

COMMON CORALLINE RED ALGAE

Corallines:

One group of Red algae — the corallines, have hard, limey “skeletons” that make the group relatively easy to recognize (examples Figs 1-3, 6-8). They are pink to grey-pink in colour, bleaching white. Below is a key to a few of the common ones of southern Australia.

Coralline look-alikes

Unfortunately, some odd members of other algal families also resemble corallines. These are posted at the end of this key.

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

Names: these follow Womersley, H.B.S. (1996) as that publication continues to be a comprehensive and complete description of southern Australian species. Common names used are from Edgar, G. J. (2008). Recent name changes from the Website *Algaebase.org* are on page 11.

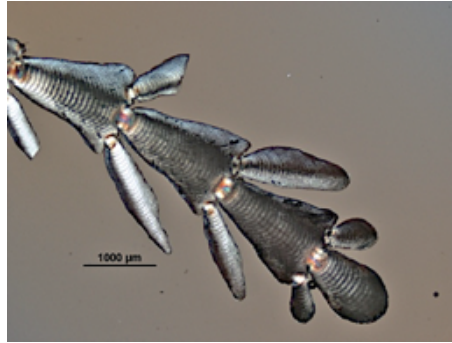


Fig.1: magnified view of *Corallina* showing jointed segments



Fig. 2: knobby, unbranched, pebble-like *Lithophyllum*



Fig. 3: magnified view of *Metagoniolithon radiatum* showing forked branching at tips but rings of side branches below



Fig. 4: *Metagoniolithon stelliferum*, narrow side branches in rings about each joint of the main branches (axes)

KEY

- 1a. plants are **jointed**, with flexible joints between solid segments (see images opposite) 2.
- 1b. plants are **not jointed**, but pebble-like (see Fig. 2) or leaf-like (see Fig. 8.) 9.
- 2a. side branches in **rings** from each of the joints. Branch tips have microscopic gelatinous caps. (Fig. 5.) *Metagoniolithon*
- 2b. branching forked or feathery (see Fig 6) 3.
- 3a. side branches arise in a **feather-like** pattern (branching is opposite, in one flat surface), although tips may be forked. (see Fig. 6.) 4
- 3b. branching pattern of the **whole** plant is **forked** (dichotomous). (see Fig. 7.) 7.

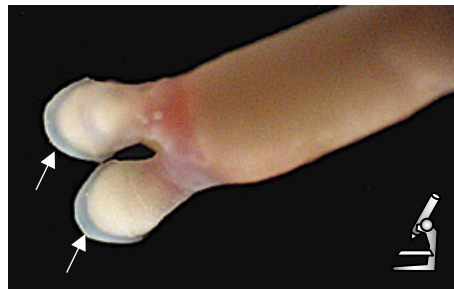


Fig. 5: microscope view of gelatinous caps (arrowed) of *Metagoniolithon*

Metagoniolithon radiatum, Fig. 3, grows on rock. *M. stelliferum*, (Fig. 4) has many branches at each joint and *M. chara* has 2-3 branches: both these latter species grow on other plants, often on the seagrass *Amphibolis*.
See Womersley & Johansen 1996, p.31



Fig. 6: feather-like branching pattern in *Corallina*



Fig. 7: forked (dichotomous) branching in *Jania*



Fig. 8: leaf-like branching in *Metamastophora flabellata*

4a. segments in upper parts of main stems are **flat** and **wedge-shaped**, with rounded edges
..... 5.

4b. segments on the main stems (Figs 9-11), are fairly **straight-sided**. Forked, cylindrical ultimate branches that look like antennae often occur

.... ***Halptilon roseum*** ("rosy coralline") as ***Jania rosea*** in ***Algaebase***



Fig. 9: *Halptilon roseum* growing as a turf in shallow water at reef's edge.
Photo: D Muirhead



Figs 10, 11: *Halptilon roseum*
Above: flat segments of main branches and prominent sprays of side branches
Left: detail of the fairly straight-sided segments of main branches and cylindrical, antennae-like side branches

5a. plants form a dense turf from the lower intertidal to shallow water on reefs, often bleached white in summer and growing with *Halptilon*. Segments de-calcified with acid each show **10-20** dark bands under the microscope. Figs 12-14

..... ***Corallina officinalis*** ("tufted coralline")

5b. plants usually grow in low light conditions either at depth or in shaded intertidal pools. Segments de-calcified with acid each show **20-50** bands under the microscope. (see Fig. 16, next page)

..... 6.

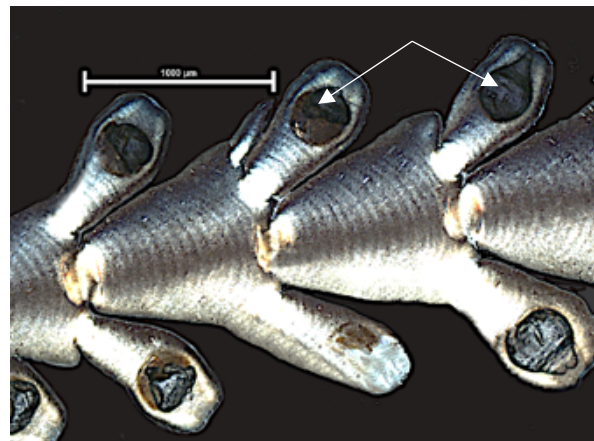


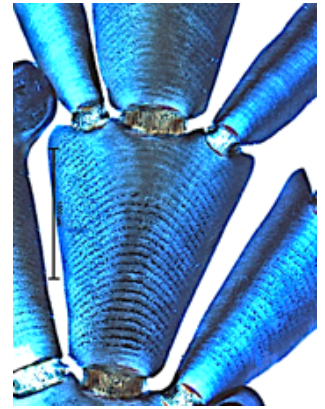
6a. plants 50-120 mm tall, main segments about 2 mm wide and **as tall as wide**; laterals arise from most segments in upper parts. Figs 15-17 (next page) ***Arthrocardia wardii*** ("Ward's coralline")

6b. plants 20-40 mm tall, main segments about 1mm wide and 2-4 times taller than wide; laterals only occasionally from segments. Figs 18, 19. (next page) ***Arthrocardia flabellata* subsp. *australica***



Figs 12-14: *Corallina officinalis*
Right: plants forming a turf amongst the leafy brown alga, *Ecklonia*, reef edge, Aldinga
Below, left: bleached plants from shallow water turf
Below, right: wedge-shaped segments of main branches de-calcified, about 14 dark bands and side branches with female structures (cystocarps, arrowed)





Figs 15-17, *Arthrocardia wardii*
 Left and centre: whole plants
 Above: wedge-shaped solid segments of main branches when de-calcified with acid show about 30 dark bands



Figs 18, 19: *Arthrocardia flabellata* subsp. *australiana* – small plants, narrow segments

- 7a. segments in *upper* parts are *cylindrical* and slender. Female organs form swellings in the *forks* of branches. Figs 6, 20-24 (this and the next page) *Jania* 6 spp
- 7b. segments *throughout* the plant are *flat* or compressed 8.



Fig. 20: pink and bleached *Jania* amongst other algae and sea grass, forming rounded turf on rock in shallow water

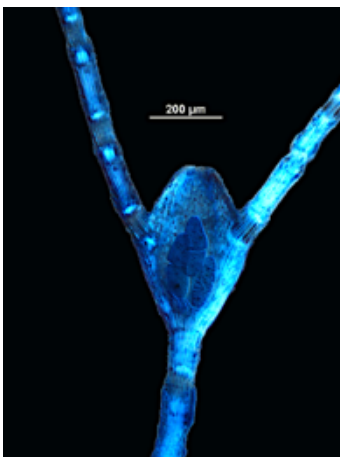


Fig. 21: *Jania micrarthrodia* with female structure in the angle between forked branches, a characteristic of the genus

J. parva, *J. micrarthrodia* (Fig. 21) and *J. minuta* (Fig. 23) have narrow segments (< 200µm wide). Forked branches of *J. verrucosa* (Fig. 22, “ball coralline”) occur in all planes producing ball-shaped plants. In *J. pusilla* and *J. pulchella* (Fig. 24) they are generally in one plane. There are only 4-10 segments in the whole plant in *J. pusilla* (not illustrated).



Fig. 24: *Jania pulchella* with flattened wedge-shaped segments below, but cylindrical segments in upper parts



Fig. 22, (left): bleached *Jania verrucosa*



Fig. 23, (above): *Jania minuta* on the blade of a seagrass

- 8a. segments shaped like arrow-heads (Figs 22, 23). Female organs (cystocarps) form swellings in the arms of the arrows. Figs 25, 26. *Cheilosporum sagittatum* (“Arrow coralline”)
- 8b. segments flattened or cylindrical, regularly forked. (Figs 27-29). *Amphiroa* 2 spp
- 9a. plants consist of thin, fragile *discs* (Fig. 24) about 10mm wide attached at one edge to red algae (especially *Ballia*). Figs 30 31 (next page) *Synarthrophyton patena* (“button coralline”)
- 9b. plants not as above 10.
- 10a. plants of thin, upright, brittle, leaf-like branches 11.
- 10b. plants pebble-like *or* form crusts on other plants, *or* brittle sheets on rocks 12.



Fig. 25: *Cheilosporum sagittatum*

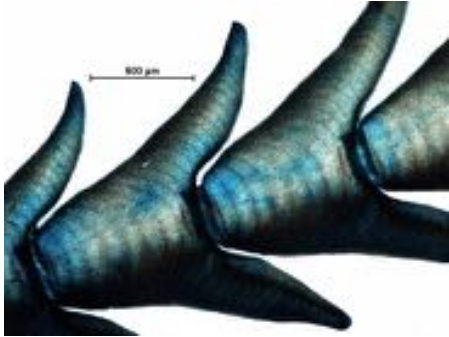


Fig. 26: *Cheilosporum sagittatum*, detail of segments



Figs 27, 28 (above & right): *Amphiroa anceps* (flat-branched coralline”): —segments flattened;

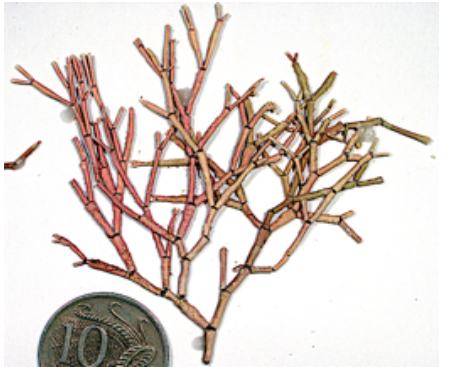


Fig. 29: *Amphiroa gracilis* (“twiggy coralline”) segments cylindrical

Figs 30, 31: *Synarthrophyton patena* disc-shaped plants



- 11a. leafy parts curled (Figs 8, 32, 33)
 *Metamastophora flabellata*
 ("rosette coralline")
- 11b. leafy parts flat, tips small, fan-shaped, often split at the upper margins of blades. Fig. 34.
 *Mastophoropsis canaliculata*
 ("split coralline")



- 12a. plants form scaly patches on other algae or seagrass leaves and stems.
 **encrusting epiphytic coralline algae, Figs 35-40, page 6**

- 12b. plants consist of flat crusts, sheets or granular bumps **on rocks** sometimes forming pink, lumpy pebbles about 50 mm wide or becoming coral-like
 ***lithothamnions and **rhodoliths Figs 40-48, pages 7, 8**

Figs 32, 33:
Metamastophora flabellata
 — leafy parts curled

Fig. 34: *Mastophoropsis canaliculata* — leafy parts fan-shaped, split at upper margins of blades



Woelkerling, W. *in* Womersley (1996), part IIB page 151 has put together a field guide to some of the non-jointed coralline algae using features observable with a hand lens. The more obvious of such species are illustrated below and in the next page. Identifications made using these images can only be tentative because microscopic investigation, especially of reproductive features, is required for valid identification.

PLANTS WITH DISTINCTIVE GROWTH FORMS (this and next page)

- plants upright, to 230mm tall, of a stalk and spreading, flat, ribbon or fan-shaped leafy branches: *Mastophoropsis canaliculata* and *Metamastophora flabellata* (see also above)
- plants flat on rock (prostrate), forming shiny discs or sheets 20-1500mm across and 1-3mm thick **loosely** attached to rock, commonly with root-like struts underneath: *Phymatolithon masonianum*
- plants forming overlapping, flat, fan-shaped layers: *Lithophyllum prototypum*
- plants delicate, very thin and encrusting other algae and sea grasses, often in large numbers: *Melobesia membranacea*, *Pneophyllum* spp, *Hydrolithon farinosum*

PLANTS WITH DISTINCTIVE REPRODUCTIVE STRUCTURES (next page)

- reproductive structure in patches on the surface of bumps: *Sporolithon durum*
- reproductive structures in crater-like bumps, plants often on holdfasts of large algae, of lumpy, layered or with short upright branches: *Mesophyllum macroblastum* and *M. printzianum*

*lithothamnion = in this key, a general term used for non-jointed, stony or scaly coralline alga. e.g. Figs 34, 37.

**rhodolith = an un-attached, commonly nodular plant body resembling a pebble, that develops by fragmentation, or by envelopment of a stone or other solid object. e.g. Figs 41, 46

SOME COMMON, ENCRUSTING, EPIPHYTIC CORALLINE RED ALGAE



Fig. 35: *Pneophyllum coronatum* forming pink scaly patches on leaves of sea grasses



Fig. 36: *Hydrolithon farinosum* growing as chalky scales on the thin leaves of Eelgrass, *Heterozostera*

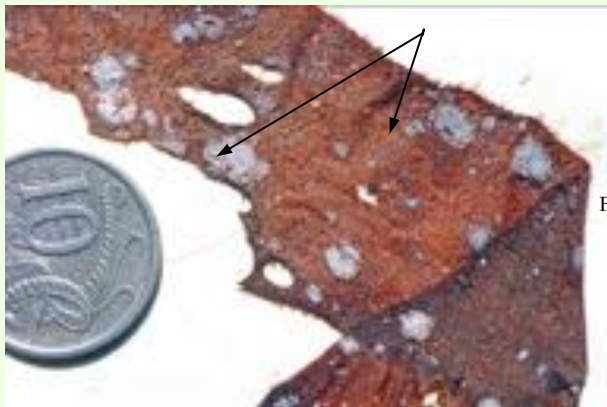


Fig 37: *Pneophyllum coronatum* (arrowed) on the brown alga *Glossophora nigricans*



Fig. 37: encrusting form of *Synarthrophyton patena* (compare this with the totally different disc-shaped form in Fig. 20). Unfortunately, only detailed microscope investigation can truly separate this encrusting form from several other species

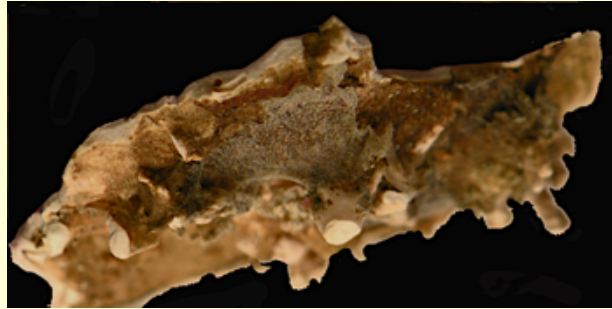
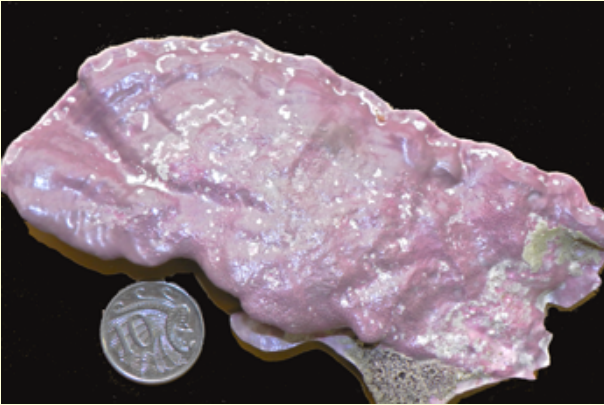


Figs 38, 39: *Melobesia membranacea*
Above, left & right: plants coating the minute, balloon-shaped surface structures (utricles) of the Green alga *Caulerpa simpliciuscula* forming a scale with reproductive bumps of the Green alga *Apjohnia*



SOME CORALLINE RED ALGAE ENCRUSTING ROCKS

LYING AS BRITTLE SHEETS



Figs 40. 41: *Phymatolithon masonianum* (“fan coralline”) (as *Masoniana kraftii* in *Algaebase*) has a shiny surface and can be stripped off the rock on which it is loosely attached

Above: the underside often has small, peg-like projections

FORMING LAYERED SHEETS TIGHTLY ADHERING TO ROCK

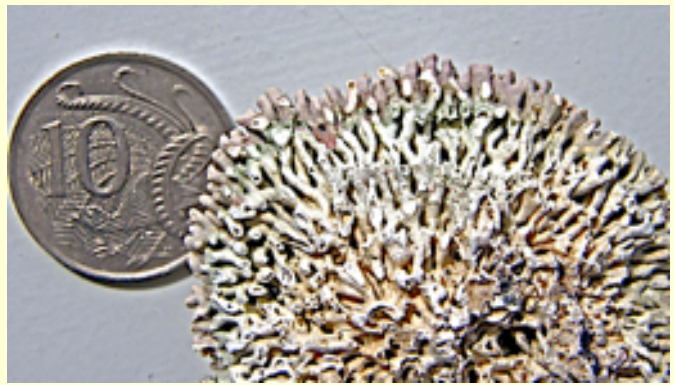


Fig. 42: *Mesophyllum* showing layered flat lobes

LOOKING LIKE PEBBLES OR BOULDERS OR RESEMBLING ANIMAL HARD CORALS



Figs 43, 44: *Sporolithon durum* ("large-lobed rhodolith")
 Above, left: lumpy smooth surface
 Above, right: sunken patches of spores, characteristic of the genus



Figs 45, 46 *Spongites hyperellus* ("shore coralline") can form bands of growth in the lower intertidal or become detached and form rhodoliths
 Above, left: a rhodolith, erect, forked branching typical of the species
 Above, right: the relatively tall branches and porous nature of *Spongites hyperellus* exposed in broken surfaces of the plants



Fig. 47: *Melobesia brassica-florida* (as *Neogoniolithon brassica-florida* in *Algaebase*) grows on rocks or becomes detached and ball-shaped. When fertile conspicuous female cystocarps protrude at the surface



Fig. 48: *Lithophyllum corallinae* coats large shells, sea-urchins, rocks, or can be detached and grow as an irregular-shaped mass. It has knobby, often unbranched ridges

CORALLINE LOOK-ALIKES — WITH ARTICULATED BRANCHES

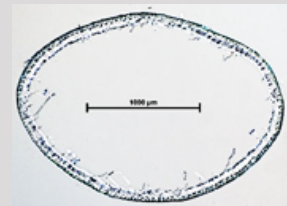
Rhodopeltis australis
 Family: Dumontiaceae -
 has chalky or limey
 deposits in its tissues
 and is segmented like
 articulated red coralline
 algae, but has a
 prominent mid-vein



Figs 47 48: two views of *Rhodopeltis* at different scales

Some of the Order: Nemaliales also have limey representatives

Dichotomaria obtusata
 segments flat when dried,
 pink in colour (similar to
Amphiroa). Internally, it has a
 completely different anatomy, and
 does not produce stony, pustule-
 like female structures



Figs 47, 48 *Dichotomaria obtusata*
 Left: whole plant
 Above: cross section

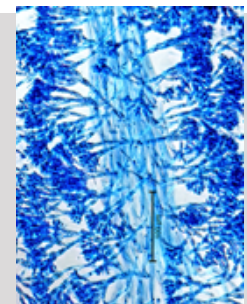
Tricleocarpa cylindrica is a rare
 plant from Rottnest I., WA that
 looks like a large *Jania* species,
 but is structurally and
 reproductively different



Liagora has a chalky surface,
 branches are flexible, not
 segmented, filamentous
 internally. Plants do not produce
 stony, pustule-like female
 structures.



Figs *Liagora harveyana*
 Left: whole plant
 Right: cross section



CORALLINE LOOK-ALIKES — STONY, NON-ARTICULATED RED ALGAE

the Families Hildenbrandiaceae and Peyssonneliaceae - encrust rocks and may be confused with encrusting red coralline algae, but they do not produce knobby or crater-like reproductive structures



Fig. 49: *Hildenbrandia rubra*



Fig. 50: *Hildenbrandia lecanellieri*



Fig. 51: *Hildenbrandia crouaniorum*



Fig. 52: *Hildenbrandia patula*

The members of the Peyssonneliaceae (Figs 53-55) have some lime, but are dark red to red-brown rather than the pink colour of corallines



Fig. 53: *Peyssonnelia dubyi* on a shell

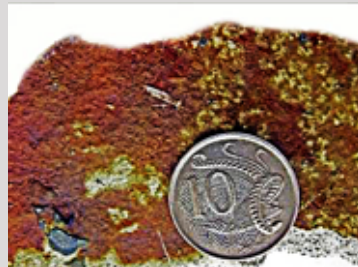


Fig. 54: *Peyssonnelia splendens*

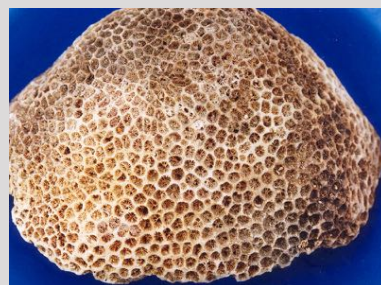


Fig. 55: *Peyssonnelia boudouresquei* (as *Olokunia boudouresqueia* in *Algaebase*)

CORALLINE LOOK-ALIKES — STONY ANIMAL CORALS



Left: Colourful sponges and stony coral, *Culicia* on the roof of a cave



Dry, boulder size *Plesiastrea versipora* colony, commonly found washed up on local beaches



partitions in polyp cavities of distinguish stony corals from coralline Red algae

REFERENCES

- Edgar, G.J., 2008. *Australian Marine Life: the plants and animals of temperate waters. 2nd Edition*. Reed, Victoria.
- Womersley, H.B.S., & Johansen, H.W. (jointed corallines) and Woelkerling, W.J. (stony corallines)
in Womersley, H.B.S (1996). *The Marine Benthic Flora of Southern Australia. Part III*.
Govt. Printer, S. Australia

ALGAL SPECIES ILLUSTRATED IN THE KEY

species	author/s	page (s)	name in <i>Algaebase</i>	authors
<i>Amphiroa anceps</i>	(Lamarck) Decaisne	4		
<i>Amphiroa gracilis</i>	Harvey	4		
<i>Arthrocardia flabellata</i> subsp. <i>australica</i>	Womersley & H.W. Johansen	2, 3		
<i>Arthrocardia wardii</i>	(Harvey) Areschoug	2, 3		
<i>Cheilosporum sagittatum</i>	(Lamouroux) Areschoug	4	<i>Jania sagittata</i>	(Lamouroux) Blainville
<i>Corallina officinalis</i>	Linnaeus	2		
<i>Dichotomaria obtusata</i>	(J. Ellis & Solander) Lamrck	9		
<i>Haliptilon roseum</i>	(Lamarck) Garbary & H.W. Johansen	2	<i>Jania rosea</i>	(Lamarck) Decaisne
<i>Hildenbrandia crouaniorum</i>	J. Agardh	10		
<i>Hildenbrandia lecancellieri</i>	Hariot	10		
<i>Hildenbrandia patula</i>	Womersley	10		
<i>Hildenbrandia rubra</i>	(Sommerfelt) Meneghini	10		
<i>Hydrolithon farinosum</i>	(Lamouroux) Penrose & Chamberlain	6		
<i>Jania micrarthrodia</i>	Lamouroux	3, 4		
<i>Jania minuta</i>	Johansen & Womersley	4		
<i>Jania pulchella</i>	(Harvey) Johansen & Womersley	4		
<i>Jania pusilla</i>	(Sonder) Yendo	4		
<i>Liagora harveyana</i>	Zeh	9		
<i>Lithophyllum corallinae</i>	(P. Crouan & H. Crouan) Heydrich	8		
lithothamnions		5		
<i>Mastophoropsis canaliculata</i>	(Harvey) Woelkerling	5		
<i>Melobesia brassica-florida</i>	Harvey	8	<i>Neogoniolithon brassica-florida</i>	(Harvey) Setchell & L.R. Mason
<i>Melobesia membranacea</i>	(Esper) Lamouroux	6		
<i>Mesophyllum</i>		7		
<i>Metagoniolithon chara</i>	(Lamarck) Ducker	1		
<i>Metagoniolithon radiatum</i>	(Lamarck) Ducker	1		
<i>Metagoniolithon stelliferum</i>	(Lamarck) Ducker	1		
<i>Metamastophora flabellata</i>	(Sonder) Setchell	1, 5		
<i>Peyssonnelia boudouresquei</i>	Yoneshigue	10	<i>Olokunia boudouresquei</i>	(Yoneshigue) Pestana, Cassano & J.M.C.Nunes
<i>Peyssonnelia dubyi</i>	P. Crouan & H. Crouan	10		
<i>Peyssonnelia splendens</i>	Womersley	10		
<i>Phymatolithon masonianum</i>	Wilks & Woelkerling	7	<i>Masoniana kraftii</i>	Athanasiadis & D. Ballantine
<i>Pneophyllum coronatum</i>	(Rosanoff) Penrose	6		
<i>Pneophyllum coronatum</i>	(Rosanoff) Penrose	6		
Rhodoliths				
<i>Rhodopeltis australis</i>	(Harvey) Harvey	9		
<i>Spongites hyperellus</i>	(Foslie) Penrose	8		
<i>Sporolithon durum</i>	(Foslie) Townsend & Woelkerling	8		
<i>Synarthrophyton patena</i>	(Hooker f. & Harvey) R.A. Townsend	5, 6		
<i>Tricleocarpa cylindrica</i>	(J. Ellis & Solander) Huisman & Borowitzka	9		