

FILAMENTOUS RED ALGAE

PART II 3rd edition: algae with whorl-branchlets overlapping, rhizoidal covering dense

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 within this website.

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

This key is *restricted* to algae from southern Australian waters that have

- *threads* (filaments) of cells, growing in a single line (*uniaxial* algae)
- **no** compact wrappings (*cortication*) of regularly arranged (pericentral) cells around at least main branches, although there may be a dense, loose sheaths of rhizoids
- long main branches (axes) with rings of short side branches (*whorl-branchlets*)

This includes Tribes in the Ceramiales such as the Crouanieae, Wrangelieae and Dasyphileae. It excludes algae with cortication so complete that the thread or filamentous construction is completely obscured.

Names follows Womersley (1998) as this continues to provide the most available and comprehensive descriptions of species. There have been no recent name changes in the Website *Algaebase*

- 1a. main branches (axes) densely covered by downward growing rhizoids, whorl-branchlets often obscured 2
- 1a. axes naked or slightly covered by rhizoids, rings or opposite pairs of whorl-branchlets distinct or overlapping 4.
- 2a. side branches **opposite** on main axes, irregular in whorl-branchlets which consist of long, thin filaments, giving the whole plant a woolly appearance. Tetrasporangia divided in a cross pattern (cruciate) or in 2 opposite pairs (decussate). Figs 1-3
..... Family: Ceramiales,
Tribe: Warrenieae (*Warrenia*, 1 species)
- 2b. main and side branches with 2 opposite then alternately branched whorl-branchlets per cell, **rapidly obscured** by rhizoids; tetrasporangia tetrahedrally divided. See Fig. 9
..... 3.
- 3a. main axes with 4-5 irregularly branched, overlapping whorl-branchlets per axis cell, producing a fluffy effect; axes thickly coated with rhizoids. Figs 4-9 Tribe: Wrangelieae (*Wrangelia*: 5 species)
- 3b. main axes and branches initially with 2 **opposite** alternately branched whorl-branchlets per axis cell, rapidly obscured by rhizoids Figs 10-13
.....Tribe: Lasiotalieae (1 species, next page)



Fig. 1: *Warrenia comosa*



Fig. 4.: *Wrangelia nobilis*

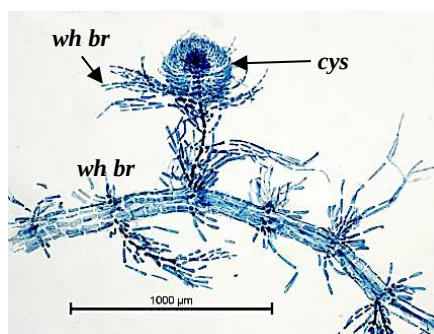


Fig. 6.: *Wrangelia penicillata* with relatively exposed whorl-branchlets (*wh br*) and terminal female structure (cystocarp, *cys*)

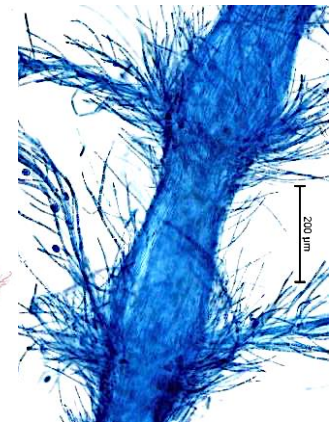


Fig. 2: *Warrenia comosa*
detail of branching pattern

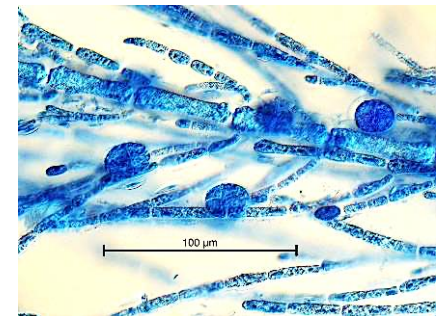


Fig. 3: *Warrenia comosa*, whorl-branchlet bearing tetrasporangia



Fig. 5: *Wrangelia nobilis*, overlapping whorl-branchlets producing a "fluffy" effect

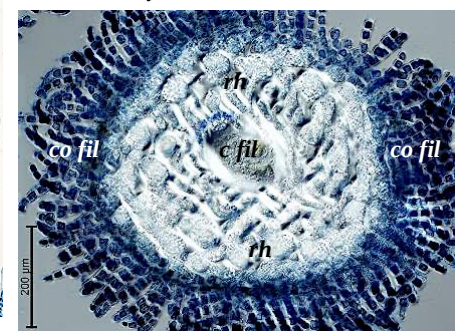


Fig. 7: *Wrangelia nobilis*, cross section: mass of rhizoids (*rh*) wrapped around central filament, (*c fil*) producing short chains of cells (cortical filaments, *co fil*)



Fig. 8: *Wrangelia nobilis*, branch tips

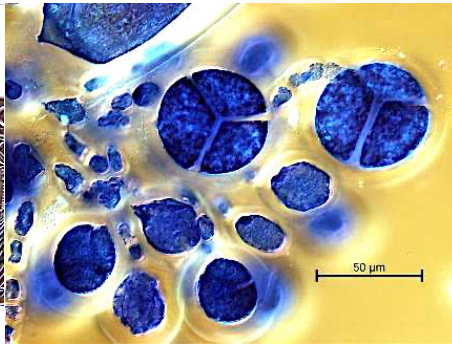


Fig. 9: *Wrangelia nobilis*, tetrahedrally divided tetrasporangia in delicate branch clusters within whorl-branchlets

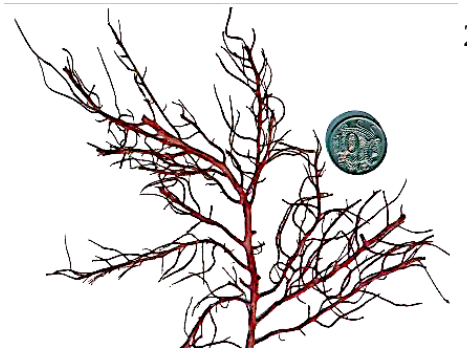


Fig. 10: *Lasiothalia hirsuta*

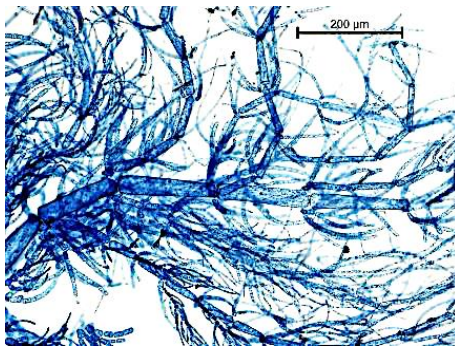


Fig. 11: *Lasiothalia hirsuta*, near a branch tip showing exposed opposite pairs of whorl-branchlets

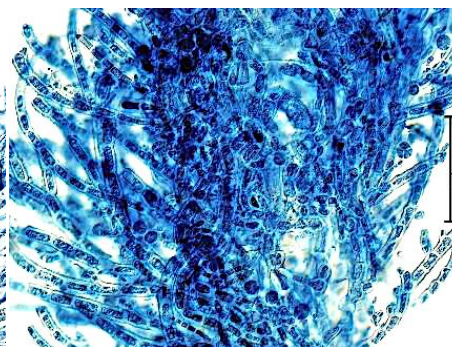


Fig. 12: *Lasiothalia hirsuta*, main axis densely wrapped in rhizoids and curved, branched filaments

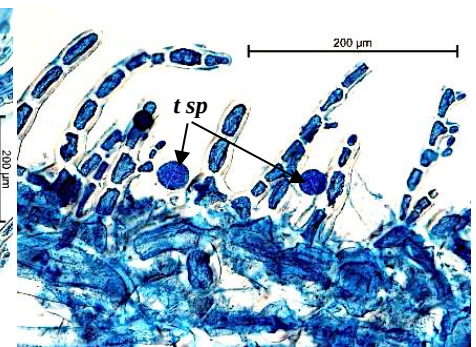


Fig. 13: *Lasiothalia hirsuta*, axis edge densely wrapped in branching rhizoids; tetrahedrally divided sporangia (*t sp*) in protruding filaments

- 4a. whorl-branchlets overlapping, forming a continuous loose sheath about axes 5.
 4b. whorl-branchlets well separated, producing an open bead-like sheath about axes or a feathery appearance **see Part III.**
 5a. whorl-branchlets in rings of 3 or 4, spirally or oppositely arranged 6.
 Family: Ceramiaceae, Tribe: Crouanieae (5 genera)
 5b. whorl-branchlets in rings of 5 or 6, alternately arranged or in opposite groups. 10
 Family: Ceramiaceae, Tribe: Dasyphileae.
 6a. whorl-branchlets in rings of 3 7.
 6b. whorl-branchlets in rings of 4 (5) 8.
 7a. axes cylindrical, side branches arising irregularly, whorl-branchlets discernible microscopically. Figs 14-16 *Crouania* (5 species)
 7b. axes flattened, side branches flat-branched (pinnate), whorl branchlets embedded in thin, strap-like fronds. Figs 17-19 *Gattya* (1 species)



Fig. 14: *Crouania mucosa*

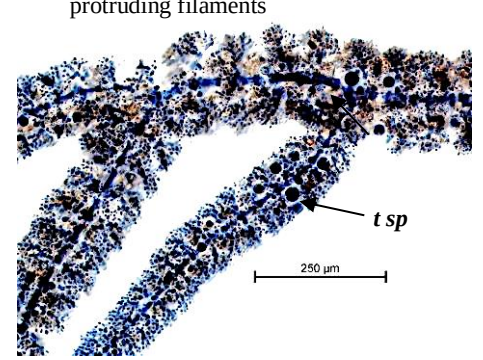


Fig. 15: *Crouania shepleyana*, overlapping whorl-branchlets; tetrasporangia (*t sp*)

Fig. 16: *Crouania destriana*, axis with stubby whorl-branchlets along the central filament (*c fil*)

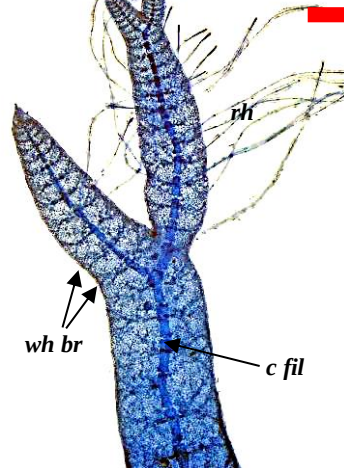


Fig. 18: *Gattya pinella*, blade tip, central filament (*c fil*), whorl branchlets (*wh br*) beneath surface cells, rhizoids (*rh*)

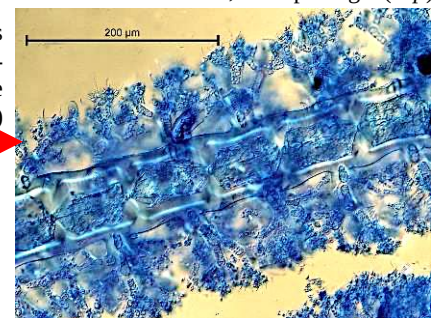


Fig. 19: *Gattya pinella* cross section, central filament (*c fil*), whorl-branchlets (1-3)



Figs 17-19: *Gattya pinella*

- 8a. axes flattened, blade-shaped, flat-branched.
Figs 20-22
..... *Euptilocladia* (2 species)
- 8b. axes cylindrical 9.



Fig. 20: *Euptilocladia spongiosa*

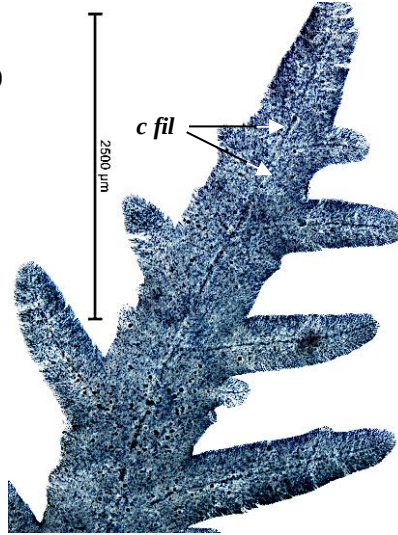


Fig. 21: *Euptilocladia spongiosa*, frond tip: central filament (*c fil*) just visible beneath dense overlapping whorl-branchlets

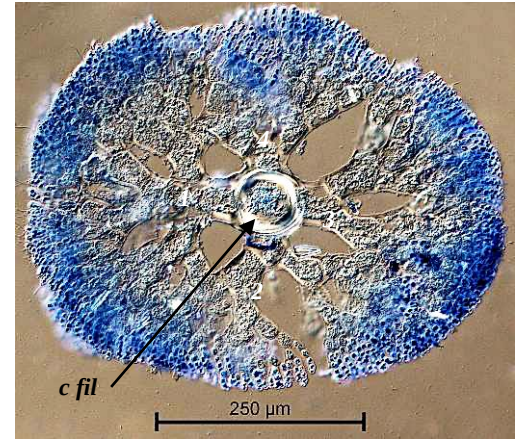


Fig. 22: *Euptilocladia spongiosa*, cross section, central filament (*c fil*), 4 radiating whorl-branchlets (1-4)

- 9a. plant spongy, firm, except in *Pt. gracilis* and *Pt. australis* in which whorl-branchlets are more widely spaced.
Figs 23-26
..... *Ptilocladia*
(5 species)
- 9b. plant slimy, floppy; dense whorl-branchlets creating a beaded effect along axes. Figs 27-30
..... *Gulsonia*
(1 species)



Figs 23-26: *Ptilocladia pulchra*

Above: pressed specimen
Above, right: plants amongst rocks in shallow water

Left: branch tips, overlapping whorl branchlets obscuring the central filament; and tetrasporangia (*t sp*)
Right: cross section, central filament and 4 whorl-branchlets (1-4)

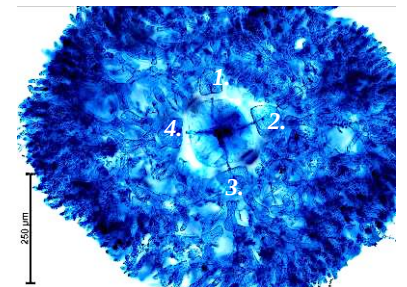
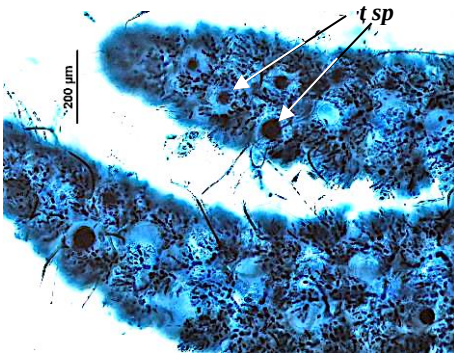


Fig. 27: *Gulsonia annulata*



Fig. 28: *Gulsonia annulata*, backlit enlargement showing bead-like whorl-branchlets

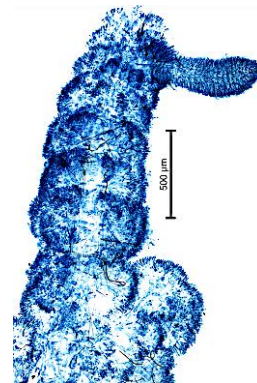


Fig. 29: *Gulsonia annulata*, central filament visible beneath rings of whorl-branchlets

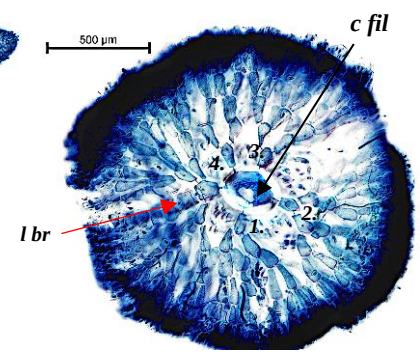


Fig. 30: *Gulsonia annulata*, central filament (*c fil*), 4 whorl-branchlets (1-4) and lateral branch (*l br*) emerging from the central filament

- 10a. axis cells with rings of 6 whorl-branchlets;
 sporangia at tips of short filaments. Figs 31-34
 *Dasyphila preissii*
- 10b. axis cells with rings of 5 whorl-branchlets;
 sporangia stalkless within lower parts of whorl-
 branchlets. Figs 35-38
 *Muellerena* (1 species)



Fig. 35: *Muellerena wattsii*



Fig. 31: *Dasyphila preissii*

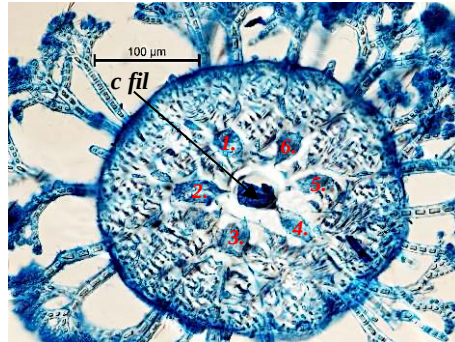


Fig. 33: *Dasyphila preissii*: cross section, central filament (c fil), origin of whorl-branchlets (1-6) within a mass of rhizoids

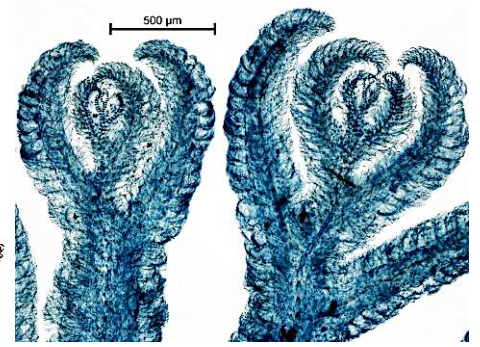


Fig. 32: *Dasyphila preissii*, axis tips, alternate branches reaching the same height

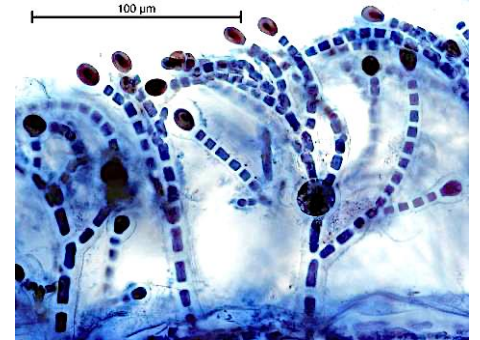


Fig. 34: *Dasyphila preissii*, sporangia (some as yet undivided) at tips of whorl-branchlets

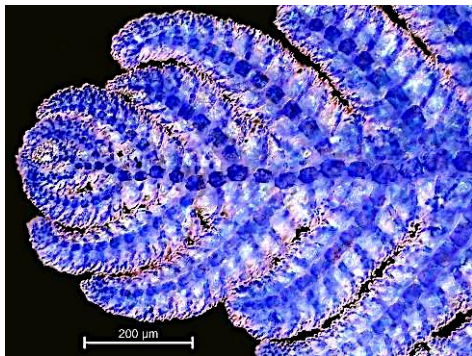


Fig. 36: *Muellerena wattsii*, axis tip

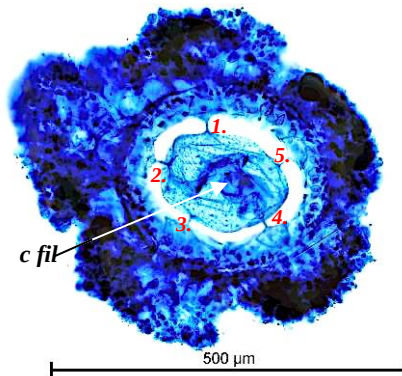


Fig. 37: *Muellerena wattsii* cross section, central filament (c fil), origin of whorl-branchlets (1-5)

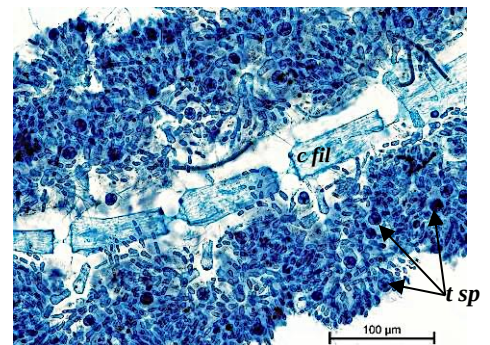


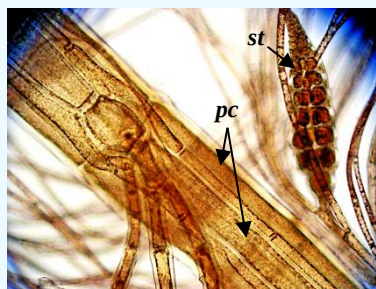
Fig. 38: *Muellerena wattsii*, tissue squash exposing the central filament (c fil), dense whorl-branchlets stalkless tetrasporangia (t sp) within

Look-alike algae

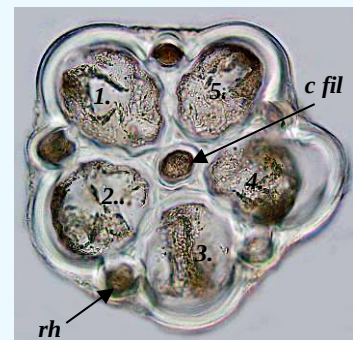
Some *Dasya* and *Doxodasya* species have a central filament and hair-like tufts (trichoblasts), but close inspection shows they also have blocks of closely-fitting sheath (pericentral) cells, flask-shaped cystocarps and tetrasporangia in specialized branches (stichidia) so belong in **Part XI**



Dasya extensa: stalked, flask-shaped cystocarps; dense hairy trichoblasts



Doxodasya hirta: blocks of pericentral cells (pc) on axes; lance-shaped branch (stichidium, st) bearing tetrasporangia



Doxodasya hirta cross section: central filament (c fil); pericentral cells (1-5); rhizoids (rh)

SPECIES ILLUSTRATED IN THE KEY

species	author/s	page/s
<i>Crouania destriana</i>	Wollaston	2
<i>Crouania mucosa</i>	Wollaston	2
<i>Crouania shepleyana</i>	Wollaston	2
<i>Dasya extensa</i>	Sonder ex Kützinger	4
<i>Dasyphila preissii</i>	Sonder	4
<i>Doxodasya hirta</i>	(J. Agardh) Womersley & Parsons	4
<i>Euptilocladia spongiosa</i>	Wollaston	3
<i>Gattya pinella</i>	Harvey	2
<i>Gulsonia annulata</i>	Harvey	3
<i>Lasiothalia hirsuta</i>	Harvey	2
<i>Muellerena wattsii</i>	(Harvey) Schmitz	4
<i>Muellerena wattsii</i>	(Harvey) Schmitz	4
<i>Ptilocladia pulchra</i>	Sonder	3
<i>Warrenia comosa</i>	(Harvey) Harvey ex Schmitz & Hauptfleisch	1
<i>Wrangelia nobilis</i>	Hooker f. & Harvey	1, 2
<i>Wrangelia penicillata</i>	(C. Agardh) C. Agardh	1

REFERENCES

Algaebase. Listing the world's algae <https://www.algaebase.org/> accessed January 2025

Womersley, H.B.S. (1998) The Marine Benthic Algae of southern Australia Part IIIC. State Herbarium of South Australia