

FILAMENTOUS RED ALGAE PART VII: red algal “creepers” (Tribe: Herposiphonieae of the Family: Rhodomelaceae)

This key	Formal classification of algae relies on investigating microscopic reproductive features in detail. Often a complete set of reproductive stages is unavailable in the specimens to be investigated, making identification very difficult if the technical systematic literature is used. Fortunately, some algae grow in specific places and some have recognizable shapes that allow them to be sorted directly into the level of Family, Tribe or Genus and so shortcut a systematic search through intricate and often unavailable reproductive features. The pictured key below uses this artificial way of searching for a name. Then you can proceed to the appropriate fact sheets or further keys to refine your identification. The key generally starts with the large and obvious and then proceeds to the smaller and obscure species.
Limitations	Unfortunately, to use this key, microscopic investigation of specimens is essential.
Images used below	
Scale	The coin used as a scale is 24 mm or almost 1” across.
Names	Names follow Womersley (1998) as this continues to provide the most available and comprehensive descriptions of species. Name changes in the Website <i>Algaebase</i> have been checked.

THE HERPOSIPHONIEAE

This is a group of **seven** genera in southern Australia, some easily mistaken for a variety of filamentous Red algae.

Microscopic investigation is necessary to separate the Herposiphonieae from other Tribes in the Family: Rhodomelaceae such as the Lophothalieae and Polysiphonieae.



Special features of the Herposiphonieae -

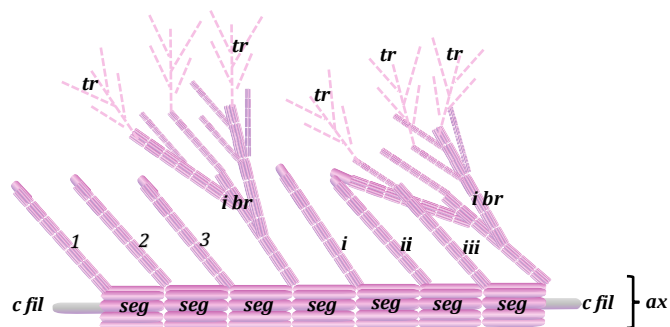
- many plants lie flat on other algae (they are prostrate and epiphytic) or have a substantial creeping base, features from which the Tribe gets its name
- ends of branches often curve downwards or backwards (like snakes about to strike)
- most importantly**, two types of side branches (**laterals**) arise along main branches (**axes**):
 - short, unbranched laterals or laterals with limited growth (called **determinate** laterals) that occur either on one side **or** alternate on opposite sides of axes
 - continually growing (**indeterminate**) laterals that may branch a few times or may develop into additional axes
- a particular sequence** of determinate and indeterminate branches occurs along axes (although this is sometimes difficult to detect in densely branched species)

Algal names are from Womersley (2003). Currently there have been no name changes in the Website *Algaebase*.

FIRST STEP

Ensure you are truly looking at the Herposiphonieae by checking if the specimen to be identified has one of the required sequences of determinate and indeterminate laterals illustrated by the diagrams on the next page.

HERPOSIPHONIEAE: DIAGRAMMATIC EXAMPLE



- main branch (axis, **ax**); the central filament (**c fil**) has been exposed
- segments (**seg**) of pericentral cells
- determinate branches (2 sets shown – **1-3** and **i-iii**)
- indeterminate branches (2 shown – **i br**)

DIFFICULTIES:

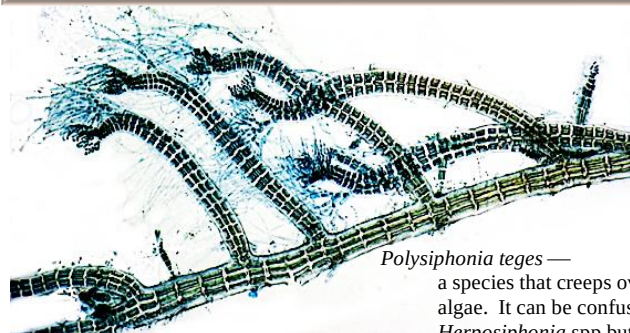
Separating members of the Herposiphonieae that have upright branches from some epiphytic and creeping *Polysiphonia* spp (in the Tribe: Polysiphonieae) can be difficult.

Features in common with *Polysiphonia*:

- a central filament of cells ringed with pericentral cells of equal length forming segments along branches
- extremely fine, branched hairs — trichoblasts — near ends of branches
- sporangia in a single line along modified side branches

Features in contrast to *Polysiphonia*:

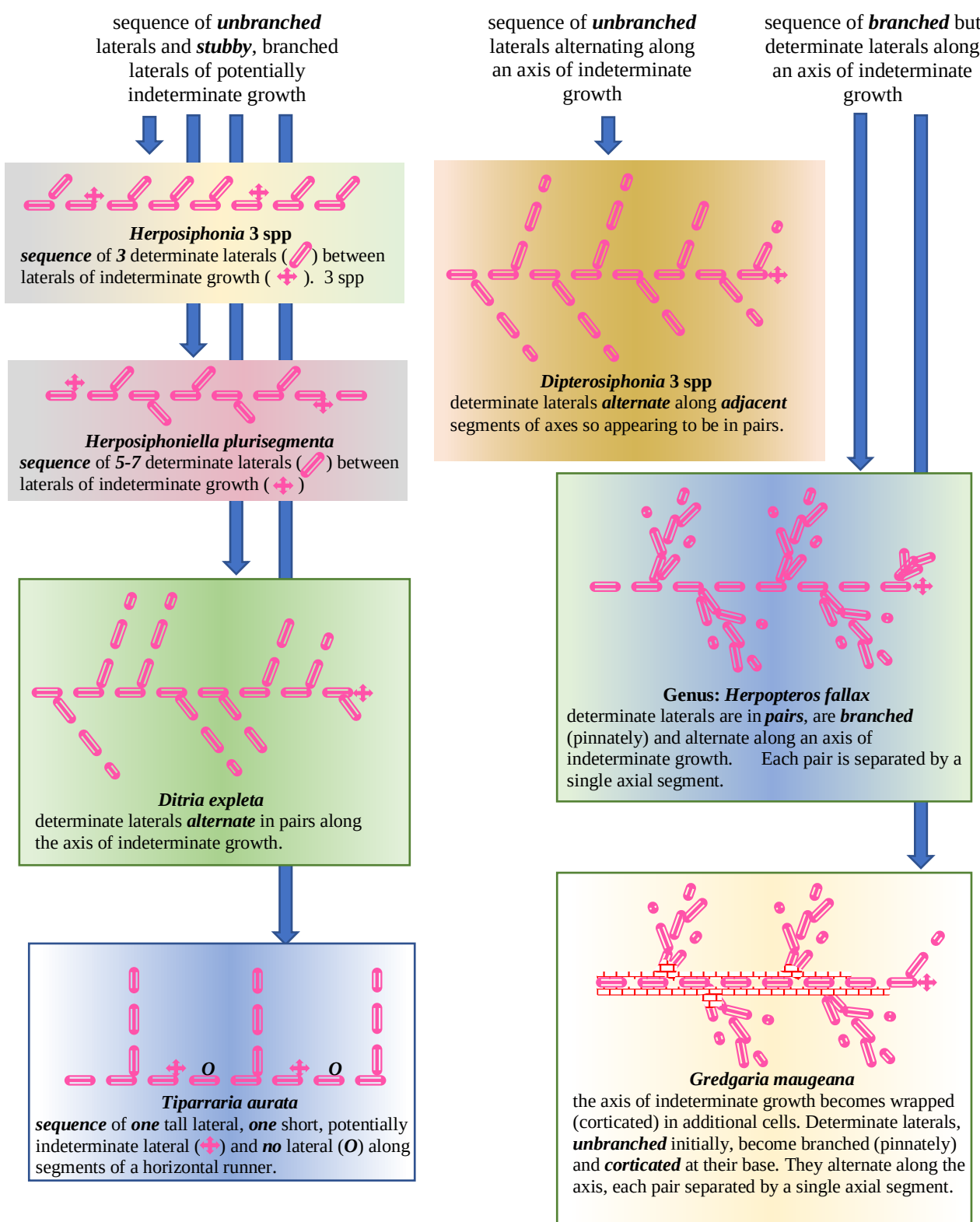
- plants are sometimes pale red or orange. *Polysiphonia* species are often dark red, almost black
- trichoblasts when fresh are **coloured**, not colourless as in *Polysiphonia*
- a **sequence** of determinate and indeterminate laterals occurs in the Herposiphonieae, but **not** in *Polysiphonia* where laterals look similar to each other



not
in the
Herposiphonieae

Polysiphonia teges —
a species that creeps over other Red algae. It can be confused with *Herposiphonia* spp but in *P. teges*, erect laterals are **in no particular sequence**

HERPOSIPHONIEAE: THE BRANCHING PATTERNS



IF THE SPECIMEN TO BE IDENTIFIED HAS ONE OF THE BRANCHING PATTERNS SHOWN ABOVE, THEN PROCEED TO THE NEXT PAGE FOR THE KEY TO MEMBER SPECIES OF THE HERPOSIPHONIEAE

KEY TO THE HERPOSIPHONIEAE

- 1a. laterals spreading **horizontally** from axes, branched mostly in one plane (see diag. opposite) 2.
 1b. laterals **erect** on creeping axes (diag. opposite) 11.
- 2a. branches broad-flattened, laterals spreading outward from the axes, branched, appearing thorny 3.
 2b. branches tubular (terete), laterals unbranched, plants appearing feathery (pinnate) 4.
- 3a. edges of axes and bases of laterals coated (corticated) with cells additional to the 6-7 pericentral cells seen in surface view. Figs 1-5 *Herposiphon fallax*
 3b. axes un-corticated, of 8 pericentral cells per segment, only 2 large ones obvious in surface view. Figs 6-10. (next page) *Gredgaria maugeana*

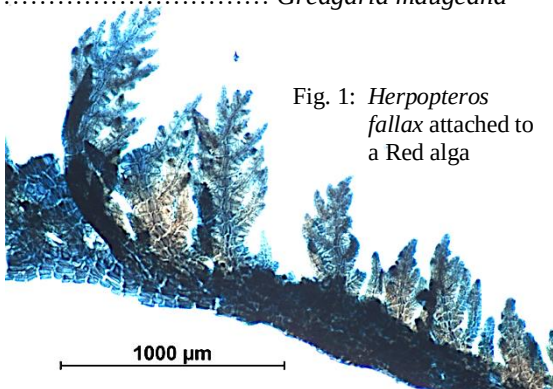
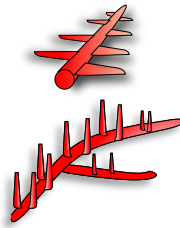
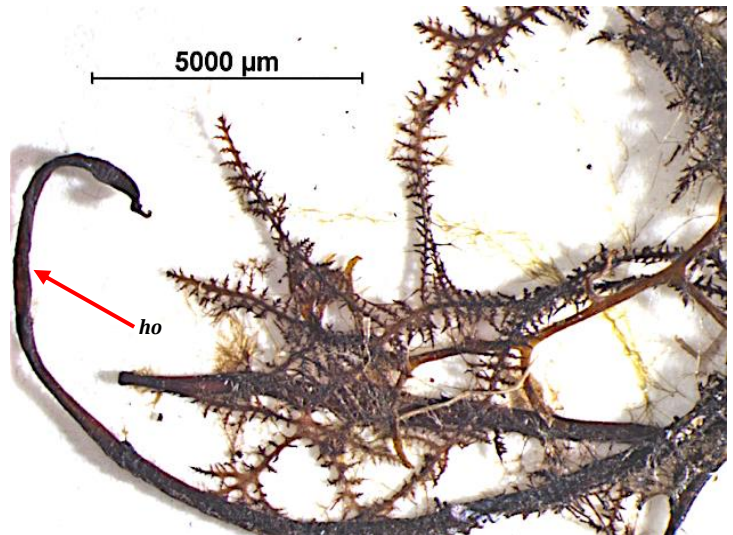


Fig. 1: *Herposiphon fallax* attached to a Red alga



Figs 2, 3: (above & below) two magnifications of *Herposiphon fallax* attached to the Red alga, *Protokuetzingia* (host, **ho**)

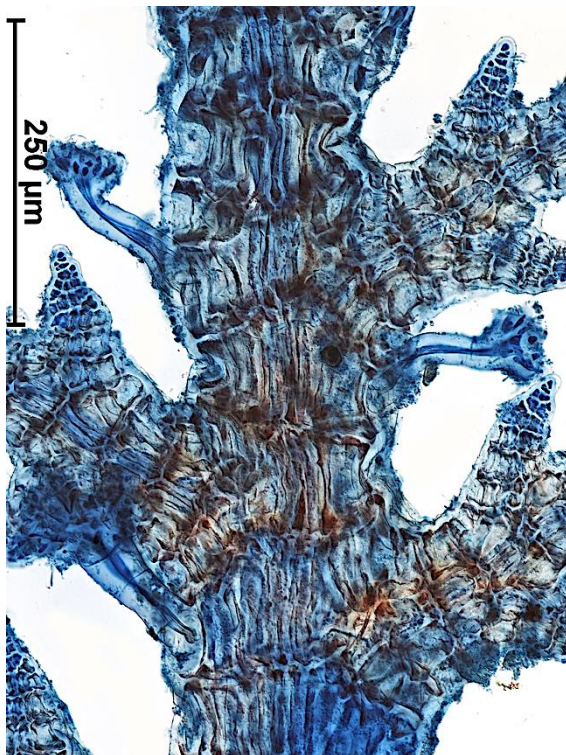


Fig. 4: *Herposiphon fallax*, wide-spreading laterals, corticated at the base; axis with multi-celled adhesive pads on rhizoids

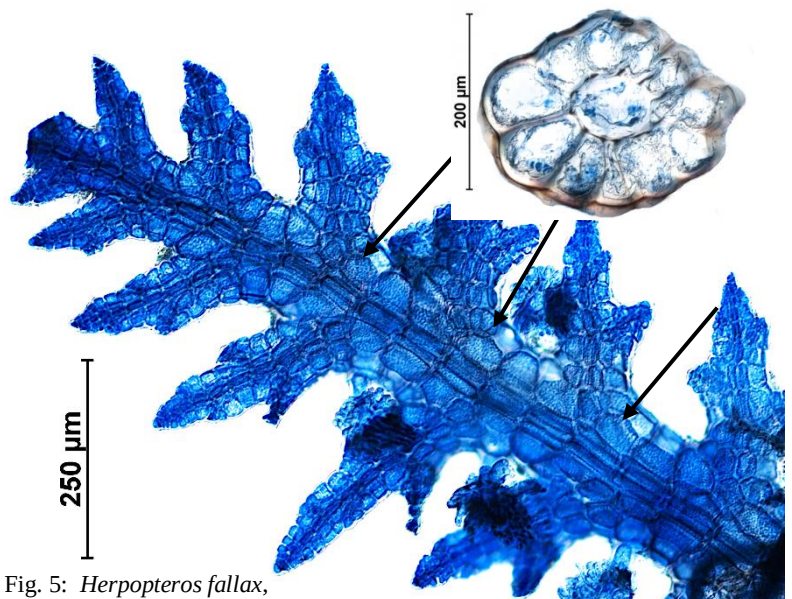


Fig. 5: *Herposiphon fallax*, with basal cortication (arrowed) running into the axis. Insert: cross section, 6 pericentral cells visible on each side of the axis



Separating *Herposiphon* from other members of the Polysiphonieae such as *Pitophycos* and *Diplocladia* can be difficult. See also the appendix: "Herposiphonieae look-alikes"

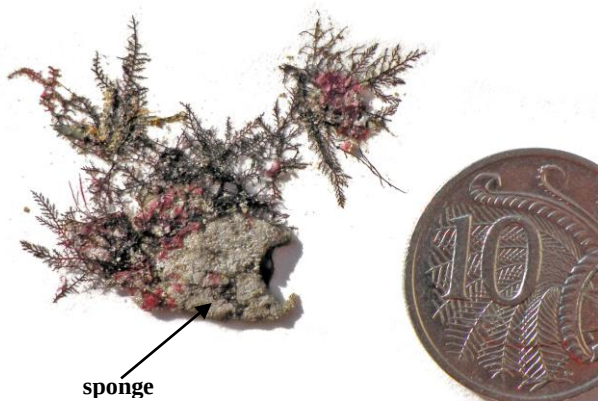


Fig. 6: *Gredgaria maugeana* on a piece of sponge



Fig. 8: *Gredgaria maugeana* female plant, bulbous cystocarps

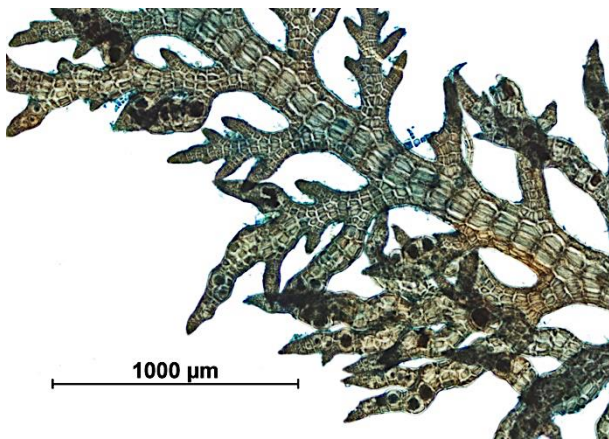


Fig. 9: *Gredgaria maugeana* sporangial plant, sporangia (arrowed) in a single line, but swelling the lateral

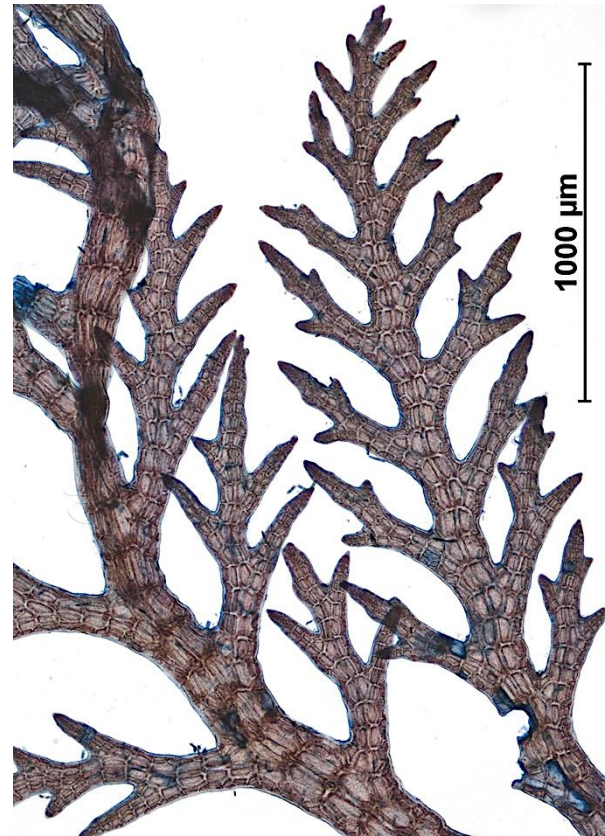


Fig. 7: *Gredgaria maugeana* branched laterals alternating along a flattened axis lacking cortication

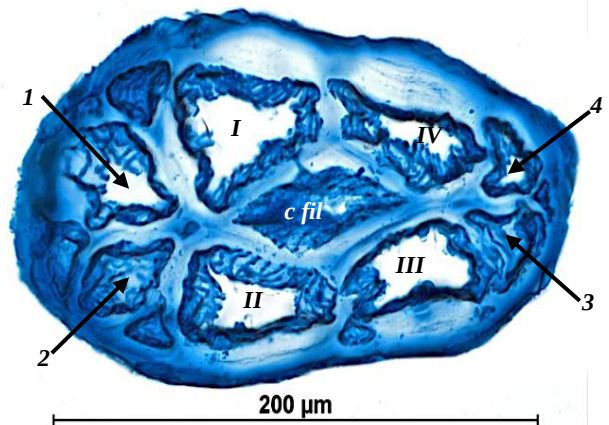


Fig10: *Gredgaria maugeana* cross section of flattened axis: central filament (*c fil*), large (*I-IV*) and small (*1-4*) pericentral cells in view

- 4a. laterals appear **paired** along the edges of axes 5.
 4b. laterals do not appear paired 7.
- 5a. lateral pairs **undivided** 6.
 5b. **one** member of the lateral pairs is **divided**,
 the other is **undivided**. Figs 11-13.
 *Dipterosiphonia dendritica*
- 6a. laterals occur in pairs on one side and then the
 opposite side of axes. Plants grow on fan-
 shaped blades of the Brown algae *Zonaria* and
Lobophora. Figs 14-16.
 *Ditria expleta*
- 6b. **pairs** of laterals occur on opposite sides of axes
 Figs 17, 18 (next page).
 *Dipterosiphonia australica*

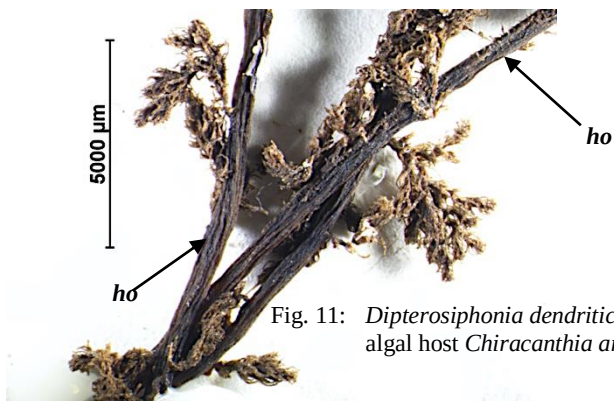
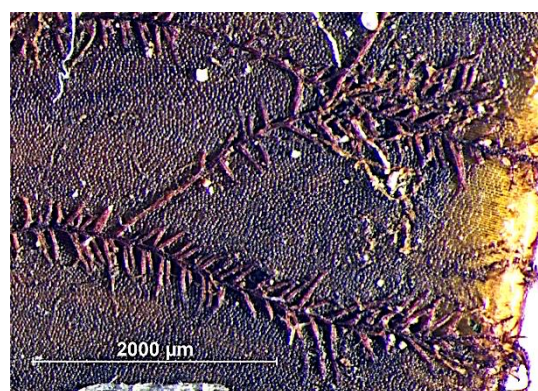
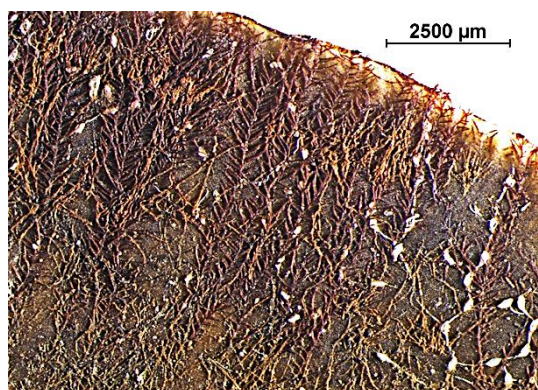
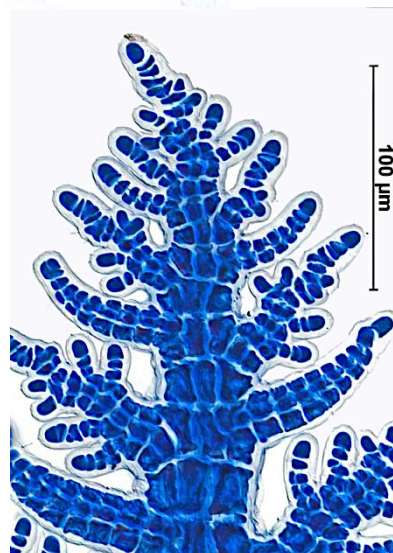


Fig. 11: *Dipterosiphonia dendritica* on the Red algal host *Chiracanthia arborea* (ho)

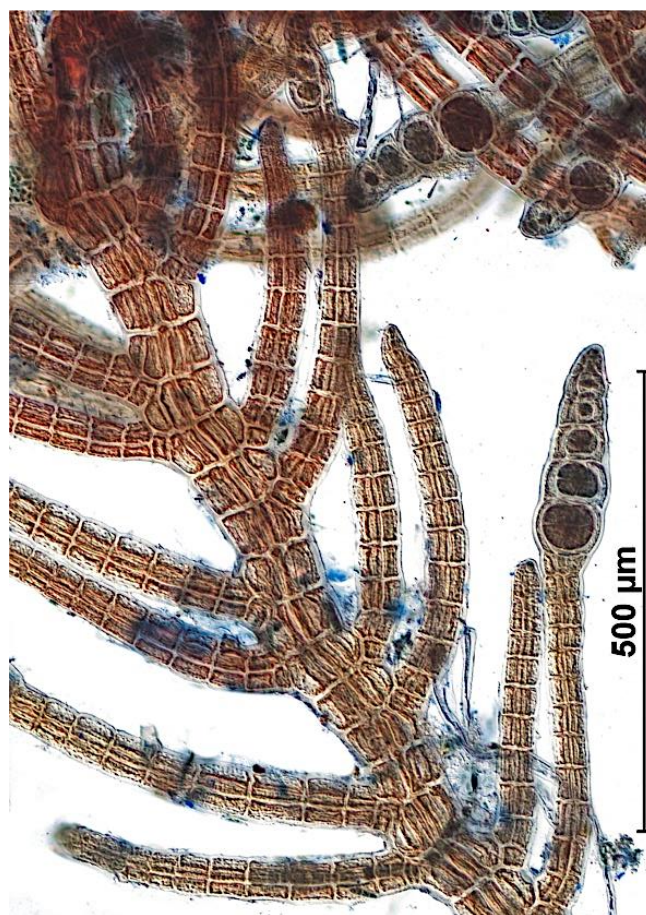


Fig. 12: *Dipterosiphonia dendritica*
 Branches lying on the host (ho) over which
 they were creeping

Fig. 13: *Dipterosiphonia dendritica*
 Alternating pairs
 of
 undivided+divided
 laterals along an
 axis



Figs 14, 15: *Ditria expleta*
 Two magnifications of plants on the flat blade of the
 Brown alga host *Lobophora variegata*



Figs 16: *Ditria expleta*: pairs of undivided laterals, on
 opposite sides of an axis, one with sporangia

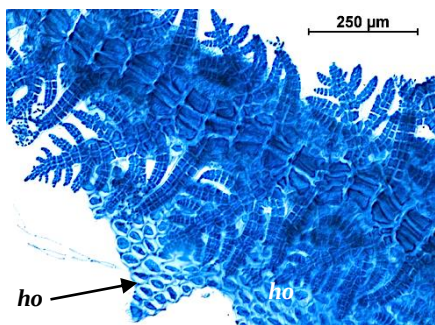


Fig. 17: *Dipterosiphonia australica* lying on a Red alga host (*ho*)

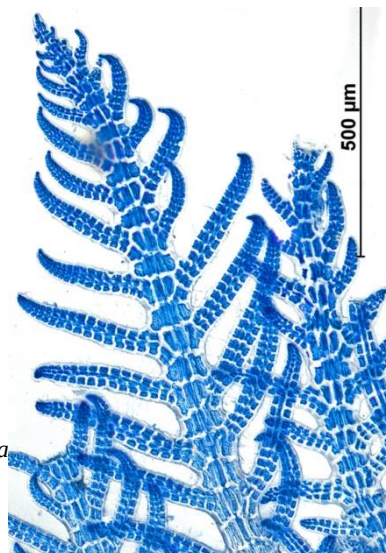


Fig. 18: *Dipterosiphonia australica* laterals paired across the axis

7a. plants creep over seagrass stems, with erect laterals producing a dense clothing 2-6 mm high. Figs 19, 20.

.....*Dipterosiphonia prorepens*

7b. plants taller, with branched axes forming a tufted plant body 8.

8a. plants open-branched, laterals opposite unbranched, producing a fish-bone (pinnate) appearance. 5-7 unbranched laterals between stubby laterals of indeterminate growth. Figs 21, 22.

..... *Herposiphoniella plurisegmenta*

8b. plants branched variously. 3 unbranched laterals between stubby laterals of indeterminate growth

..... 9.



Fig. 19: *Dipterosiphonia prorepens* densely clothing a stem of *Amphibolis*



Fig. 20: *Dipterosiphonia prorepens* branching pattern: pairs of unbranched laterals along axes, curved at tips



Fig. 21: *Herposiphoniella plurisegmenta*

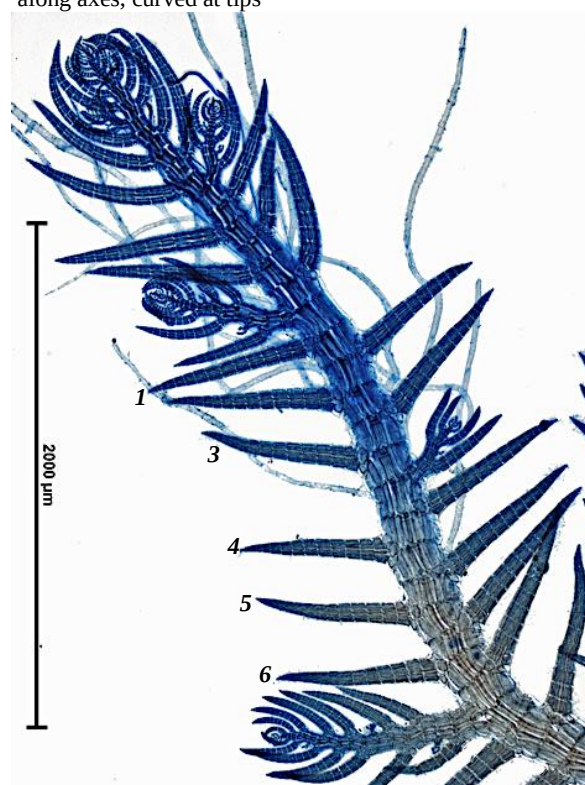


Fig. 22: *Herposiphoniella plurisegmenta*
A genus with 5-7 unbranched laterals between stubby indeterminate laterals (one set above, marked 1-6)

- 9a. plants relatively robust, axes usually $> 200\mu\text{m}$ in width 10.
 9b. plants slender, axes $< 200\mu\text{m}$ in width 12
- 10a. plants occur in a variety of red colours including orange-brown; branching irregular; axes up to $600\mu\text{m}$ wide. Figs. 23, 24.
 *Herposiphonia versicolor*
- 10b. plants red; branching mainly comb-like often on outer sides of axes (abaxial); axes $80\text{--}200\mu\text{m}$ wide. Figs 25-27.
 *Herposiphonia rostrata*

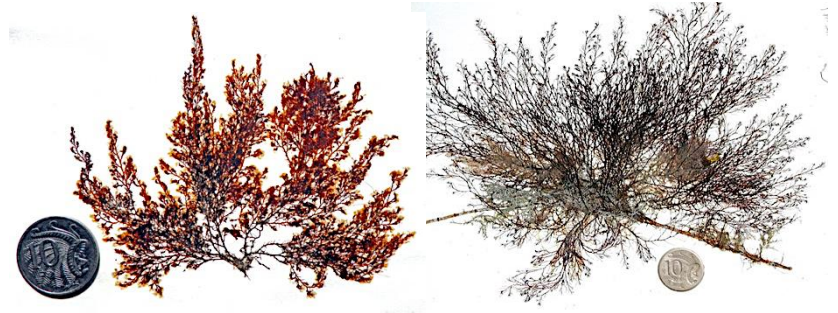
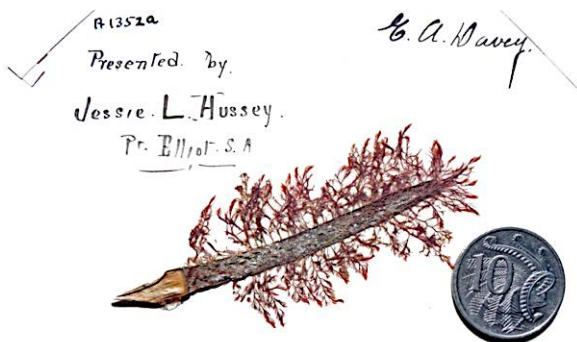
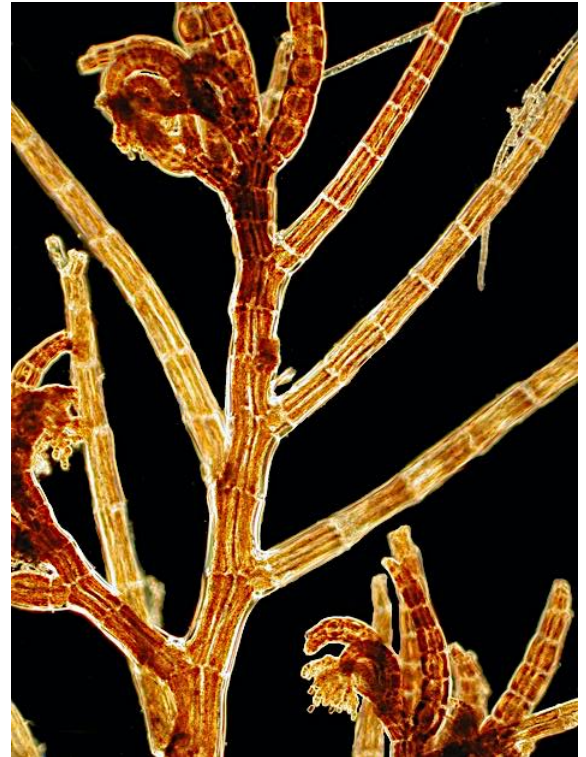


Fig. 23: *Herposiphonia versicolor*. Colour variation of pressed plants

Fig. 24: *Herposiphonia versicolor* backlit specimen, orange-brown in colour, illustrating few unbranched laterals between branched laterals



Start Bay,
S. Australia.

Herposiphonia rostrata. Fig. 25: *Herposiphonia rostrata* on a blade of seagrass



Fig. 26: *Herposiphonia rostrata* variation in form

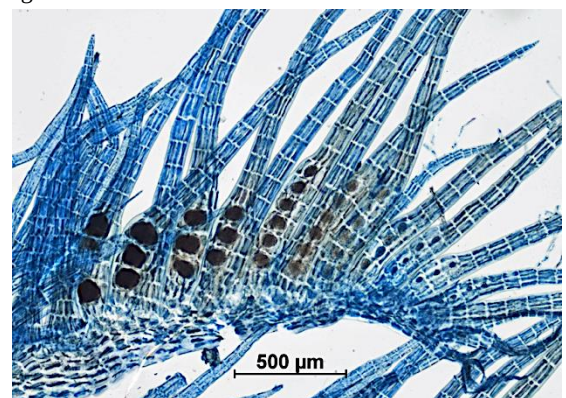


Fig. 27: *Herposiphonia rostrata* one-sided branching of determinate laterals bearing sporangia

- 11a. delicate, low creeping plants, erect parts only
a few mm tall 12.
11b. plants with erect parts > 2mm tall 13.

12a. shallow-water species, forming mat-like
masses on intertidal rocks or other algae
to 6m deep, trichoblasts **prominent**, 7-9
pericentral cells per segment. Figs 28-31.

..... *Herposiphonia calothrix*
12b. rare species, 55m deep, running loosely
across the bryozoan *Calpidium*,
trichoblasts **absent**, pericentral cells
usually 12 per segment, indeterminate
laterals apparently **dormant**, alternate
along either side of the axis. Fig. 32.

..... *Herposiphonia elegans*

See Womersley, H.B.S. (2004) Additions to the marine
flora of southern Australia. *Trans Roy. Soc. S Aust.* **128** (2),
211-212

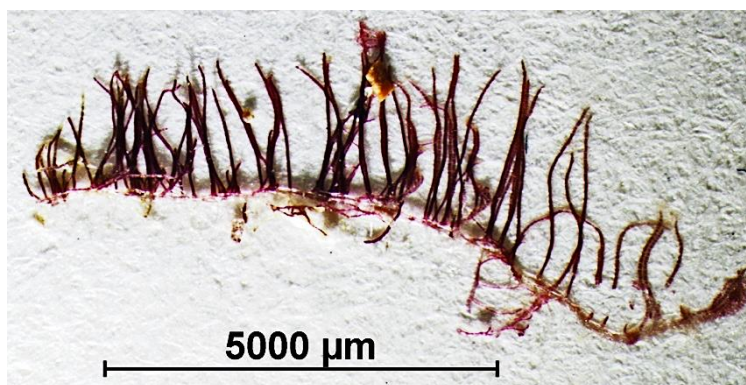


Fig. 28: *Herposiphonia calothrix*
Portion of a plant extracted from its attachment to a *Codium* plant)

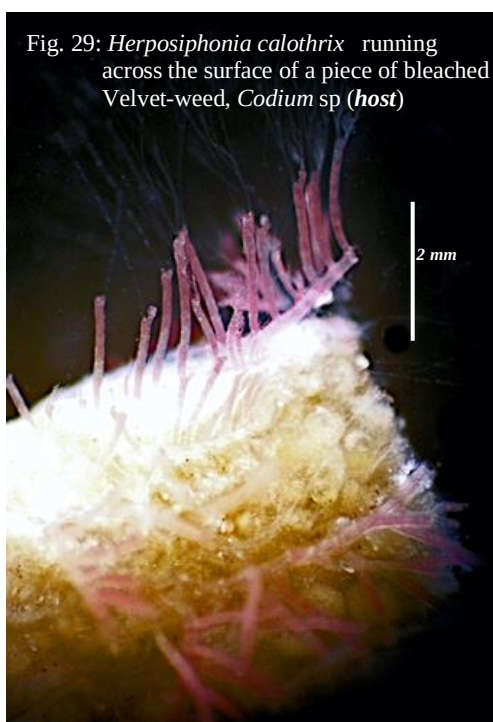


Fig. 29: *Herposiphonia calothrix* running
across the surface of a piece of bleached
Velvet-weed, *Codium* sp (*host*)

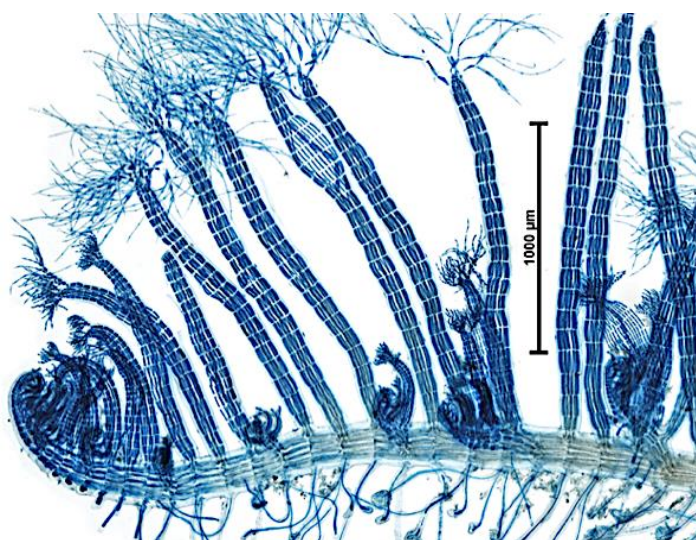


Fig. 30: *Herposiphonia calothrix*
Three undivided determinate laterals between stubby branched
indeterminate laterals; numerous fine rhizoids from the base of
the prostrate axis that is curved backwards at the apex



Fig. 31: *Herposiphonia calothrix*
Tissue squash of
prostrate axis, 8
pericentral cells per
segment displayed (the
species may have 7-9)

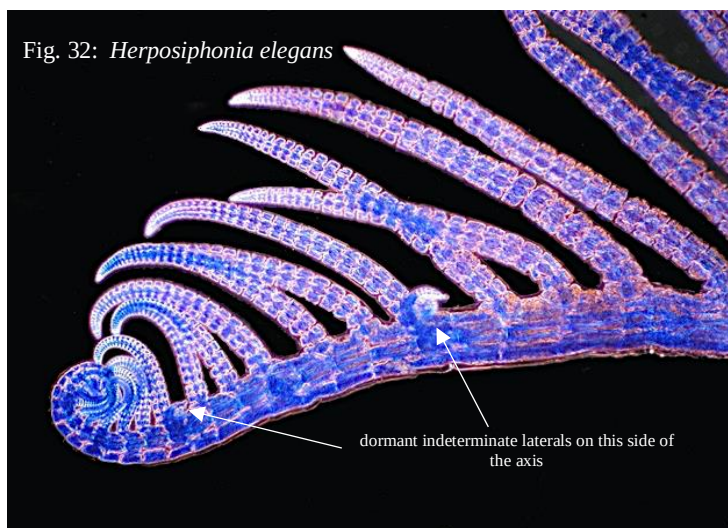


Fig. 32: *Herposiphonia elegans*

dormant indeterminate laterals on this side of
the axis



Difficulties:
separating creeping members of *Herposiphonia* from
Lophosiphonia prostrata and *Polysiphonia teges* can be
difficult.

See the appendix: “Herposiphonieae look-alikes”

- 13a. plants lowly, 10-30 mm high, branches end in dense tufts of trichoblasts. On the creeping axes, a repeated sequence of **one long** lateral, **one short** lateral then **no** lateral occurs. Figs 33-36.

..... *Tiparraria aurata*

- 13b. axes with **one** or **a pair** of short (determinate) laterals on opposite sides of the axis 14.

- 14a. erect branches only about 20 mm tall, branching dense, axes about 100 μ m wide, segments of determinate-laterals stubby, L:B = 1-2. Figs 37, 38.
..... *Herposiphonia filipendula*

- 14b. erect branches 30-60 mm tall, branching open comb-like (pectinate) branching pattern of determinate-laterals, their segments L/B = about 1 or 2.5
..... 15.



Fig. 33 : *Tiparraria aurata* on the blade of a seagrass

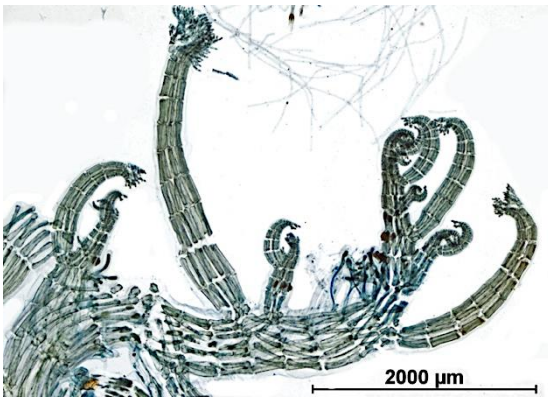


Fig.34: *Tiparraria aurata* .
Ends of axes curved back, tipped with short trichoblasts

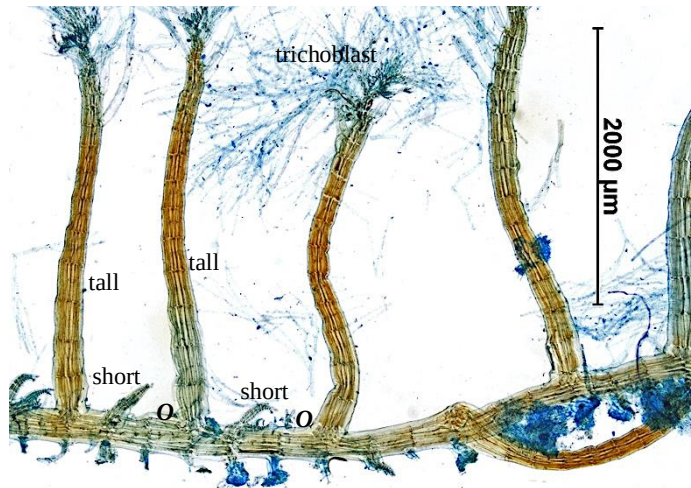


Fig.35: *Tiparraria aurata* .
creeping axis with sequence of 1 tall, 1 short and no lateral (0) along the segments of its length

Fig.36: *Tiparraria aurata*.
Bulbous, stalked female cystocarps near ends of axes
tipped with mature, hair-like trichoblasts

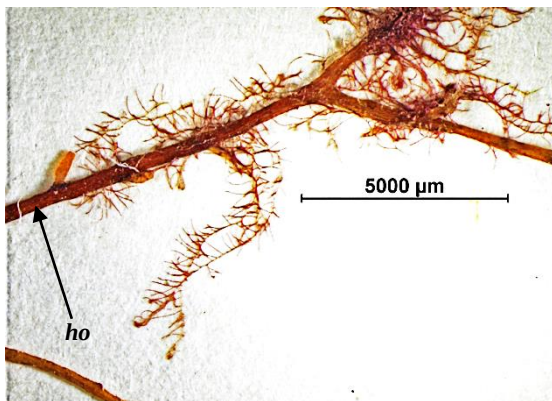
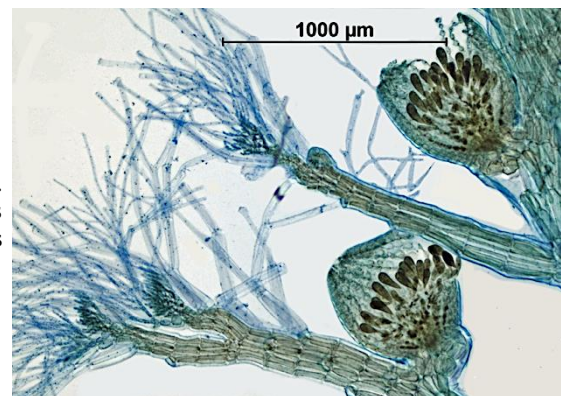


Fig. 37 *Herposiphonia filipendula*
on the red alga *Laurencia filiformis* (host, **ho**)

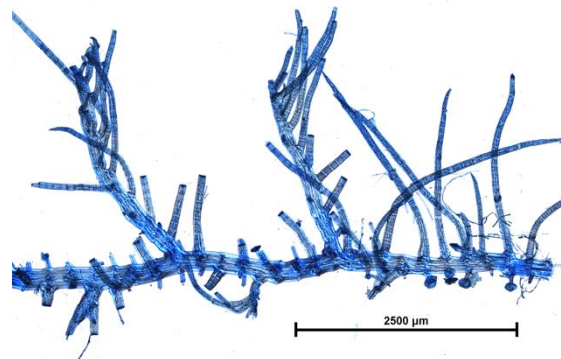


Fig. 38: *Herposiphonia filipendula*:
slender, creeping runner with short, undivided erect laterals

15a. axes 160-260µm wide; segments stubby,
L/B = 0.8-1.2 Figs 39, 40.

..... *Herposiphonia monilifera*

15b. axes 80-110µm wide; segments more
elongate, L/B = 3-4. Figs 41-44.

..... *Herposiphonia pectinella*

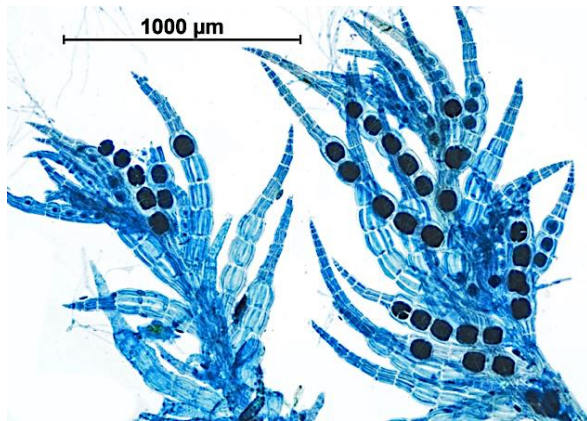


Fig. 39: *Herposiphonia monilifera*
laterals bearing sporangia in bead-like rows, a
feature from which the species gets its name

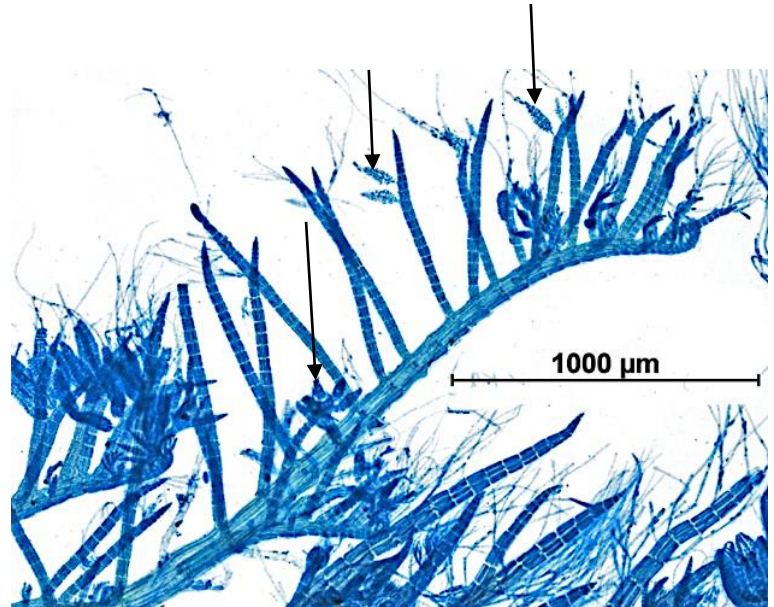


Fig. 40: *Herposiphonia monilifera*
Male plant with spermatangial heads (arrowed)



Fig. 41:
Herposiphonia pectinella

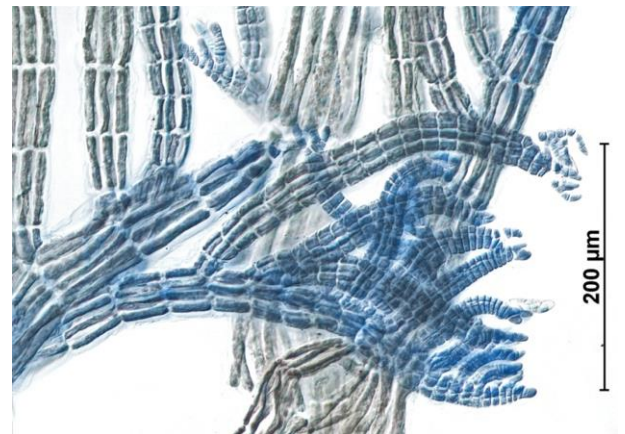


Fig. 42: *Herposiphonia pectinella*, curved apices,
segments initially stubby, but rapidly develop
the proportions of L:B >1

Fig. 43:
Herposiphonia pectinella
thin, segments,
proportions of L:B >>1

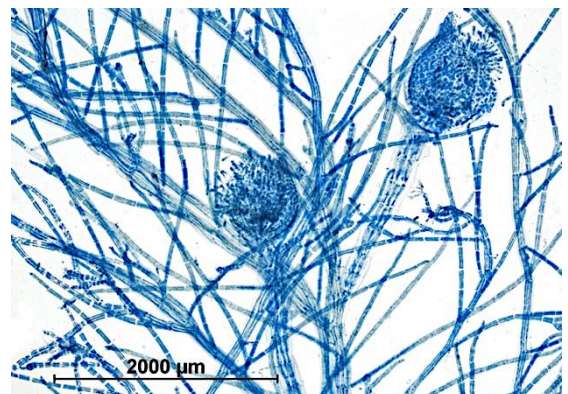
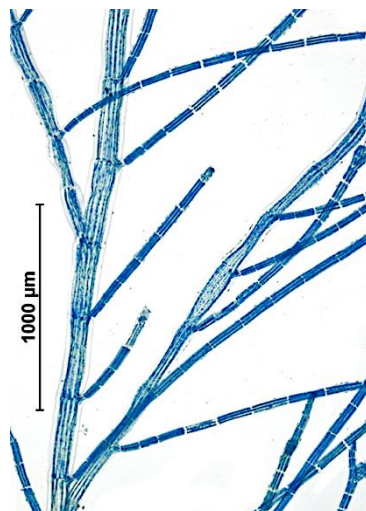


Fig. 44: *Herposiphonia pectinella*
thin laterals; swollen female cystocarps
releasing carposporangia

SPECIES ILLUSTRATED

species	author(s)	page
<i>Dipterosiphonia</i>	<i>australica</i>	Womersley
	<i>dendritica</i>	(C. Agardh) F. Schmitz
	<i>prorepens</i>	Falkenberg
<i>Ditria</i>	<i>expleta</i>	Huisman
<i>Gredgaria</i>	<i>maugeana</i>	Womersley
<i>Herposiphonia</i>	<i>calothrix</i>	(Harvey) Womersley
	<i>elegans</i>	Womersley
	<i>filipendula</i>	(Harvey ex J. Agardh) Falkenberg ex De Toni
	<i>monilifera</i>	(Hooker & Harvey) Falkenberg
	<i>pectinella</i>	(Harvey) Falkenberg
	<i>rostrata</i>	(Sonder) Reinbold
	<i>versicolor</i>	(Hooker & Harvey) Reinbold
<i>Herposiphoniella</i>	<i>plurisegmenta</i>	Womersley
<i>Herpopteros</i>	<i>fallax</i>	Falkenberg
<i>Tiparraria</i>	<i>aurata</i>	(Harvey) Womersley

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

Womersley, H.B.S. (2003) The Marine Benthic Algae of southern Australia Part IIID. ABRS, Canberra and the State Herbarium of South Australia

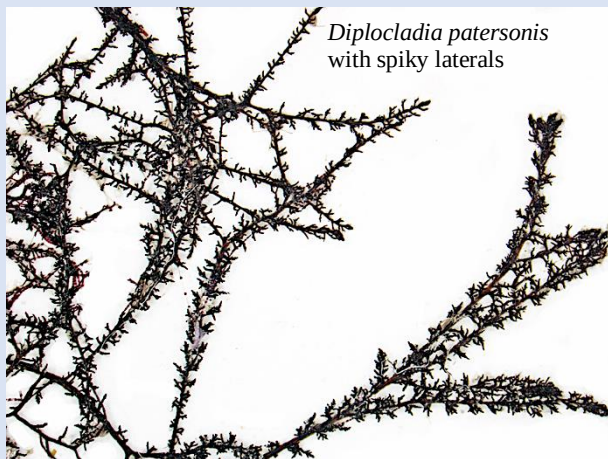
HERPOSIPHONIEAE LOOK-ALIKES



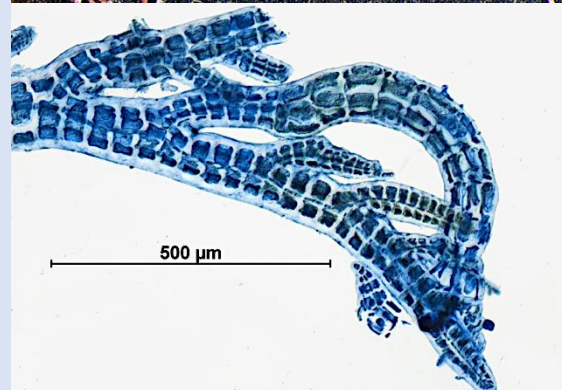
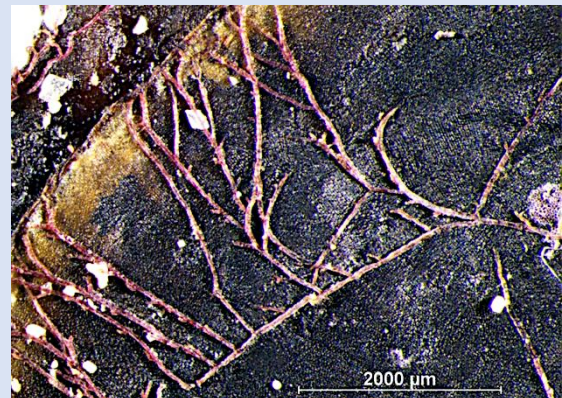
Dasyclonium spp

Left: *D. incisum* attached to *Laurencia elata* (host, **ho**): feather-like laterals with smaller, comb-like laterals on their inner side (adaxial)

Right: *D. flaccidum*



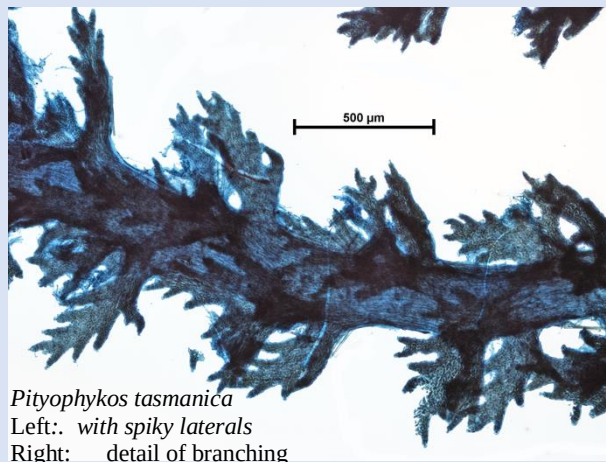
Diplocladia patersonis
with spiky laterals



Lophosiphonia spp

Right, above: *L. prostrata* creeping over the blade of the Brown alga *Lobophora*

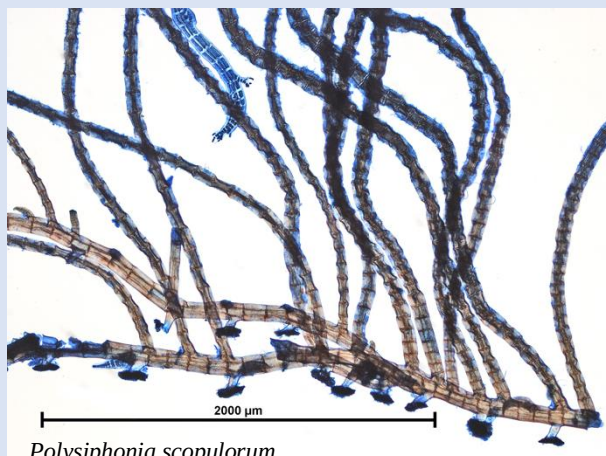
Right, below: detail of branching



Pityophykos tasmanica
Left: with spiky laterals
Right: detail of branching



Polysiphonia teges
Erect laterals inconsistent number of segments apart

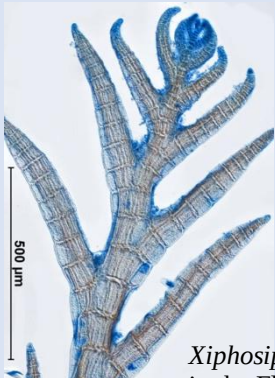


Polysiphonia scopulorum
Erect laterals inconsistent number of segments apart



Polysiphonia amphibolis

Left: covering a blade of the seagrass, *Amphibolis*
Right: detail of the creeping axis with erect laterals



Xiphosiphonia pennata (as *Pterosiphonia pennata* in the Flora)
Above: branching patterns
Right: globular female cystocarps

