wiry or stiff cylindrical main branches. *Algae Revealed.* 5pp. Adelaide: State Herbarium of South Australia. flora.sa.gov.au/algae_revealed

6a. axes narrow (0.2-0.4 mm wide); branchlets numerous, the hairy tufts at their tips producing an overall woolly appearance to the plant; fertile branchlets have a short stalk. Figs 17-19.
…… *Sporochnus pedunculatus*
included under *Sporochnus comosus* in the Flora. This cosmopolitan species was recognised by Yee (2014).

6b. axes thicker (0.5-1.5 mm wide), fertile branchlets are ***stalkless***. Figs 20-22. ..... *Sporochnus apodus*

7a. plants large, 200-900 mm tall, tree-like, with a prominent disc-shaped holdfast; axes thick, 1-2 mm wide; side branches divided several times. Figs 23-25.
…….. *Sporochnus radiciformis*

7b. plants smaller, branching more open, holdfast less conspicuous …….… 8.

8a. branchlets long, thin, when fertile, with a very long stalk (2-10 mm long). Figs 26-28.
……..…. *Sporochnus moorei*
(next page)

8b. fertile branchlets with a short stalk.
…….…… 9.

Fig. 17: *Sporochnus pedunculatus*

Fig. 18: *Sporochnus pedunculatus*, young, stalked, fertile branchlets

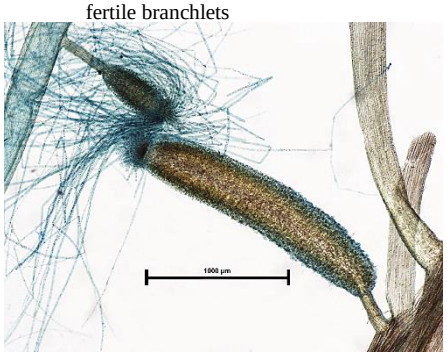


Fig. 19: *Sporochnus pedunculatus*, developing and mature fertile branchlets

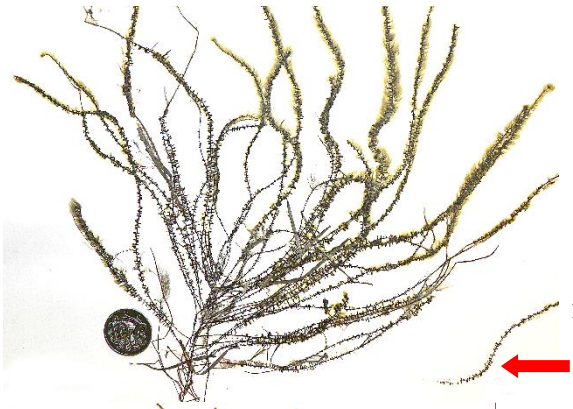


Fig. 21: *Sporochnus apodus*

Fig. 20: *Sporochnus apodus*, stalkless, fertile branchlets

Fig. 22: *Sporochnus apodus*, detail of a stalkless, fertile branchlet

Fig. 24: *Sporochnus radiciformis*

Fig. 23: *Sporochnus radiciformis*, basal pad

Fig. 25: *Sporochnus radiciformis*, stalked, fertile branchlets

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Fig. 27: *Sporochnus moorei*, whole plant

9a. plants much-branched; fertile branchlets elongate with sterile sections just below the tuft of hairs at tips. Figs 29-30.
…… *Sporochnus stylosus*

9b. plants may be excessively hairy; fertile branchlets egg-shaped, becoming elongate and sometimes curved, sterile sections below the tips are ***absent***. Figs 31- 33.
…….....…… *Sporochnus comosus*
according to Yee (2014), only some specimens listed under this name in the Flora belong to this species; the others belong to *S. pedunculatus* (see above)

10a. branches somewhat compressed; when fertile, tips end in unique cup-and-cone shaped structures, but when non-reproductive, they bear dense hair tufts that are, however, readily shed. Figs 34-37.
……...……..... *Carpomitra costata*

10b. branches cylindrical; cup-and cone-structures ***absent***; hairs usually prominent ..... 11.

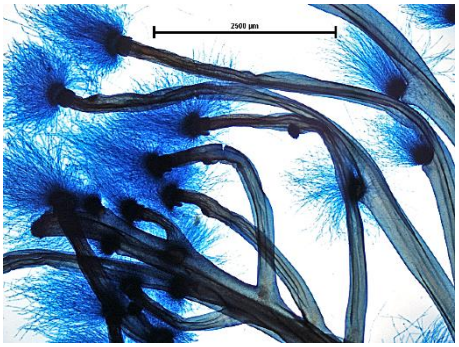


Fig. 26: *Sporochnus moorei*, linear side branches

Fig. 28: *Sporochnus moorei*, fertile branchlets, long stalks (***st***)

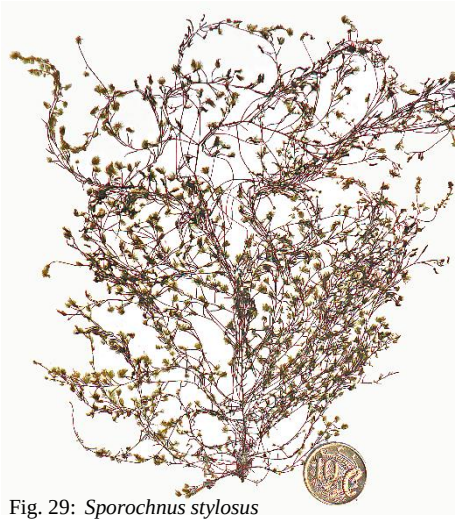


Fig. 29: *Sporochnus stylosus*

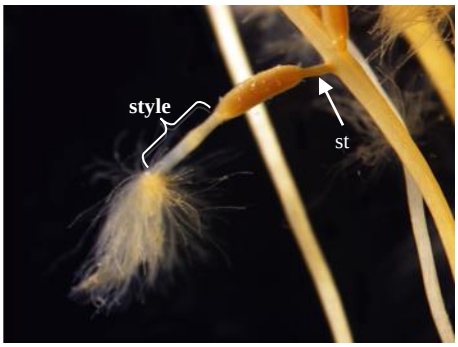


Fig. 30 *Sporochnus stylosus*, fertile branchlet, stalk (***st***), sterile section (***style***)

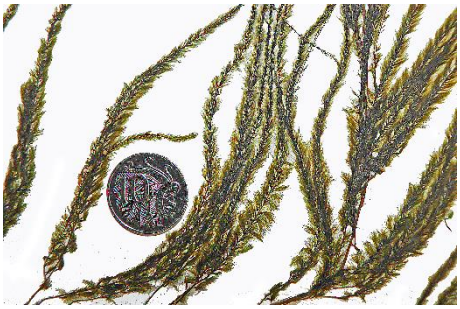


Fig. 31 *Sporochnus comosus*, side branches covered with dense tip-hairs of branchlets

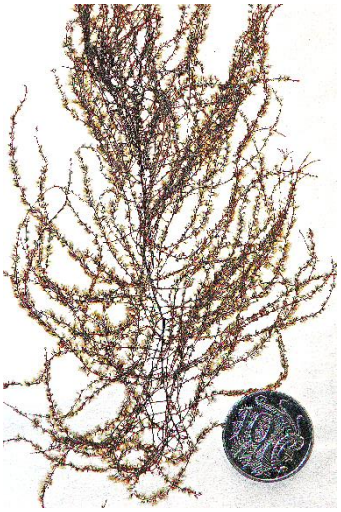


Fig. 32 *Sporochnus comosus*

Fig. 33 *Sporochnus comosus*, stalked fertile branchlets with dense tip-hairs

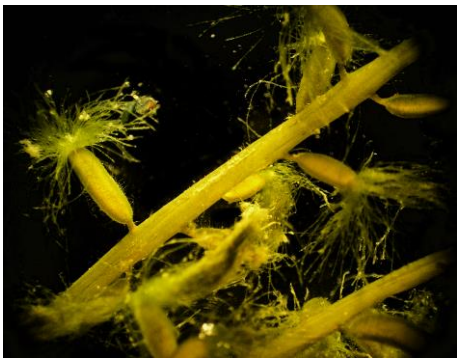


Fig. 34. *Carpomitra costata*: wiry branches ending in prominent hair-tufts

Figs 35, 36: *Carpomitra costata*, fertile cup-and-cone tips (left), tip hair-tufts (above)

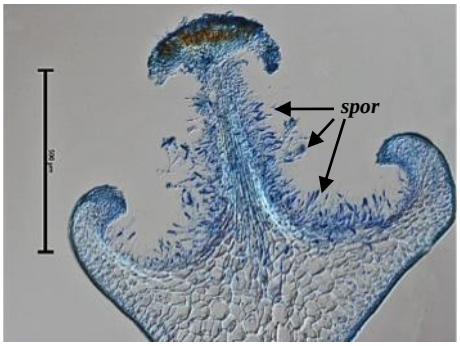


Fig. 37: *Carpomitra costata*, fertile cup-and-cone tip in lengthwise section, minute spore sacs (***spor***)

Baldock, R.N. (2015). Pictured key to some common algae of southern Australia: brown algae with wiry or stiff cylindrical main branches. *Algae Revealed.* 5pp. Adelaide: State Herbarium of South Australia. flora.sa.gov.au/algae_revealed

11a. branch surfaces swathed in masses of ***long***, ***individual***, coloured hairs. Figs 38-40.

…….. *Sporochnus herculeus*

as *Sporochnema tomentosa* in the Flora. Rare: only known from 22-30m deep at two sites in S Australia

11b. branch surfaces hairless, ***or*** with hairs in discrete ***patches*** ..... 12.

12a. hairs in dense ***patches*** scattered along branch surfaces giving the plant a fuzzy appearance; microscopic spore sacs (sporangia) occur at the base of hairs. Figs 41-43.

…….. *Austronereia australis*

12b. hairs at branch tips ***or*** hair-like side branches occur in rings around branches ..... 13.

13a. hair-like side branches in rings of 4; main branches in ***opposite pairs***. Figs 44, 45.

…… *Arthrocladia villosa*

Family: Arthrocladiaceae

rare: one collection only from Pt Stanvac, S Australia, probably introduced from temperate N hemisphere waters

13b. hair-tufts at branch tips; branch surfaces bumpy due to microscopic, globe-shaped outgrowths. Figs 46, 47. ..... *Nereia lophocladia*

rare: only known from one collection at Pt Phillip Heads, Vic.

Fig. 44: *Arthrocladia villosa*

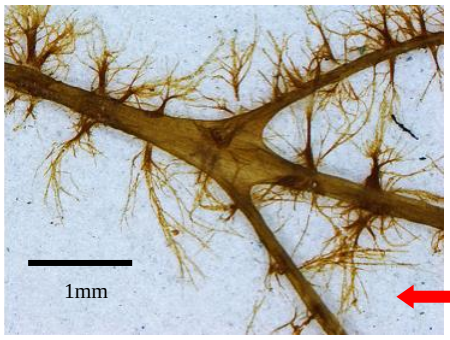


Fig.45: *Arthrocladia villosa*: hair-like side branches in rings of 4

Fig. 38. *Sporochnus herculeus*: individual long, numerous hairs along axes

Fig. 40. *Sporochnus herculeus*: cross section showing equal-sided cells (parenchyma)

Fig. 41: *Austronereia australis*

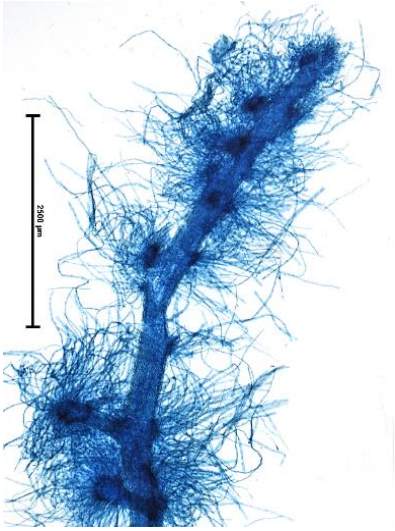
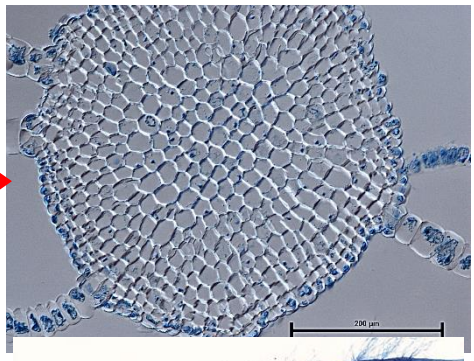


Fig. 46: *Nereia lophocladia*

Fig. 39. *Sporochnus herculeus*: branch tips



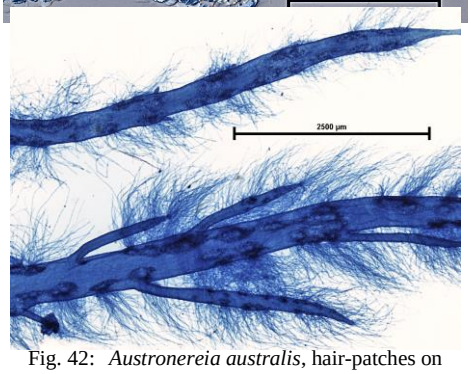


Fig. 42: *Austronereia australis*, hair-patches on branch surfaces

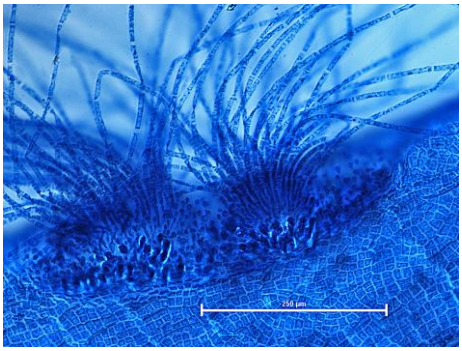


Fig. 43: *Austronereia australis*, hair-patches, microscopic spore sacs at bases of hairs

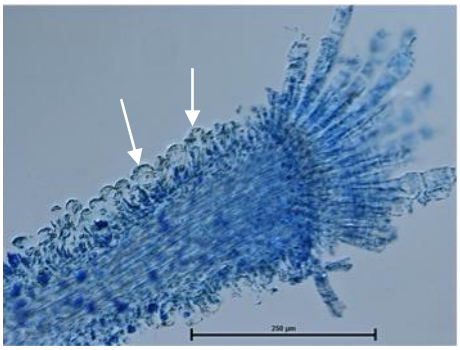


Fig. 47: *Nereia lophocladia*, branch tip, globe-shaped outgrowths on surfaces (arrowed)

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