PICTURED KEY TO SOME COMMON BROAD BLADED RED ALGAE OF SOUTHERN AUSTRALIA. 3rd EDITION
(not including leafy algae with much divided blades or slimy 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 some 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 artificial 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 sheets within this website.

Scale: the coin used as a scale is 24 mm or almost 1" wide. Microscope images of algae are usually blue stained.

1a. blades tissue-paper thin, almost transparent, edges often ruffled, stalks small or practically absent

…………………3. 2.

1b. blades thicker, leathery, gristy or parchment-like, opaque, edges smooth or wavy, usually attached by a stalk ……………………….. 5.

2a. blades usually whole and undivided, 2 cells thick, cells similar throughout. Figs 1-3.

…………………§ Pyropia, Porphyra (3 spp)

see also “Porphyra at a glance”

2b. blades sometimes lobed, > 2 cells thick, of several cell types …….. 3.

3a. surface views of young blades show rings (rosettes) of cells; cross sections and tissue squashes may show thin threads in addition to large round cells. Figs 5-7.

…………………§ Leptosomia rosea

see also “Rhodophyceae at a glance”

3b. rosettes absent; tissue squashes show a few large, spidery, long-armed (ganglionic) cells and numerous smaller cells …………… 4.

4a. blade “shot-holed” or entire, smooth or with a spiny surface; evenly coloured. Figs 8-12 (next page).

…………………§ Kallymenia (5 spp)

see also “Kallymenia at a glance”

4b. blade whole, smooth, sometimes mottled. Figs 12, 13 (next page).

…………………§ Halymeria in part

see also “Halymeriaeae at a glance”

Figs 1, 2: § Pyropia (Porphyra) columbina
Left: narrow bladed form

Figs 3, 4: § Pyropia (Porphyra) columbina
Left: surface cells  Right: plants on threads of a Green alga

Figs 5-7: Leptosomia rosea
Left: plants on a stem of a sea grass
Centre: surface view, cell rosettes
Right: cross section, mix of large cells and threads in the core

§ Pyropia has been proposed for Porphyra columbina and P. woolhouseae on the basis of nuclear and plastid genes (see Sutherland, J.E. et al (2011). A new look at an ancient Order: generic revision of the Bangiales (Rhodophyta). Phycological Society of America 47, 1131-1151). The name of the one remaining species of Porphyra in southern Australia, Porphyra lucasi, was retained, probably because molecular analysis of this species was not attempted. As all three species are structurally very similar, and in fact the paper above did not include structural differences when renaming the species, criteria used in the Flora to separate species will be retained in the web pages including “Porphyra at a glance” to which you are referred in step 2a of the key above as the only accessible way of separating species.

100 μm

Fig. 8: *Kallymenia cribrogloea*

Fig. 9: *Kallymenia cribrogloea*, detail of “shot-holes” in the blade

Fig. 10: *Kallymenia rubra*, with a very short stalk

Fig. 11: *Kallymenia rubra*, tissue squash, long-armed (ganglionic) cell

Fig. 12-13: *Kallymenia spinosa*,

Above: plants with spiny surfaces
Right: tissue squash, long-armed (ganglionic) cells (arrowed), young female structures (carpogonial systems, c sys)

Fig. 14: *Halymenia kraftii*

Fig. 15:

can be confused with *Erythrymenia minuta*, see step 8b.

Figs 15-17: *Halymenia plana*,
Above: whole plant
Above, right: mottled surface
Below, right: tissue squash, long-armed cells prominent amongst small surface cells and thread-like inner cells

Fig. 16: *Halymenia plana*, detail of mottled surface

5a. surface felty with microscopic hairs; tissue squashes show only fine, twisted threads. Rare. Figs 18, 19. 

............... *Predaea huismanii*

see also “Nematostomataceae at a glance”

5a. surface not felty; cross sections or tissue squashes show either threads with chains of small cells or oval cells of different sizes .......... 6.

6a. cross sections show a core of large oval cells mixed with or grading to small ones in outer layers

......................................................... 7.

6a. cross sections show a core of threads and outer layers with chains of small cells ........................................... 10.

7b. tips of young blades notched and with a diamond cell-pattern in surface view; older blades often dark red-brown and lacking the surface diamond-shaped cell pattern but with numerous spots consisting of clumps of microscopic hairs (trichoblasts), some bearing reproductive cells. Figs 20-25.

............... *Lenormandia latifolia*

Family: Rhodomelaceae
Tribe: Amansieae

7b. blades not notched; diamond cell-pattern and hair clumps absent .......................................................... 8.

Figs 20-22: *Lenormandia latifolia*

Left: young blade, diamond cell pattern, patches of hairs, notched tip
Above: older blade, diamond cell-pattern obliterated, basal stalk very short
Right: older blade, ruffled, torn into elongate lobes

Figs 23-25: *Lenormandia latifolia*

Left: blade detail, patches of hairs, notched tip
Centre: patch of hairs (trichoblasts)
Right: cross section of blade, mix of large and small cells in the core, small cells in the outer layer (cortex)

8a. plants may be large (50-200 mm tall), blades frilly, or with marginal outgrowths; cross sections show 1-2 rows only of small cells in outer layers (cortex) ........................................ 9.

8b. plants smaller (5-20 mm tall) and paddle-shaped; cross sections show short chains, facing outwards, of very small cells in outer layers (cortex). Figs 26-28.

............... Erythrymenia minuta
see also “Rhodymeniaceae at a glance”

9a. blade edges usually fringed with small, thin outgrowths, or with broader strap-like blades narrowed basally; spores scattered in the blades. Figs 29-31.

............. Hymenocladium chondricola
see also “Rhodymeniaceae at a glance”

9b. blades edges frilly, patches of spores occur in tiny bladelets on the blade surface. Figs 32-34.

.............. Rhodymenia halymenioides
see also “Rhodymeniaceae at a glance”
10a. female pustules (cystocarps) **protrude** from the blade surface ........................................... 11.
10b. fertile patches **sunken** into the blade surface ............................... 12.

11a. plants can be large (1 m tall); blades gristy, **broad** at the base, attached by a tiny stalk; female pustules (cystocarps) on **both** the blade surfaces and edges. Figs 35-40.

.................. *Sarcothalia radula*
see also “Gigartinaceae at a glance”

11b. blades lance shaped, parchment-like and **lustrous** when dry; female pustules (cystocarps) only on the blade surface. Figs 41-43.

......... *Rhodoglossum gigartinoides*
see also “Gigartinaceae at a glance”
12a. tissue squashes or cross sections show large, long-armed (ganglionic) cells present .......................... 13.
12b. long-armed (ganglionic) cells absent; basal stalk and holdfast tiny. Figs 44-47.
......................... Aeodes nitidissima see also “Halymeniaceae at a glance”

13a. tissue squashes show outer small cells in loose, branching sprays ................................................. 14.
13b. tissue squashes show outer small cells mostly in tight parallel rows ............................................ 15.

14a. several blades arise from a short stalk; tissue squashes show strings of 5-8 cells in sprays from the outer layers of blades. Figs 48-53.
......................... Platoma 2 spp see also “Nemastomataceae at a glance”
14b. blades single, or forked; tissue squashes show strings of 4 cells in sprays from outer layers. Figs 54-56. (next page).
................................. Tsengia laingii see also “Nemastomataceae at a glance”

15a. blades can be slimy. Surface layers have microscopic sprays of cells with strings about 4 cells long

15b. blades can be large (>1m across), leathery, tough, with a slight surface sheen, sometimes divided at edges into lance-shaped side blades. Surface layers have microscopic sprays of cells in strings more than 10 cells long. Figs 57-61.

............. *Pachymenia orbicularis*

see also “Halymeniaceae at a glance”
16a. blades large compared to basal stalks, with a wide core of sparse, fine threads; outer sprays of cells with about 8 cells in chains

16b. blades often divided; core narrower of mostly thicker, branched cells, outer sprays of cells with 1-3 cells in chains

\textit{Cryptonemia} in part

\textit{Schizymenia} dubyi

\textit{Grateloupia} ovata

See also “Halymeniaceae at a glance”

17a. blades usually \textit{slimy}, divided into several large, roughly triangular blades narrowing rapidly to a very small common stalk. Figs 70-72.

\textit{Schizymenia} dubyi

See also “Nemastomataceae at a glance”

17b. blades \textit{leathery}, usually single, broad, oval-shaped with tiny basal stalk. Figs 73-75.

\textit{Grateloupia} ovata

See also “Halymeniaceae at a glance”

Figs 70-72: \textit{Schizymenia} dubyi

Above: whole plant

Centre: cross section, wide core (medulla, \textit{med}), outer layers (cortex, \textit{co}) of sprays of small cells, sunken female structure (cystocarp, \textit{cys})

Far right: single surface spray, at the end of a thread dissected from the core of a blade

Figs 73-75: \textit{Grateloupia} ovata

Far left: large plant with tiny basal stalk (arrowed)

Centre: cross section near blade edge, part of a wide core (medulla, \textit{med}) and outer layer (cortex, \textit{co})

Right: detail of the tiny basal stalk and holdfast that secure the large blade to a substrate

Baldock, R. N. (2020). Pictured key to some common broad bladed red algae of southern Australia. 3\textsuperscript{rd} Edition. 9 pp., Algae Revealed. State Herbarium of South Australia. flora.sa.gov/algae_revealed
SUMMARY
Genera/species included in this key:

<table>
<thead>
<tr>
<th>Genus/Species</th>
</tr>
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<tbody>
<tr>
<td><em>Aeodes nitidissima</em></td>
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<td><em>Cryptonemia kallymenioides</em></td>
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<td><em>Cryptonemia wilsonii</em></td>
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Pachymenia orbicularis from 25 m deep, Pelorus Island