Pictured Key to common red algae of southern Australia: *Chondria* and *Husseya* 2nd Ed.

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 sheet.

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

Artefacts Microscope images are usually blue stained, or have a black background. Branches of pressed specimens are often flattened, looking un-naturally compressed, preserved specimens yellow or brown

The key on the next pages identifies species of *Chondria* and *Husseya*, 2 genera of the Family: Rhodomelaceae, Tribe: Chondrieae. Some of these are commonly found by reef-walkers, and easily confused with other narrow-branched red algae such as *Laurencia* and *Chondrophycus*.

Other members of Chondrieae have recognisably different shapes:

- *Acanthophora* (Figs 1, 2) has small spines, and is rare. It is described in a separate Fact Sheet in this Website
- *Coeloclonium* (Figs 3, 4) has hollow branches, pinched top and bottom into sections or segments. It is listed with similar red algae in *Algae at a glance: Beadlike Red Algae*.
- *Cladurus elatus* (Figs 5-7) has branches with visible internal partitions like bricks in a wall, and as in other members of the Chondrieae when viewed in cross section, has a well defined central thread ringed by 5 (pericentral) cells (Fig. 6).

Fig 1: *Acanthophora dendroides*, branches spiny

Fig 2: *Acanthophora dendroides*, branches with small spines

Fig 3: *Coeloclonium debile*, branches hollow, jointed (left)

Fig. 4: *Coeloclonium debile*, central thread and radiating pericentral cells just visible (right)

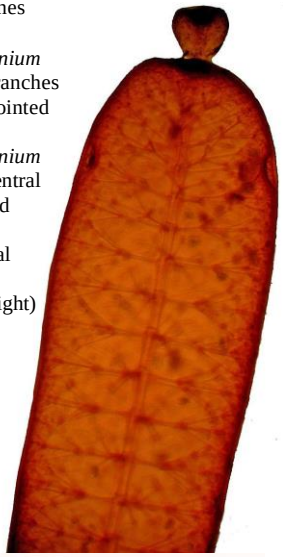


Fig 5: *Cladurus elatus*, branches showing a "brick-wall" pattern of internal partitions

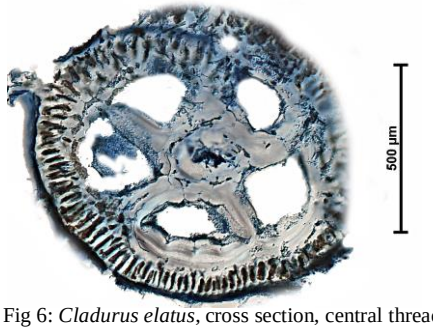
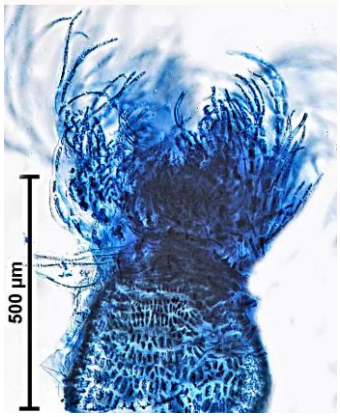


Fig 6: *Cladurus elatus*, cross section, central thread, 5 pericentral cells (above)

Fig. 7: *Cladurus elatus*, branch tip, clusters of hairs (trichoblasts) (right)



Baldock, R.N. (2016) Pictured key to common red algae of southern Australia: *Chondria* and *Husseya*. 2nd Ed. *Algae Revealed*. 10 pp. State Herbarium S Australia. flora.sa.gov.au/algae_revealed

Chondria and *Husseya* have these features:

- plants dark brown-red to yellow in colour, branches cylindrical or slightly compressed, usually firm, but often drying gristly or tough
- 1-several main branches (axes) and shorter side branches arranged radially *or* in one flat surface
- internal microscopic structure, when seen in cross section, largely of equal-sided cells (parenchyma)
- cross sections of young branches show the cell of a central thread ringed by ***5*** large cells (*pericentrals*) (Fig. 8). Some surface views of branch tips especially those containing sporangia have *thread-like* pericentrals radiating out from the central filament like spokes of a wheel (Fig. 9).
- inner cells often have wall thickenings seen under the microscope as bright bands or caps on cells (Fig. 10).
- male structures consist of unique, thin, flat discs (Fig. 11.)
- branch tips pointed *or* blunt. Hair tufts (*trichoblasts*) at tips are responsible for the growth of the branch. (Fig. 11). In some species these are found in a dimple or pit.

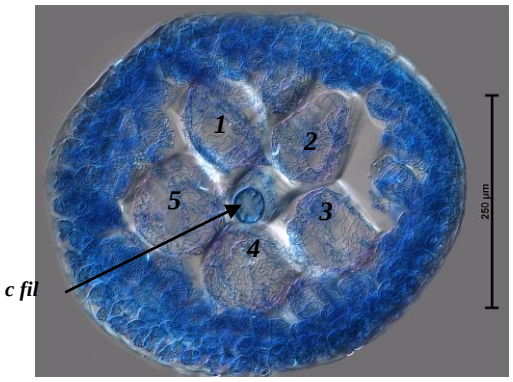


Fig 8: *Chondria* cross section, central thread (***c fil***) ringed by 5 pericentral cells (***1-5***) (above)

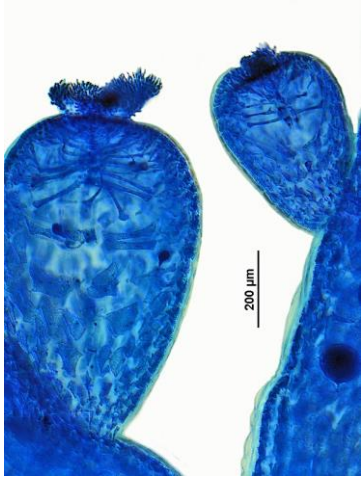


Fig 9: *Chondria curdieana* branch tips, spoke-like pericentral cells radiating from a central thread , bunches of branched threads (trichoblasts) at tips (above, right)

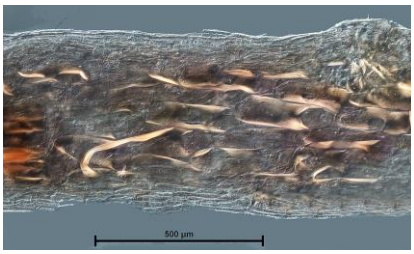


Fig 10: *Chondria curdieana* side view, bright bands on internal cells (above)

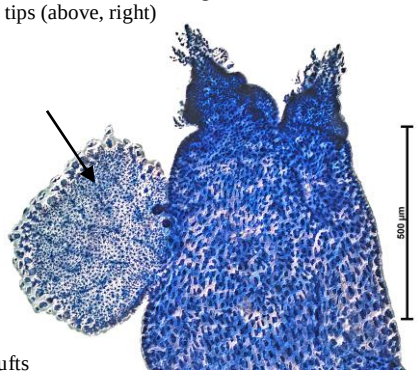


Fig 11: *Chondria fusifolia*, pointed tips with hair tufts (trichoblasts), disc-shaped male structure (arrowed) (above, right)

Look-alike algae – *Laurencia* and *Chondrophycus*

Laurencia

- a cross section near branch tips shows a ring of ***4*** pericentral cells about each central thread cell in this genus (Fig. 12). This pattern is soon obliterated by the production of numerous additional cells
- in fresh specimens viewed microscopically, plants may have unique, bright cell bodies (*corps en cerise*) (Fig. 13).

Chondrophycus

- in a cross section, no visible central thread ringed by pericentral cells is apparent (Fig. 14).
- there are no bright cell bodies

Flat male discs are ***absen****t* in both these genera.

A separate pictured key is provided for *Laurencia* and *Chondrophycus* in the *Algae Revealed* Web pages.

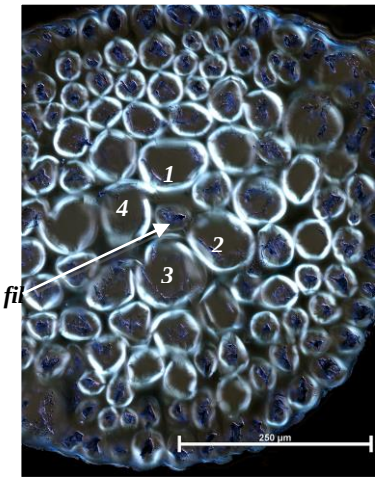


Fig. 12: *Laurencia*, cross section, central thread (***c fil***) ringed by 4 pericentral cells (***1-4***) (above)

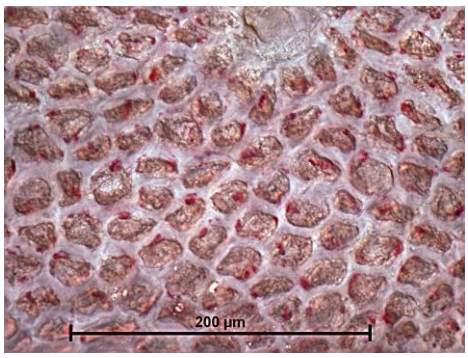


Fig. 13: *Laurencia*, bright cell bodies in surface view (above)

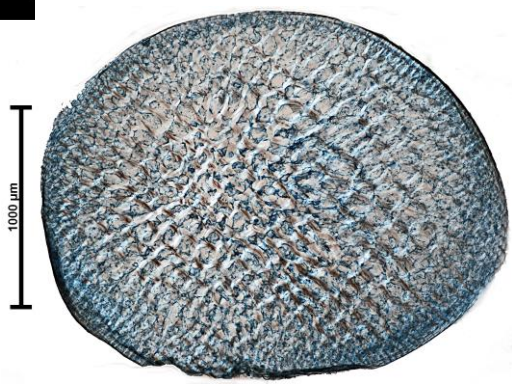


Fig. 14: *Chondrophycus*, cross section

1a. dark brown-red; branches wiry, with flattened ends in pressed specimens; cross sections of ***mature*** axes show rings of large cells separated by minute rhizoids; mature female structures (cystocarps) with a prominent stalk, sporangial structures bunched in angles between axes and short side branches. Figs 15-20. Widespread in relatively shallow water. ..... *Husseya rubra*

1b. plants fleshy; rings of large cells *absent*; cystocarps on short stalks or stalkless; sporangia in short branches ..... 2.

2a. plants grow flat on other algae, attached by many-celled clamps (haptera) from undersides of flat axes. Mature female structures (cystocarps) attached along their edges to neighbouring branches. Figs 21-24. Apparently an E states species. ..... *Chondria infestans*

2b. plants upright, sides of cystocarps *not* touching the branches ..... 3.

Fig. 15: *Husseya rubra*, tips flattened in pressed specimens

Fig. 16: *Husseya rubra* , fertile plant, tufts of spore structures in angles between axes and side branches (arrowed)

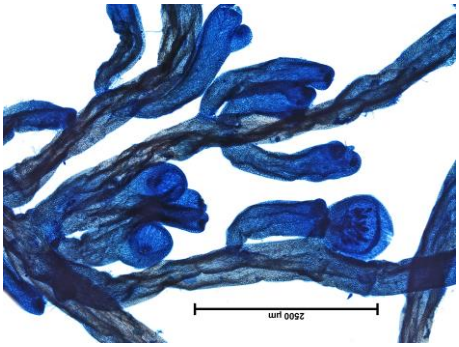
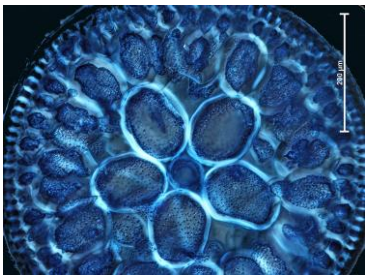
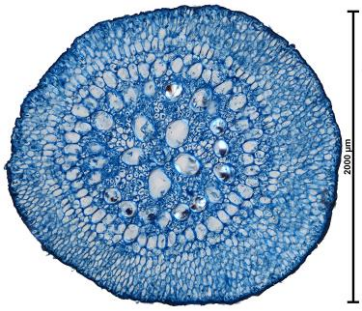


Fig. 19: *Husseya rubra*, bulbous mature female structures on long stalks

Fig. 21: *Chondria infestans*, flat branches lying over the host, *Polyopes constrictus*





Figs 17, 18: *Husseya rubra*, cross sections of young (upper) and old (lower) axes

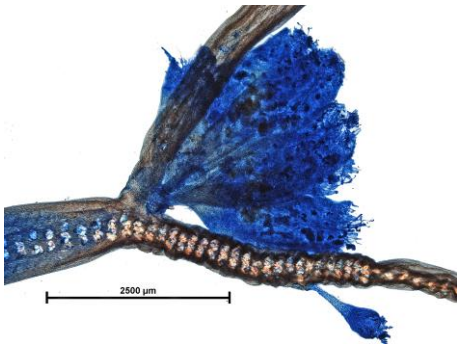


Fig. 20: *Husseya rubra*, bunch of sporangial structures (stichidia), bright cell wall thickenings in the axis

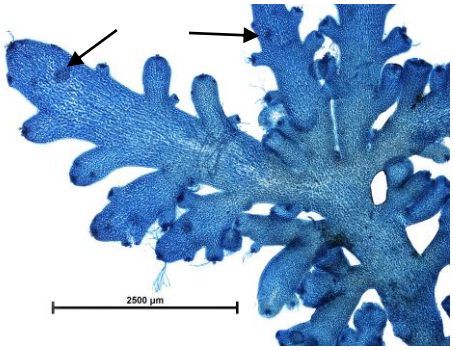


Fig. 22: *Chondria infestans*, plant freed from its host,compressed branches in two rows at edges of axes; clamps (haptera) seen as dark spots (arrowed)

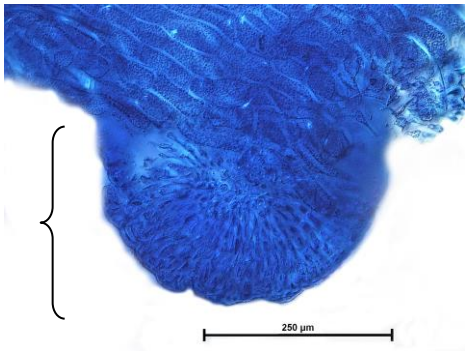


Fig. 23: *Chondria infestans*, underside of a branch showing a clamp (bracketted) torn free from the host

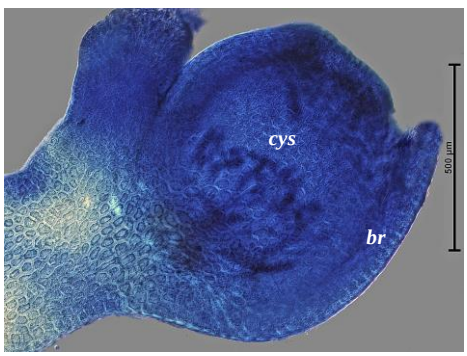


Fig. 24: *Chondria infestans*, mature female structure (cystocarp, ***cys***) attached along the underside to the adjacent short side branch (***br***)

3a. main branches (axes) cylindrical ..... 4.
3b. axes mostly compressed, at least near the plant base ..... 15.

4a. smaller branches thin, < 0.25 mm wide ……..…..... 5.
4b. smaller branches thicker, >0.25 mm wide ..... 6.

5a. plants grow on sea grasses, algae, or in free, loose tangles; branching radial, tips pointed; mature female structures (cystocarps) with a short beak on the underside; male plates with only a few, scattered rim-cells Figs 25-27. Confined to sheltered estuaries.
..... *Chondria angustissima*
5b. plants on rock or other hard surfaces, branching often on one side of axes, tips rounded with slight pits; beaks on cystocarps *absent*. Possibly an introduced species. Figs 18-21. Found mainly in harbours; possibly introduced.
…….. *Chondria arcuata*

Fig. 25: *Chondria angustissima* on a seagrass leaf

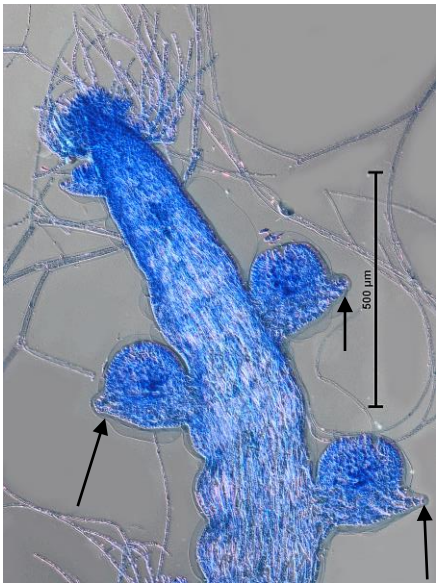


Fig. 26: *Chondria angustissima*, pointed tip; cystocarps with a beak (arrowed)

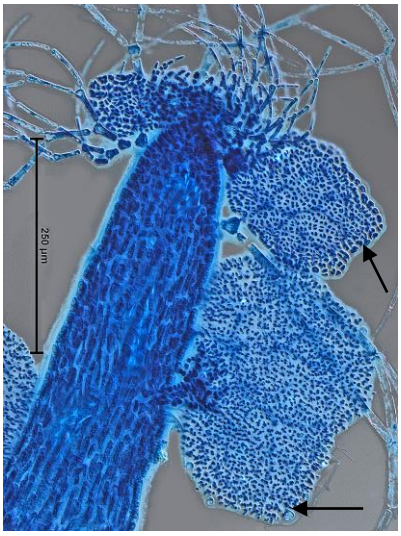


Fig. 27: *Chondria angustissima*, pointed tip; with hair-tufts (trichoblasts), male plates with discontinuous rim cells

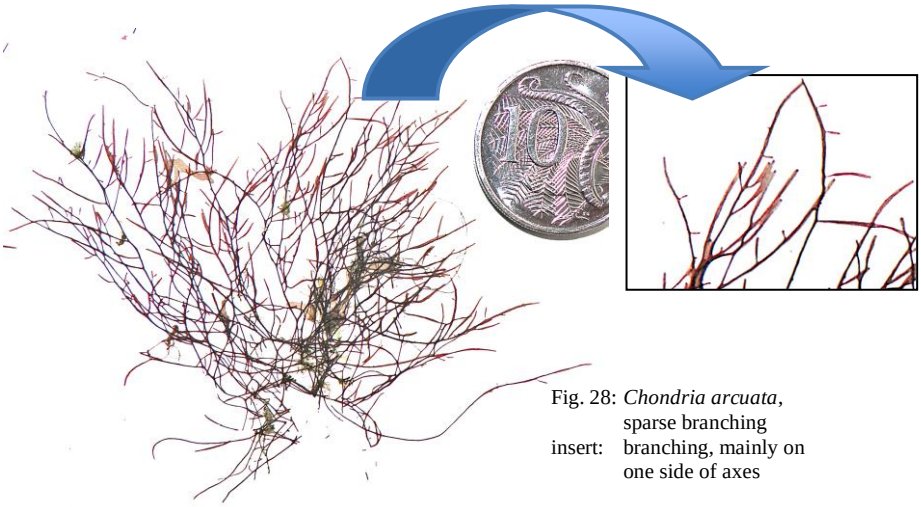


Fig. 28: *Chondria arcuata*, sparse branching
insert: branching, mainly on one side of axes

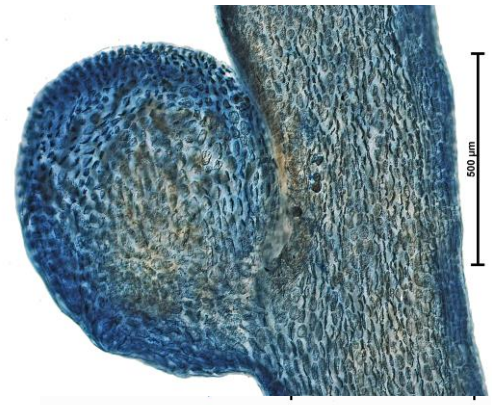


Fig. 29: *Chondria arcuata*, cystocarp beak *absent*

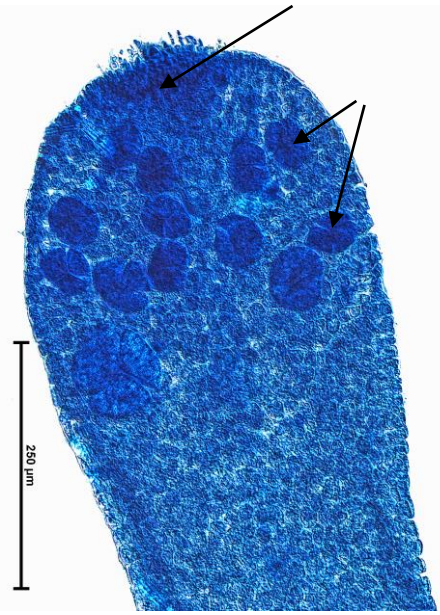


Fig. 30: *Chondria arcuata*, tip blunt, with a shallow pit (arrowed); tetrasporangia (*t sp*)

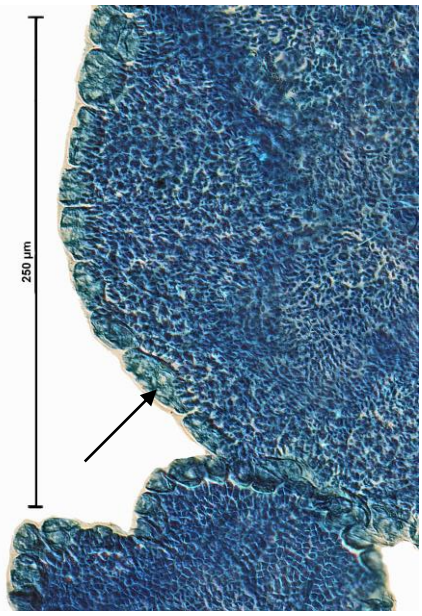


Fig. 31: *Chondria arcuata*, detail of male plate with continuous rim cells (arrowed)

6a. minute, swollen storage organs at the base of axes or in upper branches. Figs 32-34. A deep-water western species.
……..…… *Chondria bulbosa*

6b. storage organs *absent* (but encrusting parasites may be present and cause some confusion in identification.
…….. 7.

7a. bright cell-wall thickenings ***complex***, forming elaborate patterns within branches; surface cells (epidermis) elongate. Figs 35-37. Known only from Victoria.
……..….. *Chondria hieroglyphica*
(a "rare" species; see separate Fact Sheet)

7b. bright cell wall thickenings absent or simple, seen as caps or bands on cells within branches; epidermis cells short or long ……..… 8.

8a. surface cells short, length/breadth ~ 1.5; ultimate branches ~ 1 mm wide; some curved upwards, branching can be dense. Figs 38-41 (next page).
A widespread species.
…….. *Chondria incurva*

8b. surface cells longer, length/breadth = 1.5-10; ultimate branches < 1mm wide, not curved …….. 9.

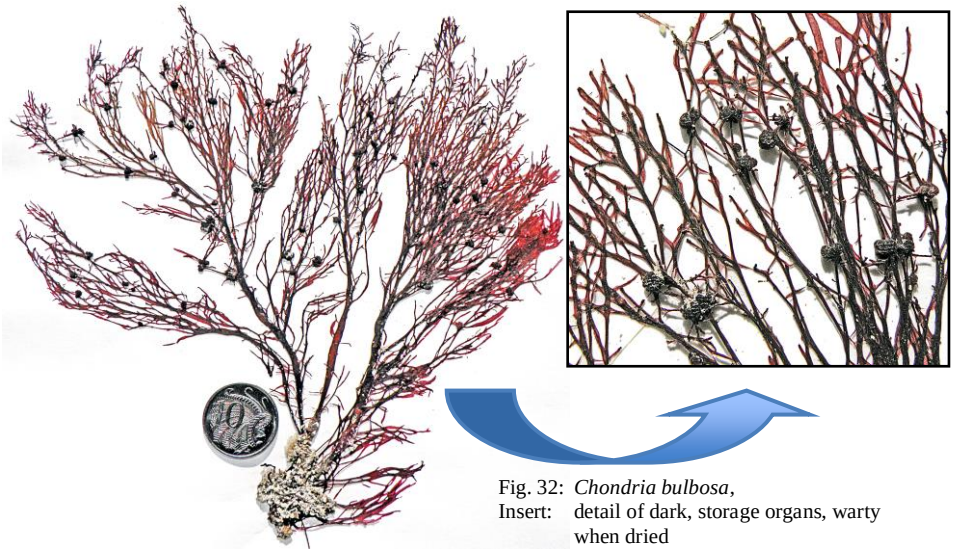


Fig. 32: *Chondria bulbosa*,
Insert: detail of dark, storage organs, warty when dried

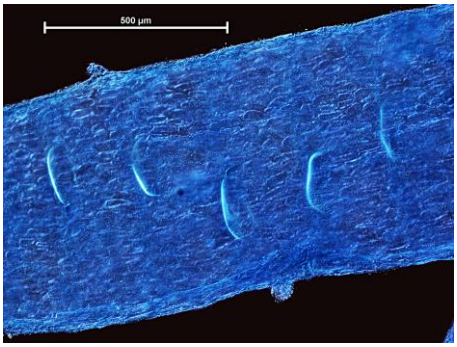


Fig. 33: *Chondria bulbosa*, bright, cell wall thickenings (above)

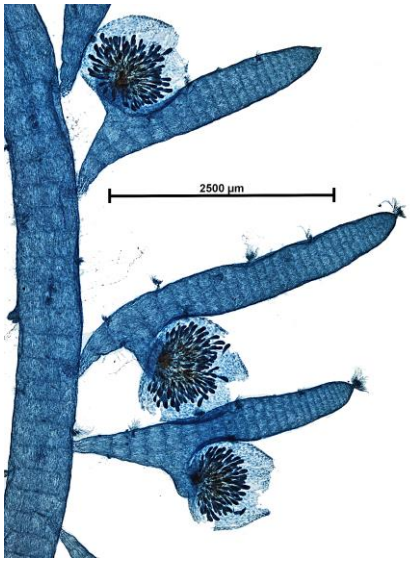


Fig. 34: *Chondria bulbosa*, mature female structures (cystocarps, slightly squashed) at the base of short, pointed side branches bearing hair-tufts (trichoblasts) (right)

Fig. 35: *Chondria hieroglyphica*

Fig. 36: *Chondria hieroglyphica*, complex, bright, cell wall thickenings

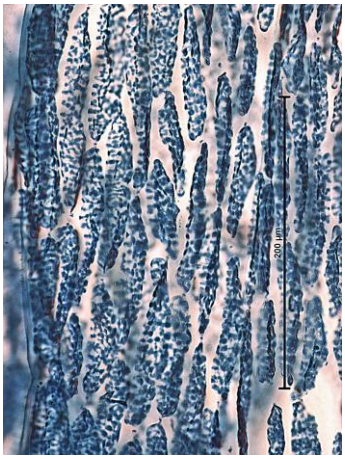
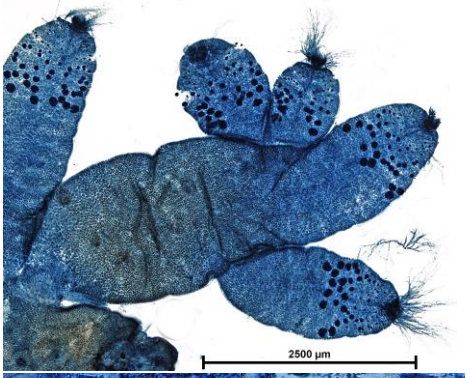


Fig. 37: *Chondria hieroglyphica*, elongate surface cells



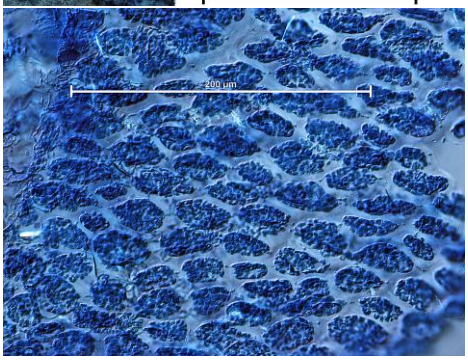


Fig. 38: *Chondria incurva (left)*

Fig. 39: *Chondria incurva*, short curved branches (above)

Fig. 40: *Chondria incurva*, swollen ultimate branches, tetrasporangia in bands across branches (above, right)

Fig. 41: *Chondria incurva*, short surface cells (right)

9a. ***rare***; side branches mainly arise from one side of axes; mature female structures (cystocarps) almost stalkless but with a basal swelling. Figs 42, 43. Known only from SE Australia.
……. *Chondria subsecunda*

9b. side branches irregular or arise radially
…….. 10.

10a. plants in tangled masses, ends of side branches often curled (like tendrils), tips rounded; cell-wall thickenings often prominent. Figs 44-46. Found in tangled masses in sheltered habitats in tidal pools or tidal flats.
…… *Chondria capreolis*

10b. ends of side branches straight; tips pointed or rounded ……..…… 11.

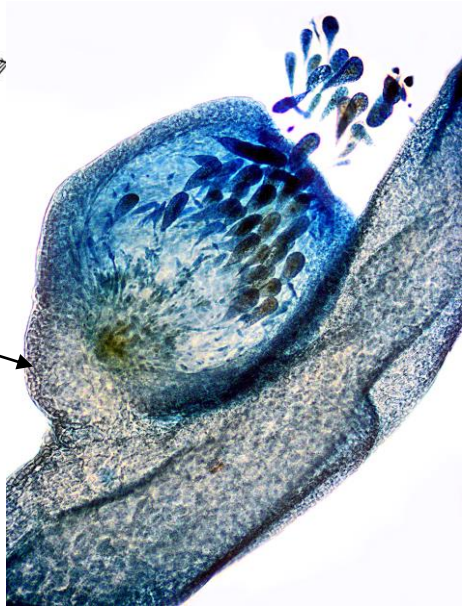


Fig. 42: *Chondria subsecunda*, largely one-sided branching

Fig. 43: *Chondria subsecunda* mature female structure (cystocarp), almost stalkless, with a basal swelling (arrowed)

Fig. 44: *Chondria capreolis*, prominent cell-wall thickenings of inner cells

Fig. 45 *Chondria capreolis*, whole plant

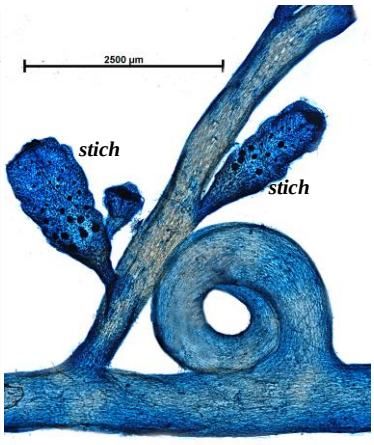


Fig. 46: *Chondria capreolis*, curled end (tendril) of a side branch; sporangial branches (stichidia, *stich*)

11a. ultimate branches coming to a point; cell-wall thickenings (when present) occur ***both*** ends of inner cells; mature female structures (cystocarps) with a basal spur; male plates with rim-cells 2-3 cells wide. Figs 47-50. Widespread.
…….…… *Chondria fusifolia*

11b. ultimate branches with tips rounded or with shallow pits; cell-wall thickenings on ***tops*** of inner cells only; cystocarp spurs present *or* absent; male plates with rim-cells 1-3 cells wide
……..…….. 12.

12a. surface cells short, length/ breadth ≈ 2-5; mature female structures (cystocarps) lacking a spur; tetrasporangia large, 180-250 µm wide
..... 13.

12b. surface cells usually longer, length/breadth ≈ 5-17; cystocarps with a spur; male plates with rim cells 1 cell wide; tetrasporangia smaller, 120-150 µm wide ..... 14.

13a. plants red, fading to brown; side branches often in tufts; axes 1.2-2.0 mm wide, ultimate branches ~ 0.6 mm wide; cell-wall thickenings usually as massive caps on inner cells; branches with sporangia elongate. Figs 51-54. A SE Australian species, similar to *C. succulenta*.
..... *Chondria subfasciculata*

13b. plants red-brown to brown; side branches usually arising singly; axes 0.4-1.0 mm wide, ultimate branches ~ 0.4 mm wide; cell-wall thickenings forming caps on cells at first, later girdles, some hooked; branches with sporangia are short, oval-shaped. Figs 55-58 (next page). Common and widespread on seagasses and algae, mainly in shallow water.
..... *Chondria curdieana*

Fig. 47: *Chondria fusifolia*

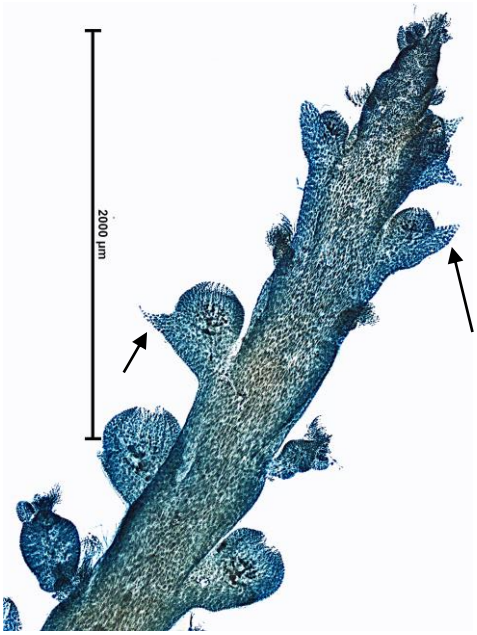


Fig. 48: *Chondria fusifolia*, mature female structures (cystocarps), stalkless but with a pointed spur at the base (arrowed)

Fig. 49: *Chondria fusifolia*, bright cell-wall thickenings at both ends of a inner cells, their lengths marked by brackets

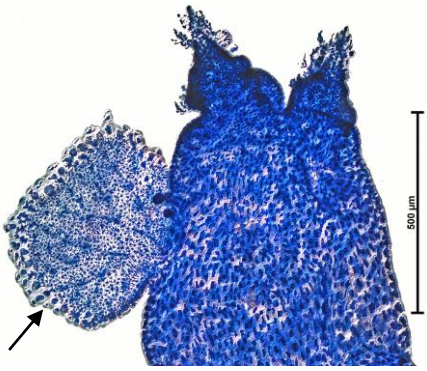


Fig. 50: *Chondria fusifolia*, male plate, rim cells 1-3 cells wide (arrowed)

Fig. 51: *Chondria subfasciculata*

Fig. 52: *Chondria subfasciculata*, detail of bunches of branches arising from axes

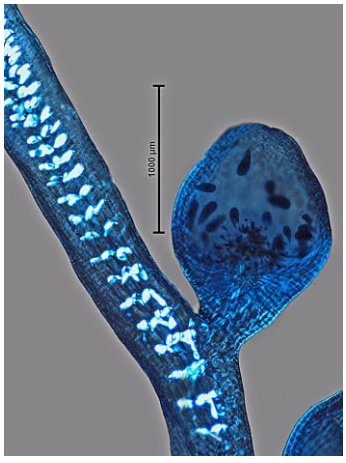


Fig. 53: *Chondria subfasciculata*, cystocarp lacking a basal spur, prominent bright cell-wall thickenings forming massive caps on inner cells

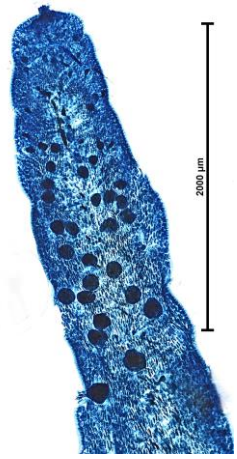
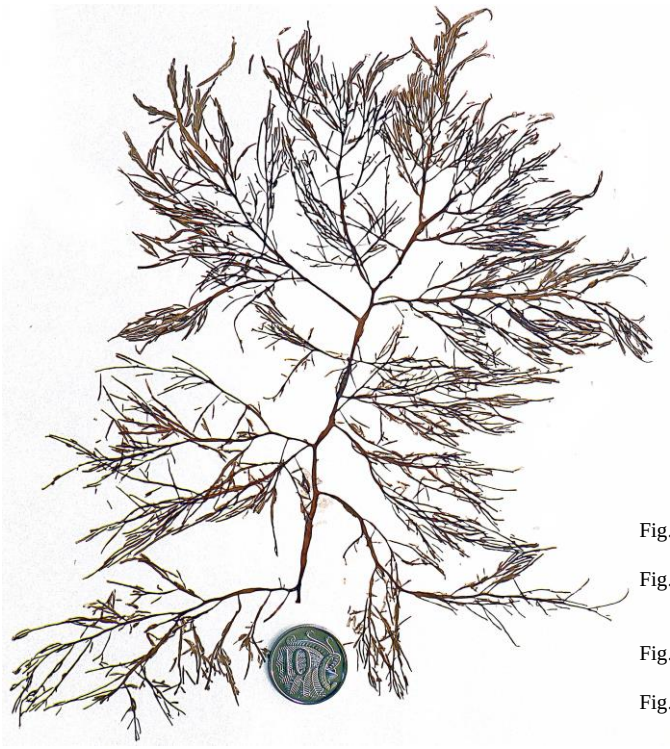


Fig. 54: *Chondria subfasciculata*, elongate branch bearing large tetrasporangia



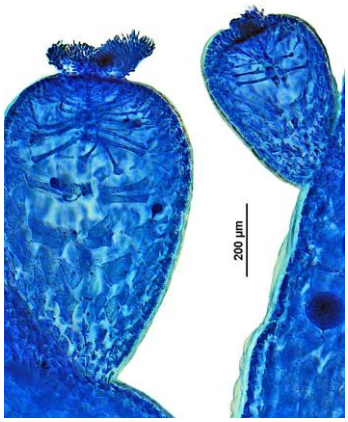
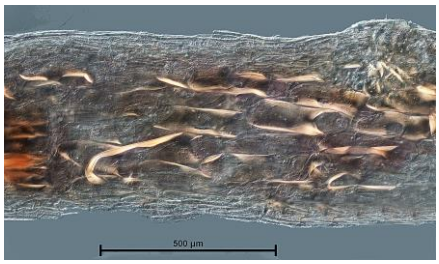


Fig. 55: *Chondria curdieana*, whole plant (left)
Fig. 56: detail of brancheing, mainly single, not bunched (above)
Fig. 57: stubby branches bearing sporangia (above, left)
Fig. 58: bright, hooked and elongate cell wall thickenings (right)



14a. plants red to dark red, usually ***large***, 100-400 mm tall; branching ***loose***, cell-wall thickenings ***absent***; surface cells 10-15 µm wide, length/breadth ≈ 9-17. Figs 59-61. Widespread in sheltered habitats.
..... *Chondria harveyana*

14b. plants red-brown, usually smaller, 30-180 mm tall; cell-wall thickenings if present consist of caps on upper parts of inner cells; surface cells 20-25 µm wide, length/breadth varying from 1.5-7, Figs 62-64. Probably confined to sheltered inlets with strong water flow.
..... *Chondria succulenta*

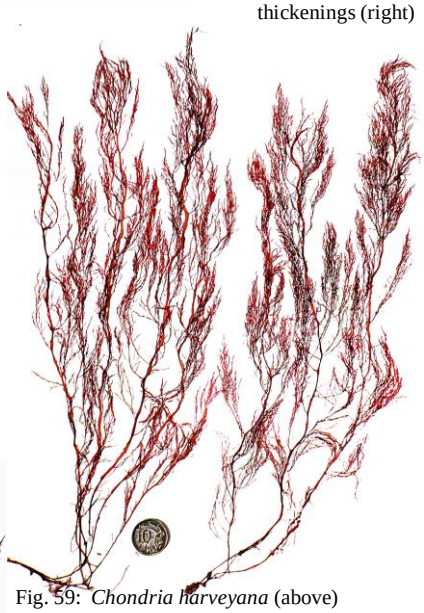


Fig. 59: *Chondria harveyana* (above)
Fig. 60: cystocarps with spurs (above, right

Fig. 61: *Chondria harveyana*, elongate surface cells (right)

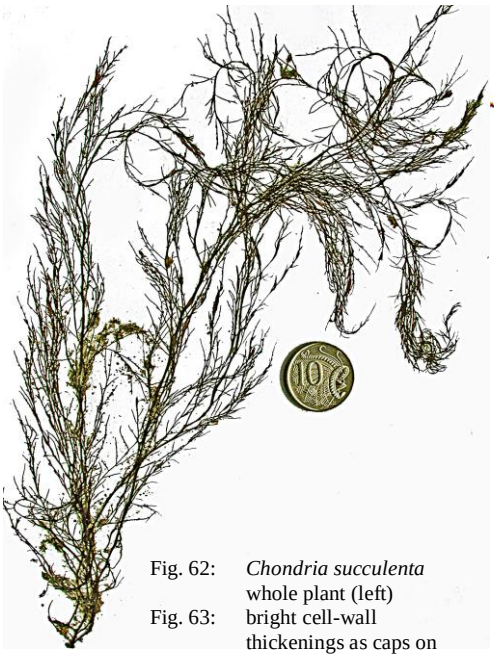
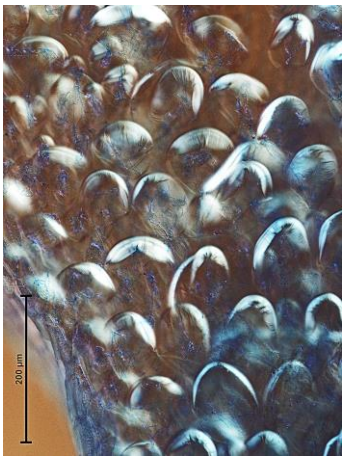
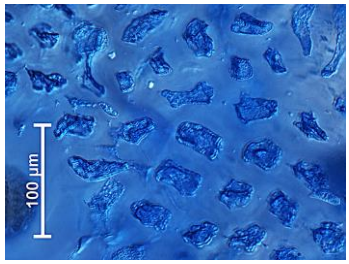


Fig. 62: *Chondria succulenta* whole plant (left)
Fig. 63: bright cell-wall thickenings as caps on inner cells (right)





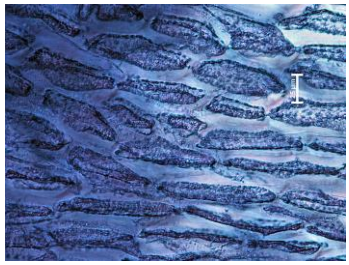


Fig. 64: *Chondria succulenta*, comparison of length of surface cells

15a. plants small, 20-60 mm tall, on sea grasses or rock. Branches cylindrical near tips, compressed below, 0.3-0.8 mm wide, tips coming to a point. Figs 65-68. Possibly a western species only.
……*Chondria lanceolata*

15b plants larger, 50-300 mm tall. All branches compressed, 0.8-3.0 mm wide
…….. 16.

16a. most tips ***pointed***; main branches 0.8-1.5 mm wide; surface cells ***angular***, 15-35 µm wide. Figs 69-71. Probably rare, a deep water species from SE Australia.
…… *Chondria foliifera*

16b. tips rounded or with a pit; main branches 1.5-3.0 mm wide; surface cells rounded, 20-85 µm wide. Figs 72-74. A widespread, distinctive species from rough-water coasts.
……... *Chondria incrassata*

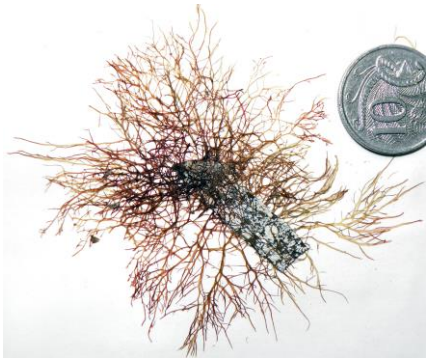


Fig. 65: *Chondria lanceolata*, whole plant

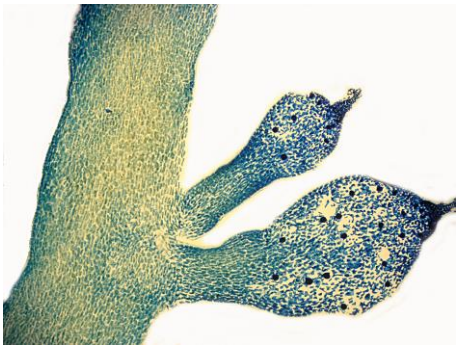


Fig. 66: *Chondria lanceolata*, pointed short side branches bearing sporangia

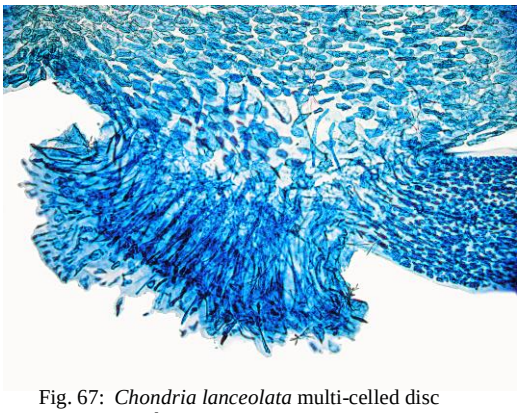


Fig. 67: *Chondria lanceolata* multi-celled disc attaching to seagrass

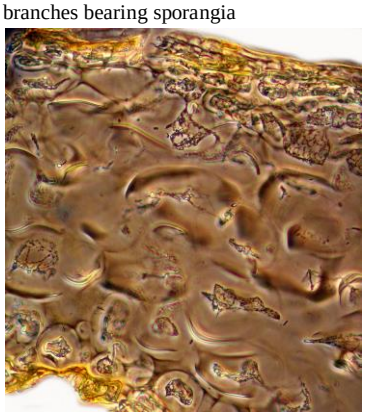


Fig. 68: *Chondria lanceolata*, cell wall thickenings (arrowed)

Fig. 69: *Chondria lanceolata*

Fig. 70: *Chondria lanceolata*, detail of branching pattern

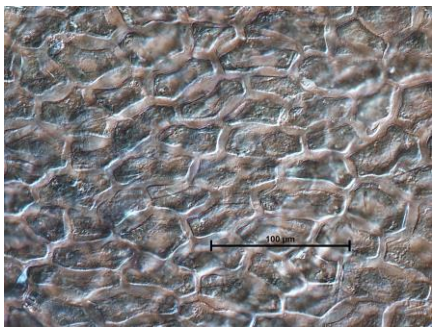


Fig. 71: *Chondria lanceolata*, surface cells

Fig. 72: *Chondria incrassata*

Fig. 73: *Chondria incrassata* , detail of branching pattern

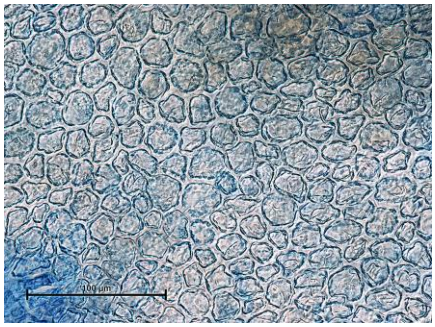


Fig. 74: *Chondria incrassata* , surface cells