

Pictured Key to some common red algae of southern Australia: slimy/mucilaginous red algae

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 <i>some</i> 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 <i>artificial</i> 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 of algae are usually blue stained, or have a black background. Branches of pressed specimens are often flattened and look unnaturally compressed.

This key is *restricted* to algae with a *slimy/mucilaginous/"gooey"* consistency.

Although this characteristic is pretty subjective and includes widely different and un-related groups it can get you a possible species or genus name that can be investigated further using the "Fact Sheets", "Algae at a Glance" or additional "Pictured Keys" sections found on this Web site.

Unavoidably, as with many algae, microscope work will be needed to separate species.

1a. a cross section shows large oval or equal-sided cells (parenchyma) in the core of branches. See Figs 1, 6.
..... 2.

1b. a cross section or a tissue squash shows fine threads or filaments in the core of branches. See Fig. 2.
..... 6.

2a. plants flat, leafy, major branches (axes) >10mm wide, fronds sparsely fringed with microscopic *teeth*; small cells appear in vague rings (*rosettes*) about larger, deeper cells in surface microscope views. Figs 3-7.
..... *Gloiophyllis barkerieae*

Family: Cystocloniaceae (in part)

2b. axes flat or cylindrical, <10mm wide, teeth *absent*, although female reproductive structures (cystocarps) may have *horns*; rosettes *absent*.
..... 3.

Family: Rhodymeniaceae (in part)



Fig. 3: *Gloiophyllis barkerieae*

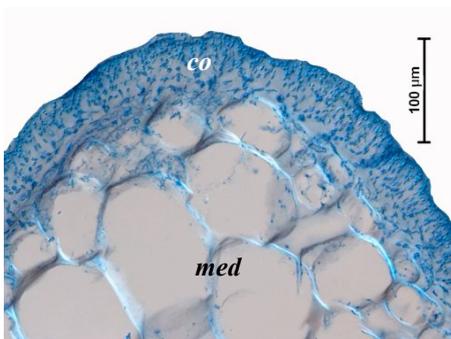


Fig. 1: *Gloiocladia fruticulosa*, cross section, large ovoid cells in the core (medulla, *med*) and branched tufts of small cells in the outer

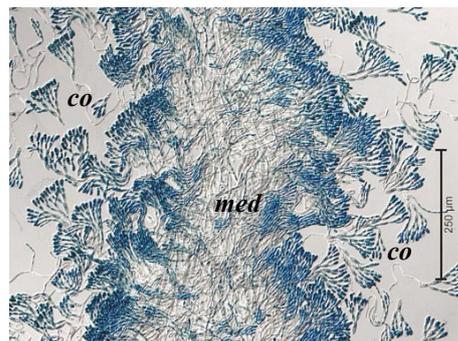


Fig. 2: *Helminthocladia australis*, tissue squash, fine filamentous core (medulla, *med*), branched tufts of cells in the outer layer (cortex, *co*)



Fig. 4: *Gloiophyllis barkerieae*



Fig. 5: *Gloiophyllis barkerieae*, detail of minute teeth along blade edges and dark female structures (cystocarps) embedded in the blades

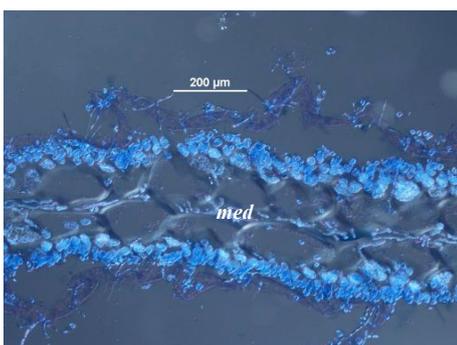
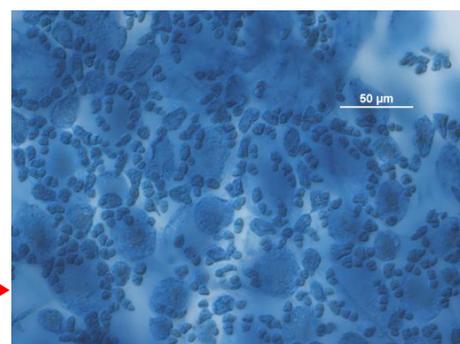


Fig. 6: *Gloiophyllis barkerieae* cross section, large oval cells in the frond core (medulla, *med*)

Fig. 7: *Gloiophyllis barkerieae*, cells in surface view show patterns of small cells ringing larger lower ones (rosettes)



- 3a. branches generally flat, 4-10 mm wide, smaller side branches from branch edges 4.
- 3b. branches cylindrical or slightly flanged, generally radially branched, 1-2 mm wide. Figs 8, 9.
..... *Gloiocladia fructiculosa*
- 4a. branching mainly forked, small proliferations on margins and blade surfaces often occur. Figs 10-12.
..... *Gloiocladia polycarpa*
- 4b. branching in 2 rows from branch edges (pinnate) 5.
- 5a. branching irregular, plants usually growing on sea-grasses. Figs 13, 14.
..... *Gloiocladia australis*
(as *G. australe* in the Benthic Flora)
- 5b. branching regular, branches narrowing near tips, plants usually on rocks. Figs 15, 16.
..... *Gloiocladia halymenioides*



Fig. 8: *Gloiocladia fructiculosa*



Fig. 9: *Gloiocladia fructiculosa*, cylindrical branches, female reproductive organs (cystocarps) with 2-4 horns



Fig. 10: *Gloiocladia polycarpa*, main branches forked



Fig. 11: *Gloiocladia polycarpa*, detail of small proliferations



Fig. 12: *Gloiocladia polycarpa*, horned cystocarps at branch margins



Fig. 13: *Gloiocladia australis*, attached to a seagrass

Fig. 14: *Gloiocladia australis* flat branches without proliferations, female reproductive organs (cystocarps) horned, at branch edges



Fig. 15: *Gloiocladia halymenioides*

Fig. 16: *Gloiocladia halymenioides*, narrow branch endings, spiky cystocarps



6a. branches cylindrical (terete, circular in cross section), or narrow-compressed (ovoid in cross section), ≈ 4 mm wide. See Fig. 17, but also step #13a for *Gibsmithia womersleyi*, a species in which the branches flatten on drying

6b. algae consisting of flat blades (foliose) ≥ 10 mm wide. See Fig. 18.

7a. branches internally a core of loose microscopic threads, embedded in gel, ending in bunches or chains of outward-pointing cells loosely held together and readily separated when making a tissue squash for microscopic examination. See Fig. 19.

7b. tissue squash shows a large central thread in the branch core, mixed with fine rhizoids and radiating threads in rings, ending in outward pointing bunches of small cells. See Fig. 20.

11. Family: Dumontiaceae (in part)

8a. outer layers (cortex) ending in compact hemispherical cells; cores, initially of branched threads, may become hollow. Figs 21,22. *Nothogenia fastigiata* Family: Galaxauraceae

8b. outer layers loosely held together; plants, branches not hollow

9a. no star-shaped (stellate) cells found in tissue squashes

9b. stellate cells found in tissue squashes. Figs 23, 24. *Grateloupia intestinalis* Family: Halymeniaceae



Fig. 17: *Helminthocladia australis*



Fig. 18: *Platoma foliosum*

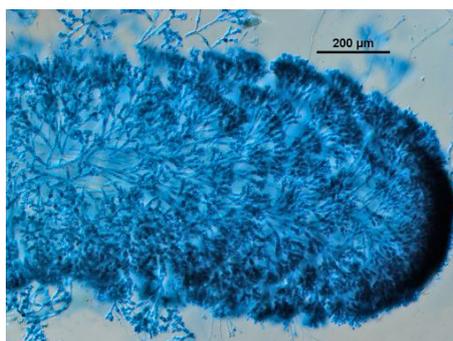


Fig. 19: *Helminthora*, tissue squash, numerous fine threads ending in radiating branched tufts of small cells

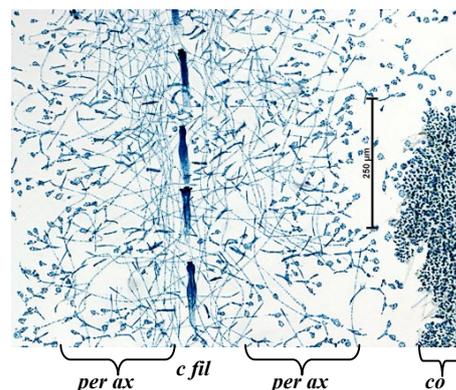


Fig. 20: *Dasyphloea insignis*, tissue squash, central thread (*c fil*) loosely wrapped in rhizoids, radiating threads (*per ax*) ending in small surface cells (*cortex, co*,



Fig. 21: *Nothogenia fastigiata*

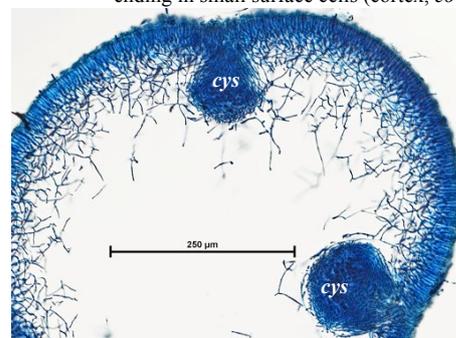
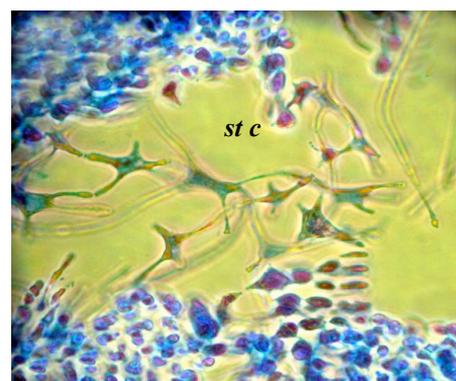


Fig. 22: *Nothogenia fastigiata*, cross section; compact outer cells (*cortex, co*), core of branched threads (*medulla, med*), hollow centre, embedded female structures (*cystocarps, cys*)

Fig. 23: *Grateloupia intestinalis*



Fig. 24: *Grateloupia intestinalis*, tissue squash, star-shaped cells (*st c*)



10a. plants “stringy”, branching sparsely and irregularly forked, usually from near the plant base, Figs 25, 26.

..... *Nemalion helminthoides*

Helminthora lindaurei

Family: Liagoraceae

10b. branching more dense, branches either regularly forked and wider or in 2 rows from the edge of axes. Figs 27-32.

..... *Helminthora australis*

Helminthocladia beaugleholei,

Helminthocladia dotyi,

Helminthocladia australis

Helminthocladia densa

Family: Liagoraceae

WARNING: correct separation of genera depends on female reproductive features. See individual Fact Sheets in the Web.



[See also step #19a of this key](#)



Fig. 25: *Nemalion helminthoides*



Fig. 26 : *Helminthora lindaurei*



Fig. 27 *Helminthora australis*, from a region of moderate water movement



Fig. 28: *Helminthora australis*, from the intertidal exposed to rough water

Fig. 29: *Helminthocladia beaugleholei* →

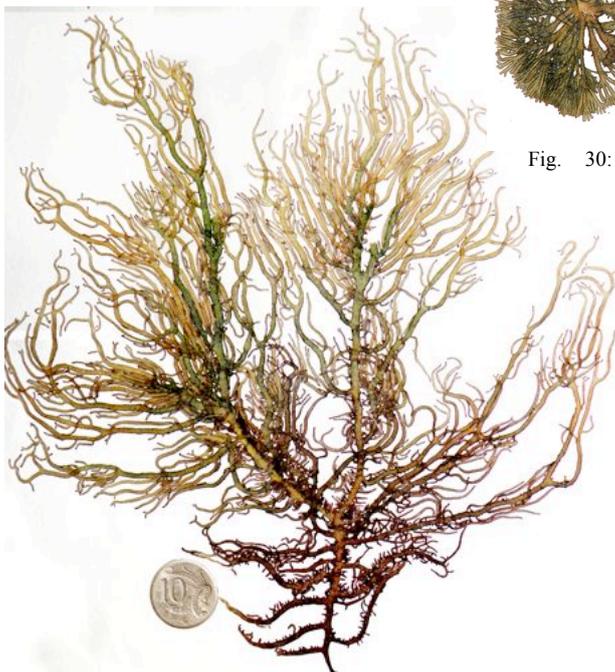


Fig.31: *Helminthocladia australis*



Fig. 30: *Helminthocladia dotyi*

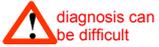


Fig. 32: *Helminthocladia densa*

11a. axis 2-5 mm wide; large central thread in the branch core, outer layers (cortex) of loose branches *without* hairs. Figs 7, 33-35.
 *Acrosymphyton taylori*

11b. axis 1-2 mm wide; central thread small, wrapped in fine rhizoids outer layers (cortex) compact, hairs *present* 12.

12a. short *icicle-like* hairs protrude from tightly packed outer layers. Figs 20, 36-38.
 *Dasyphloea insignis*



12b. extremely fine, *long*, single-celled hairs with swollen tips protrude from loosely packed outer layers. Figs 39-41.
 *Dudresnaya australis*



Fig. 33: *Acrosymphyton taylori*

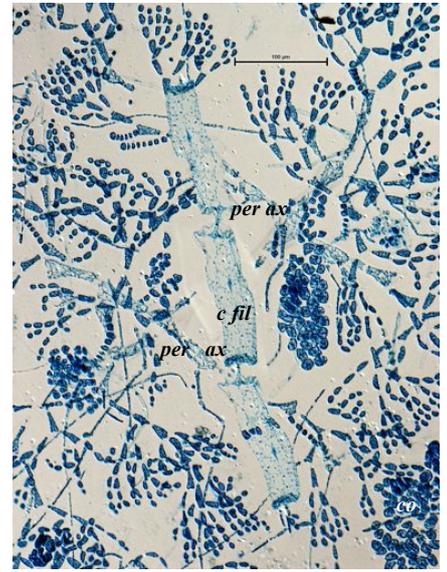


Fig. 34: *Acrosymphyton taylori*, tissue squash; central filament (*c fil*) radiating threads (periaxials, *per ax*), loose surface branches (cortex, *co*)

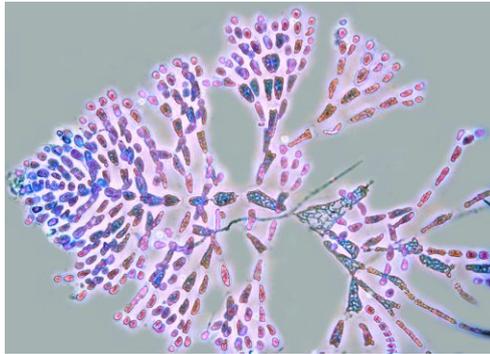


Fig. 35: *Acrosymphyton taylori*, branch tip showing development of the central thread and radiating periaxials



Fig. 36: *Dasyphloea insignis*

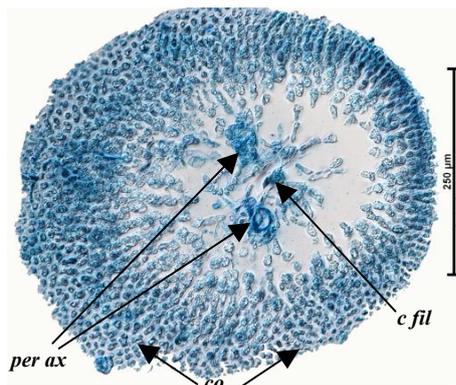


Fig. 37: *Dasyphloea insignis*, cross section; central filament (*c fil*), radiating branches (periaxials, *peri*), ending in small, tightly-packed cortical cells (*co*)

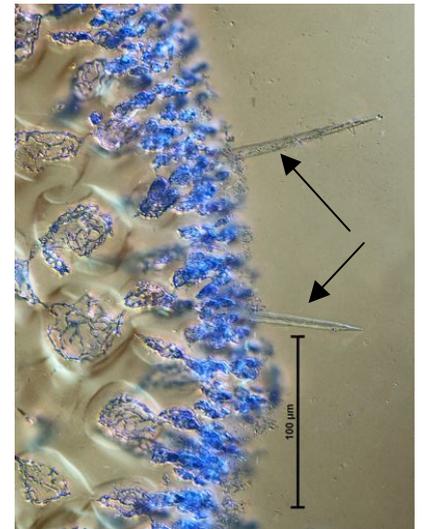


Fig. 38: *Dasyphloea insignis*, outer layer (cortex) with icicle-like hairs (arrowed)



Fig. 40: *Dudresnaya australis*

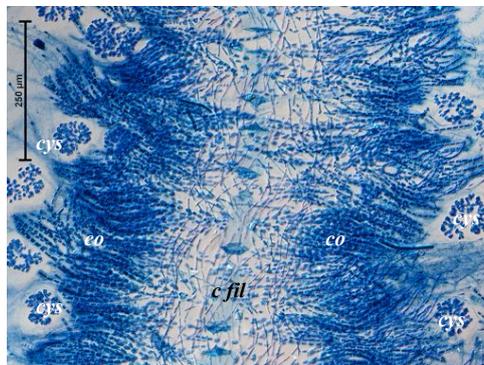


Fig. 39: *Dudresnaya australis*, tissue squash; central filament (*c fil*), radiating loosely-packed cortical cells (*co*), female reproductive structures (cystocarps, *cys*)

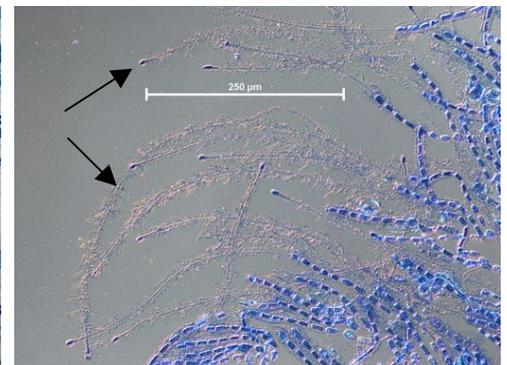


Fig. 41: *Dudresnaya australis*, loosely-packed outer layer (cortex), branches ending in extremely fine, single-celled hairs (arrowed) with swollen tips

13a. branches cylindrical but drying flat, 2-30 mm wide, branching mainly from a *gristly basal knob* up to 10 mm across; tissue squash shows a wide core of fine threads and chains of small cells in outer layers.
Figs 43-44.

..... *Gibsmithia womersleyi*
rare
Family: Dumontiaceae

13b. plants unbranched, *or* branching forked *or* arising from edges of a flat axis; basal knob *absent*
..... 14.

14a. blades large, broad, flat, >50 mm wide 15.
14b. blades narrower 19.

15a. plants leaf- or blade-like, blades unbranched, or with small marginal lobes or blades arising mainly *from the base of the plant*, often drying gristly (cartilaginous)
..... 16.

(found also in “**Pictured Key to some common broad bladed red algae of southern Australia**”)

15b. plants strap-like, *forked* once or twice, blade edges *crinkled*, surfaces mottled or marked with “rivulets”.
Figs 45, 46.
..... *Tsengia laingii*
Family: Nemastomataceae



Fig. 42: *Gibsmithia womersleyi* basal knob arrowed

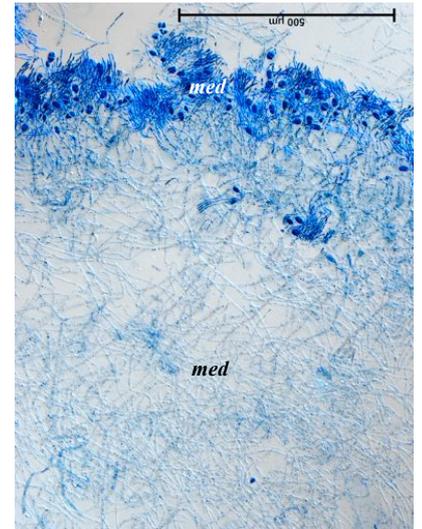


Fig. 43: *Gibsmithia womersleyi*, tissue squash, mass of fine threads in core (medulla, *med*) outer layer (cortex, *co*) with cruciate tetrasporangia

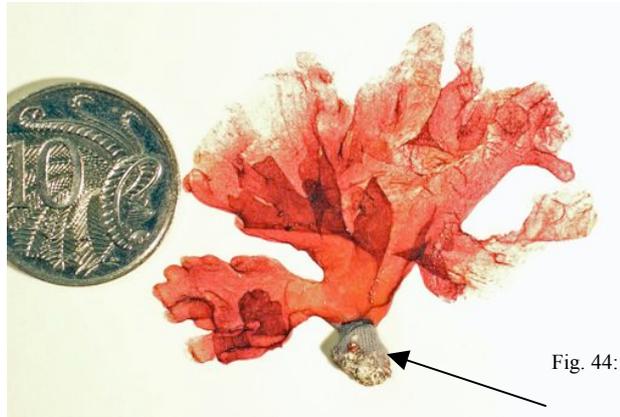


Fig. 44: *Gibsmithia womersleyi*, basal knob arrowed



Fig. 45: *Tsengia laingii*, two plants with contrasting shapes

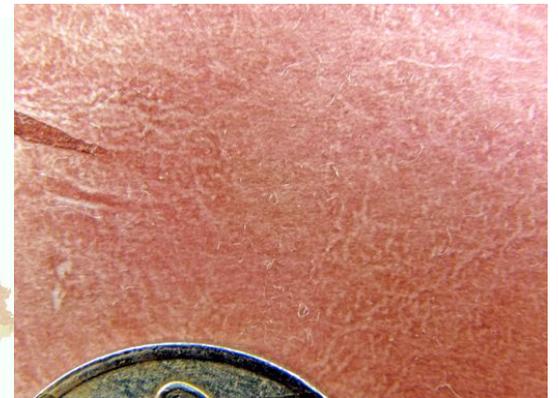


Fig. 46: *Tsengia laingii*, mottled surface, with some “rivulets”

16a. plants large, oval-shaped, *undivided*, arising from a small cylindrical stalk, drying gristly; female structures (cystocarps) embedded in the blade. Figs 47, 48.

..... *Grateloupia ovata*
Family: Halymeniaceae

16b. plants branching usually only from the short base
..... 17.
Family: Nemastomataceae (in part)

17a. small lobes at blade edges, blade surface with "rivulet" markings . Figs 49, 50.

..... *Platoma foliosum*

17b. small lobes *absent*, although the blade may be torn into large pieces when old; rivulet markings absent or present 18.

18a. rivulet markings on surface *absent*; gland cells usually but not always present in the outer cell layer (cortex); female structures sunken, opening by a *pore*. Figs 51-53.

..... *Schizymenia dubyi*

18b. rivulet markings *present*; gland cells *absent*, female structures without pores. Figs 54-56.

..... *Platoma australicum*



Fig. 47: *Grateloupia ovata*, close-up of the small basal stalk

← Fig. 48: *Grateloupia ovata*



Fig. 49: *Platoma foliosum*, rivulet markings on the blade surface

← Fig. 50: *Platoma foliosum*



Fig. 51: *Schizymenia dubyi*

Fig. 52: *Schizymenia dubyi*, plant base with short stalk, surface mottling *absent* →

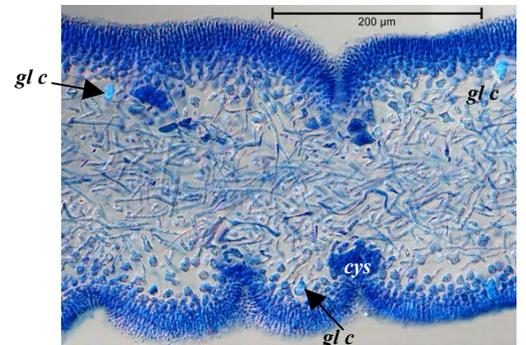
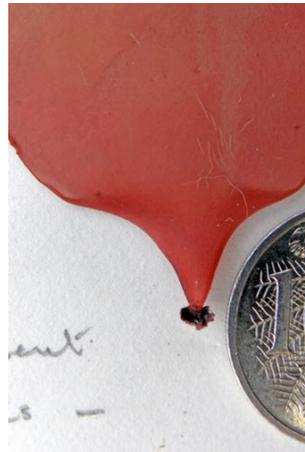


Fig. 53: *Schizymenia dubyi*, cross section, bright gland cells (*gl c*), cystocarps (*cys*) with sunken pores



Fig. 54: *Platoma australicum*



Fig. 55: *Platoma australicum*, surface mottled, with rivulets

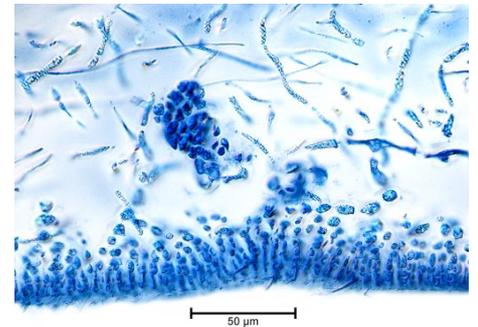


Fig. 56: *Platoma australicum*, cross section, (*cys*) sunken, pore *absent*

- 19a. blades regularly forked, narrow.
Figs 62-64.
..... *Tsengia feredayae*
Family: Nemastomataceae
- 19b. short side branches arise at blade
edges 20.
- 20a. spidery (ganglionic) cells present in
tissue squashes, pinnate branching
throughout. Figs 57, 58.
..... *Gelinarina ulvoidea*
Family: Halymeniaceae
- 20b. ganglionic cells *absent*; axes
compressed, forked, short side
branches numerous. Figs 59-61.
..... *Tsengia comosa*
Family: Nemastomataceae



Fig. 57: *Gelinarina ulvoidea*

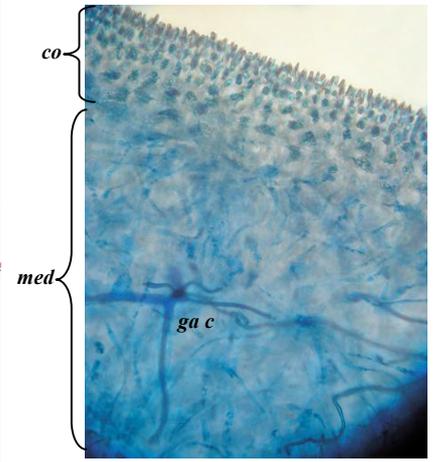


Fig. 58: *Gelinarina ulvoidea*, cross section, outer, compact layer of small, out-ward pointing cells (cortex, *co*), wide core of intertwined threads (medulla, *med*) with large, spidery (ganglionic) cells (*ga c*)

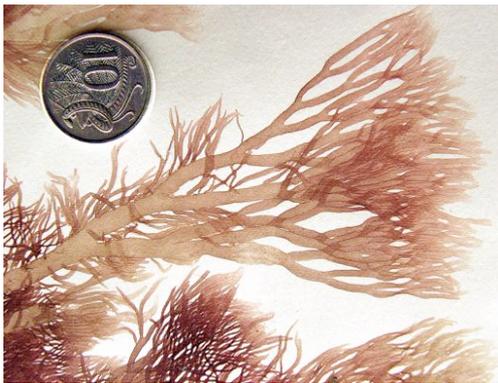


Fig. 59: *Tsengia comosa*, detail of forked main branches fringed by small side branches



Fig. 60: *Tsengia comosa*

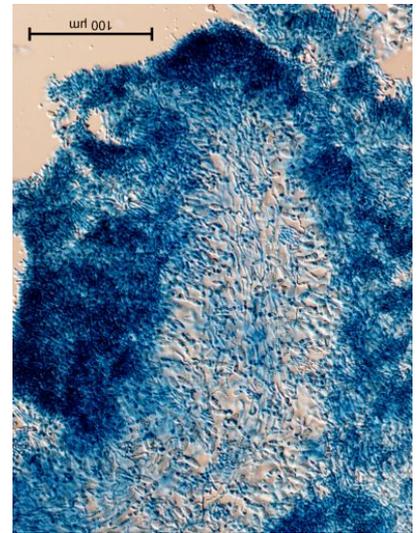


Fig. 61: *Tsengia comosa*, tissue squash of branch tip



Fig. 62: *Tsengia feredayae*



Fig. 63: *Tsengia feredayae*, regularly forked pressed plants with branches that have shrunk and darkened during preparation

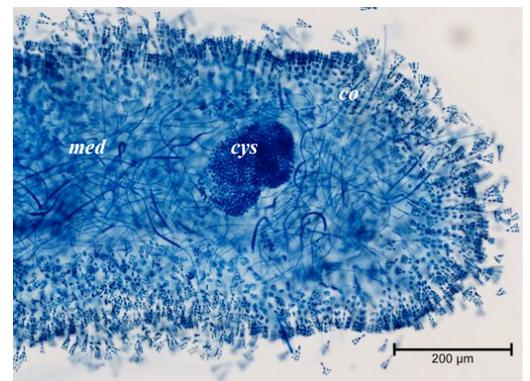


Fig. 64: *Tsengia feredayae*, tissue squashes; core of threads (medulla, *med*) tufts of small cells (cortex, *co*), female structure, (cystocarp, *cys*)