PICTURED KEY TO SOME COMMON FILAMENTOUS RED ALGAE OF SOUTHERN AUSTRALIA. MASTER KEY 2ND EDITION

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 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
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 and these may produce compressed or slightly flattened branches
- 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 making tissue squashes in order to move apart the corticating cells, or
- by cutting a cross section to expose the central filament, or
- by viewing short, relatively un-corticated side tufts

1a. filaments of cells ***naked***, growing in a single line (monosiphonous); 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"
(Class: Bangiophyceae. Tribes: Monosporeae, Callithamnieae, Spermothamnieae, Griffithsieae, Warrenieae, Bornetieae, Sphondylothamnieae in the Family: Ceramiaceae. Family: Acrochaetiaceae)

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) ……4.

3a. filament cells ringed with 2-4 short, ***overlapping*** branches (whorl-branchlets) with dense but loose rhizoids resulting in felt-like branches that are cylindrical or flattened in outline. Figs 3-6. **…….. go to**
"Filamentous red algae of southern Australia Part II: algae with whorl-branchlets overlapping, rhizoidal covering dense"
(Tribes: Warrenieae, Wrangelieae Lasiothalieae, 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 Part III: algae with well-defined whorl-branchlets"
(Tribes: Sphondylothanieae, Antithamnieae, Heterothamnieae, Pterothamnieae, Family: Ceramiaceae, *Inkyuleea* of the Family: Balliaceae)

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

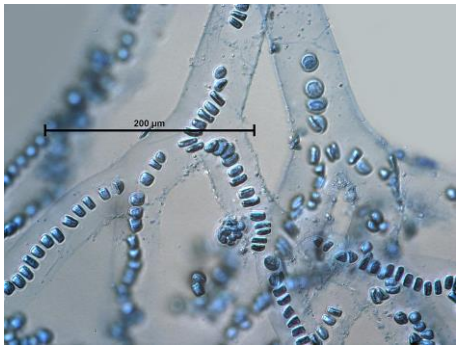


Fig. 2: *Stylonema alsidii*, threads of un-connected, disc-shaped cells

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

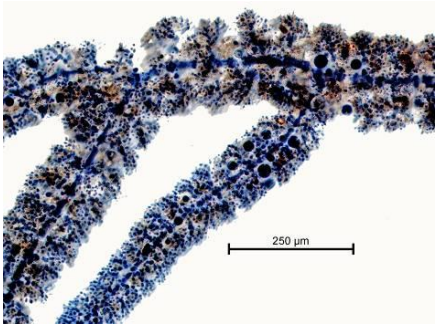
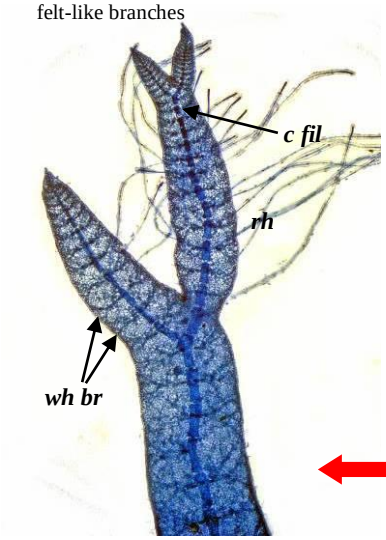


Fig. 4: *Crouania shepleyana*: overlapping whorl-branchlets



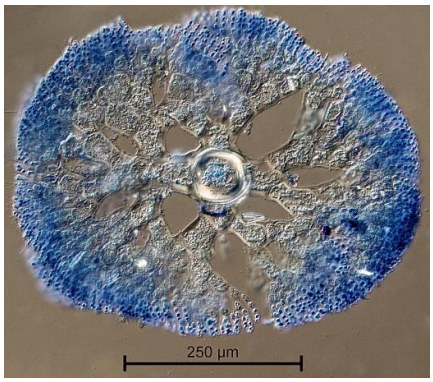


Fig. 5: *Euptilocladia mucosa*, cross section, whorl-branchlets overlapping

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

Baldock, R.N. (2019). Pictured key to some common filamentous red algae of southern Australia. Master Key. 2nd edition. 5pp. *Algae Revealed.* Adelaide: State Herbarium of South Australia. flora.sa .gov.au/algae_revealed

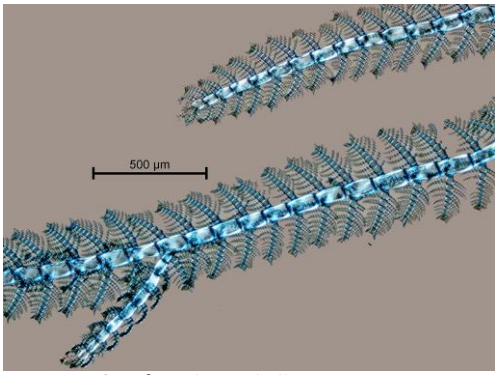


Fig. 7: *Acrothamnion preissii*, opposite pairs of whorl-branchlets

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

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

4a. cells of filaments where exposed are ringed in their ***upper parts*** (nodes) with ***small*** cells; 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, Spyrideae, in the Family: Ceramiaceae)

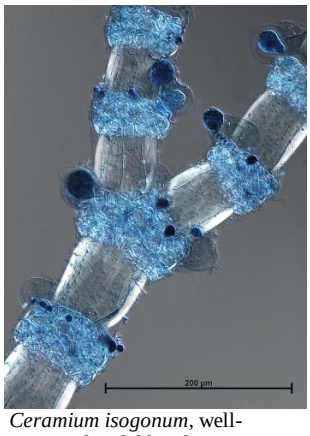


Fig. 10: *Ceramium isogonum*, well-separated nodal bands;

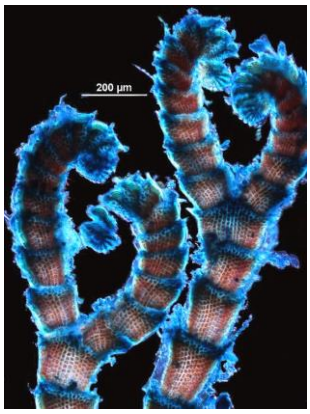


Fig. 11: *Centroceras clavulatum*, nodal cell rings; longitudinal columns of cortical cells

4b. central filaments of main branches (axes) are ringed by regular bands of (pericentral) cells equal in length to axial cells, and sometimes obscured by additional corticating cells; bright gland cells are ***absent*** or produced inwardly from the pericentral cells
…… 5.

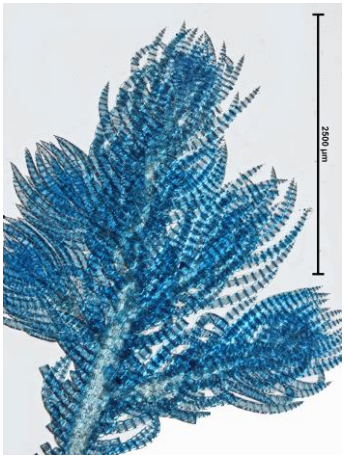


Fig. 13: *Spyridia dasyoides*, opposite, stiff, prominently banded side filaments

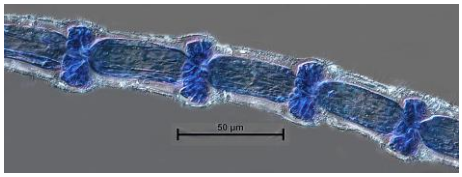
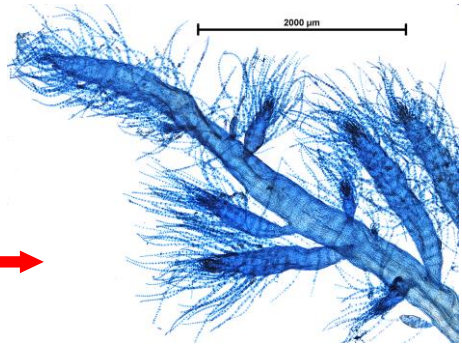


Fig. 12. *Spyridia filamentosa*, single filament, corticating cells at nodes 2 cells deep

5a. apical cells prominent; pericentral cells in rings of 4, usually with 2 opposite ones each producing a pair of ***flanking cells*** half their length; plants often quickly disintegrating after collection. Figs 15, 17. **…… go to**
"Filamentous red algae of southern Australia Part VI: Family: Sarcomeniaceae"

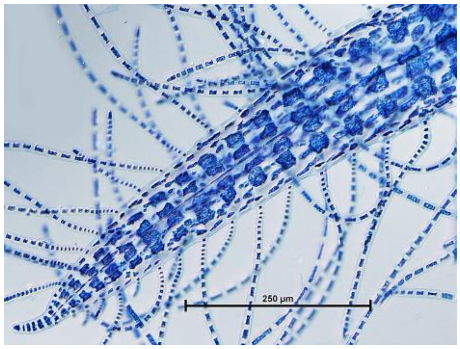


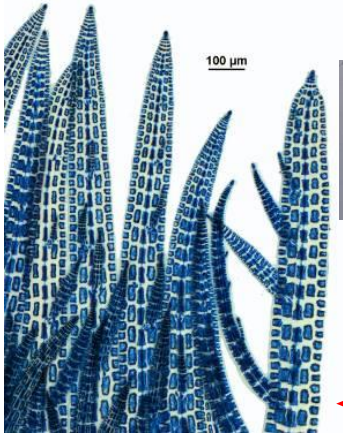
5b. apical cells prominent or obscure, pericentral cells 3-20, or obscure, pairs of flanking cells ***absent***; plants not disintegrating rapidly
…… 6.

6a. side branches similar to main branches
.....7.

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

6b. side branches ***short***, sometimes filamentous, naked, branched or in single lines (monosiphonous), or flat-branched and comb-like …….. 8.





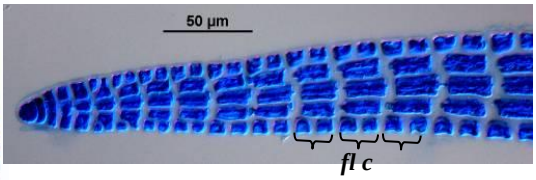


Fig. 15: *Platysiphonia delicata*, flanking cells (***fl c***) paired on 2 opposite pericentral cells

Fig. 16: *Sarcotrichia tenera*, prominent apical cell, flanking cells, hairs

Fig. 17: *Platysiphonia delicata*, prominent apical cells

7a. pericentral cells 4-20. Extremely fine, ***colourless***, hair-like branches (trichoblasts) occur close to growing points but may be rapidly shed. Figs 18-21.
…….. **go to**
"Filamentous red algae of southern Australia Part VII: Tribe: Polysiphonieae of the Family: Rhodomelaceae"

7b. pericentral cells 3. Trichoblasts ***absent***. Plants are ***tiny***, rarely observed, tufted, and represent the sporangial stage of *Asparagopsis* spp with tetrasporangia divided in a cross pattern (cruciate). Figs 21-24.
..... *Falkenbergia* stage of *Asparagopsis*

8a. pericentral cells 4-7, seen in bands in side view and in cross sections of main branches (axes) at least near plant tips; tip cells with ***straight*** cross-walls; side branchlets mainly naked, branched or as single threads, sometimes so numerous and hair-like they give the plant a ***woolly appearance***. Sporangia in ***lines*** or ***spirals*** in expanded branchlets or special cigar-shaped structures (stichidia); mature female structures (cystocarps) flask- or goblet-shaped
..... 9.

8b. pericentral cells ***absent***, irregularly-arranged, equal-sided cells forming close to tips partly obliterate the line of large cells of the central thread; tip cells with ***sloping*** (oblique) cross-walls; short side branchlets ***flat-branched***, alternating along main branches (axes). Sporangia ***scattered*** in side branches, cystocarps ***loosely*** wrapped in filaments of side branchlets. Figs 25-30 (next page**).**
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"Filamentous red algae of southern Australia. Part VIII: axes with irregular cortication"
(Tribes: Ptiloteae and Rhodocallideae, of the Family: Ceramiaceae)

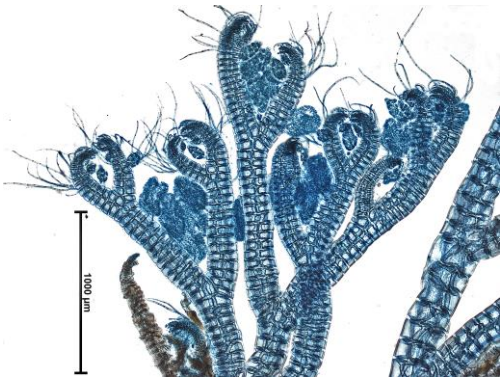


Fig. 18: *Polysiphonia succulenta*, colourless trichoblasts at incurved tips, male branches

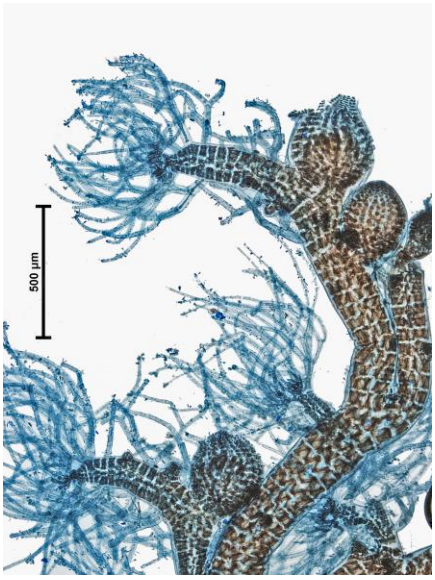


Fig 19: *Polysiphonia atricapilla*, thin, branched, colourless trichoblasts at tips; goblet-shaped mature female structures (cystocarps)

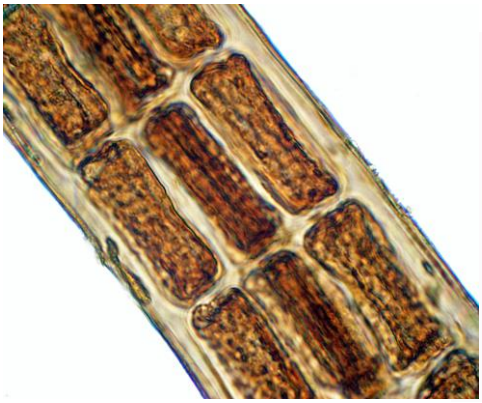


Fig. 20: *Polysiphonia teges*, bands of 4 pericentral cells (the underlying cells of the central filament, equal in length to pericentral cells, is obscured)

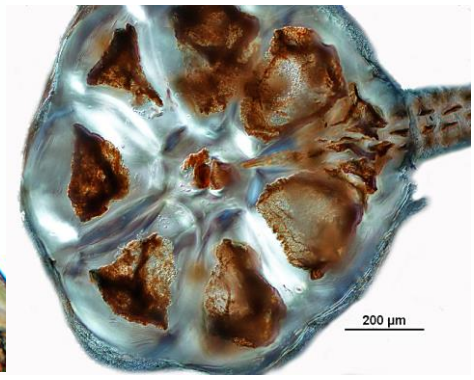
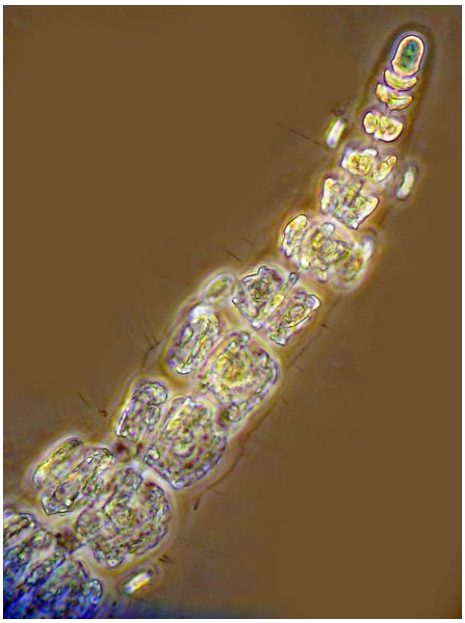


Fig. 21: *Polysiphonia decipiens*, cross section, central filament surrounded by 7 pericentral cells, origin of a side branch



Figs 22-24: *Falkenbergia*, several plants (left), filaments with bands of 3 pericentral cells ringing narrow central cells (above left), tetrasporangia (***t sp***) divided in a cross pattern (cruciate) (above right)

Fig. 25: *Euptilota articulata*, detail of feathery (pinnate) branching

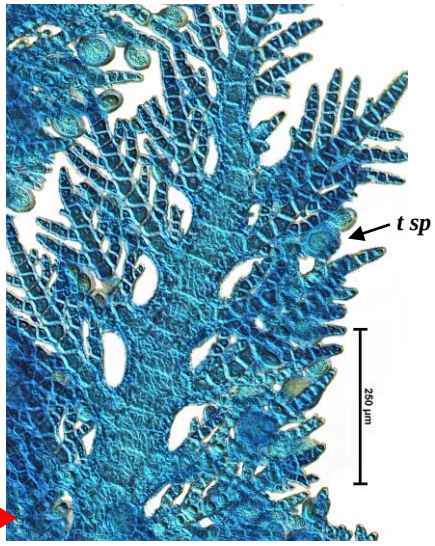


Fig. 26: *Euptilota articulata*: tetrasporangiate plant: alternating, comb-like side filaments; sloping (oblique) cross walls seen near tips; tetrasporangia (***t sp***) scattered in filaments

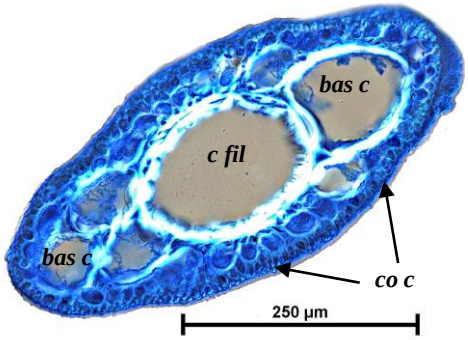


Fig. 27: *Euptilota articulata*, cross section: central filament (***c fil***); basal cells of side filaments (***bas c***); corticating cells (***co c***)

Fig. 28: *Rhodocallis elegans*, plants are flat-branched. The basic filamentous construction is visible only in undamaged branch tips and may be difficult to locate

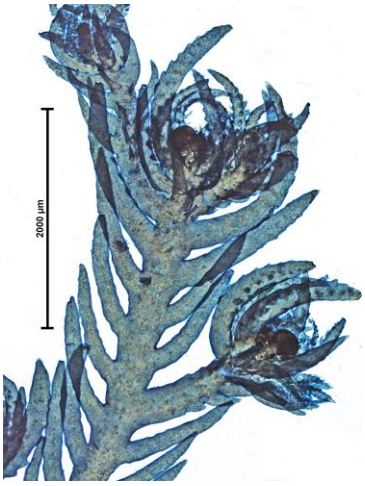


Fig. 29: *Rhodocallis elegans*, naked mature female structures (cystocarps) at branch tips

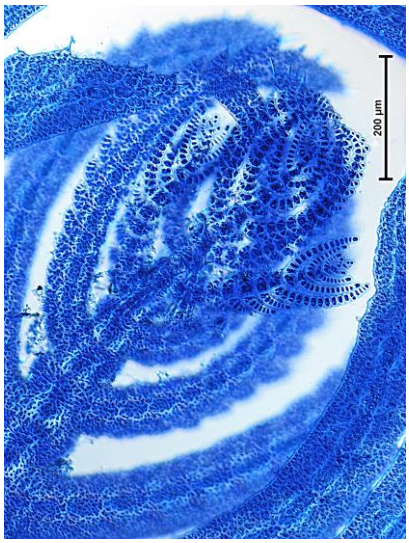


Fig. 30: *Rhodocallis elegans*, branch tip, filaments visible, side branches alternating

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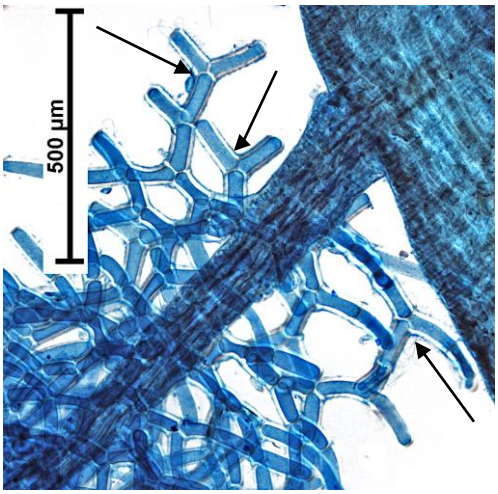
9a. sporangia ***in rings of 4-6***, always in special cigar-shaped structures (stichidia). Cells at forks of side branchlets share a common wall at their bases.
Figs 31-36 (opposite and next page**).**
..... **go to**
"Filamentous red algae of southern Australia. Part V. Family: Dasyaceae"

9b. sporangia ***single or paired*** in a line or spiral, sometimes in stichidia but mainly in swollen, side branchlets. Cells at forks of side branchlets have separate walls at their bases. Figs 36-39. ..... **go to**
"Filamentous red algae of southern Australia. Part IX. Tribe: Lophothalieae of the Family: Rhodomelaceae



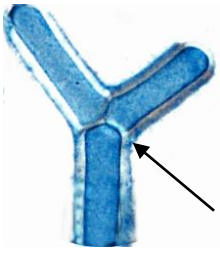


Fig 31: *Dasya cliftonii*, cells sharing a common wall at the fork of a branchlet (arrowed), (insert enlarged)

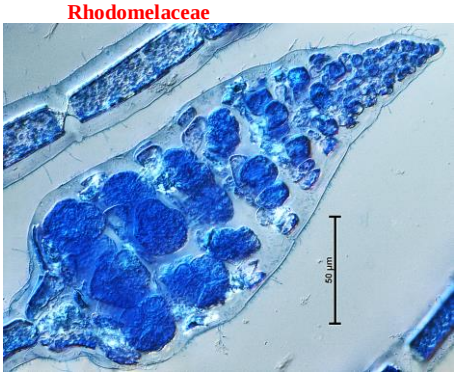


Fig 32: *Dasya atactica*, sporangial structure (stichidium) with sporangia in rings of 6

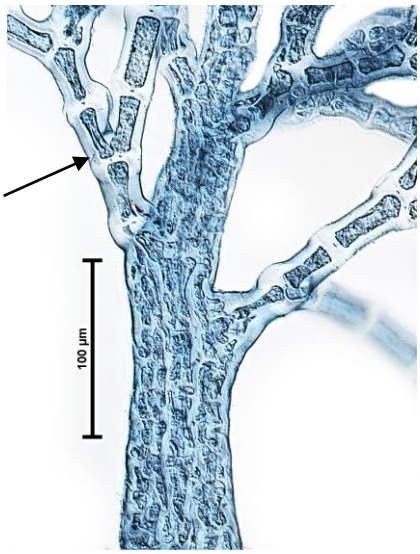


Fig 33: *Dasya crinita*, cells sharing a common wall at the fork of a branchlet (arrowed)

(Dasyaceae)

Fig. 34: *Dasya extensa*, dense hair-like side branchlets and stalked, mature female structures (cystocarps)

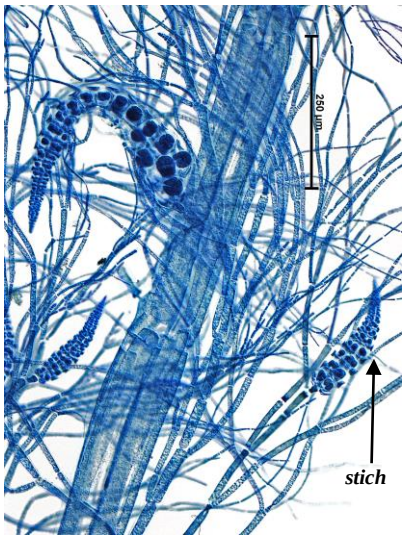


Fig. 35: *Dasya crescens*, narrow axes with bands of 4 pericentral cells; ***coloured*** side filaments naked, lance-shaped stichidia (***stich***) present

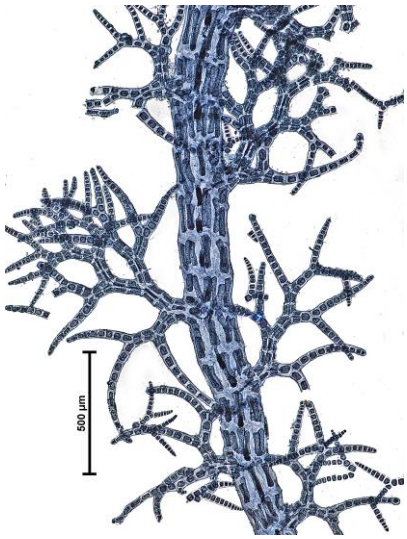


Fig. 36: *Heterosiphonia australis*, axis with bands of 7 pericentral cells (4-5 seen in side view); filamentous side branches branched, cells in a single line (monosiphonous) except at base

(Lophothalieae)

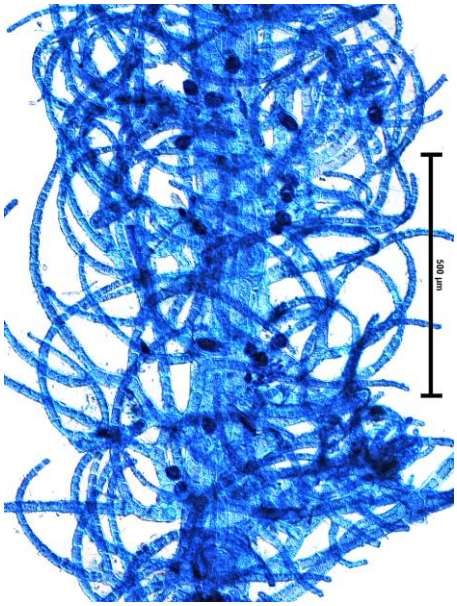


Fig. 37: *Veleroa adunca*, dense, hair-like side branchlets curved upward

Fig. 38: *Brogniartella australis* (left) main branches (axes) with bands of pericentral cells, cells at forks of side branchlets with separate walls at their bases (insert, above, of an enlarged branch; compare this with Fig. 30 in which branch cells share a common cell wall)

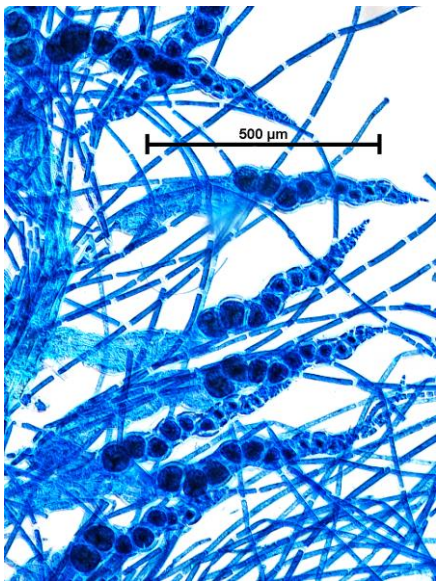


Fig. 39: (left) *Lophocladia kuetzingii*, sporangial structures (stichidia), sporangia single, in a spiral

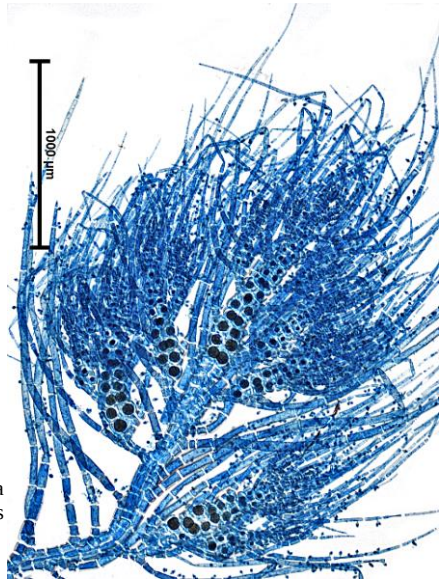


Fig. 40: (right) *Lophothalia hormoclados*, sporangia paired in swollen side branchlets