

SOUTHERN AUSTRALIAN SPECIES OF *PHACELOCARPUS*
("SAWTOOTH" ALGAE) AT A GLANCE

Close up views of preserved material have been coloured; the coin scale is 24 mm or almost 1" across

BASIC PARTS

(using *Phacelocarpus peperocarpus* as an example)



BRANCH DETAILS

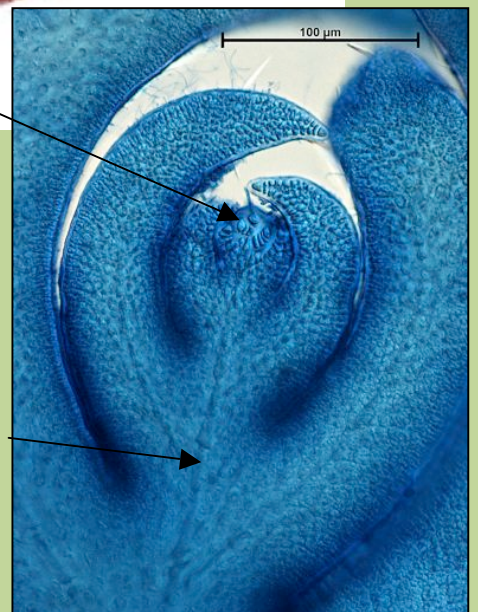


middle strut or axis
of a branch – the
rachis

ultimate branches –
ramuli – in two
opposite rows

reproductive organs
in between ramuli
(*axillary*)

MICROSCOPE VIEW OF A BRANCH TIP



← basal stalk – *stipe*

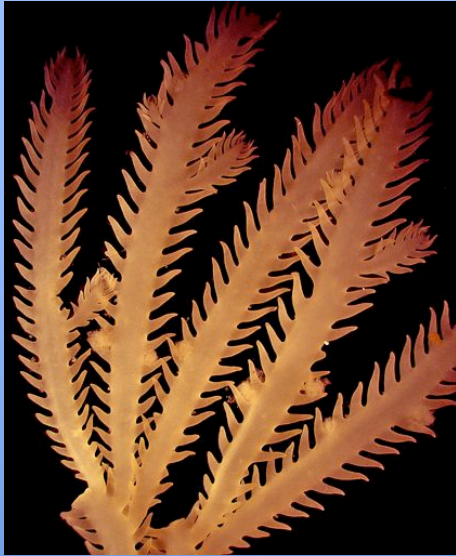
branches ending in a
single (*apical*) cell

central thread
visible for a
short distance
below tip

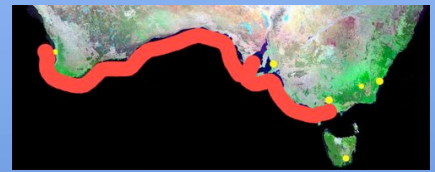
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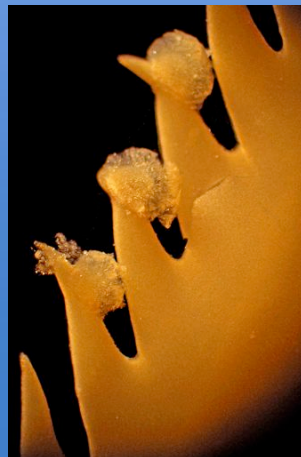
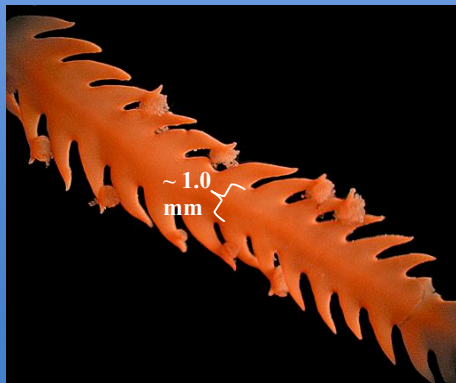
I. ultimate branches (ramuli) shorter than or equal in length to the width of the axis (rachis)



ultimate branches tooth-like, axis with raised mid-rib and prominent flanges, reproductive structures lying *between* ultimate branches
*Phacelocarpus alatus*



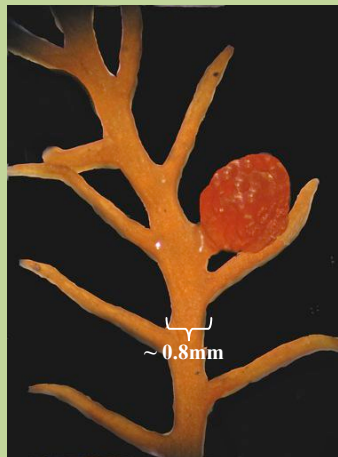
species intergrade



axis mid-rib less prominent, flanges less prominent, reproductive structures lying *on edges* of ultimate branches; a deep water species
*Phacelocarpus complanatus*



II. ultimate branches (ramuli) longer than the width of the axis (rachis)

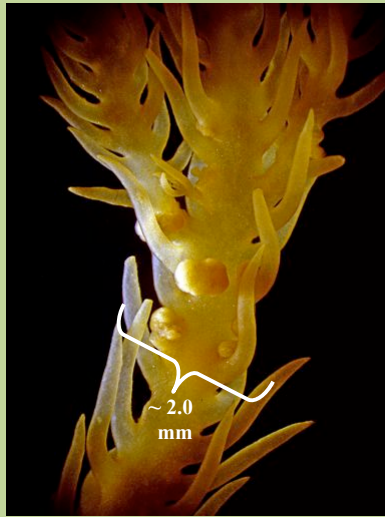


all branches cylindrical, ultimate branches *widely separated* (by 2-6x their width), reproductive structures practically *stalkless* on the *axis edges*.
 *Phacelocarpus sessilis*



intergrades with the next species

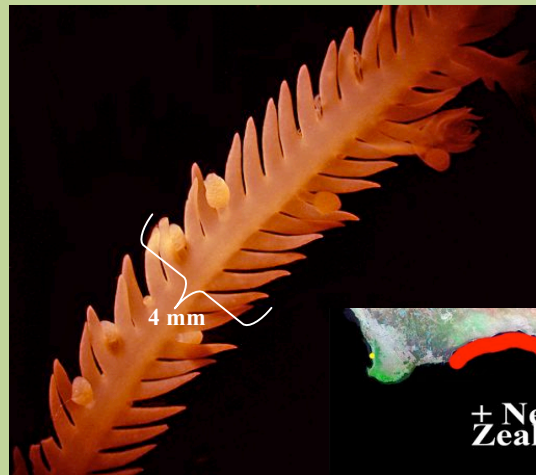
Part II continued next page



stalk cylindrical, *delicate*, other branches slightly compressed, ultimate branches *separated* by only 0.5-1.5x their width, twisted sometimes; width of whole branch \approx 2 mm, male & sporangial structures *stalkless* on *axis edges*
 ***Phacelocarpus apodus***



stalk cylindrical, *robust*, other branches compressed, ultimate branches *slightly separated* (by 0.5-1.5x their width), total branch width \approx 4 mm, all reproductive structures *stalked* (to some degree) on the *axis edge*
 ***Phacelocarpus peperocarpus***



ALGAL LOOK-ALIKES

Some feathery red algae, only distantly related reproductively, superficially resemble *Phacelocarpus*.

1. *Psilothallia*

Family: Rhodomelaceae
similar to *Phacelocarpus*, this genus has

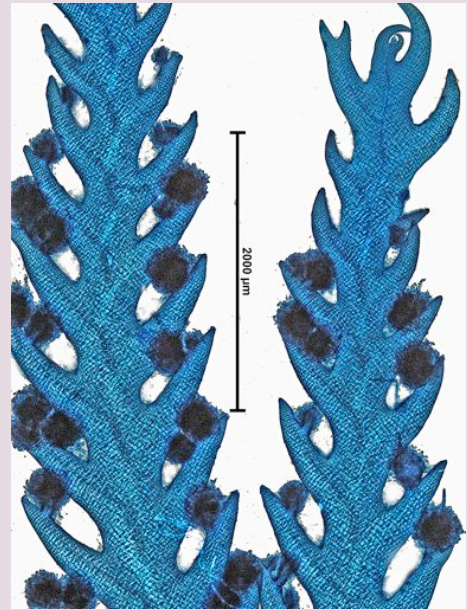
- pinnate, flat
- short side branches with reproductive organs on their edges.

It differs in having:

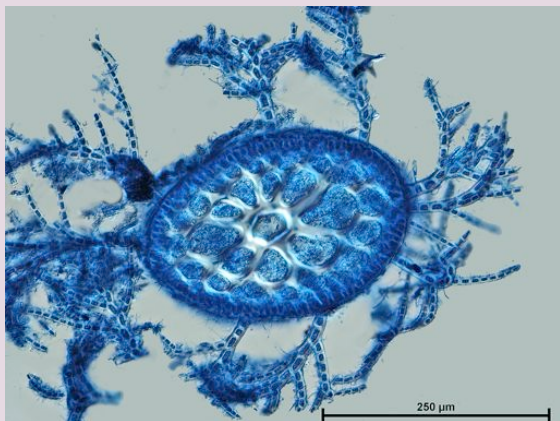
- rings of fine, branched, hair-like filaments (trichoblasts). Unfortunately, these may be lost with age
- a central filament surrounded by a ring of cells (pericentrals)



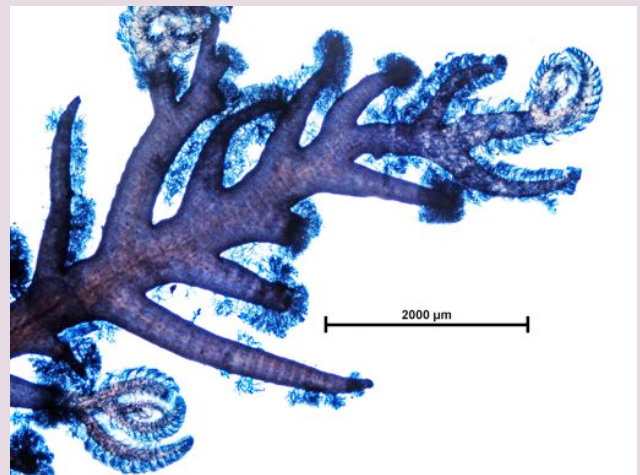
Psilothallia striata



Psilothallia siliculosa, branches denuded of branched filaments (trichoblasts) and position of female structures (cystocarps) are similar to those of some *Phacelocarpus* spp



Psilothallia striata, cross section, central filament ringed by 8 oval cells (pericentrals) with filamentous branches (trichoblasts) extending beyond the outer layers



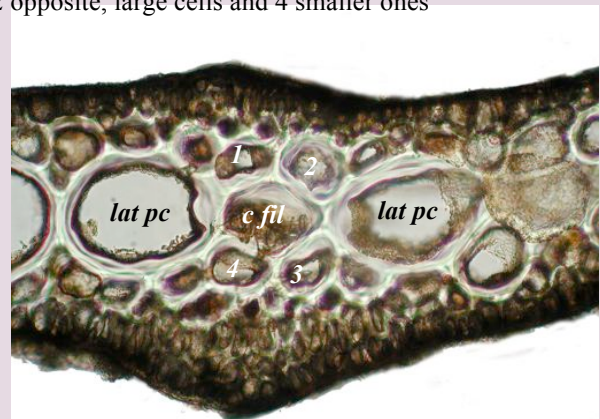
Psilothallia striata, filamentous branches(trichoblasts) intact

2. *Dictyomenia tridens* Family: Rhodomelaceae

This has a flat axis and pinnate, spiky side branches. It has branched, filamentous trichoblasts at branch tips, but these are soon lost. Seen in cross section, a central filament is ringed by 2 opposite, large cells and 4 smaller ones



Dictyomenia tridens



Dictyomenia tridens, cross section, central filament (c fil), large side pericentral cells (lat pc) and smaller pericentrals (1-4)

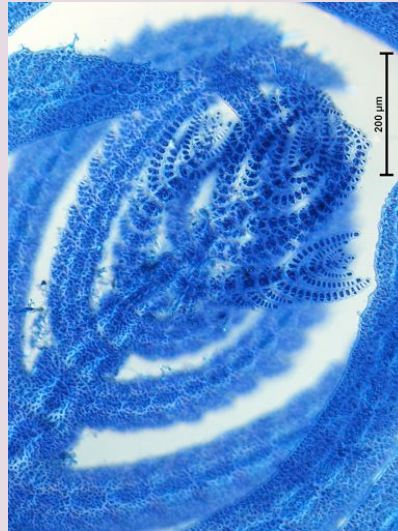
3. *Rhodocallis elegans*

Family: Rhodocallidae

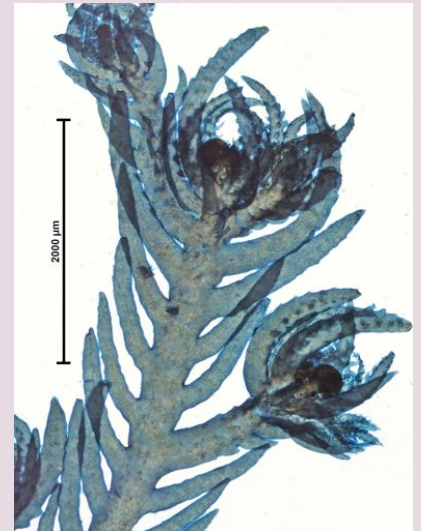
This has flat, pinnate branching, but branch edges are toothed, tips have a basic filamentous structure and exposed reproductive organs.



Rhodocallis elegans



Rhodocallis elegans, filamentous tips



Rhodocallis elegans, exposed female reproductive organs (cystocarps, *cys*) at tips

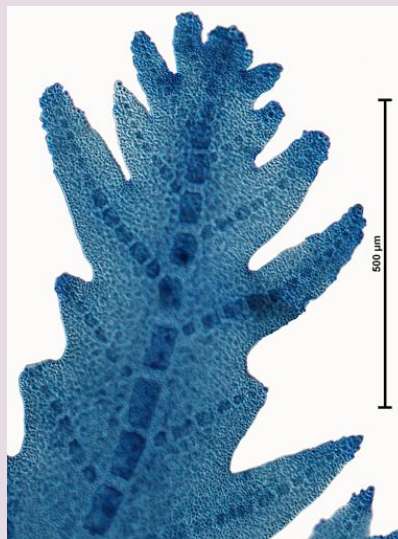
4. *Diapse ptilota*

Family: Rhodocallidae

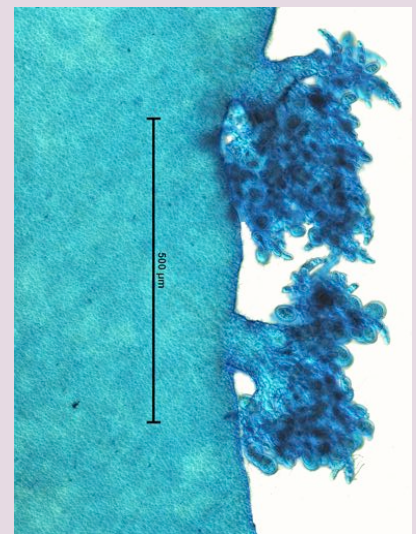
This has irregular flat, pinnate branches, but a basic filamentous structure, although this is not exposed to any extent as it is in *Rhodocallis*. Reproductive organs found at the edges of axes are associated with bunches of branched filaments



Diapse ptilota



Diapse ptilota, branch tips with densely-staining central filaments showing through smaller surface cells



Diapse ptilota, branch edge with sporangia amongst stalked bunches of filaments