

# Pictured Key to some algae of southern Australia: strap-like & narrow-leaved red algae (algae with narrow, flat branches)

**Red Algae.** With some 800 species, many of which are endemic (found nowhere else), southern Australia is a major centre of diversity for red algae. Classification is based on detailed reproductive features. 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 sheets to verify identifications.

**Scale:** the coin used as a scale is 24 mm or almost 1" wide. Microscope images of algae are usually blue stained.

This key is *restricted* to algae with

- compressed or flat, strap-shaped blades of similar size throughout the plant (about 5-15 mm wide)
- internal structure of many cells, often equal-sided ("parenchymatous")
- side branches often forked (dichotomous)

*Excluded* are algae where

- branches are cylindrical in cross-section and only a few mm in width. (See "Narrow-branched red algae.")
- small side branches form a regular, feathery (pinnate) pattern. (See the pictured key of the same name.)
- the whole plant is plate-shaped or broad-bladed (20+ mm wide). See the pictured key: "Broad-bladed red algae".)
- the internal construction consists of strings of cells (threads or meshes). This may be obscured by the later development of additional (corticating) cells and can then only be seen clearly at plant tips or located by investigating cross sections microscopically. (Find these in other pictured keys, such as "Filamentous red algae: Master Key" or "... Red mesh-algae".)

- 1a. plants filmy, almost transparent, blade edges may be only 1-2 cells thick, some blades with a thicker mid-rib and faint branched veins. Branching from blade edges or from mid-ribs. Figs 6, 7.
- ..... 2.
- 1b. plants *not* filmy, some paper thin but *not* semi-transparent; slimy, gristly, (cartilaginous) or firm in texture, smooth or with a rough surface due to a coating of sponge or a crusty layer of bryozoan animals
- ..... 4.



Fig. 1: *Laurencia elata*, with compressed branches but < 5mm wide: **excluded** from this key. (see the pictured key: "*Laurencia* and *Chondrophyucus*")



Fig. 2: *Hypnea*, with narrow, cylindrical branches: **excluded** from this key. (see the pictured key: "Narrow branched red algae")



Fig. 3: *Sarcothalia radula*, with broad blades: **excluded** from this key. (see the pictured key: "Broad-bladed red algae")



Fig. 4: *Gigartina pinnata*, with broad main branches and pinnate side branches: **excluded** from this key. (see the pictured key: "Feathery flat-branched red algae")



Fig. 5: *Thuretia quercifolia*, blades with chains of cells in rings: **excluded** from this key. (see the pictured key: "Red mesh-algae")

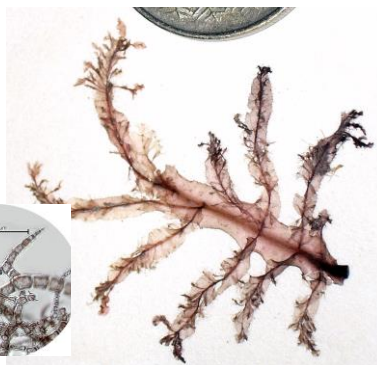


Fig. 6: *Hypoglossum harveyanum* in the Delesseriaceae, filmy, strap-like fronds with a mid-rib, side branches arise from the mid-ribs



Fig. 7: *Haraldiophyllum notii* in the Delesseriaceae, filmy fronds, mid-rib absent, flat-branched, spore patches embedded in blades

- 2a. blades long and narrow (linear), narrower basally; fertile structures delicate, **protruding** ..... 3.
- 2b. blades broader, lance- , leaf-shaped, or forked; fertile structures **embedded** in blades. Figs 6, 7 (previous page) .....

See **“Southern Australian Groups at a glance: Delesseriaceae”**

- 3a. plants grow on the feathery red alga *Ballia*; blades 1-cell thick, older blades with irregular shorter blades from mid-ribs; cells in rows, **6-sided**; sporangia in small, dense linear structures (stichidia) along mid-ribs. Figs 8, 9. .... *Sonderella linearis*

Family: Rohodmelaceae  
Tribe: Sonderelleae

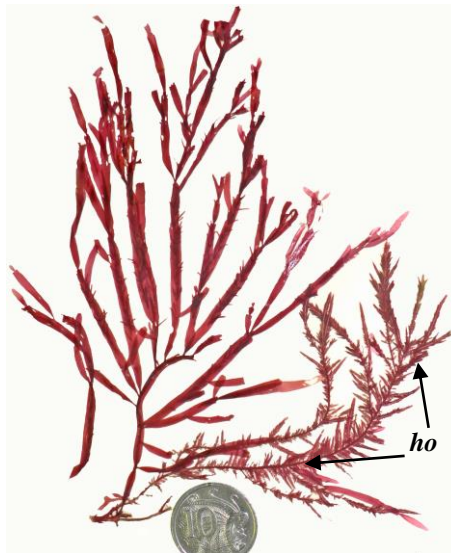


Fig. 8: *Sonderella linearis* on *Ballia callitricha* (host, ho)

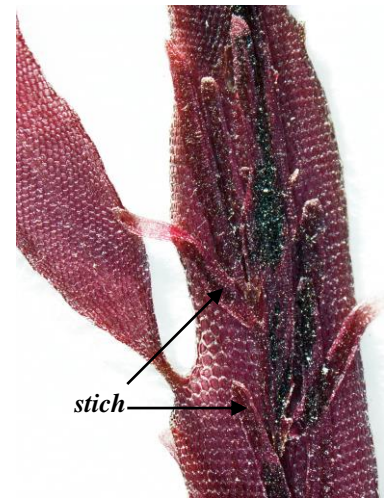


Fig. 9: *Sonderella linearis*, cells 6-sided, in rows. Linear sporangial structures (stichidia, stich) occur along the mid-rib

- 3b. plants grow on rock or other algae, have a short stalk, are delicate, often quickly disintegrating after collection; mature female structures (cystocarps) on short stalks, protruding in dense masses from blade surfaces. Figs 10, 11. .... *Sarcomenia delesserioides*

Family: Sarcomeniaceae



Fig.10: *Sarcomenia delesserioides*. Insert: detail of blades



Fig.11: *Sarcomenia delesserioides*, side branch with clusters of stalked cystocarps



Fig.12: *Gloiophyllis barkariae*

- 4a. blades thin, often only 1-2 cells thick; branching usually regular; fertile structures **embedded** in blades. Figs 6, 7. (previous page) .....

See **“Southern Australian Groups at a glance: Delesseriaceae”**

- 4b. blades thicker, branching long and narrow (linear), forked or irregular, fertile structures **protruding** from the blade surface or edge ..... 5.

- 5a. plants **slimy**. (example, Fig. 12)  
See **“Pictured key : slimy/mucilaginous algae”**

- 5b. plants firm, surfaces smooth, or rough, (may be covered with sponge or animal growth), **not** slimy ..... 6.

- 6a. blades rough, coated with **sponge**, or a scale of microscopic **bryozoan animals** ..... 7.

- 6b. blades smooth, or with small, restricted patches of sponge or other animal growth ..... 10.

- 7a. blades coated with sponges ..... 8.

- 7b. blades coated with a scaly bryozoan colony (usually of *Bathypora nitens*), blunt tips are **in-rolled**. Where exposed, blade cells are rhomboid-shaped and in spreading rows (chevrons) (see Fig. 25).

*Amansia* 3 spp

- ..... 9.



Fig.13: *Osmundaria prolifera*, detail of branching from mid-ribs, warty surface of blades

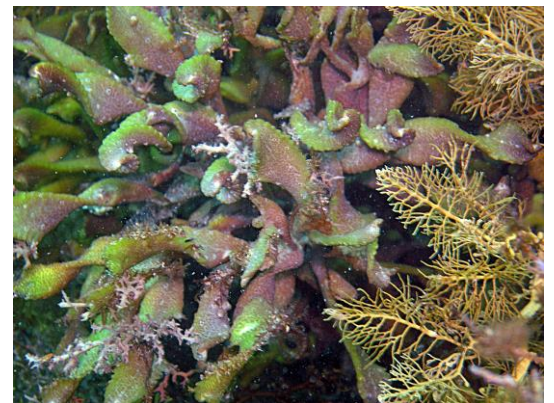


Fig.14: *Osmundaria prolifera*, underwater image, fronds twisted, tips and edges greenish



Fig.15: *Osmundaria prolifera*, edge view of a blade with protruding sporangial structures

8a. blades long and narrow (linear), **edged** with minute bumps, **twisted**,  $\approx 10$  mm wide; side branches arise from mid-ribs; tips often yellow to greenish under water. Figs 13-15. (previous page)

..... *Osmundaria prolifera*  
(Also in "Pict. keys "sponge-covered red algae")

8b. blades spatula-shaped, edges **smooth**,  $\approx 5$  mm wide, **not** twisted; sponge grows between flat surface growths facing forwards. Figs 16-19.  
..... *Epiglossum smithiae*



Fig. 16: *Epiglossum smithiae*



Fig. 17: *Epiglossum smithiae*, sponge-covered spatula-shaped blades, bunches of minute reproductive structures on surfaces and edges

9a. edges smooth, except for clusters of reproductive structures on marginal teeth when fertile. Figs 20-22, 25.

..... *Amansia pinnatifida*

9b. edges with alternating, very short incurved branches. Figs 23, 24.

..... *Amansia serrata*

(the third *Amansia* sp, *L. mamillaris* is a rare W Australian species, with broad blades – see the separate Fact Sheet)

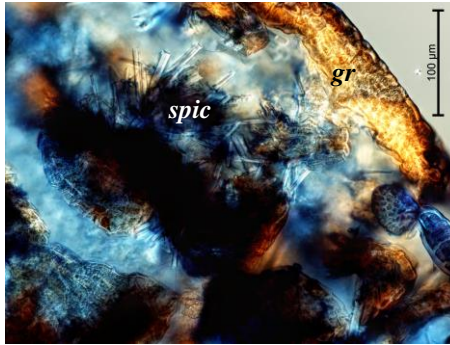


Fig. 18: *Epiglossum smithiae*, surface sponge spicules (*spic*), flat surface growths (*gr*)

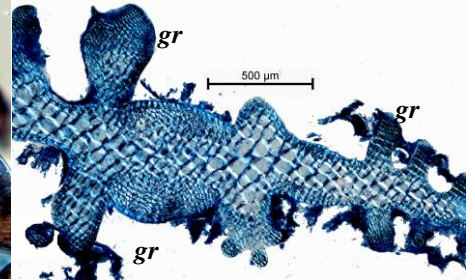


Fig. 19: *Epiglossum smithiae*, cross section, detail of surface outgrowths (*gr*)



Fig. 20: *Amansia pinnatifida*

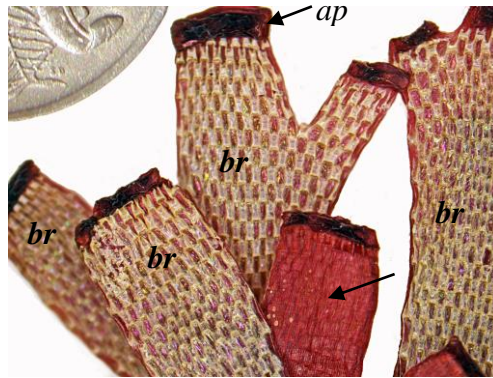


Fig. 21: *Amansia pinnatifida*, in-rolled blade ends (apex, *ap*) bryozoan coat (*br*), uncoated blade (arrowed)

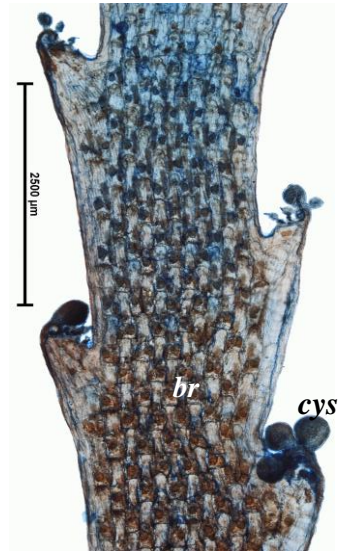


Fig. 22: *Amansia pinnatifida*, blade edges smooth except for teeth bearing clusters of stalked bulb-shaped cystocarps (*cys*); bryozoan coat (*br*)



Fig. 23: *Amansia serrata*

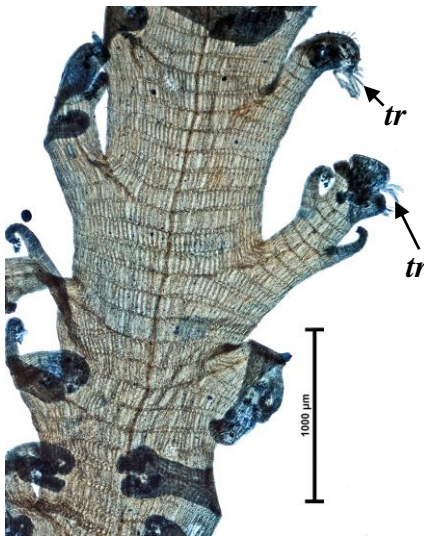


Fig. 24: *Amansia serrata*, short, alternating, branched, incurved side-branches, ending in branched hairs (trichoblasts, *tr*)

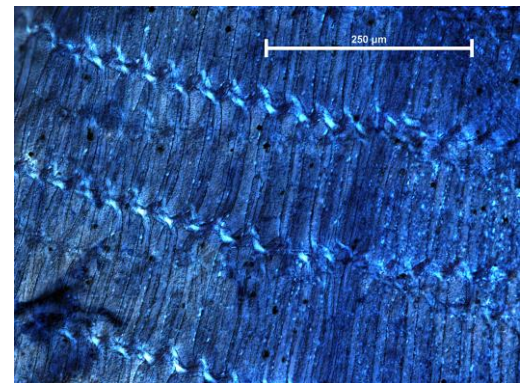


Fig. 25: *Amansia pinnatifida*, highly magnified view of part of a blade free of a bryozoan coat; rhomboid cells in rows

- 10a. blade edge prominently saw-toothed ..... 11.
- 10b. saw-tooth edges **absent**, although minute teeth may be present ..... 12.

11a. blades spirally twisted, teeth single  
 Figs 26, 27. .... *Vidalia spiralis*  
 Family: Rhodomelaceae; Tribe: Amansieae

11b. blades **not** spirally twisted, teeth may divide into 3's or appear single if blade is denuded. .... *Dictyomenia*  
 4 spp (3 with strap-like blades)  
 Family: Rhodomelaceae; Tribe Pterosiphoniae  
 See **Algae at a glance: Dictyomenia**

12a. blade tops in-rolled, **notched**, a microscopic **pointed tip** in each notch. Faint diamond pattern of inner cells present. See Figs 36, 37.  
 ..... 16.  
*Lenormandia* 5 spp (next page)  
 Family: Rhodomelaceae; Tribe: Amansieae

12b. blade tops flat, **not** in-rolled, notches **absent** ..... 13.

13a. blade edges show numerous **lines of dividing cells** (see Fig. 31); tufts of branched hairs (trichoblasts) often on blade surfaces.. *Pollexfenia* 3 spp  
 ..... 14  
 Family: Rhodomelaceae; Tribe: Pterosiphoniae  
 See also **"Algae at a glance: Pollexfenia"**

13b. not as above ..... 19.

14a. plants small, 20-50 mm tall, on Sea nymph (*Amphibolis*) stems, Fig. 30.  
 ..... *Pollexfenia crispata*

14b. plants on rock or algae, 100-250 mm tall ..... 15.

15a. mid-ribs absent. Figs 31, 34.  
 ..... *Pollexfenia pedicellata*

15b. mid-ribs prominent. Figs 32, 33.  
 ..... *Pollexfenia lobata*



Fig. 26: *Vidalia spiralis*

Fig. 27: *Vidalia spiralis*, detail of twisted blades with saw-toothed edges

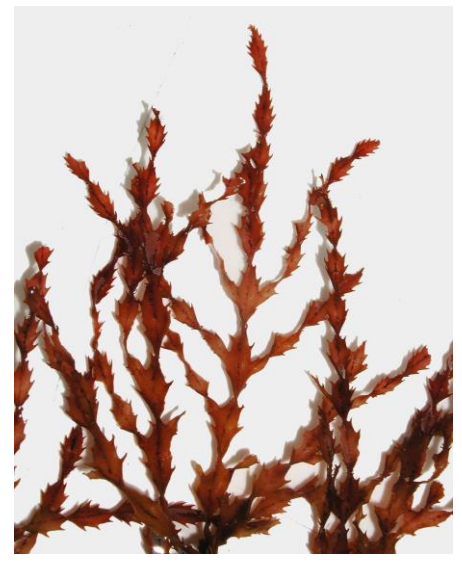


Fig. 28: *Dictyomenia tridens*



Fig. 29: *Dictyomenia tridens*, detail of branched teeth; blades with ring cell-patterns



Fig. 30: *Pollexfenia crispata*

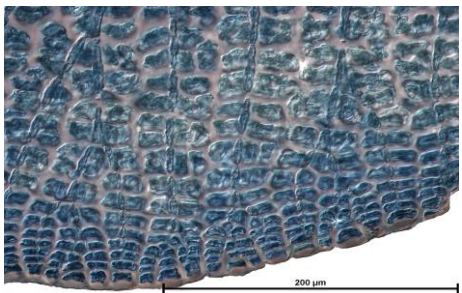


Fig. 31: *Pollexfenia pedicellata*, dividing lines of cells at blade edge



Fig. 32: *Pollexfenia lobata*, with ruffled blades



Fig. 33: *Pollexfenia lobata*, with linear blades



Fig. 34: *Pollexfenia pedicellata*

- 16a. blades 20-40 mm wide, plants often over 200 mm tall. .... 17.  
 16b. blades 10-20 mm wide, plants 50-150 mm tall ..... 18.
- 17a. blades red-brown, mid-ribs **conspicuous**, thick; basal stalk long. Figs 35-37.  
 ..... *Lenormandia muelleri*
- 17b. blades dark red, mid-ribs **inconspicuous**; basal stalk short. Fig. 38.  
 ..... *Lenormandia spectabilis*



Fig. 35: *Lenormandia muelleri*, mid-ribs **conspicuous**, thick; basal stalks long



Fig. 36: *Lenormandia muelleri*, notched blade, diamond shape cell patterns

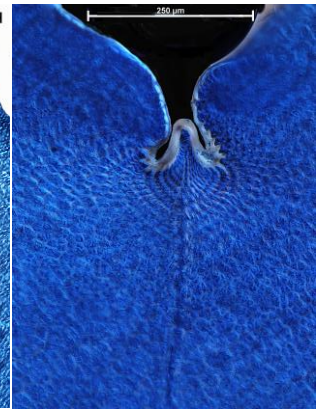


Fig. 37: *Lenormandia muelleri*, detail of the minute pointed tip



Fig. 38: *Lenormandia spectabilis*, blades 20-40 mm wide, mid-ribs **inconspicuous**; basal stalk short



Fig. 39: *Lenormandia pardalis*, blades arising from blade mid-ribs; dark female structures (cystocarps) scattered on the surface

- 18a. blade edges **without** teeth; branches and reproductive structures grow from blade mid-ribs. Figs 39, 40.  
 ..... *Lenormandia pardalis*
- 18b. blade edges **minutely toothed**; branches and reproductive structure from blade edges. Figs 41, 42.  
 ..... *Lenormandia marginata*  
 (a fifth *Lenormandia* sp., *L. latifolia*, can be found in the Pictured key: Broad-bladed red algae)

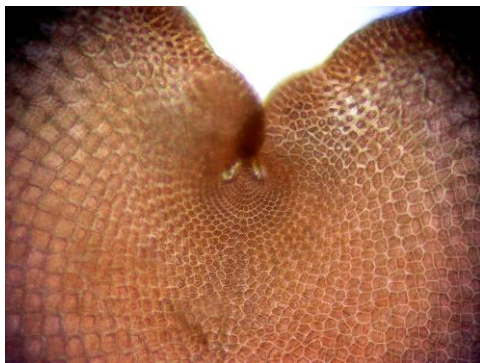


Fig. 40: *Lenormandia pardalis*, minute pointed tip in the notch of a blade, radiating cell rows, (diamond cell-patterns not yet established)

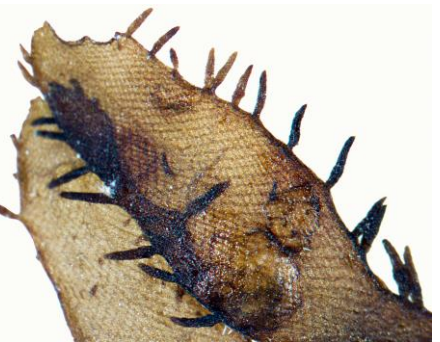


Fig. 42: *Lenormandia marginata*, two (slightly overlapping) blades with diamond cell patterns and sporangial structures (stichidia) along blade edges

Fig. 41: *Lenormandia marginata*, blades arising from blade edges

- 19a. blades in surface view show rings (rosettes) of small cells around large inner cells. .... 20.  
 19b. rosettes not apparent ..... 22.

- 20a. blade edges smooth; tissue squash shows large cells mixed with many fine threads; female structures (cystocarps) form pustules on blade surfaces; sporangia in pyramidal stacks of 4 (tetrahedral). Figs 42-44.



..... *Leptosomia rosea*

Family: Rhodymeniaceae

- 20b. blade edges smooth or fringed, single threads in cores may appear as veins in some species; cystocarps on blade surface or edges; sporangia divided into stacks of 4 (zonate) ..... 21.



- 21a. blade edges fringed with minute outgrowths; female structures (cystocarps) fringe blades. Figs 45-48

..... *Craspedocarpus* 4 spp

Family: Cystocloniaceae

See "... Groups at a glance: Cystocloniaceae"

- 21b. blade edges smooth or fringed; cystocarps on blade surfaces or edges; cell rings (rosettes) and veins only weakly developed. Figs 49-52.

..... *Rhodophyllis* 3 spp

Family: Cystocloniaceae

See "... Groups at a glance: Cystocloniaceae"



Fig. 42: *Leptosomia rosea* on seagrass

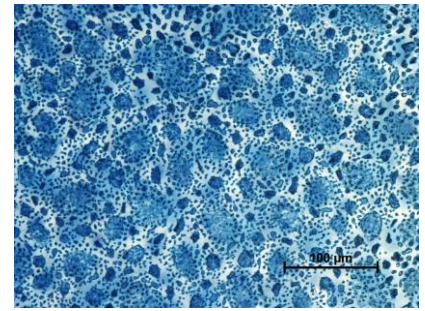


Fig. 43: *Leptosomia rosea*, surface view of cell rings (rosettes)

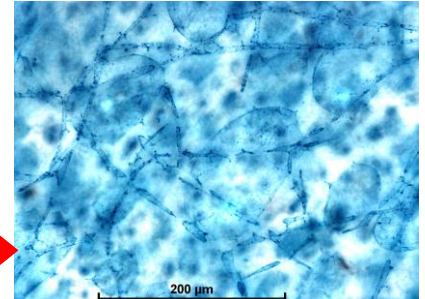


Fig. 44: *Leptosomia rosea*, tissue squash, fine threads amongst other cells



Fig. 45: *Craspedocarpus venosus* surface view of clearly defined cell rosettes, veins



Fig. 46: *Craspedocarpus ramentaceus* fringed with short blades



Fig. 47: *Craspedocarpus blepharicarpus*



Fig. 48: *Craspedocarpus blepharicarpus*, female structures (cystocarps) on blade edge

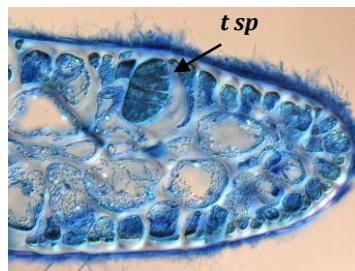


Fig. 49: *Rhodophyllis multipartita*, cross section with large zonate tetrasporangium (*t sp*)



Fig. 50: *Rhodophyllis membranacea*



Fig. 51: *Rhodophyllis volans*



Fig. 52: *Rhodophyllis membranacea*, weakly developed cell rosettes; veins

- 22a. cross sections of blades, or tissue squashes show a core (medulla) of fine threads, outer layers (cortex) of very small cells. .... 23.  
 22b. cross sections of blades show a core of large oval-shaped cells, grading to surface smaller cells ..... 24.  
 (next page)

- 23a. tissue squashes show spidery (ganglionic) cells amongst extremely fine threads; outer layers (cortex) of chains of outward-facing cells; female structures (cystocarps) sunken in blade surfaces. Figs 53-57.

..... *Cryptonemia* 5 spp  
 Family: Halymeniaceae  
 See “Algal groups at a glance: Halymeniaceae”

- 23b. ganglionic cells *absent*; core threads with many arms, cortex of an inner, dense cell layer and distinct outer layer of outward-facing cells; cystocarps along blade edges Figs 58-60. .... *Sarcodia marginata*  
 Family: Sarcodiaceae

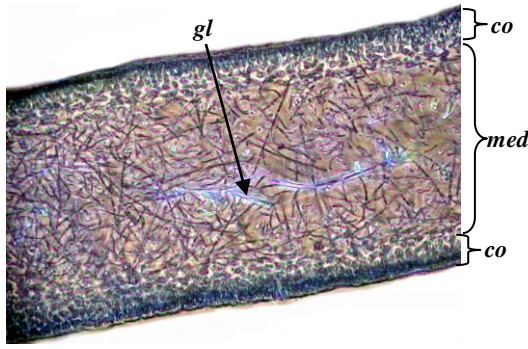


Fig. 53: *Cryptonemia digitata*, cross section, *wide* core (medulla, *med*) of fine threads, spidery (ganglionic) cell (*gl*), outer layers (cortex, *co*) of chains of outward facing cells



Fig. 54: *Cryptonemia digitata*, tissue squash, fine core threads, bright, spidery (ganglionic) cells



Fig 55: *Cryptonemia digitata*

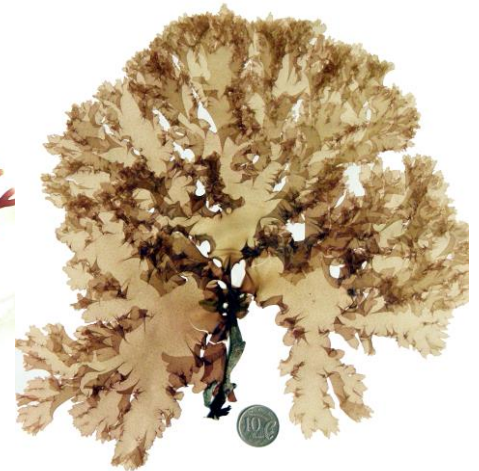


Fig 56: *Cryptonemia kallymenioides*



Fig. 57: *Cryptonemia nitophylloides*



Fig. 58: *Sarcodia marginata*

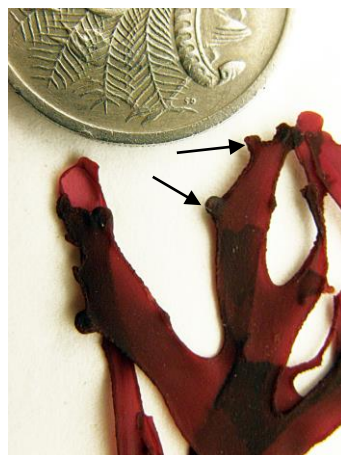


Fig. 59: *Sarcodia marginata*, detail of cystocarps (arrowed) along blade margins

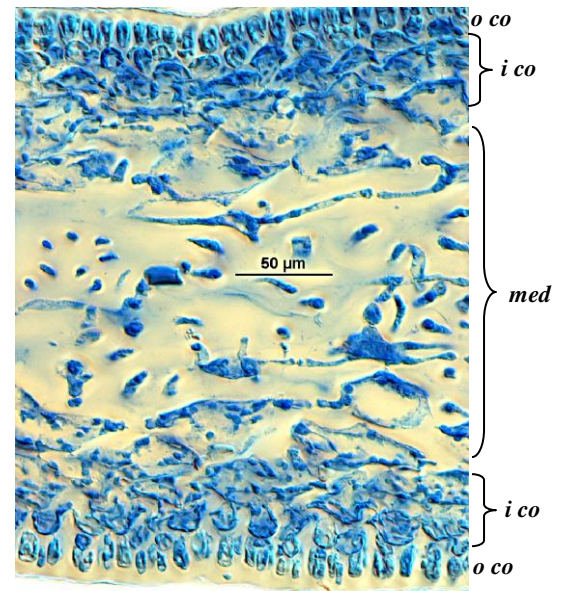


Fig. 60: *Sarcodia marginata*, cross section, medulla, (*med*) of many-armed threads, inner cortex (*i co*), outer cortex (*o co*)

- 24a. plants **leathery**, forked or with a flat, thick, broad, central main branch (axis) ..... 25.
- 24b. plants **softer** and flexible, main branches regularly forked or with a wide main branch and short side-branches forked or toothed ..... 26.

- 25a. plants usually upright (except *Curdiea crassa*); female structures (cystocarps) form pimple-like lumps near blade margins. Figs 57-62.

..... *Curdiea* 3 spp  
Family: Gracilariaceae

See “**Southern Australian groups at a glance: Gracilariaceae**”

- 25b. plants grow flat on rocks, attached by short outgrowths (haptera); cystocarps generally scattered on blade surfaces. Figs 63-66.

*Tylotus obtusatus*  
Family: Dicranemataceae



Fig. 59: *Curdiea angustata*, cystocarps along blade edges



Fig. 62: *Curdiea angustata*



Fig. 61: *Curdiea crassa*, edge of the blade lifted to reveal a white layer of bryozoan animals on the underside

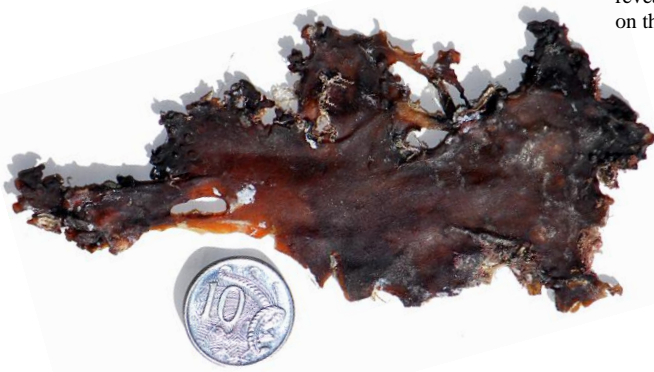


Fig. 60: *Curdiea crassa* lies flat on rocks



Fig. 63: *Tylotus obtusatus*



Fig. 64: *Tylotus obtusatus*, root-like attachment structures



Fig. 65: *Tylotus obtusatus*, peg-like attachment structures on the blade underside

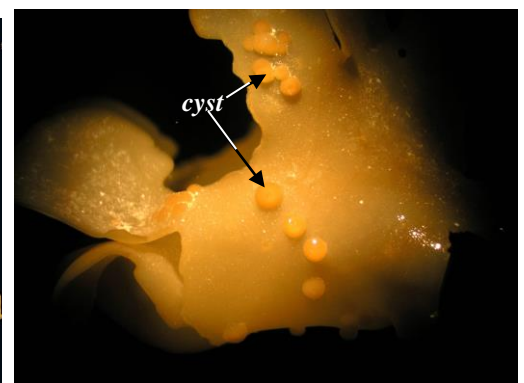


Fig. 66: *Tylotus obtusatus*, cystocarps on the blade surface



26a. blades forked, short side branches absent. Figs 67- 74.

See “*Southern Australian groups at a glance: Rhodymeniaceae*”

26b. blades with short, small side branches ..... 27.



Fig. 67: *Rhodymenia obtusa* (Some specimens collected from Victoria and Tasmania and placed in this species include a hidden, new species, *Rhodymenia wilsonis*)



Fig. 68: *Halopeltis cuneata* (= *Rhodymenia cuneata* and *Rhodymenia halymenioides* in the Marine Benthic Flora)



Fig. 69: *Halopeltis australis* (= *Rhodymenia australis* in the Marine Benthic Flora)

200  $\mu$ m

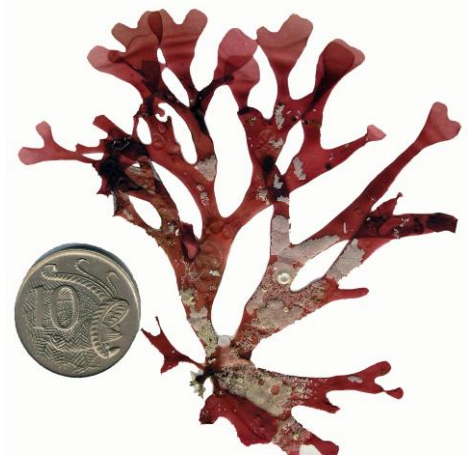


Fig. 70: *Halopeltis verrucosa* (= *Rhodymenia verrucosa* in the Marine Benthic Flora), with a basal coating of whitish bryozoans

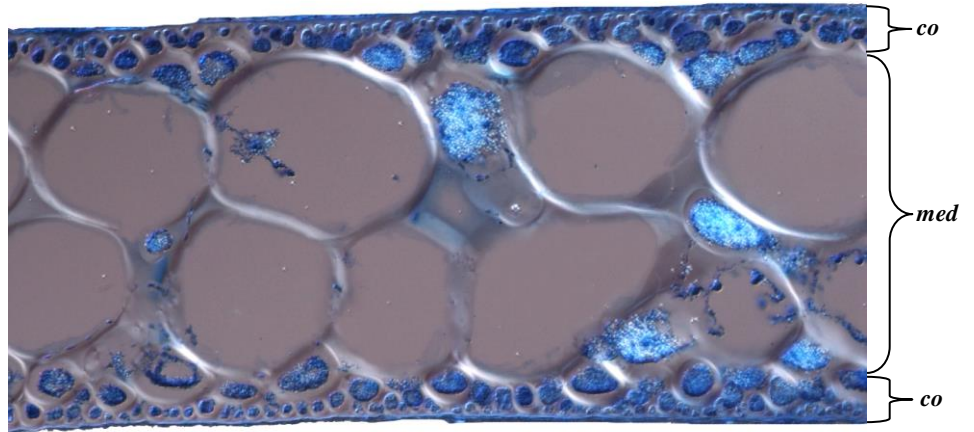


Fig. 71: *Halopeltis cuneata* (= *Rhodymenia cuneata* and *Rhodymenia halymenioides* in the Marine Benthic Marine Benthic Flora), cross section, wide core (medulla, *med*) of large cells, rapidly grading to small cells of the narrow outer layers (cortex, *co*)



Fig. 72: *Halopeltis verrucosa*, warty cystocarp on the blade surface

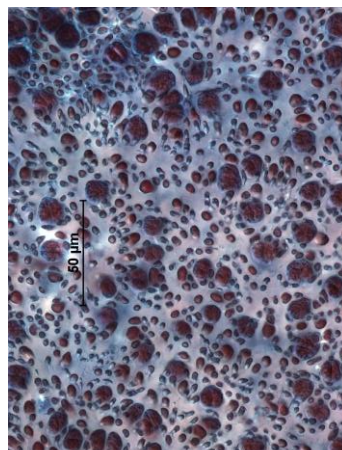


Fig. 73: *Halopeltis verrucosa*, surface view of large tetrasporangia amongst small cortex cells



Fig. 74: *Rhodymenia leptophylla*

27a. short side branches fringing the main branch (axis) are narrow, usually unbranched themselves. Figs 75-79.

*Rhodymenia prolificans*,  
*Rhodymenia stenoglossa*

27b. side branches toothed or branched ..... 28.

28a. side branches usually spiky, arranged in sets of 2's, or 3's, 4's and 5's; some may be serrated on the outer edge. Tetrasporangia in fingerlike structures tufted in branch angles. Core in cross section **without** obscure threads. Figs 80-82.

See "**Southern Australian groups at a glance: Plocamium**"

28b. side branches not as above, ends usually forked, rounded or horn-like. Tetrasporangia scattered, embedded in the blade. Core in cross section with obscure threads wrapped around large rounded cells (see Figs 92, 93. .... *Callophyllis*,  
*Austrophyllis*  
(next 2 pages)



Fig. 75: *Rhodymenia prolificans*



Fig. 76: *Rhodymenia prolificans*, detail of numerous, extra, short side branches fringing the blades



Fig. 78: *Rhodymenia stenoglossa*



Fig. 79: *Rhodymenia stenoglossa*, detail of narrow blades arising from a common base

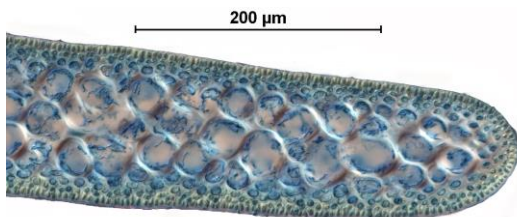


Fig. 77: *Rhodymenia prolificans*, cross section

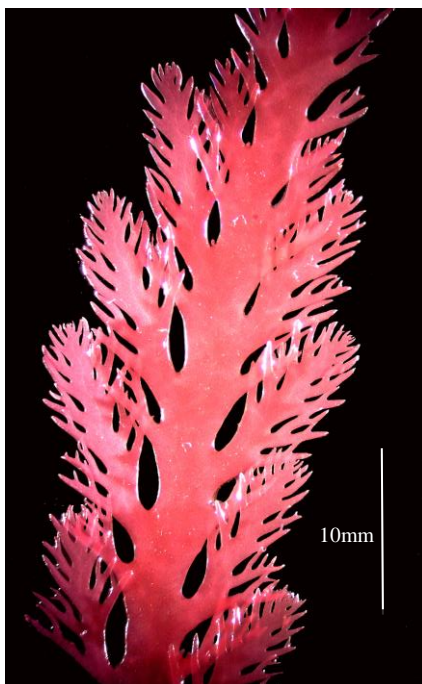


Fig. 80: *Plocamium mertensii*

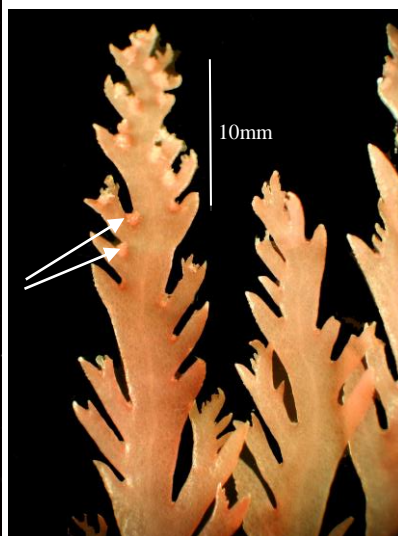


Fig. 81: *Plocamium preissianum*, tufts of reproductive structures in branch angles (arrowed)



Fig. 82: *Plocamium angustum*

29a. branching fairly regular; edges of main blades largely smooth, tips lance-shaped and parallel ..... 30.

29b. branching more irregular, edges of main blades (axes) with small antler-like or spiny side prongs, tips spiny, or spreading ..... 31.

30a. blades 10-50 mm wide, forked about every 10-30 mm; female reproductive structures (cystocarps) pimple-like, scattered throughout blades. Figs 83, 84.  
..... *Austrophyllis harveyana*

30b. blades < 10 mm broad, cystocarps restricted to branch tips. Figs 85, 86.  
..... *Callophyllis cervicornis*

31a. plants large, robust, commonly >150 mm tall; tips rounded, and 2 mm wide. Figs 87, 88, 95.  
..... *Callophyllis lambertii*

31b. plants thinner, more delicate, usually < 150 mm tall; tips pointed, ≤ 1mm wide for some distance. Figs 89-94.  
..... *Callophyllis rangifera*

*Austrophyllis alcicornis*  
(similar vegetatively these 2 spp are separated on female reproductive features – see individual Fact Sheets and Fig. 94)



Fig. 83: *Austrophyllis harveyana*



Fig. 85: *Callophyllis cervicornis*



Fig. 84: *Austrophyllis harveyana* detail of branches at tips, scattered, pimple-like cystocarps



Fig. 86: *Callophyllis cervicornis*, branch tips with cystocarps



Fig. 87: *Callophyllis lambertii*

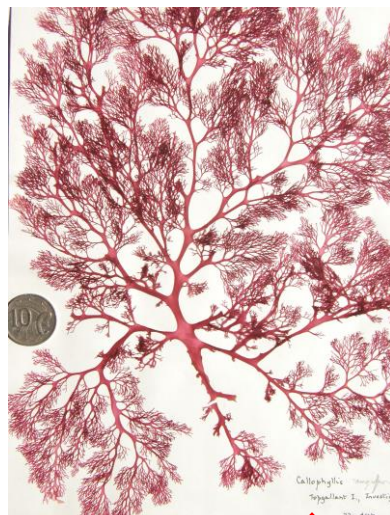


Fig. 89 *Callophyllis rangifera*



Fig. 91: *Austrophyllis alcicornis*



Fig. 90: *Callophyllis rangifera* tips



Fig. 92: *Austrophyllis alcicornis* tips

Fig. 88: *Callophyllis lambertii*, tips

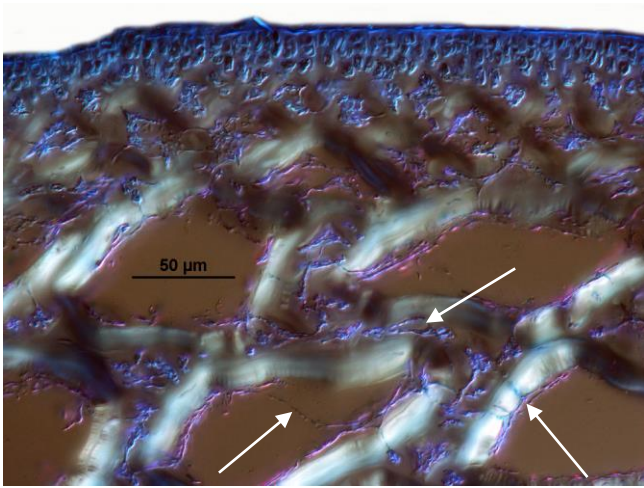


Fig. 93: *Austrophyllis harveyana*, cross section showing large, thick-walled core cells ringed by delicate threads (arrowed)

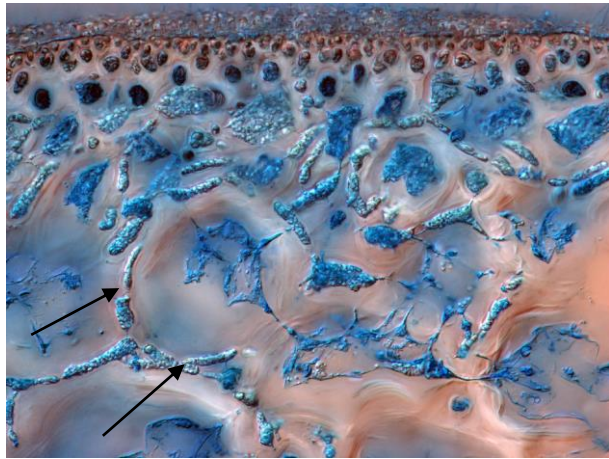


Fig. 95: *Callophyllis lambertii*, cross section showing large core cells ringed by delicate threads (arrowed)

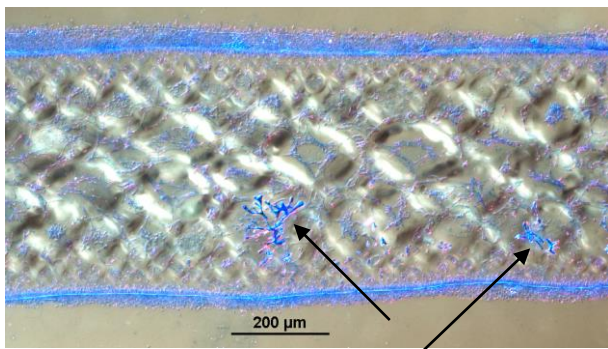


Fig. 94: *Austrophyllis alcicornis*, cross section of young female stage, showing heavily stained, amoeba-like cells (arrowed) involved in reproduction, a feature separating the genus from *Callophyllis*