

FILAMENTOUS RED ALGAE. Part VIII: axes with irregular cortication 2nd edition

This key

is a way of starting the search for a name. of a species. 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 24 mm or almost 1" wide.

Images microscope images of algae are usually blue stained.

Restrictions

The key contains algae

- in the Tribes: Ptiloteae and Rhodocallideae of the Family: Ceramiaceae
- from southern Australian waters
- found in of Womersley (1998). One species (*Ptilota hannafoordii*) now placed in the Tribe: Anthamnieae in *Algaebase*
- some of which have solid and flat branches superficially better located in the pictured key "**feathery flat-branched red algae 2nd edition**". However, plant tips and reproductive structures place them within filamentous algal groups

Features of the Tribes

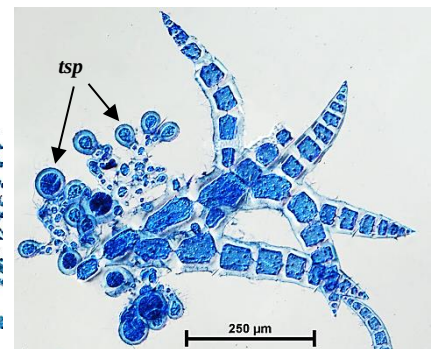
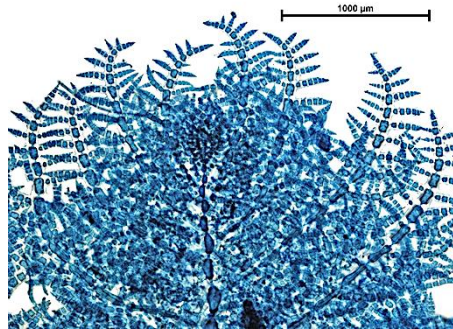
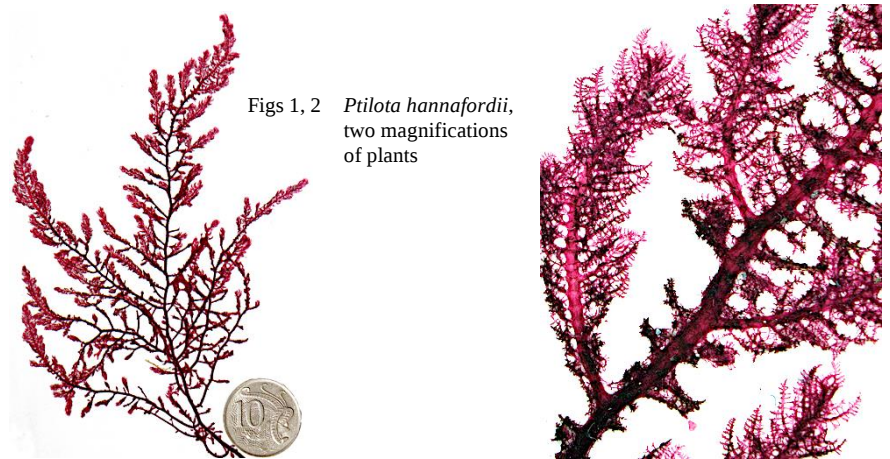
- basic **filamentous construction**. Cells initially grow in a single line (algae are **uniseriate**), although this is visible generally only near branch tips, and continues as a **prominent central filament** seen in cross sections under the microscope.
- filament cross walls may slope (are **oblique**)
- tip cells cut off cells alternately, eventually forming flattened rings of 2-10 cells (periaxial cells), seen in cross section about the central filaments
- branching generally occurs in one plane ("flat-branched" so that plants are **feathery, comb-like** or **fishbone** (pinnate) in outline
- additional, closely-packed, **irregularly arranged** cells wrap around (corticate) and obscure the central filament. These are generally equal-sided (parenchymatous). They may expand more in one flat surface, producing **compressed** thin branches
- reproductive structures are usually in **exposed positions** within **naked filaments**

Names:

have been checked in the Website *Algaebase*

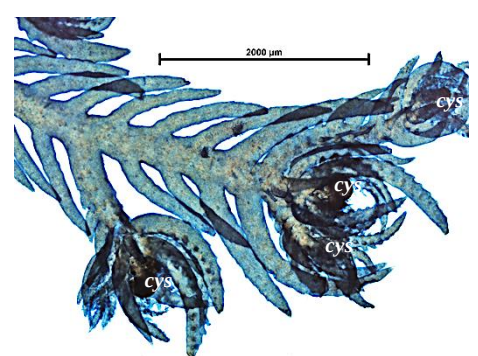
KEY

- 1a. central filament prominent; plant tips crowded with over-arching, naked side filaments ending in **sharp points**. Side branches alternate and flat-branched once or twice (bi-pinnate), producing a **comb-like** effect. Figs 1-4
..... *Ptilota hannafoordii*
as *Anthamnion hannafoordii* in *Algaebase*
- 1b. central filament rapidly obscured by equal-sided corticating cells; tip cells blunt (obtuse) 2.
- 2a. branches compressed, alternate, **linear**, tips pointed, edged with **minute spines**; 4 peri-axial cells ringing the central filament rapidly obscured rhizoids; **tetrasporangia** in pebble-like masses on the surface of short side branches; mature female structures at tips of branches. Figs 5-9..... *Rhodocallis elegans*
- 2b. edges of compressed branches smooth, tetrasporangia and cystocarps in exposed branched filaments 3.



Figs 3, 4 *Ptilota hannafoordii*

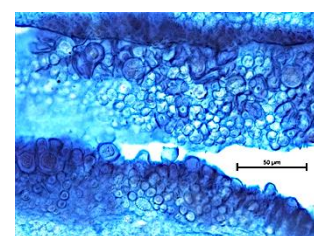
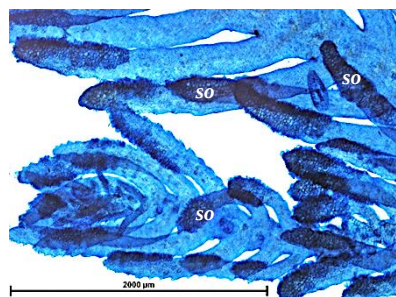
Above: plant tip, over-arching flat-branched (pinnate) side branches; prominent central filaments
Right: extracted side branch with bunches of tetrasporangia (*tsp*)



Figs 5, 6 *Rhodocallis elegans*,

Above: plant tips, flat, fishbone branching

Right: spiny, alternate side branches; cystocarps (cys) at tips, wrapped in filaments

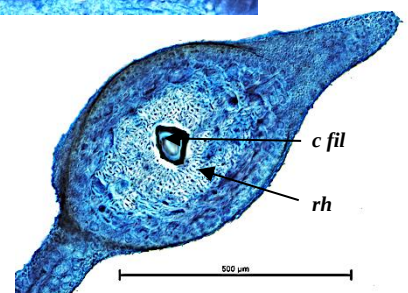


Figs 7-9 *Rhodocallis elegans*

Above: spiny side branches; surface pebble-like clusters (sori, *so*) of tetrasporangia

Right, above:
detail of pebble-like tetrasporangial clusters

Right, below:
cross section: central filament (*c fil*); dense rhizoids (*rh*)



- 3a. side branches ending in exposed filaments with **oblique** end walls; central filament and 2(-4) lateral flanking (peri-axial) cells prominent in cross sections of axes; tetrasporangia and cystocarps near ends, of branched filaments. Figs 10-13.

..... *Euptilota articulata*
Delicate featherweed in Edgar (2008)

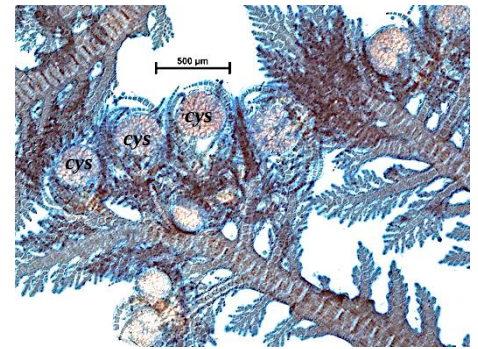
- 3b. branches corticated almost to the tips, filament end walls obscured; central filament and 4-11 lateral flanking (peri-axial) cells prominent only in cross sections of young axes, later obscured by rhizoids; tetrasporangia and cystocarps in tufts of filaments along branch edges 4.

- 4a. compressed side branches linear, but tapering to a point, tetrasporangia and mature female structures (cystocarps) in tufts of naked filaments on upper edges of side branches. Figs 19-27 (next page).

..... *Psilothallia*..... 5.

- 4b. compressed side branches often irregularly arranged, bases running into broad, thick axes; tetrasporangia and mature female structures (cystocarps) in stubby filament tufts with broad, corticated bases, scattered along branch edges. Figs 14-18.

..... *Diapse ptilota*



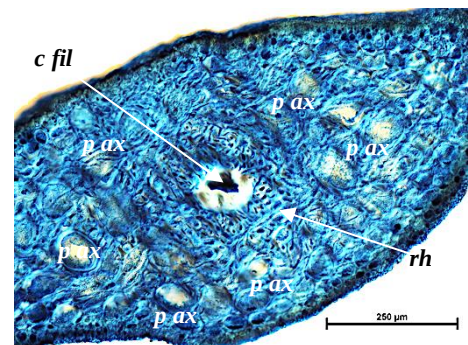
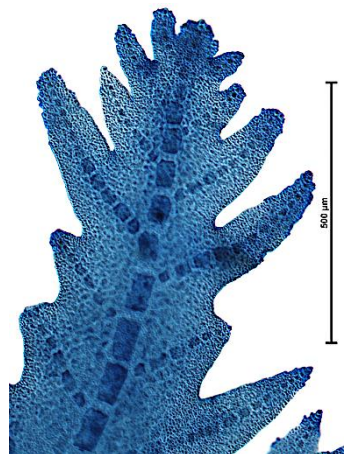
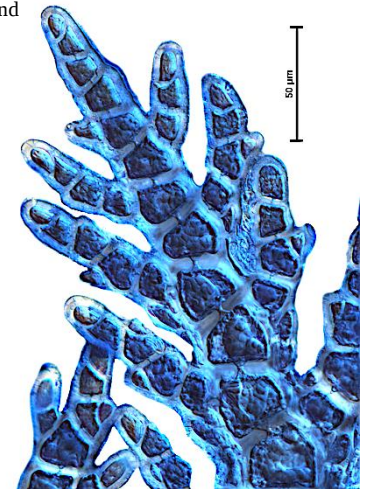
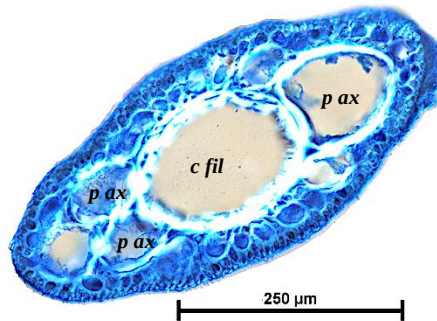
Figs 10-13 *Euptilota articulata*

Above, left: branching pattern

Above, right: mature female structures (cystocarps, cys) wrapped in a few filaments, at tips of side branches

Below, left: cross section, prominent central filament (**c fil**) and peri-axial cells (**p ax**)

Below, right: flat-branched filaments with oblique end walls



Figs 14-18: *Diapse ptilota*

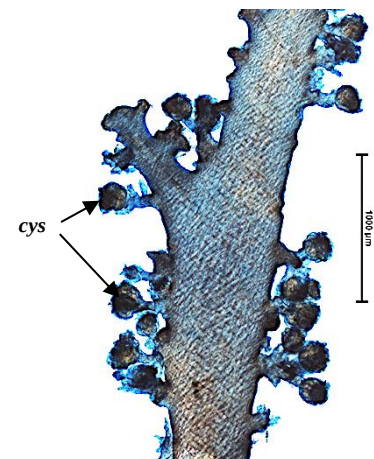
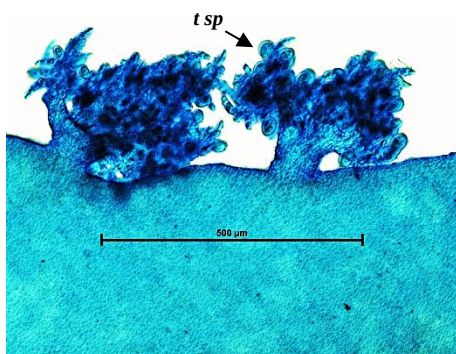
Above, left: plant tips

Above, middle: axis tip, heavily stained central filaments beneath corticating cells reach tips of branches

Above, right: cross section, central filament (**c fil**) and flanking (peri-axial) cells (**p ax**) becoming obscured by numerous rhizoids (**rh**)

Below, left: edge of a side branch, tetrasporangia (**t sp**) in tree-like clusters

Below, right: mature female structures (cystocarps, **cys**) in stubby filament tufts scattered along branch edges

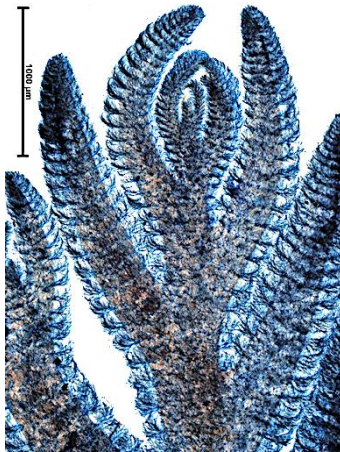
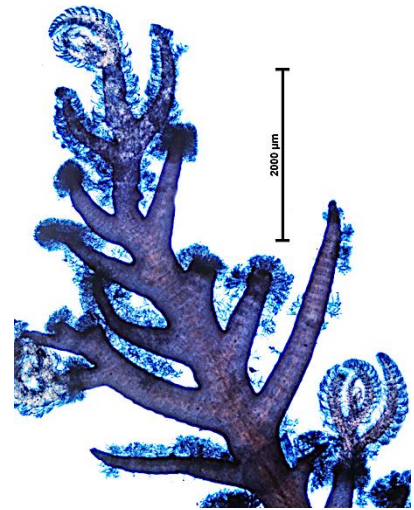


- 5a. possibly rare (W Aust, Cape Northumberland, SA); side branches more cylindrical than compressed, obscurely banded (striate), tips ringed with tufts of fine, branched filaments becoming denuded below; tetrasporangia in minute branched tufts mainly on upper branch edges. Figs 19-22.

..... *Psilothallia striata*

- 5b. from W Aust to Victoria; side branches compressed, broad basally, not banded; tetrasporangia in pod-shaped clusters standing out from branch margins. Figs 23-27.

..... *Psilothallia siliculosa*



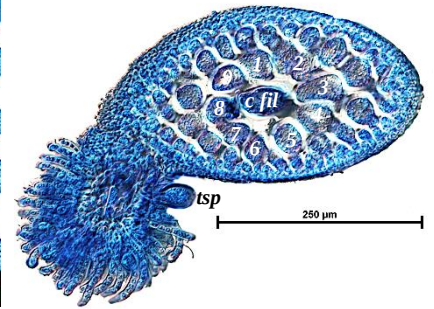
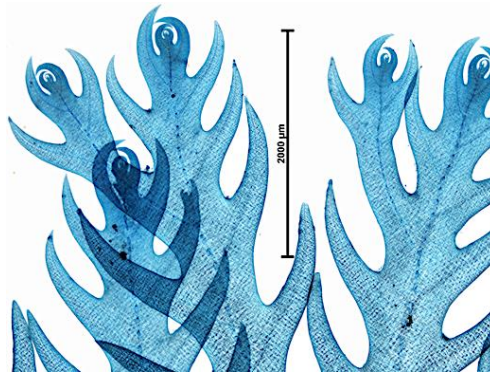
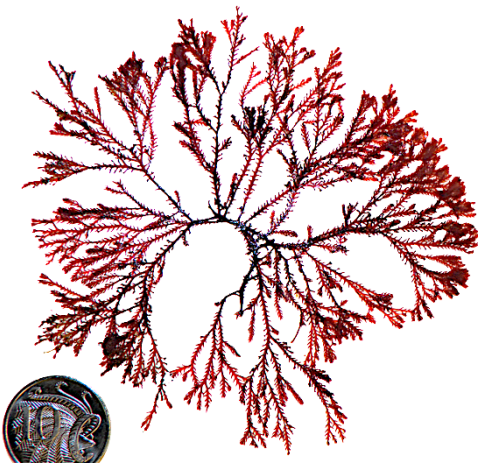
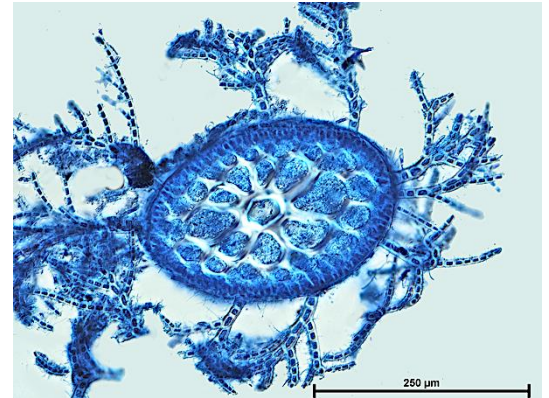
Figs 19-22 *Psilothallia striata*

Above, left: whole plant

Above, right: faintly banded branches and rings of filament tufts progressively denuded down the plant

Left: branch tips: rings of filament tufts

Right: cross section, central filament surrounded by about 8 periaxial cells that form the basal cells of outwardly-growing filament tufts



Figs 23-27 *Psilothallia siliculosa*

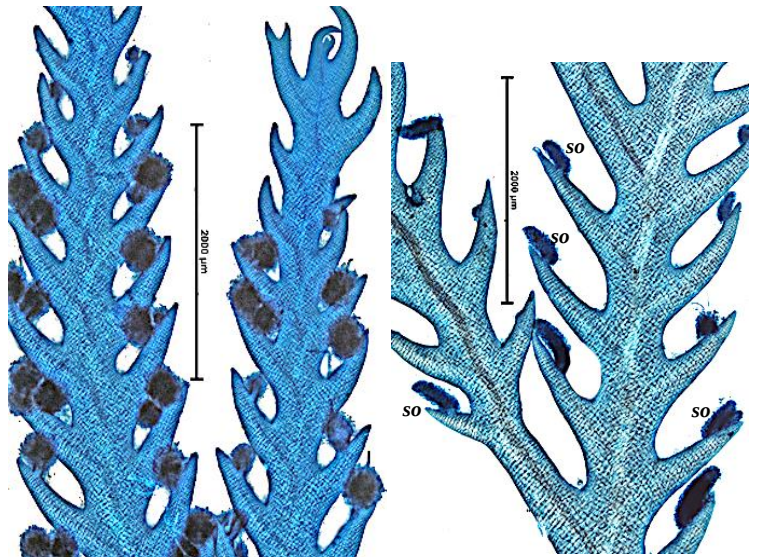
Above, left: whole plant

Above, middle: stained central filaments visible beneath corticating cells

Above, right: cross section, central filament (*c fil*), 9 periaxial cells (1-9), filament tuft bearing a tetrasporangium (*tsp*)

Right: pod-shaped clusters (sori, *so*) of tetrasporangia near tips of side branches

Far right: mature female structures (cystocarps) near tips of side branches



LOOK-ALIKE ALGAE

Comb-like algae superficially resembling the Rhodocallideae and Ptiloteae

1. *Phacelocarpus*

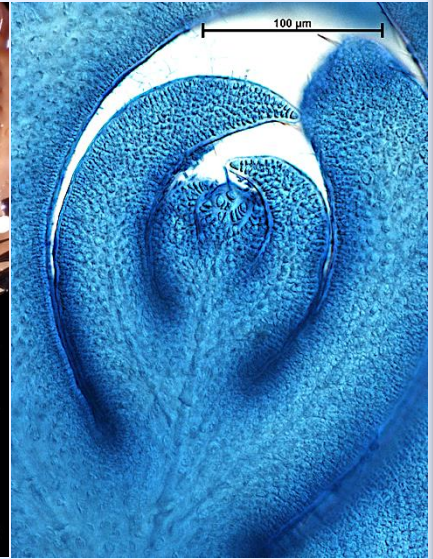
Species in this genus have comb-like, flat, branching patterns, compressed axes, and a central filament resembling *Psilothallia*, *Diapse* and *Rhodocallis*.

When inspected under the microscope:

- they **lack** any naked filament tufts. There is a single, obscure tip cell.
- **all** reproductive organs occur as swellings with distinct walls, mostly on short stalks, in the angle between axes and flat side branches
- windows cut lengthwise along axes show a central filament wreathed in rhizoids, a middle layer of large, equal-sided cells (parenchyma) grading to small cells in outer layers

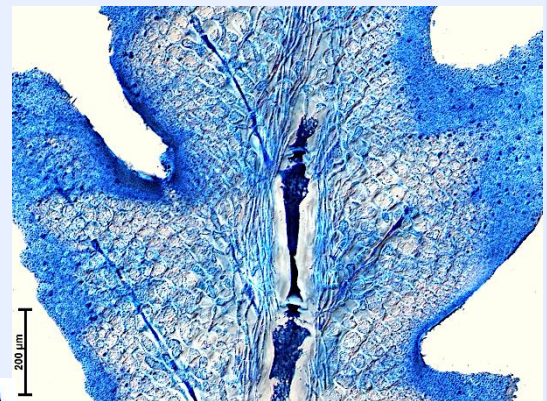


Phacelocarpus peperocarpus
mature female reproductive structures (cystocarps) in angles between axes and side branches



Phacelocarpus peperocarpus, plant tip

Phacelocarpus apodus
Window cut lengthwise in the axis revealing the central filament and large inner cells

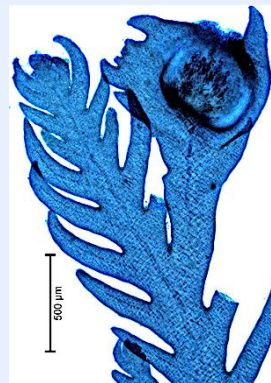


2. *Delisea*

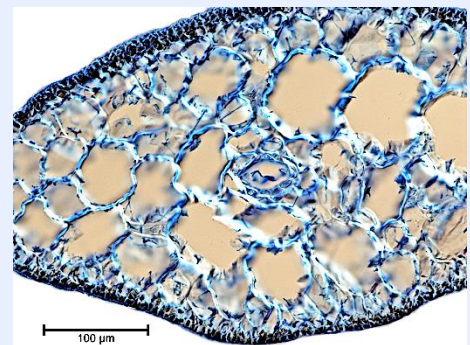
Species in this genus also have flat, comb-like branching patterns, compressed axes and central filaments resembling *Psilothallia*, *Diapse* and *Rhodocallis*.

They differ in having:

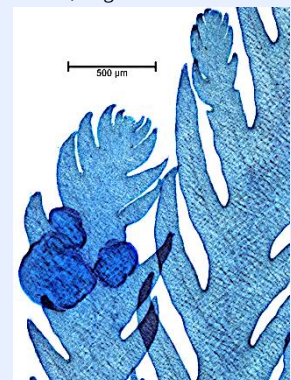
- **no** rings of flanking (periaxial) cells in cross sections of axes
- middle layers of large, irregularly arranged parenchyma
- mature female reproductive organs with distinct walls, **embedded** in branch tips
- male and tetrasporangia in patches (sori) on the surface of blades



Delisea plumosa, central filaments visible, mature female reproductive structures (cystocarp) forming a swelling at one tip



Delisea pulchra, cross section revealing the large central filament, large inner and small outer cells



Delisea plumosa: male reproductive structures forming swellings near plant tips

REFERENCES

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

Edgar, G. J. (2008) *Australian Marine Life. Second edition.* Sydney. New Holland

Womersley, H.B.S. (1998) The marine benthic flora of southern Australia Part IIIC. State Herbarium of South Australia

SPECIES ILLUSTRATED IN THE KEY

species	author(s)	page	current name in <i>Algaebase</i>	authors
<i>Diapse ptilota</i>	(Hooker f, & Harvey) Kylin	2		
<i>Euptilota articulata</i>	(J. Agardh) F, Schmitz	2		
<i>Psilothallia siliculosa</i>	(Harvey) DeToni	3		
<i>Psilothallia striata</i>	(Harvey) Schmitz	3		
<i>Ptilota hannafoordii</i>	Harvey	1	<i>Antithamnion hannafoordii</i>	(Harvey) J. Agardh
<i>Rhodocallis elegans</i>	Kützinger	1		