

# Pictured Key to common red algae of southern Australia: the Genera: *Chondria* and *Husseyia*

**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 24mm 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 *Husseyia*, 2 genera of the Family: Rhodomelaceae, Tribe: Chondrieae. Other members of the Tribe are recognisably different:-

- *Acanthophora* (Fig. 1) has spines, and is rare. It is described in a Fact Sheet elsewhere in this Website
- *Coeloclonium* (Fig. 2.) has hollow branches, pinched top and bottom into sections or segments. It is listed with similar red algae in "Some Southern Australian Beadlike Red Algae at a Glance"
- *Cladurus elatus* (Fig. 3) has branches with visible partitions

The steps identifying *Chondria* species largely follow the key in the Flora, pp 423, 424.

### *Chondria*, and *Husseyia* have these features:

- plants 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 largely of equal-sided cells (parenchyma)
- cross sections of young branches show the cell of central thread ringed by 5 large cells (*pericentrals*) (Fig. 5). Some surface views of branch tips especially those containing sporangia have *narrow* pericentrals radiating out from the central filament like spokes of a wheel (see Fig. 46). Inner cells often have wall thickenings seen under the microscope as bright bands, or caps on cells (see Figs 24, 27).
- male structures consisting of thin, flat discs (see Fig. 17)
- branch tips pointed *or* blunt. Hair tufts (*trichoblasts*) at tips are responsible for the growth of the branch. In some species these are found in a dimple or pit.

**Two genera also with tips pointed or blunt and protruding trichoblasts are easily confused with *Chondria* and *Husseyia*.**

### These are:-

#### *Laurencia*

a cross section near branch tips shows a ring of 4 pericentral cells about each central thread cell in this genus (Fig. 5)

#### *Chondrophycus*

there is no visible separation into a central thread ringed by pericentral cells in a cross section view in this genus.

Flat male discs are *absent* in both these genera. There is a separate Pictured Key for species in these two genera.

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



Fig 1: *Acanthophora*, Tribe: Chondrieae; rare, branches spiny; **excluded from this key.**



Fig 2: *Coeloclonium*, Tribe: Chondrieae; branches hollow, jointed; **excluded from this key.**



Fig 3: *Cladurus*, Tribe: Chondrieae; branches with visible internal partitions; **excluded from this key.**



Fig 4: *Laurencia*, Tribe: Laurenciae; **excluded from this key.**

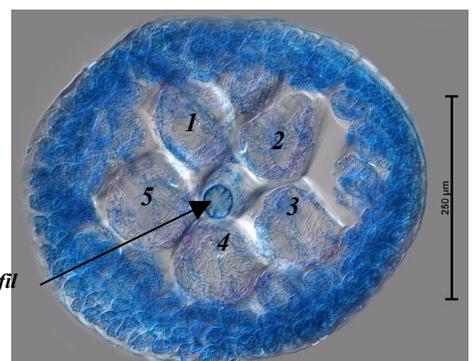
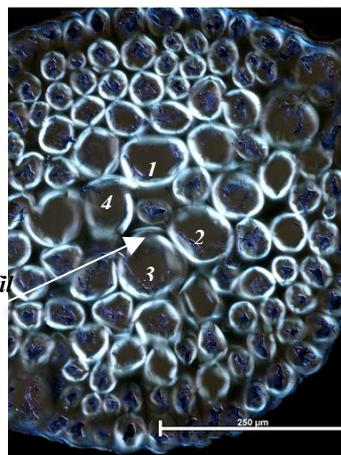


Fig. 5: comparison of cross sections of *Laurencia* (left) and *Chondria* (above)

- 1a. branches wiry, with flattened ends when dry; cross sections of mature axes show rings of large cells separated by minute rhizoids; mature female structures (cystocarps) stalked, sporangial structures bunched in angles between axes and short side branches. Figs 6-10. ....*Husseyia 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 sides to neighbouring branches. Figs 11-14. ....*Chondria infestans*
- 2b. plants upright, sides of cystocarps *not* touching the branches ..... 3.



Fig. 6: *Husseyia rubra*, with tips flattened in pressed specimens



Fig. 7: *Husseyia rubra*, some bunches of minute spore structures arrowed

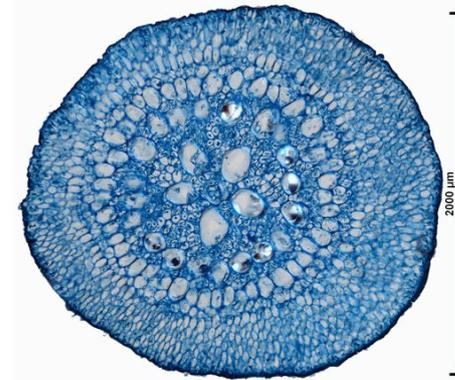
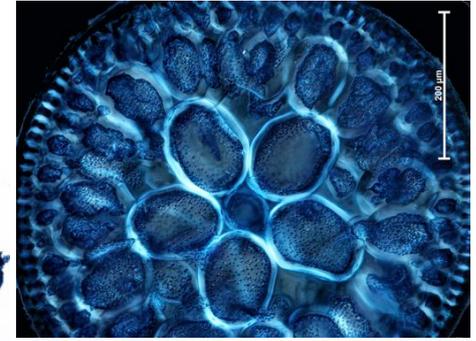


Fig. 10: *Husseyia rubra*, cross sections of young (upper) and old (lower) axes

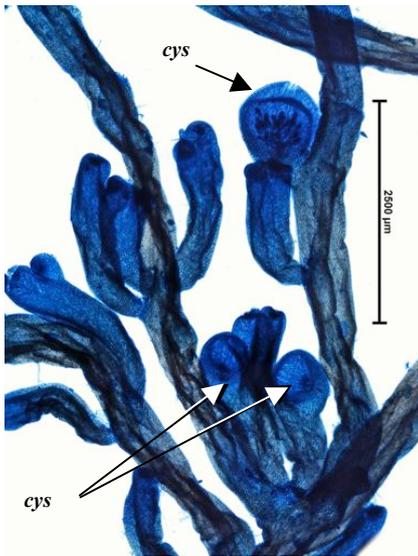


Fig. 8: *Husseyia rubra*, mature female structures (cystocarps, *cys*) stalked

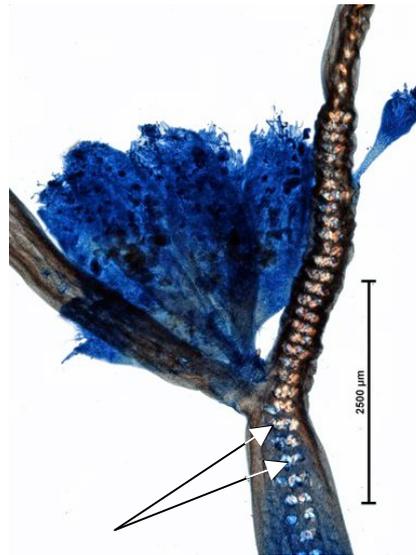


Fig. 9: *Husseyia rubra*, bunch of sporangial structures (stichidia), bright cell wall thickenings in the axis (arrowed)



Fig. 13: *Chondria infestans*, flat branches lying over the host, *Polyopes constrictus* (arrowed)

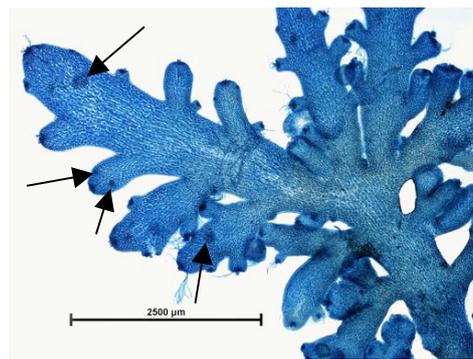


Fig. 11: *Chondria infestans*, compressed branches in two rows at edges of axes; clamps (haptera) seen as dark spots (arrowed)

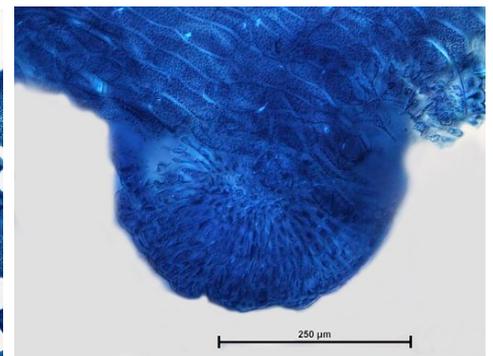
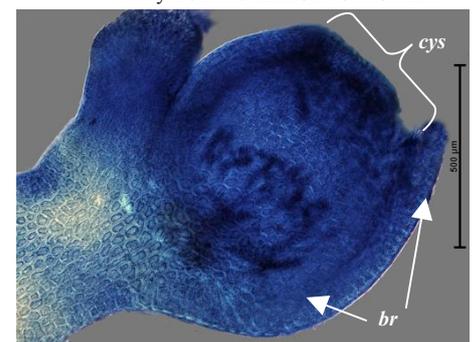


Fig. 12: *Chondria infestans*, clamp dissected away from the underside of a branch

Fig. 14: *Chondria infestans*, cystocarp (*cys*) attached along its length to the neighbouring branch (*br*)



- 3a. main branches (axes) cylindrical ..... 4.
- 3b. axes mostly compressed, at least near the plant base ..... 15.
- 4a. smaller branches thin, < 1/4 mm wide ..... 5.
- 4b. smaller branches thicker, > 1/4 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 15-17 ..... *Chondria angustissima*
- 5b. plants on rock or other hard surfaces, branching on one side of axes, tips rounded with slight pits; beaks on cystocarps *absent*. Possibly an introduced species. Figs 18-21. .... *Chondria arcuata*



Fig. 15: *Chondria angustissima* on a seagrass leaf

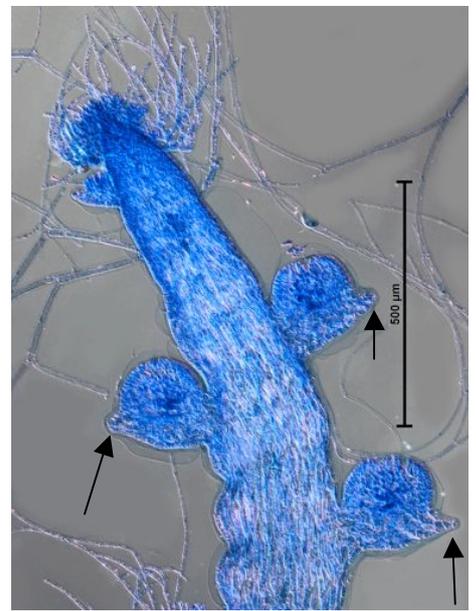


Fig. 16: *Chondria angustissima*, pointed tip; cystocarps with a beak (arrowed)



Fig. 18: *Chondria arcuata*, sparse branching on one side of axes (arrowed)

Fig. 17: *Chondria angustissima*, pointed tip; male plates with a few rim cells (arrowed)

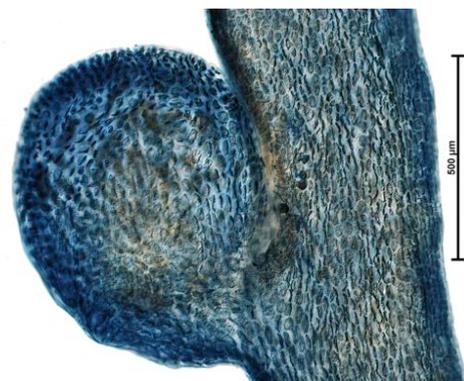


Fig. 19: *Chondria arcuata*, cystocarp beak *absent*

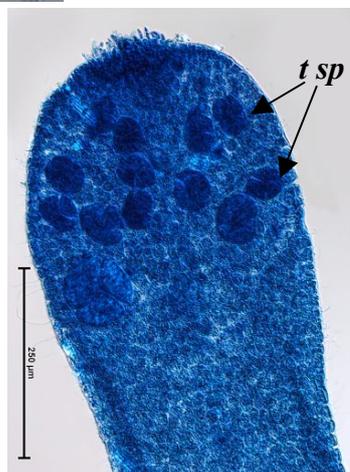


Fig. 20: *Chondria arcuata*, tip blunt, with shallow pit; tetrasporangia (*t sp*)

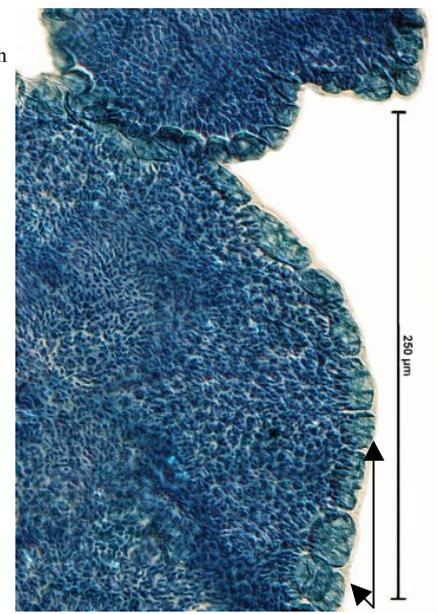
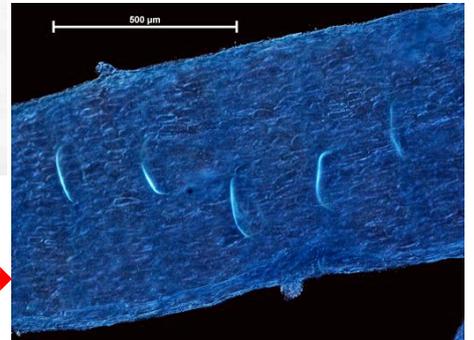


Fig. 21: *Chondria arcuata*, detail of male plate with continuous rim cells (arrowed)

- 6a. minute, swollen storage organs at the base of axes or in upper branches. Figs 22-24.  
..... *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 25-27.  
..... *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 28-31.  
..... *Chondria incurva*
- 8b. surface cells longer, length/breadth = 1.5-10; ultimate branches < 1mm wide, not curved ..... 9.



*Chondria bulbosa*  
Figs 22, 23: two magnifications showing swollen "bulbs" (arrowed)  
Fig. 24: bright cell thickenings in a branch

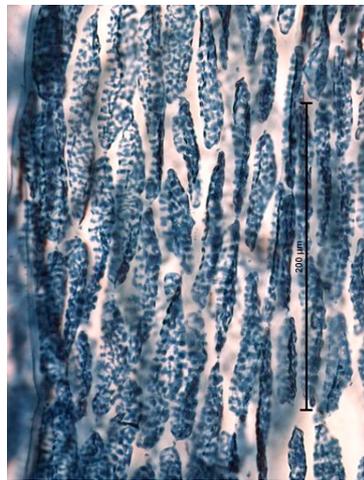


Fig. 25: *Chondria hieroglyphica*

Fig. 26: *Chondria hieroglyphica*, elongate surface cells

Fig. 27: *Chondria hieroglyphica*, complex, bright, cell wall thickenings

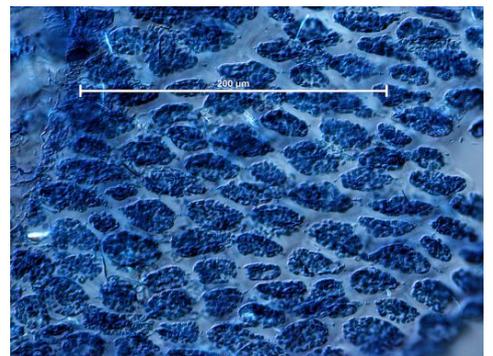
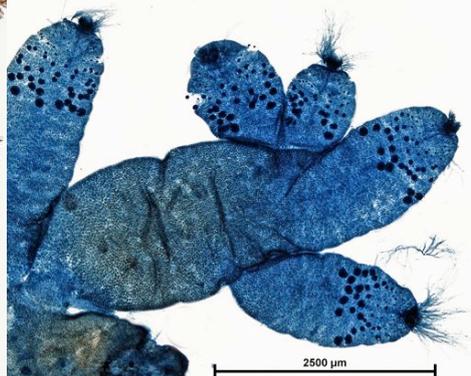
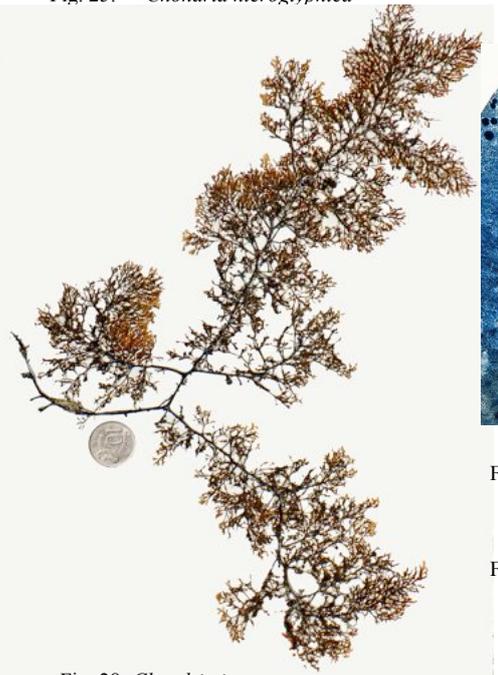


Fig. 29: *Chondria incurva*, broad ultimate branches, bearing tetrasporangia

Fig. 30: *Chondria incurva*, short surface cells



Fig. 31: *Chondria incurva*, short curved branches

Fig. 28: *Chondria incurva*

- 9a. rare; side branches mainly arise from one side of axes; mature female structures (cystocarps) almost stalkless but with a basal swelling. Figs 32, 33. .... *Chondria subsecunda* (a "rare" species; see separate Fact Sheet)
- 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 34-36. .... *Chondria capreolis*
- 10b. ends of side branches straight; tips pointed or rounded ..... 11.
- 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 37-40. .... *Chondria fusifolia*
- 11b. ultimate branches with tips rounded or with shallow pits; cell thickenings on tops of inner cells only; cystocarp spurs present *or* absent; male plates with rim-cells 1-3 cells wide ..... 12.



Fig. 32: *Chondria subsecunda* largely one-sided branching

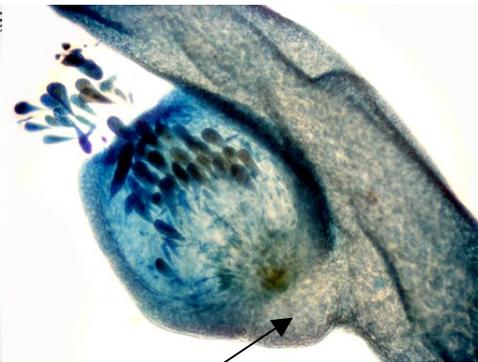


Fig. 33: *Chondria subsecunda* mature female structure (cystocarp), almost stalkless with a basal swelling (arrowed)



Fig. 34: *Chondria capreolis*



Fig. 35: *Chondria capreolis*, prominent cell-wall thickenings of inner cells

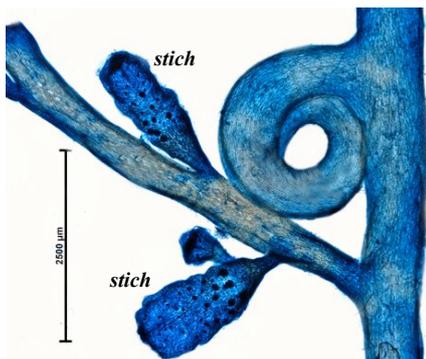


Fig. 36: *Chondria capreolis*, curled end (tendrils) of side branch; sporangial branches (stichidia, stich)

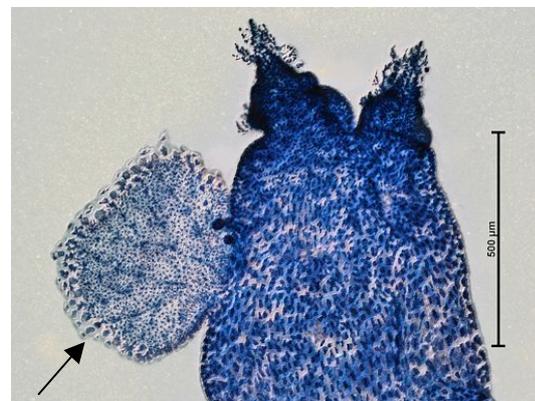


Fig. 39: *Chondria fusifolia*, pointed tips, male plate with a rim 2-3 cells thick (arrowed)

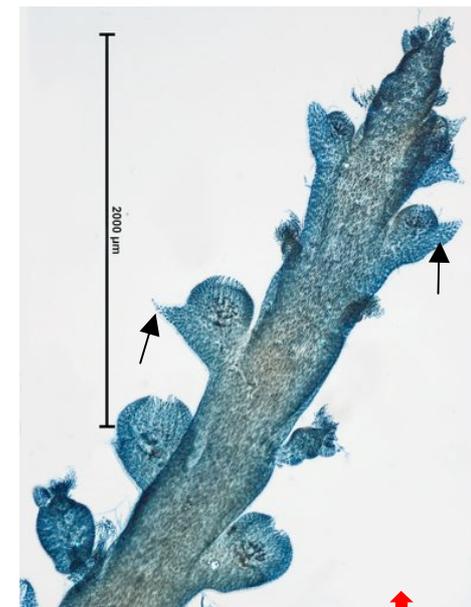


Fig. 37: *Chondria fusifolia*, mature female structures (cystocarps), stalkless but with a pointed spur at the base (arrowed)

Fig. 38: *Chondria fusifolia*



Fig. 40: *Chondria fusifolia*, cell-wall thickenings at both ends of inner cells

- 12a. surface cells short, length/ breadth  $\approx$  2-5; mature female structures (cystocarps) lacking a spur; tetrasporangia large, 180-250  $\mu$ m wide ..... 13.
- 12b. surface cells usually longer, length/breadth  $\approx$  5-17; cystocarps with a spur; male plates with a rim cells 1 cell wide; tetrasporangia smaller, 120-150  $\mu$ m wide ..... 14.
- 13a. plants red fading to brown; side branches often in tufts; axes 1.2-2.0 mm wide, ultimate branches  $\sim$  0.6 mm wide; cell-wall thickenings usually as massive caps on inner cells; branches with sporangia elongate. Figs 41-44. .... *Chondria subfasciculata*
- 13b. plants red-brown to brown; side branches usually arising singly; axes 0.4-1.0 mm wide, ultimate branches  $\sim$  0.4 mm wide; cell-wall thickenings forming caps on cells at first, later girdles, some hooked; branches with sporangia short, oval-shaped. Figs 45-48. .... *Chondria curdieana*
- 14a. plants red to dark red, usually large, 100-400 mm tall; branching loose, cell-wall thickenings *absent*; surface cells 10-15  $\mu$ m wide, length/breadth  $\approx$  9-17. Figs 49-51. (next page) .... *Chondria harveyana*
- 14b. plants red-brown, usually small, 30-180 mm tall; cell-wall thickenings if present consist of caps on upper parts of inner cells; surface cells 20-25  $\mu$ m wide, length/breadth varying from 1.5-7, Figs 52-54 (next page) .... *Chondria succulenta*



Fig. 41: *Chondria subfasciculata*

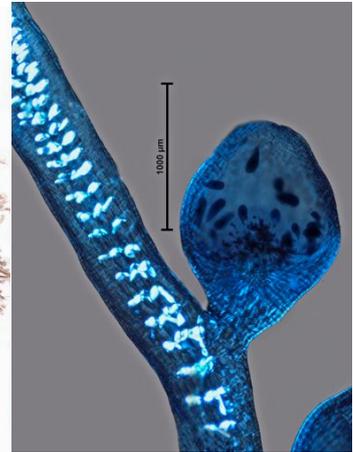


Fig. 42: *Chondria subfasciculata*, cystocarp lacking a basal spur, prominent bright cell-wall thickenings forming massive caps on inner cells



Fig. 43: *Chondria subfasciculata*, detail of bunches of branches arising from axes

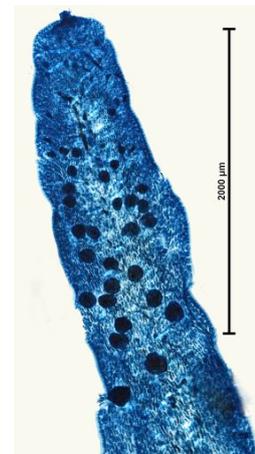


Fig. 44: *Chondria subfasciculata*, elongate branch bearing large tetrasporangia



Fig. 45: *Chondria curdieana*



Fig. 46: *Chondria curdieana*, with mainly single and not bunched side branches

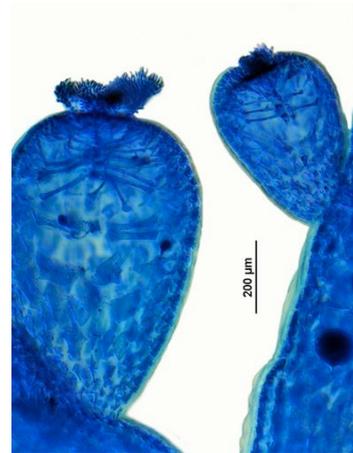


Fig. 47: *Chondria curdieana*, stubby branches bearing tetrasporangia, with narrow pericentrals radiating from the central filament like spokes of a wheel

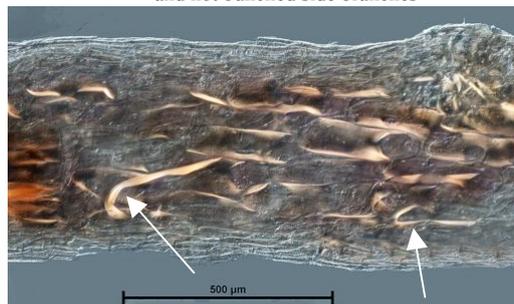


Fig. 48: *Chondria curdieana*, bright cell-wall thickenings forming girdles about cells, with 2 hooked examples (arrowed)



Fig. 50: *Chondria harveyana*



Fig. 49: *Chondria harveyana*, cystocarps with basal spurs

Fig. 51: *Chondria harveyana*, elongate surface cells

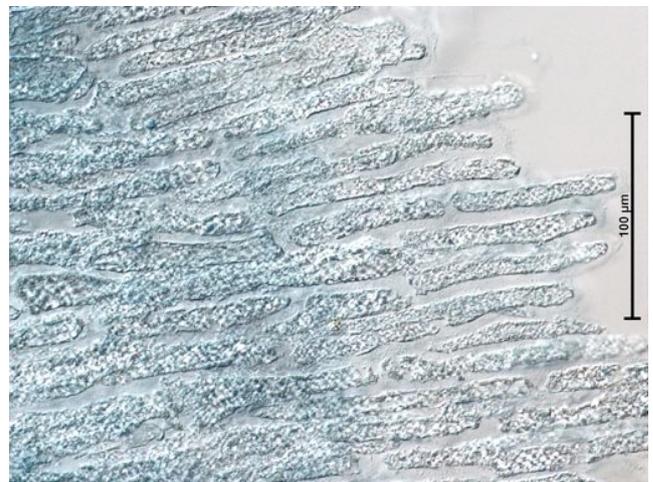


Fig. 52: *Chondria succulenta*, to same scale as Fig. 50

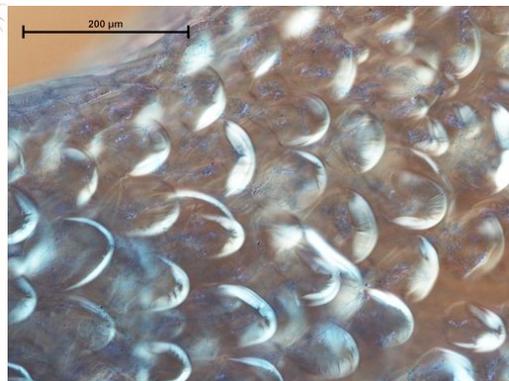


Fig. 53: *Chondria succulenta*, bright cell-wall thickenings as caps on inner cells

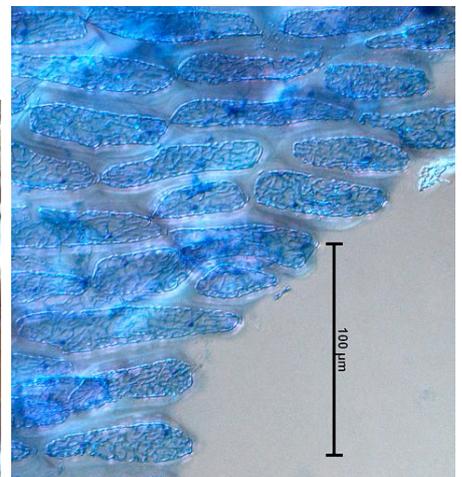


Fig. 54: *Chondria succulenta*, surface cells to same scale as Fig. 51

- 15a. rare; plants 20-60mm tall, branches from 300-800  $\mu\text{m}$  wide, cylindrical near tips, flattened in lower parts. Figs 55-56.  
 ..... *Chondria lanceolata*
- 15b. plants 50-300 mm tall , branches from 0.8-3 mm wide, flattened, but cylindrical at the very base  
 ..... 16.
- 16a. branch tips pointed, main branches 0.8-1.5 mm wide, surface cells angular, 15-35  $\mu\text{m}$  wide. Figs 57-59.  
 ..... *Chondria foliifera*
- 16b. branch tips rounded or sunken, main branches 1.5-3 mm wide; surface cells rounded, 20-85  $\mu\text{m}$  wide. Figs 60-62.  
 ..... *Chondria incrassata*



Fig. 55: *Chondria lanceolata*

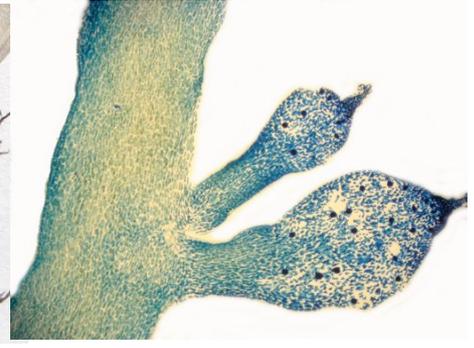


Fig. 56: *Chondria lanceolata*, stalked , pointed tetrasporangial structures (stichidia)



Fig. 57: *Chondria foliifera*



Fig. 58: *Chondria foliifera*, detail of branching pattern

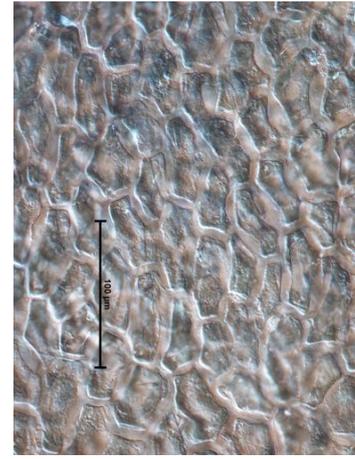


Fig. 59: *Chondria foliifera*, angular surface cells



Fig. 60: *Chondria incrassata*,



Fig. 61: *Chondria incrassata*, detail of branching pattern, and rounded tips

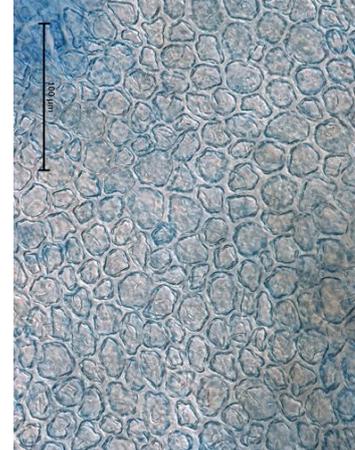


Fig. 62: *Chondria incrassata*, detail of rounded surface cells