# FELTY, ROPEY, STRINGY, FURRY, FUZZY, FLUFFY RED ALGAE

**This guide** 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 recognisable shapes that allow them to be sorted directly into the level of Genus or Family and so shortcut a systematic search through intricate and often unavailable reproductive features. The materials below use this ***artificial*** way of searching for a name. Then you can proceed to the appropriate fact sheets or keys to refine your identification.

**Limitations** Unfortunately, to use this search strategy, microscopic investigation of specimens will be needed. Also, this guide overlaps somewhat with "**filamentous red algae: Master key and Parts I - X**" and species may appear in more than one step of the key in order to capture those that may have variable shapes.

**Images used below** Unless acknowledged otherwise, all images come from pressed specimens or the extensive slide collection of the algal unit, State Herbarium of S Australia, collections generated by the late Professor Womersley and his workers over some 60 years. Images with dark backgrounds have been taken using phase contrast or interference microscopy to highlight transparent structures. Other images may be stained dark blue.

**Scale** The coin used as a scale is 24 mm or almost 1" across.

**Names** Scientific names follow those found in Womersley, H B S. (1984-2003). *The Marine Benthic Flora of Southern Australia*, as it continues to provide the most comprehensive and accessible account. Recent changes found in **Algaebase** are in the table , page 7. §Denotes a common name from Edgar, G J (2012) *Australian Marine Life. 2nd edition.* Reed New Holland

## FEATURES USED

These are superficial or "first impression" features only, merely leading you to other keys or "**Algae at a glance**" on this Website.

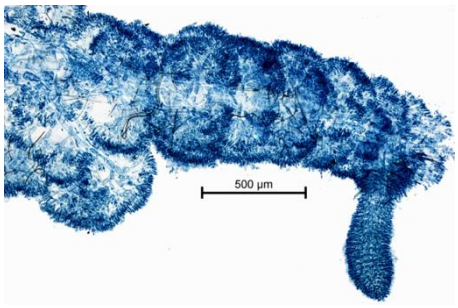
The features of texture used to separate algae can be a result of

- minute threads or filaments of cells forming a meshwork that produces a felty texture, or
- filaments extending from the plant surface, forming a furry or fuzzy texture, or
- rings of short branchlets clothing the main branches or axes, making them furry or fuzzy, or
- bases of axes loosely wrapped in coarse filaments called rhizoids producing a ropey or stringy texture
- tips of short side branches with dense filaments producing a fluffy appearance

**FELTY TEXTURE** - example, *Haloplegma*

**FURRY OR FUZZY TEXTURE**
example- *Dasya*

**ROPEY TEXTURE TO AXIS BASE**
example - *Griffithsia gunniana*




**FURRY OR FUZZY TEXTURE TO AXIS**
example - *Gulsonia*

## TECHNIQUES NEEDED

some magnification required



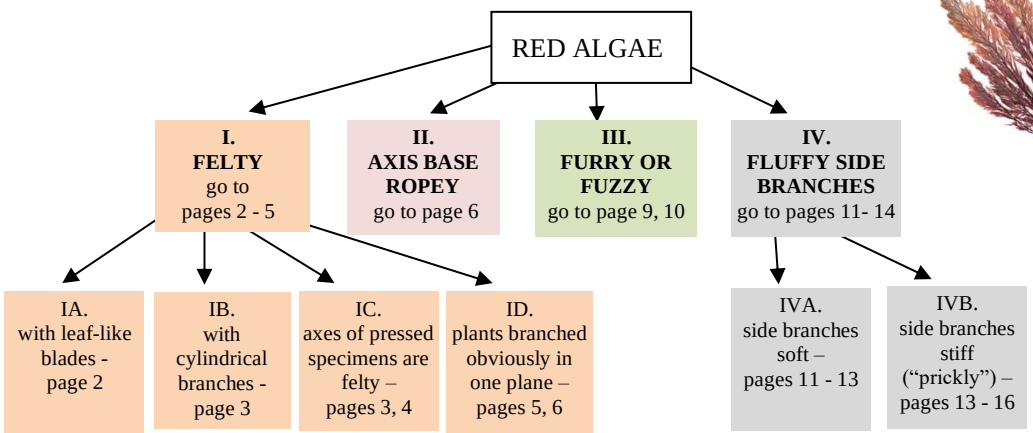
microscope examination necessary

tissue squash

cross section

**FLUFFY SIDE BRANCHES**
example – *Holotrichia*

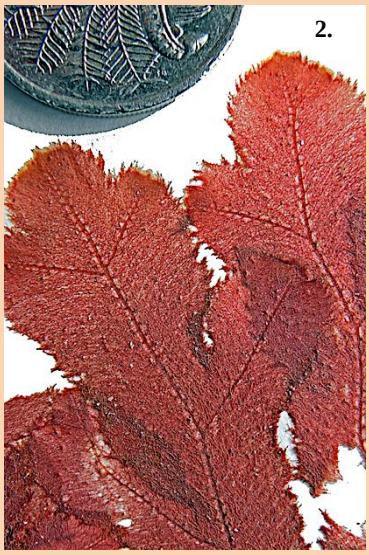
## SEARCH STRATEGY



# I.
# FELTY RED ALGAE

## IA:
## ALGAE WITH LEAF-LIKE BLADES (FOLIOSE)

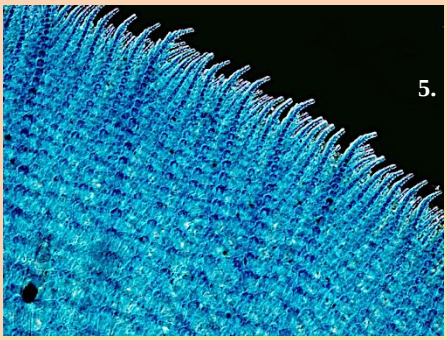
**see also "Pictured key to some common red-mesh algae of southern Australia (2nd edition)"**


***Thuretia quercifolia.*** **§Oak-leaf red alga**

Fig.1. whole plants
Fig. 2. detail of blades, ***prominent midribs***, meshwork of filaments, ***serrated edges***

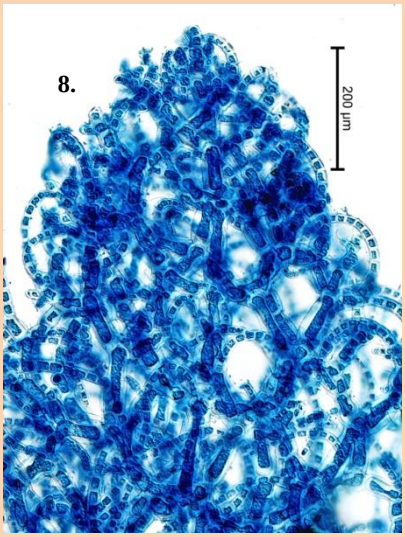





***Haloplegma duperreyi***

Fig. 3. ***frilly*** blades on seagrasses
Fig. 4. detail of felty blades
Fig. 5. microscopic surface view of a blade edge showing the closely woven threads of cells






***Haloplegma preissii***

Fig. 6. whole plant Fig. 7. detail of blades
Fig. 8. plant apex, young blade forming from branched filaments

**Panel I continued next page**

## IB: ALGAE WITH CYLINDRICAL BRANCHES

**see also "Pictured key to some common red-mesh algae of southern Australia (2nd edition)"**

***Thuretia australasica***

Fig. 9: tips f plant
Fig. 10: detail of mesh like filamentous structure



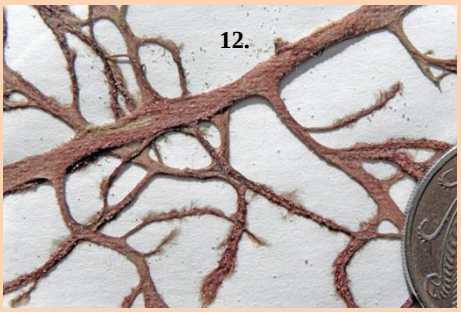
## IC: AXES OF PRESSED SPECIMENS ARE FELTY

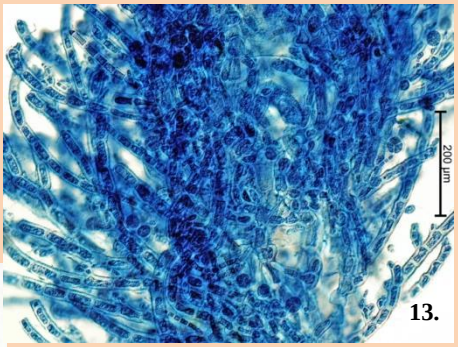
(because pressing flattens microscopic rhizoids or branchlets into a felty consistency)

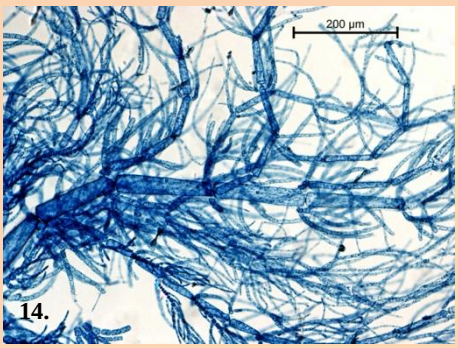
**see also "filamentous red algae Part II"**

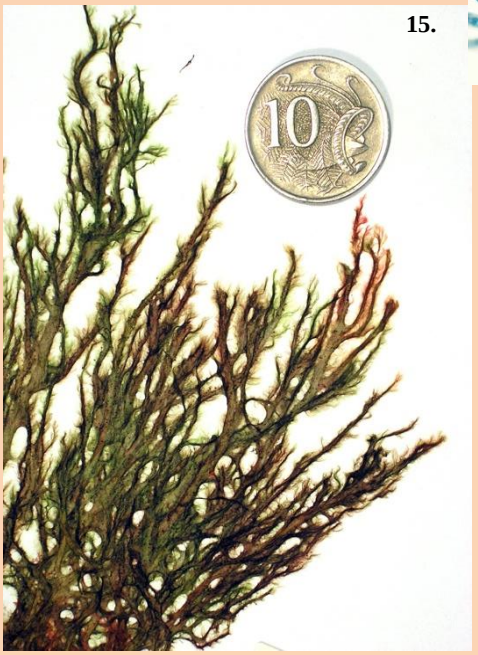
***Lasiothalia hirsuta***

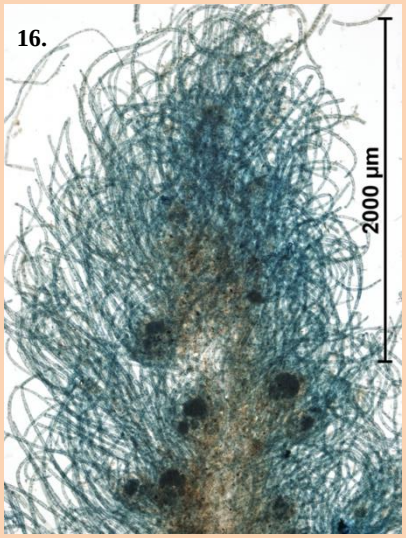
Figs 11, 12.: axes felty with rhizoids, lateral branches ***hairy***
Fig,.13. surface view of an axis covered in filaments
Fig. 14. large cells with a ***pair*** of filamentous side branches from each axial cell can be seen only near tips

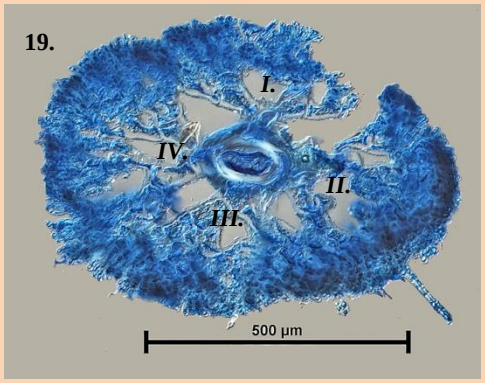


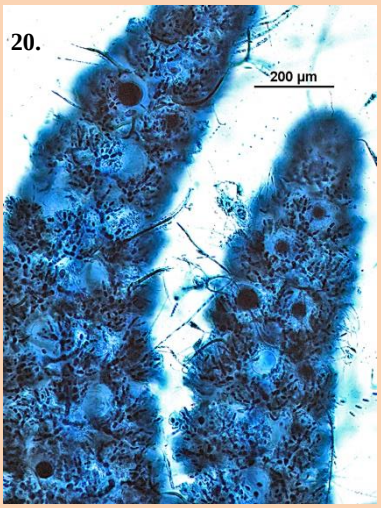
***Spongoclonium conspicuum***

**Family: Ceramiaceae, Tribe: Spongoclonieae**

Fig. 15. felty tips
Fig. 16. plant tip, dark ball-shaped structures are female cystocarps
Fig. 17. central filament of very large cells (arrowed), dissected out from the dense, fine side branches that enshroud it

**Panel I continued next page**

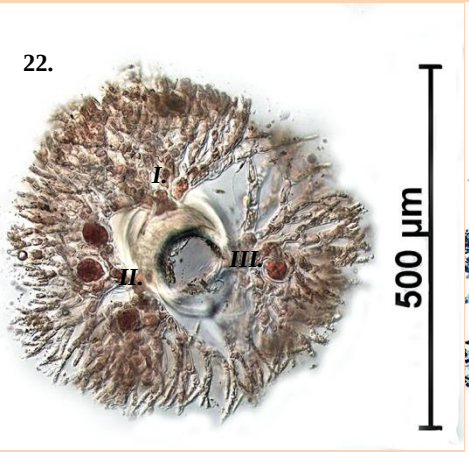



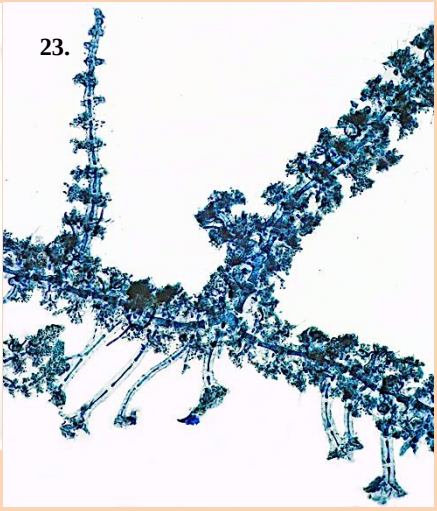

***Ptilocladia pulchra***

Fig. 18. upper plant parts

Fig. 19. cross section with central filament cell ringed by ***4 branchlets*** (*I –IV*)

Fig. 20. surface microscopic view of ***closely packed*** rings of short branchlets (dark objects are sporangia)

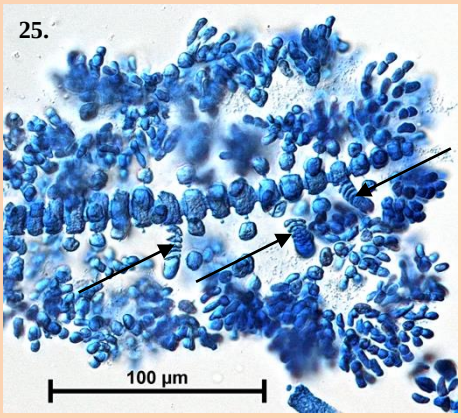



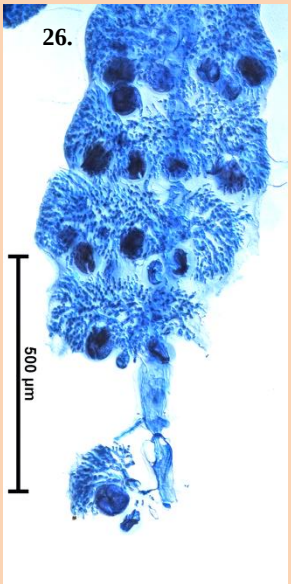

***Crouania destriana***

Fig. 21. pressed, whole plants on a seagrass stem, branches with a felty texture

Fig. 22. cross section, central large filament cell ringed by ***3 branchlets*** (*I – III*) containing red spores

Fig. 23. microscopic detail of a horizontal axis with filamentous holdfasts extending below and two upright axes with rings of whorl-branchlets above


***Crouania mucosa***

Fig. 24. pressed specimen, rings of overlapping whorl-branchlets merged together producing a felty texture , slimy when fresh

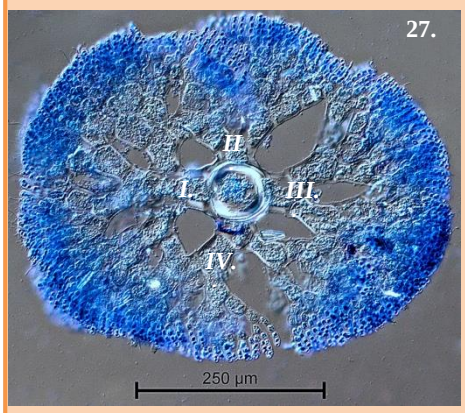
Fig. 25. tissue squash, central filament, displaced branchlets, side axes (arrowed) being initiated

Fig. 26. dissected branch viewed microscopically, exposing the rings of overlapping branchlets, deeply stained spores also present

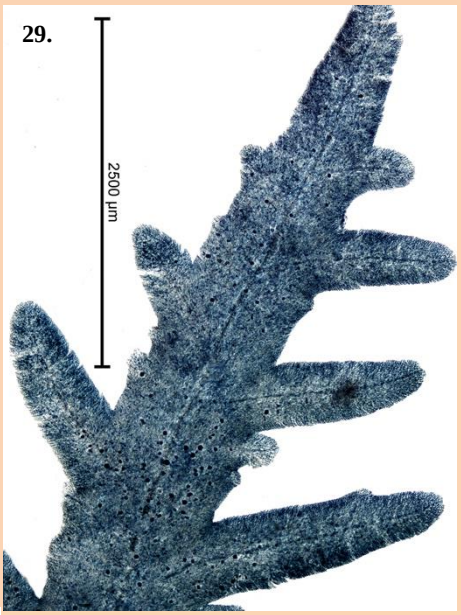
**Part I continued next page**

# ID: PLANTS BRANCHED OBVIOUSLY IN ONE PLANE

See also "filamentous red algae Part II"

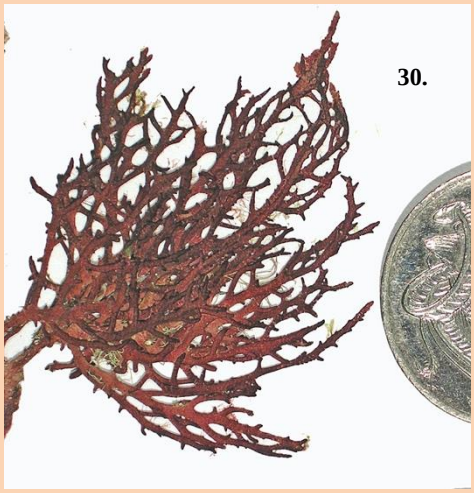


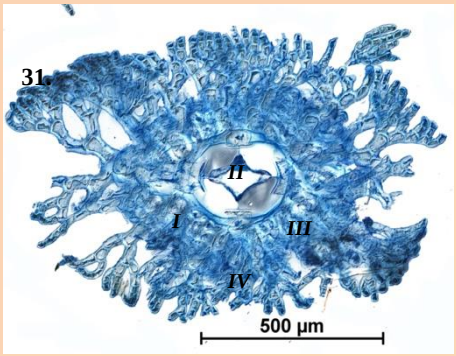


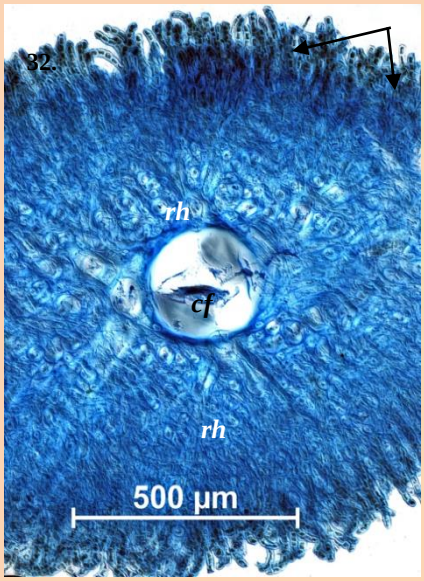



***Euptilocladia spongiosa***

27. cross section, ***4 branchlets*** (*I – IV*) radiating from a central filament cell
28. whole plant, ***flat-branched***
29. plant tip, central filaments showing through the dense overlapping branchlets that produce a felty texture in pressed specimens

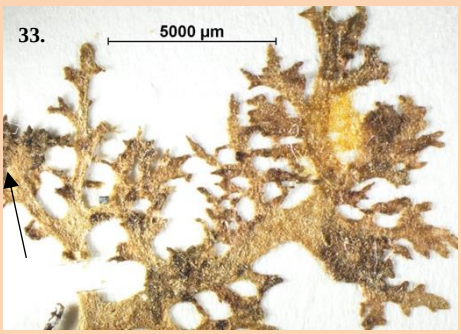


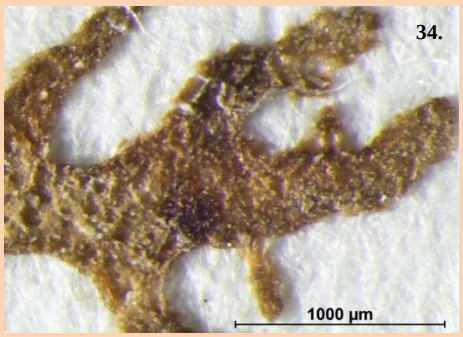



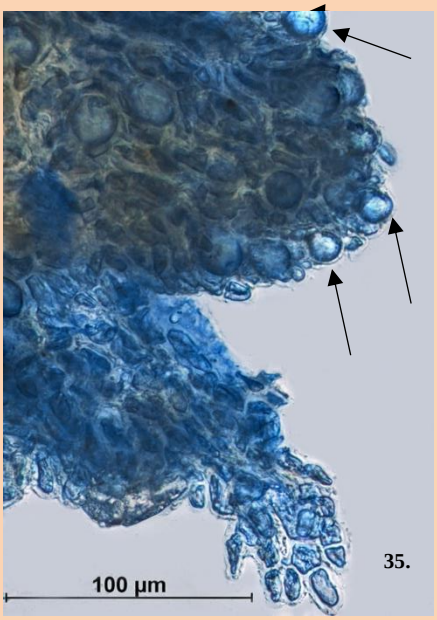




***Euptilocladia villosa***

Fig. 30. whole plant, flat-branched
Fig, 31. cross section, ***4 branchlets*** (I-IV) radiating from a central filament cell
Fig. 32. cross section, mature axis, central filament cell (***cf***) clothed in dense rhizoids (***rh***) ending in short chains of small cells radiating outwards (arrowed)




***Ptilocladia vestita***

Fig. 33: flat branching pattern
Fig. 34: detail of felty texture on a pressed specimen
Fig. 35: bright gland cells present (arrowed)

## ID: continued


***Dasyphila preissii***
Fig. 33. whole plant, opposite branching ***in one plane***, felty surface

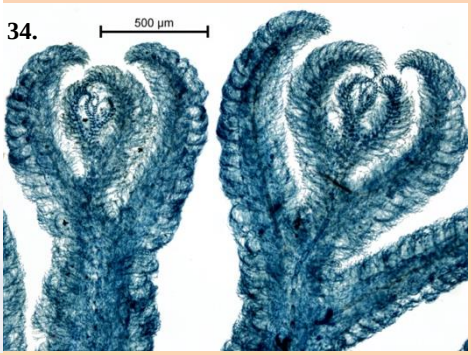



Fig. 34. microscopic detail of branch tips with ***overarching branchlets*** that produce producing the felty surface texture

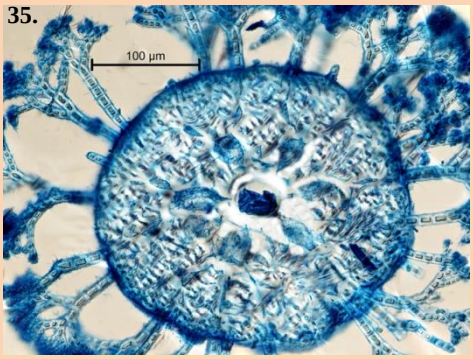



Fig. 35. cross section, central thread ringed with **7 *large cells*** (pericentral cells), branchlets radiating from the surface


Fig. 36: *Muellerena wattsii* part of a plant


Fig. 37: *Muellerena wattsii* branching pattern and felty texture of a pressed specimen

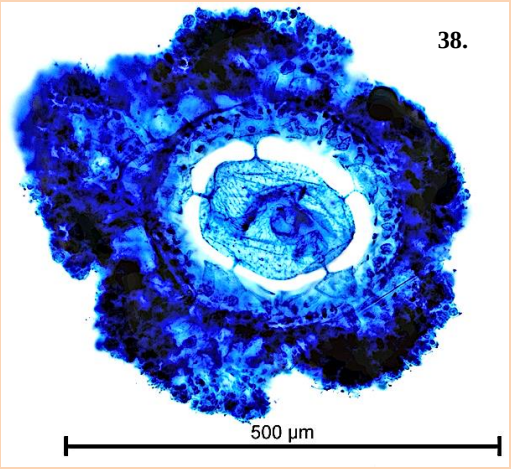



Fig. 38: *Muellerena wattsii*: cross section, showing radiating cell connections attaching the ***5 pericentral cells,*** diagnostic of the genus, to the central large filament cell and the dense ring of short (determinate) side branches producing the felty texture of the plant body

**Part II commences next page**

## PART II: AXIS BASE IS ROPEY/ STRINGY

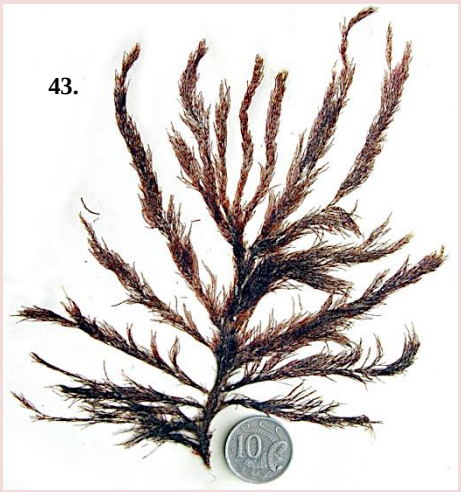

39.


40.


41.

***Griffithsia gunniana***
**see also " filamentous red algae part I"**
Fig. 39: tufts of relatively large cells
Fig. 40: plant base ropey with rhizoids
Fig. 41: tetrasporangia extruded from constrictions between inflated cells that are ringed by small (involucral) cells (arrowed)


42.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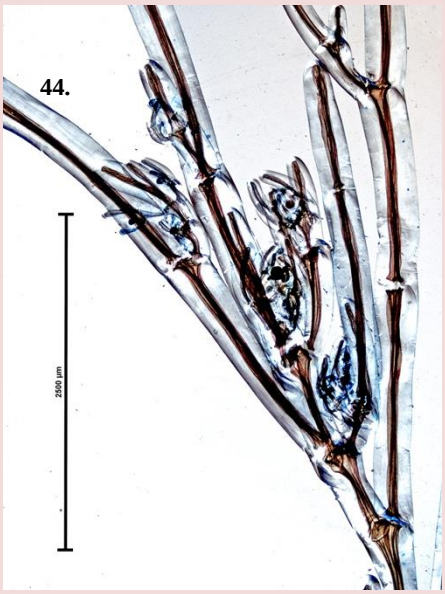
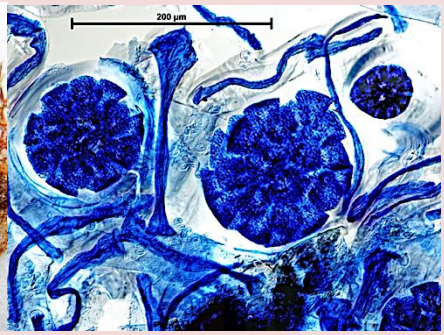

44.

***Involucrana meredithiana***
**see also "filamentous red algae Part III"**
Fig. 42. ropey plant base
Fig. 43. branching pattern, whole plant
Fig. 44. upper parts, not wrapped in ropey rhizoids, short side branches, large cells


45.


46.


47.

***Involucrana crassa***
**see also "filamentous red algae Part III"**
Fig. 45. whole plant
Fig. 46: ropey base, short whorl branchlets visible
Fig. 47. large, multi-divided spore sacs (polysporangia) diagnostic of the genus

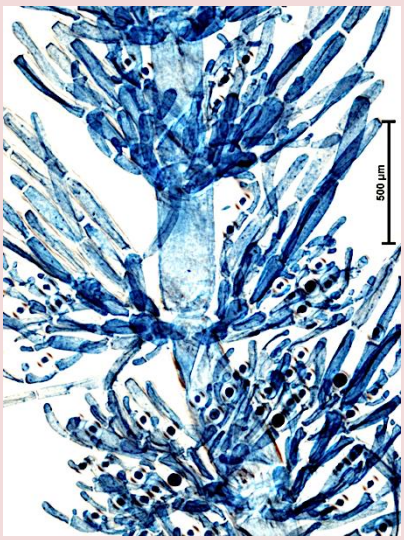
**Part II continued next page**

## PART II: continued

**48.**

**49.**

**50.**

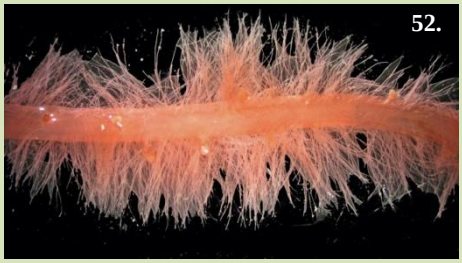



***Shepleya verticillata***
**see also "filamentous red algae Part III"**
Fig. 48. whole plant
Fig. 49: ropey base, short whorl branchlets visible
Fig. 50. detail of short whorl branchlets with sporangia

**Part III commences next page**

## III. FURRY OR FUZZY

**see also "filamentous red algae Part V (2nd edition)"**

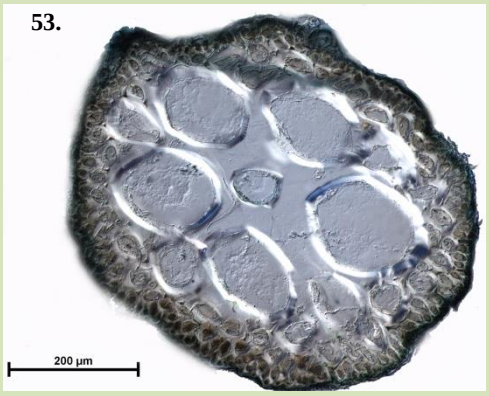
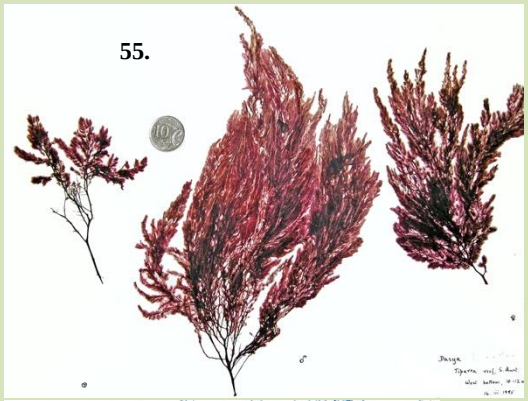
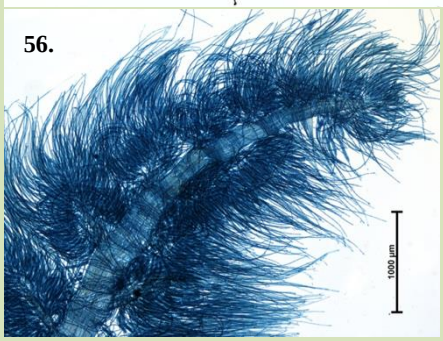




Fig. 51. ***Dasya villosa***
Fig. 52. ***Dasya extensa,*** backlit to emphasize the furry surface
Fig. 53. ***Dasya villosa*** cross section, young axis, central filament cell ringed by ***5*** (pericentral) cells

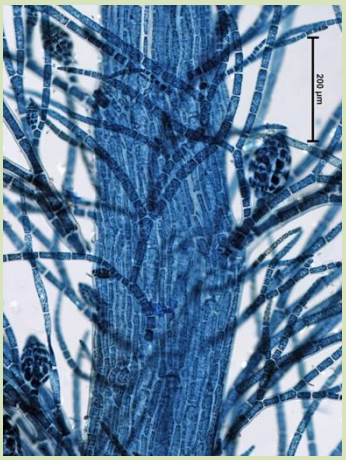
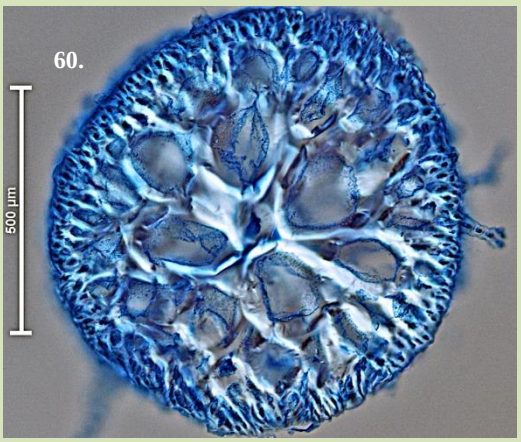




Fig. 54: ***Dasya extensa***
Fig. 55: ***D. hapalathrix***
Fig, 56: ***D. hapalathrix***, tip
Fig. 57: ***D. villosa*** detail of axis with furry covering bearing sporangial structures (stichidia)






***Doxodasya lanuginosa***
**see also "filamentous red algae Part IX**
Fig. 58: whole plant
Fig. 59: detail of furry surface
Fig. 60: cross section of young axis, central filament cell ringed by ***7*** (pericentral) cells (compared with ***5*** for *Dasya)*

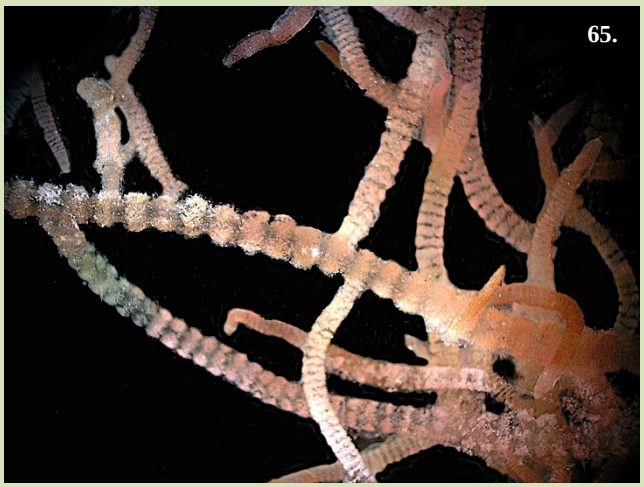
**Part III continued next page**



Figs 61, 62. several plants attached (epiphytic) on the brown alga, *Cystophora*

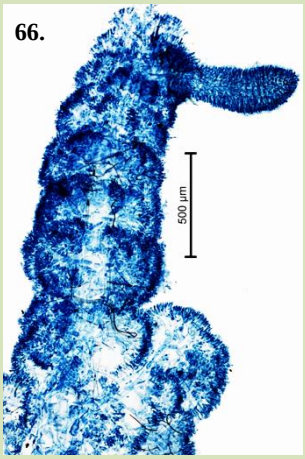

***Haplodasya tomentosa***
**see also " filamentous red algae Part IX : Tribe Lophothalieae of the Family Rhodomelaceae"**

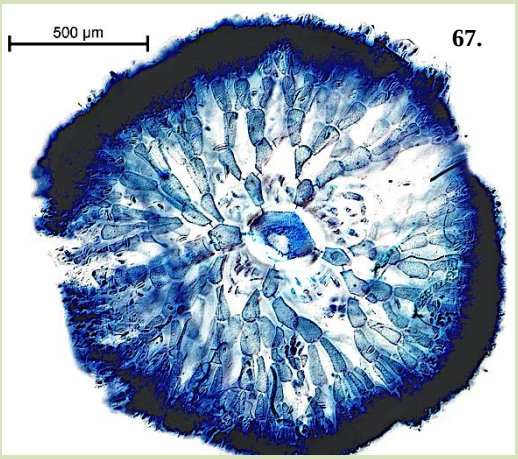
Fig, 63. hairy surface of axes, goblet-shaped female structures (cystocarps) also present


***Gulsonia annulata***
**see also " filamentous red algae Part II"**

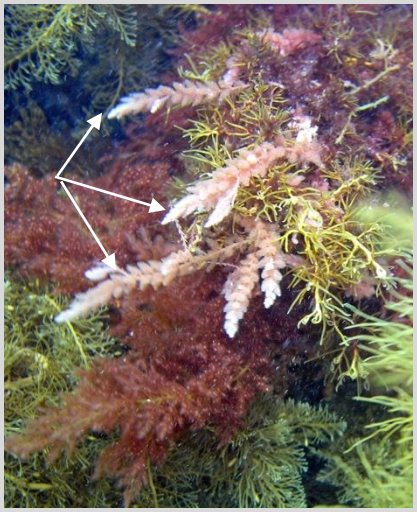
**Fig. 64. whole plant**
**Fig. 65. axes backlit to emphasize the fuzzy appearance produced by rings of tiny branches**
**Fig. 66. microscopic surface view of an axis, rings of tiny branches surrounding the large-celled central filament, small side axis developing in upper RHS**
**Fig. 67. cross section, prominent central filament cell, 4 radiating short branches**



# IV. ALGAE WITH FLUFFY SIDE BRANCHES
## IVA. SIDE BRANCHES SOFT

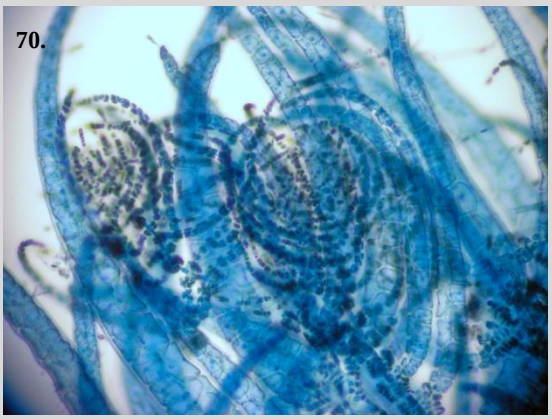
***Asparagopsis spp***
**see also** "Rhodophyta (red algae). Asparagopsis armata, Asparagopsis taxiformis" for full descriptions


**68.**


**69.**

***Asparagopsis armata***
**§Armed asparagus weed**

Fig. 68: fluffy pink plants (arrowed) growing (***epiphytic***) on other algae in shallow water
Fig. 69: fluffy side branches and barbed basal branches with backward-pointing hooks that attached to other algae, backlit to highlight the textures


**70.**

***Asparagopsis taxiformis*. §Asparagus weed**
Fig. 70: plant tips, over-arching thin branches


**71.**

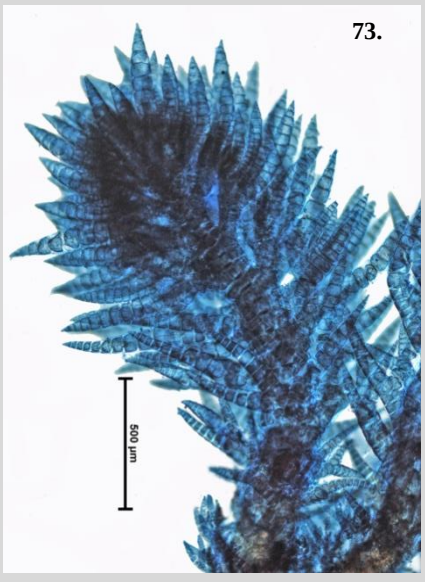
Fig 71: two pressed plants that ***grew on rock***

**72.**

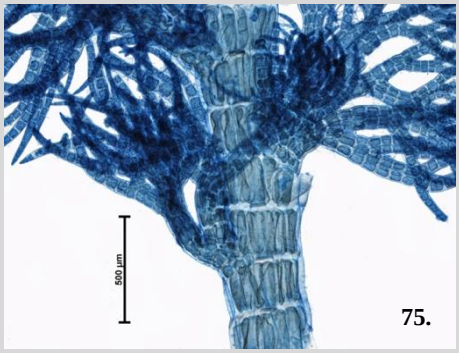
Fig. 72: fresh plants – note lack of barbed branches

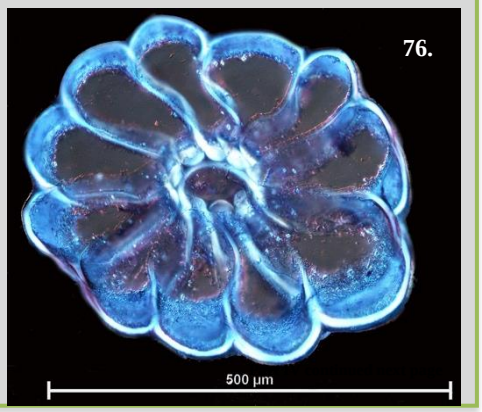
***Heterosiphonia* spp**
**see also "filamentous red algae Part V"**


**74.**


**73.**

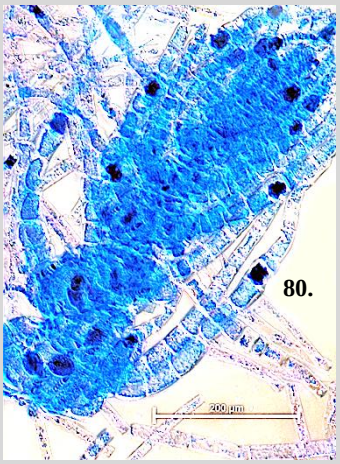
***Heterosiphonia crassipes***
Fig. 73: plant tips, ***banded***, crowded short branches with acute tips
Fig. 74: whole plant
Fig. 75: tufts of ***banded*** branches;
Fig. 76: cross section of young axis, central filament cell ringed by ***11*** (pericentral) cells


**75.**


**76.**

Species on this page can also **be found in " filamentous red algae Part IX : Tribe Lophothalieae of the Family Rhodomelaceae"**



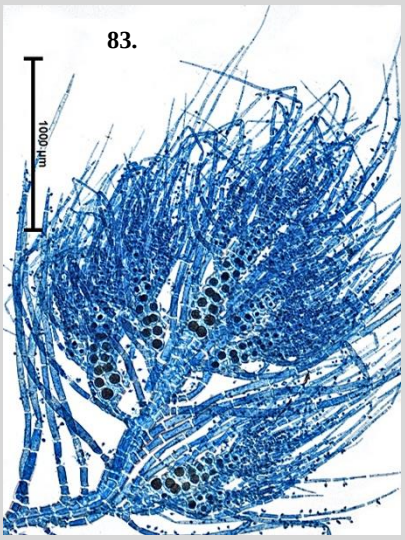

***Holotrichia comosa.*** Figs 77-80.

cross section of a mature axis

side tufts of naked cells

side tuft with deeply staining gland cells, diagnostic of the genus



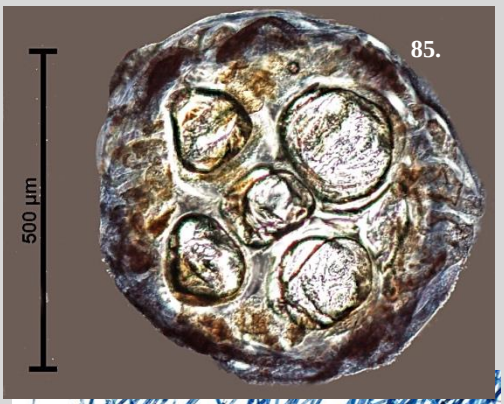



***Lophothalia hormoclados***

Fig. 81: whole plants
Fig. 82: axes with numerous hairs bearing flask-shaped female structures (cystocarps)
Fig. 83: tuft with sporangial (dark spots) in branches

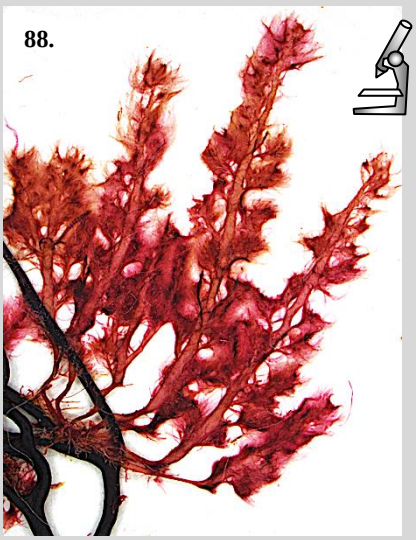
***Lophocladia kuetzingii***

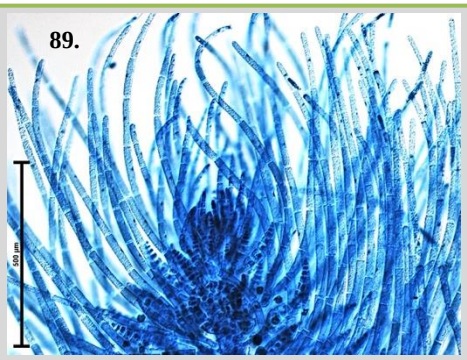
Fig. 84: whole plant
Fig. 85: cross section. central filament cell ringed by 4 (pericentral) cells
Fig. 86: bands on axes visible, numerous bunches of coloured filaments, dark-stained spores in some side branches

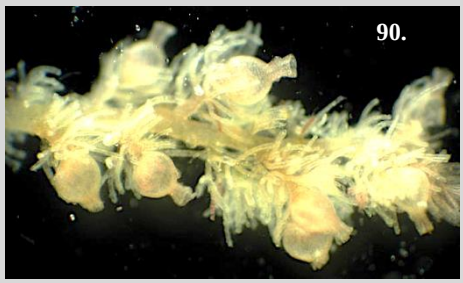





**Part IV continued next page**

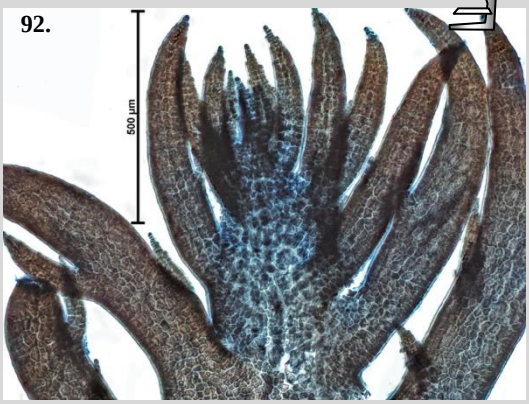




***Haplodasya urceolata***
**see also** **" filamentous red algae Part IX : Tribe Lophothalieae of the Family Rhodomelaceae" Fig.**

Fig. 87: several plants (dark red) attached (epiphytic) on the brown alga *Cystophora*
Fig. 88: detail of the tufted ends to short side branches
Fig. 89: filaments over-arching the tips of short branches, so producing the overall tufted appearance of the plant
Fig. 90: branch bearing flask-shaped female structures (cystocarps) characteristic of the species

## IVB SIDE BRANCHES STIFF, "PRICKLY"



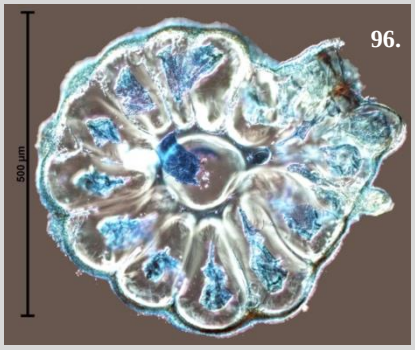
***Lophurella periclados.*** **see also** **" filamentous red algae Part IX : Tribe Polysiphonieae of the Family Rhodomelaceae"**

Fig. 91: whole plants axes covered in dark bristles (***unless denuded***, which commonly occurs)

Fig. 92: apex, solid, stiff "bristly" short side branches, "hairs" (trichoblasts) if present are colourless

Fig. 93: cross section, small central filament cell ringed by ***4*** (pericentral) cells



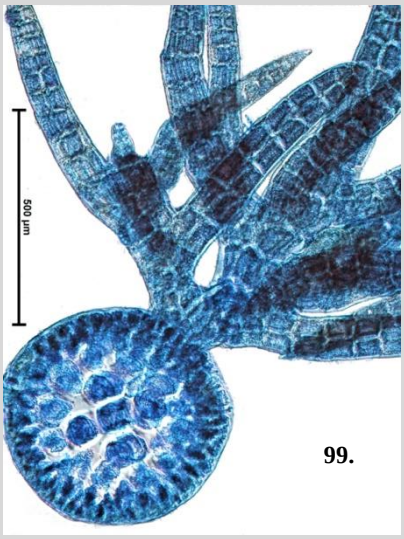



***Perrinia ericoides***. **see also** **"filamentous red algae Part VII"**
Figs 94, 95: axes clothed with rigid, thorny-looking short branches

Fig. 96. cross section, prominent central filament cell ringed by 13 (pericentral) cells

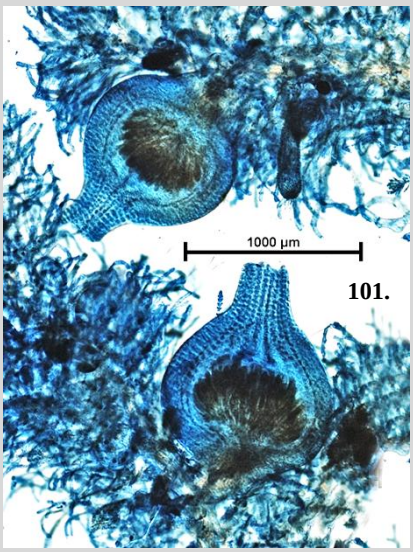
**Part IV continued next page**

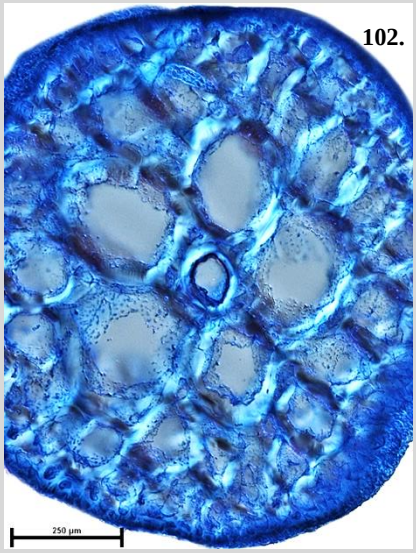





***Echinothamnion hystrix*** **see also**
**"filamentous red algae Part VII"**

Fig. 97: whole plant
Fig. 98: detail of apex with "thorny" short side branches
Fig. 99: cross section through an axis bearing a short side branch, central filament cell ringed by 4 prominent (pericentral) cells

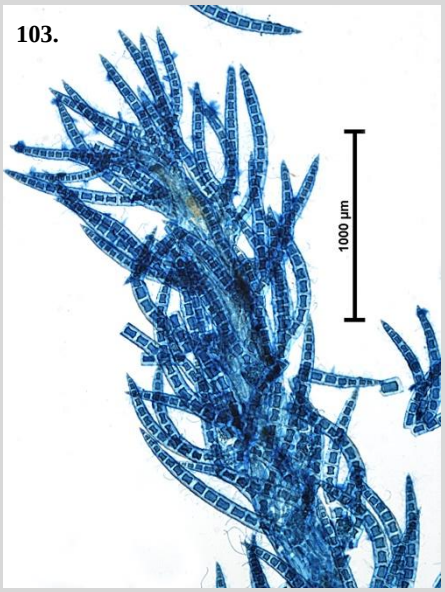



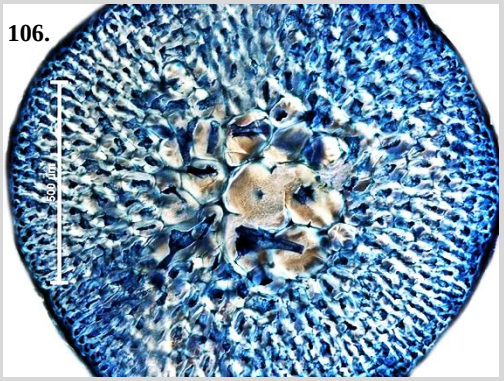

***Micropeuce feredayae***
**see also** **"filamentous red algae Part IX. Tribe Lophothalieae of the Family: Rhodomelaceae**

Fig. 100: whole plant, axes wrapped in dense short branches (unless denuded)
Fig. 101: female cystocarps with a ***prominent neck*** diagnostic of this species
Fig. 102: cross section of axis, definite central filament ringed with 5 (pericentral) cells

**Part IV continued next page**

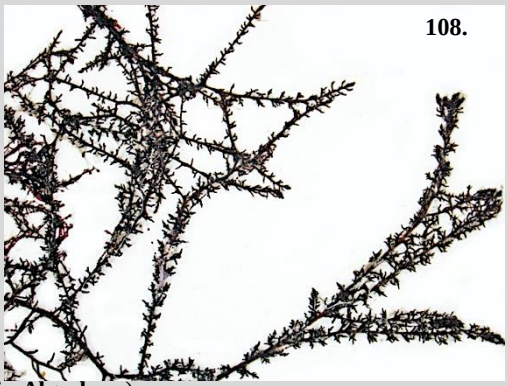


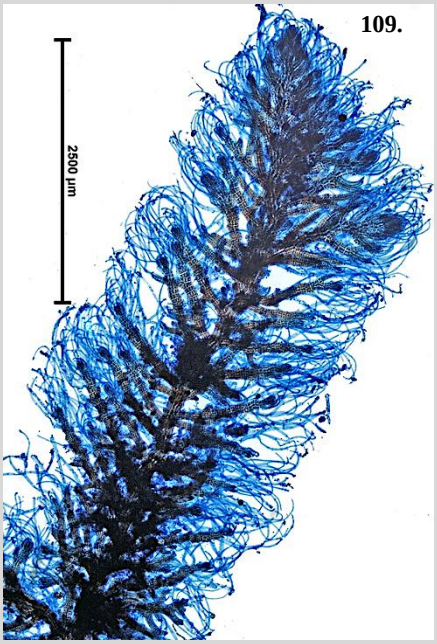



***Erythrostachys strobilifera***
**see also filamentous red algae Part IX. Tribe Lophothalieae of the Family: Rhodomelaceae**

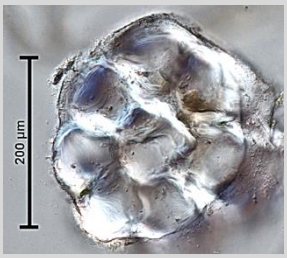
Fig. 103: microscopic detail of stiff side branches
Fig. 104: detail of spiky branches
Fig. 105: whole plant, axes often denuded of side branches near the base
Fig. 106: cross section, central filament ringed by *7* (pericentral) cells, seen best near axis tips, and this can be partly obscured by the later development of additional cells as in this figure


***Diplocladia patersonis* (*Vertebrata patersonis* in Algaebase)**
**see also "filamentous red algae Part VII"**
**Family: Rhodomelaceae, Tribe: Polysiphonieae**

Fig. 107: plants growing on rock, in sand
Fig. 108: pressed plant, dark, spiny appearance of short side branches
Fig. 109: microscopic detail of short side branches, ending in branched hairs (trichoblasts) - colourless in the unstained condition and often shed
Fig. 110: cross section, prominent central filament cell ringed by *7* (pericentral) cells

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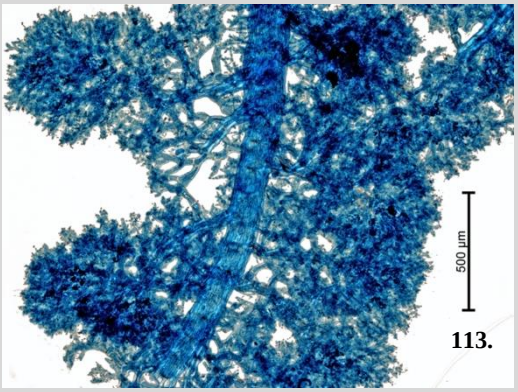


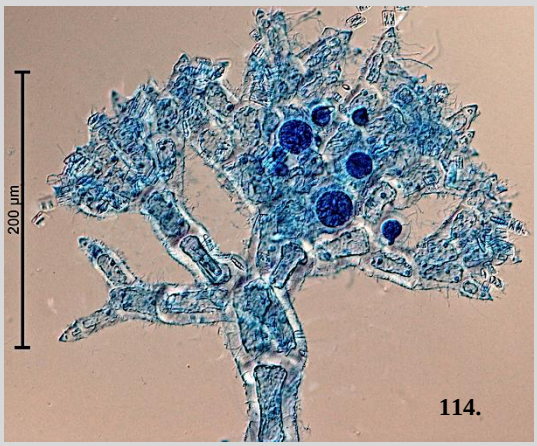



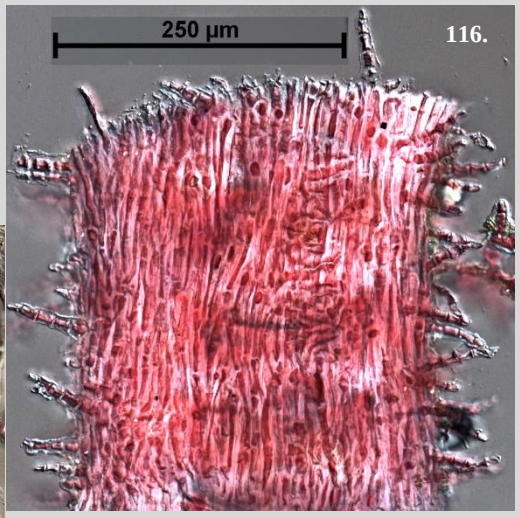


***Hirsutithallia* spp. (*H. mucronata* imaged)**
**see Family: Ceramiaceae, Tribe: Callithamnieae**

Figs 111, 112: plants at different magnifications
Figs 113, 114: microscope images of short side branches
Fig. 115: large cell dissected from the central filament of a young axis
Fig. 116: old axis, large cells of the central axis covered by rhizoids bearing short, ***outward-pointing*** filaments

## LIST OF SPECIES ILLUSTRATED ABOVE

| species | author/s | page | species | author/s | page |
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| *Asparagopsis taxiformis* | (Delile) Trevisan | 11 | *Hirsutithallia* | | 16 |
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| *Crouania mucosa* | Wollaston | 4 | *Holotrichia comosa* | (Harvey) F. Schmitz | 12 |
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| *Dasya hapalathrix* | Harvey | 9 | *Involucrana meredithiana* | (J. Agardh) Baldock & Womersley | 7 |
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| *Dasyphila preissii* | Sonder | 6 | *Lophocladia kuetzingii* | (Kuntze) P. C. Silva | 12 |
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| *Griffithsia gunniana* | J. Agardh | 7 | *Ptilocladia vestita* | (Harvey) Wollaston | 5 |
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| *Heterosiphonia* | | 11 | | | |

**ACKNOWLEDGEMENT**

Thanks to Carolyn Ricci of the State Herbarium of South Australia who gave helpful advice and also edited the material