

Pictured Key to some common filamentous red algae of southern Australia: Master Key

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, and, increasingly these days, the genetic profiles of marker genes.

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 Red algae with

1. **uniseriate** growth, that is, where most of the basic shape of the plant is produced from the growth of cells in a single line and usually from the tip cell
2. overall thread-like or **filamentous** construction. This excludes leafy, blade-like and ribbon-like algae or those consisting of solid cylinders or hollow tubes constructed of relatively equal-sided (parenchymatous) cells. Algae with filaments formed into a meshwork or net have also been excluded from this key (they are found in a separate key – the “Red Mesh Algae”)

Unfortunately, in some filamentous algae the basic thread-like construction is obscured by

- additional cells (cortical cells) growing around the central thread. These can be a loose sheath of additional threads (rhizoids), **or** compact, irregularly arranged cells **or** uniformly arranged cells
 - in others, dense, overlapping rings or whorls of short side branches obscure the underlying filamentous construction
- In such algae the uniseriate, filamentous growth pattern can then only be seen under the microscope
- near plant tips
 - or by cutting a cross section of the main branch to find the central filament inside
 - or viewing the short, relatively un-corticated side tufts

- 1a. cells naked, growing in a single line (monosiphonous), occasionally paired; branches of about the same length; compact wrappings (cortication) of regularly arranged cells around axes **absent**, although in some, loose rhizoids or scattered cells occur.

Figs 1, 2. go to
“Filamentous red algae of southern Australia Part I: algae with naked filaments”

(filamentous members of the Class: Bangiophyceae; Tribes: Monosporaeae, Callithamnieae, Spermothamnieae, Griffithsiseae, Warrenieae, Bornetieae, Sphondylothamnieae in the Family: Ceramiaceae)



Fig. 1 *Griffithsia teges*: threads of naked, cylindrical, elongate cells



Fig. 2 *Griffithsia monilis*: threads of naked, balloon-shaped cells

- 1b. filaments ringed with short branches (whorl-branchlets) **or** tightly wrapped (corticated) with additional cells
 2.

- 2a. axes ringed with whorl-branchlets
 3.

- 2b. axes wrapped with tightly adhering additional cells (corticating cells) either completely or in bands about the upper parts (nodes) of axial cells
 4.

- 3a. filament cells ringed with 2-4 short, **overlapping** branches (whorl-branchlets) and often, with dense but loose rhizoids, resulting in felt-like branches, cylindrical or flattened in outline.
 Figs 3-6. go to

“Filamentous red algae of southern Australia with whorled branches Part II: whorl-branchlets overlapping, rhizoidal covering dense”

(Tribes: Warrenieae, Wrangelieae Lasiothaliaeae, Crouanieae, Dasyphileae in the Family: Ceramiaceae)

- 3b. filaments with **well-separated** opposite pairs or rings of 3-4 whorl-branchlets.
 Figs 7-9 (next page) go to

“Filamentous red algae of southern Australia with whorled branches. Part III: whorl-branchlets well-defined”

(Tribes: Sphondylothamnieae, Antithamnieae, Heterothamnieae, Pterothamnieae in the the Family: Ceramiaceae, *Inkyuleea* in the Balliaceae)



Fig. 3. *Euptilocladia mucosa*: flat-branched, felt-like branches

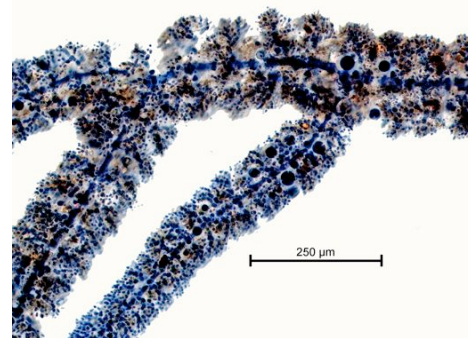


Fig. 4. *Crouania shepleyana*: overlapping whorl-branchlets

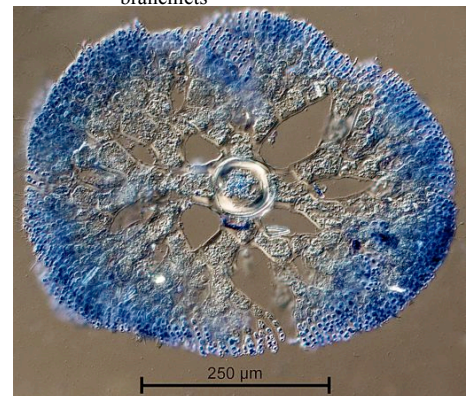
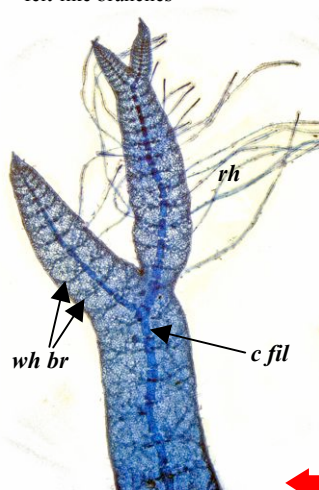


Fig. 5. *Euptilocladia mucosa*: whorl-branchlets overlapping, cross section needed to find the 4 radiating branchlets present

Fig. 6. *Gattya pinella*: blade tip: central filament (*c fil*), whorl branchlets (*wh br*) beneath surface cells, rhizoids (*rh*)

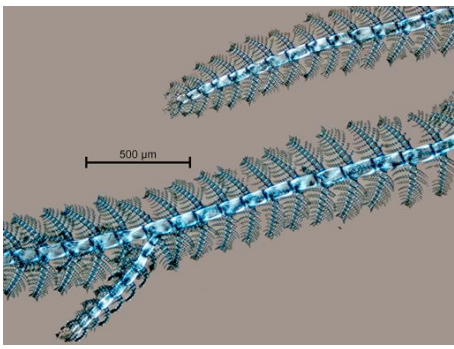


Fig. 7. *Acrothamnion preissii*: opposite pairs of whorl-branchlets

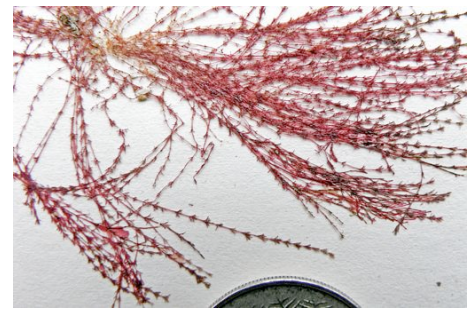
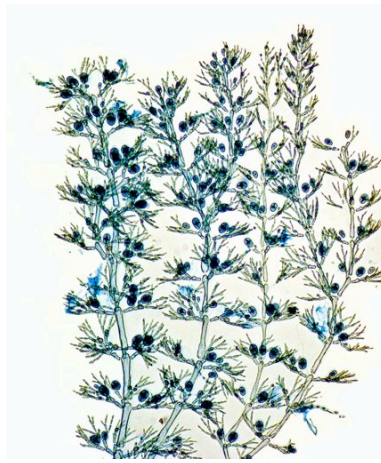


Fig. 8. *Wollastoniella mucronata*: rings of well-separated, short whorl-branchlets

Fig. 9: *Scageliopsis patens*: extended, well-separated whorl-branchlets

- 4a. cells of relatively naked filaments ringed with small cells around their **upper parts** (nodes); main branches (axes) may be partly or wholly covered by additional corticating cells; bright gland cells may be present. Figs 10-14. go to

“Filamentous red algae of southern Australia Part IV: nodally-corticated algae”
(Tribes: Ceramieae, Spyridae of the Family: Ceramiaceae)

- 4b. main branches (axes) with the central filament ringed by regular bands of (pericentral) cells equal in length to axial cells, bands often obscured by further corticating cells; bright gland cells **absent** 5

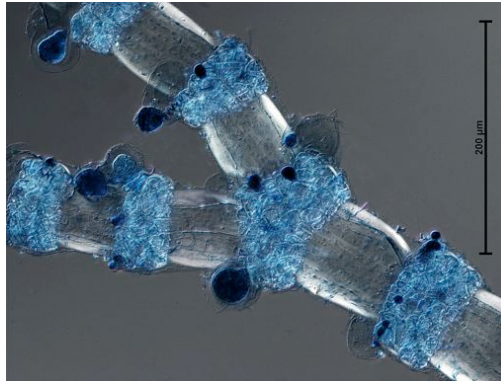


Fig. 10. *Ceramium isogonum*: well-separated nodal bands;

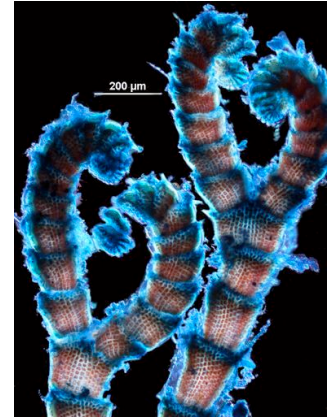


Fig. 11. *Centroceros clavulatum*: nodal cell rings; longitudinal columns of cortical cells

- 5a. apical cell prominent; pericentral cells in rings of 4, 2 with a pair of flanking cells each half the length of a pericentral cell, at least in sporangial-bearing structures (stichidia); plants often quickly disintegrating after collection. Figs 15, 16 go to

*** “Filamentous red algae of southern Australia Part VI: Family: Sarcomeniaceae”**

- 5b. apical cell prominent or obscure, pericentral cells 4-20, pairs of flanking cells **absent**; plants not disintegrating 6.

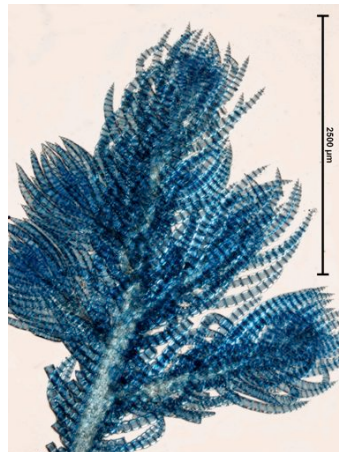


Fig. 13. *Spyridia dasyoides*: filaments stiff, opposite, prominently banded side filaments

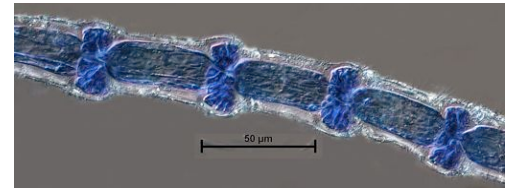


Fig. 12. *Spyridia filamentosa* single filament: corticating cells 2 cells deep at nodes

- 6a. side branches similar to main branches; extremely fine, colourless, hair-like branches (trichoblasts) occur close to growing points but may be rapidly shed. Figs 17-19 (next page) go to

*** “Filamentous red algae of southern Australia Part VII: Tribe: Polysiphoniae, Family: Rhodomelaceae”**

- 6b. side branches short and filamentous, mainly naked, branched or in single lines (monosiphonous). Figs 20-24 (next page) go to

“Filamentous red algae of southern Australia Part V: filaments regularly corticated, side-branches naked”
(Family: Dasyaceae)

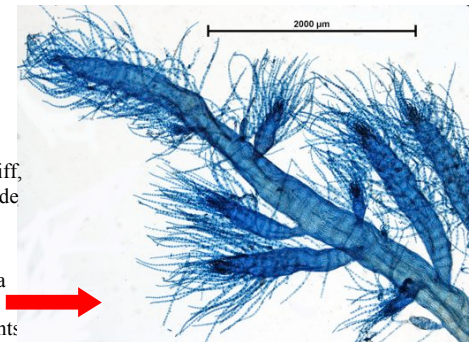
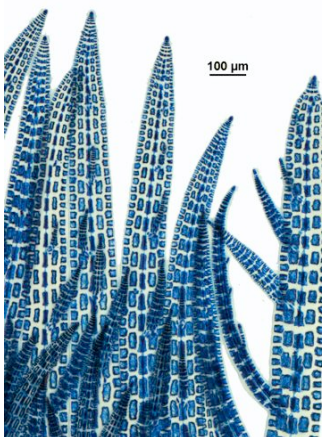


Fig. 14 *Spyridia squalida*: axis with a banded appearance and side branches with tufts of filaments: →

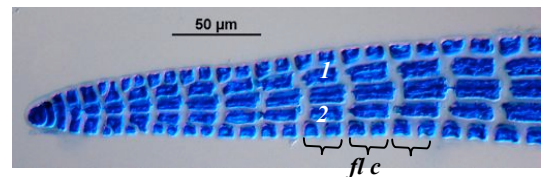


Fig. 15. *Platysiphonia delicata*: flanking cells (fl c) paired along 2 opposite pericentral cells (1, 2)

← Fig. 16. *Platysiphonia delicata*: prominent apical cells

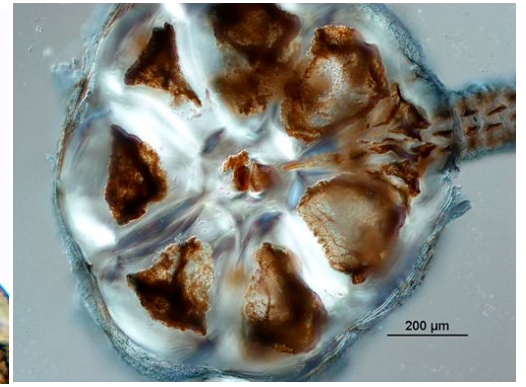
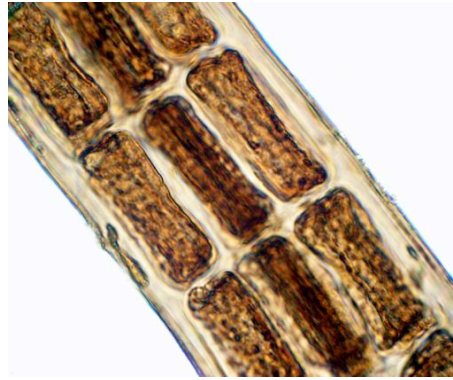


Fig. 17. *Polysiphonia teges*: bands of 4 pericentral cells obscure the underlying central filament of cells equal length

Fig. 19. *Polysiphonia decipiens*: cross section: central filament surrounded by 7 pericentral cells and a side branch

Fig. 18. *Polysiphonia atricapilla*: filaments with thin, branched, colourless trichoblasts at tips; goblet-shaped mature female structures (cystocarps)

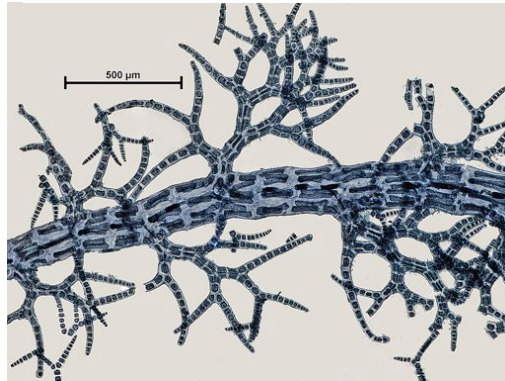


Fig. 20. *Dasya crescens*: narrow, axes ringed with bands of 4 pericentral cells; side filaments naked

Fig. 21. *Heterosiphonia australis*: axis with bands of 7 pericentral cells (4-5 showing in side view); branched filamentous side branches with cells in a single line (monosiphonous) except at base

Fig. 22. *Dasya extensa*: hairs and mature female structures (cystocarps)

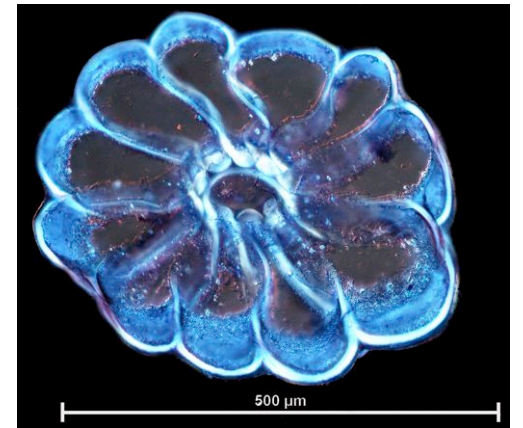
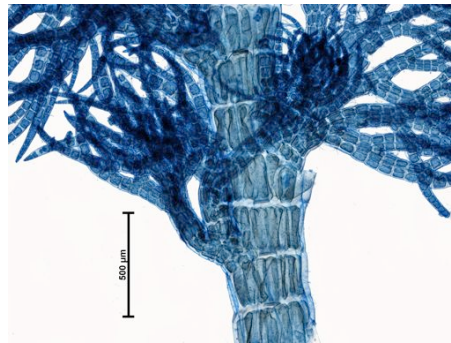


Fig. 23. *Heterosiphonia crassipes*: axis with bands of pericentral cells; short side branches with only branch endings of single lines of cells (monosiphonous)

Fig. 24. *Heterosiphonia crassipes*: cross section: central filament and 11 pericentral cells