U3A Port Fairy

Science…naturally!

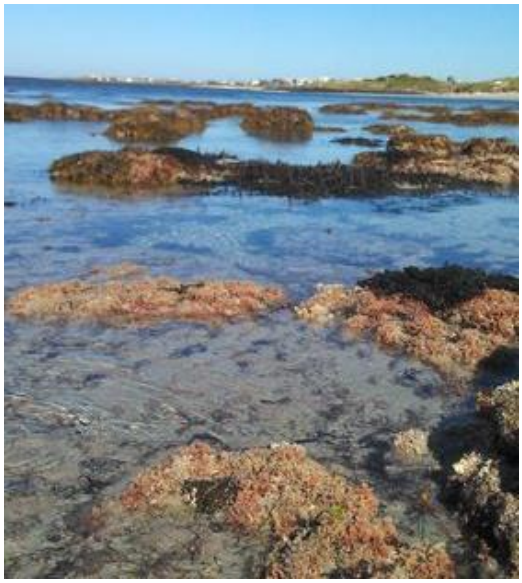
Red Seaweeds of Port Fairy

John Miller: 1 September 2020

This is the 24th in a series of guides for U3A members around Port Fairy and district to help us get out and about safely during COVID-19 restrictions. The aim of the guides is to provide enjoyable outdoor activities that can be undertaken either by yourself or others (in accordance with Government directives).

This guide is the third in the ***Seaweed Series*** and follows on from Sue's Green and Brown Seaweeds.

What is a seaweed?



Seaweeds are macroalgae – algae (singular = alga) that form a visible plant that we can see with our naked eyes. There are also lots of microalgae floating around in the oceans as well but, being predominantly single-celled, we cannot see them without a microscope.

The seaweeds as we know them on our beaches are multicellular, marine macroalgae.

The term "seaweed" includes green, brown and red macroalgae and together, along with the marine microalgae, play a vital role in capturing carbon from the atmosphere and in producing up to 90% of Earth's oxygen.

What is a Red Seaweed?

Red Seaweed, in the Phylum Rhodophyta, make up the largest group of algae in the plant kingdom, with more species accounted for than brown and green seaweeds combined. Although generally found in shallow waters, they can withstand deep water and low-light conditions.

The Rhodophyta is a distinctive group with some 650–700 genera and over 4,000 species worldwide. The southern Australian coastal area is a real hotspot for red seaweeds, with some 284 genera and over 800 species recorded, many of which are endemic.

Why are they red?

Red seaweeds are red because of the presence of the pigment **phycoerythrin**, which reflects red light and absorbs blue light. The phycoerythrin uses the energy from the blue light wavelengths to convert carbon dioxide and water into food for the plant.

Because blue light penetrates water to a greater depth than light of longer wavelengths (the red end of the spectrum), red algae can photosynthesize and live at greater depths than most other seaweeds. So, this may explain why there are so many more red seaweeds than the greens or browns which live mainly close to the surface.

Do we use red seaweeds?

In Asia, red seaweeds are important sources of food, such as nori. The high vitamin and protein content of this food makes it attractive, as does the relative simplicity of cultivation, which began in Japan more than 300 years ago.

Carrageenan is an additive used to thicken, emulsify, and preserve foods and drinks. It comes from a red seaweed (also called Irish moss – *Chondrus crispus*) and you will probably find it in nut milks, meat products, ice cream and yogurt.

An interesting recent and on-going development is the use of the subtropical red seaweed Asparagopsis (*Asparagopsis* species). When fed to cattle and sheep in low doses it virtually eliminates their methane (a major greenhouse gas) emissions – mainly through burping. For more details, and to see where this development is up to check out the ABC TV series **Fight for Planet A**, Series 1, Episode 3 at: https://iview.abc.net.au/show/fight-for-planet-a-our-climate-challenge .If you don't want to watch the whole program, the segment on seaweed and cow methane is located between 13 ½ minutes and 24 minutes of the video.

Identification of red seaweeds

Red seaweeds are mostly fairly simple to distinguish from green and brown seaweeds because they are, well, red. They do come in a variety of "reds" from almost black/purple through bright red to very light pinks – but they are not green or brown. Beyond that, things get very tricky.

It's a bit of a nightmare really and pretty much the realm of experts who have dedicated their lives to looking down microscopes at the reproductive tissue and other microscopic features that define the species.

The other great difficulty of working out which red you have found is that often very closely related species look quite different to each other and some very distantly related species can look remarkably similar.

Fortunately, we have some really good seaweed publications that can assist in at least going some way to working out what group of red seaweeds you are dealing with. A good starting point is the Seaweed Site - http://www.seaweed.ie/australia/

To get some appreciation of what you are dealing with in trying to identify a seaweed, have a look at the ***Marine Benthic Flora of South Australia*** by Womersley, which can be found at:

http://www.flora.sa.gov.au/algae_flora/The_Marine_Benthic_Flora_of_SA_static_index.shtml

The most friendly reference work is the ***Identification Factsheets of the Marine Benthic Flora (Algae) of Southern Australia*** by Baldock, which can be found at:

http://www.flora.sa.gov.au/algae_revealed/index.shtml

The Baldock factsheets group the red seaweeds into morphologically similar species which make it a little easier to determine what you are looking at.

Groups of Red Seaweeds

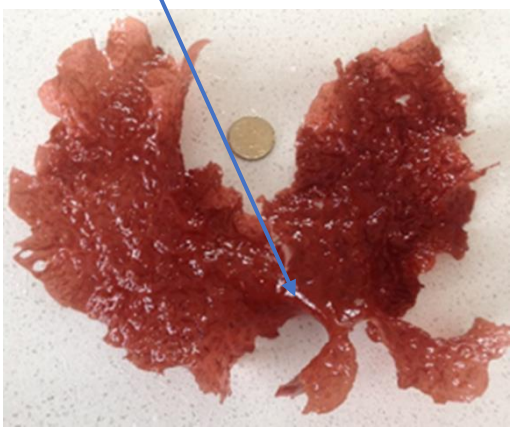
To try and make some sense of it all we will concentrate on just a few morphological groups that we find regularly along our beaches rather than trying to identify species.

Some of the following photos are mine but the majority of them were captured by either Jane Lee or Sue Knudsen who have kindly allowed me to use them here.

1 Broad bladed red algae group

The broad-bladed species, particularly the very thin leaved ones, are pretty rare on our beaches. I assume this is because they either get shredded before they get to the beach or, if they get to the beach, they rapidly dry out and crumple up. But they do occasionally make it, like the ones below that arrived on South Beach about this time last year. Unlike brown seaweeds, even the large specimens have very narrow stipes (stems) and small holdfasts.

Possibly *Lenormandia latifolia*.



Corrugated red (name unknown)

Sonderophycus australis is a very robust broad bladed red seaweed, about the size of your palm, is quite common on South Beach after a storm. It looks a bit like paint has been spilled on the beach.

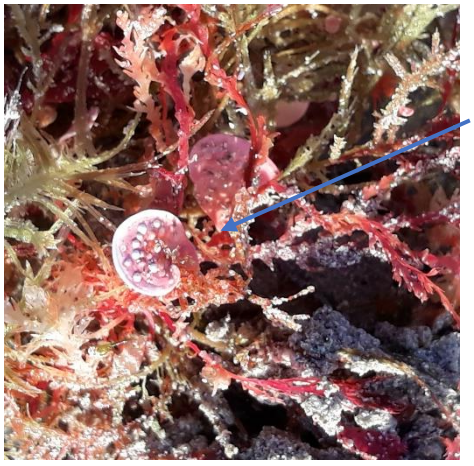
Coralline red algae group

The coralline red algae are amongst some of the most recognisable seaweeds on our beaches, but it is also possible that you did not know they were seaweed at all.

The coralline reds accumulate calcium carbonate to make a kind of “skeleton” which results in the plant feeling hard and also allowing it to persist on the beach well after the fleshy part of the plant has rotted away. They come in all shapes and sizes.

If you go for a snorkel in the lagoon on South Beach you will notice that most of the rocks on the reef where the waves break are covered in a bright red crust looking a bit like a lichen. These crustose seaweeds could be easily confused with coral.

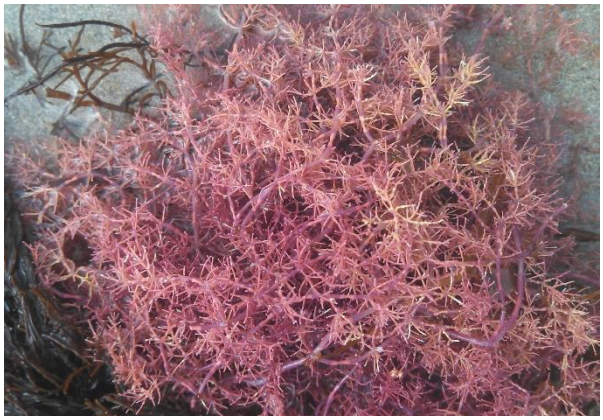
Some of the crustose coralline red seaweeds grow on the holdfasts of large brown seaweeds. After the brown seaweed is washed ashore, the “skeleton” of the red seaweed is all that remains.



The small discs of *Synarthrophyton* sp. The discs are usually about the size of a 5c piece and are almost always attached to another red seaweed called *Ballia*. The small warts on the surface of the disc house the seaweed’s reproductive structures.

The beautiful brittle skeleton of the aptly named *Corallina* sp. Note the jointed “backbone” and feathery arms.

The two most commonly see coralline red seaweeds seen on our beaches are *Metagoniolithon* sp with its whorls of finger-like projections from each joint and *Jania* sp, which has forked ends to each branchlet and looks a bit like a small white powder puff when it loses its red pigments. *Jania* is very common on the beach just west of Pea Soup.



***Metagoniolithon* sp**

***Jania* sp.**

Sponge-covered red algae group

There is a curious group of red seaweeds that are cloaked in sea sponges. I can find no reason as to why a seaweed would do this or any advantage it would gain from such an association. The cloak of sponge presumably reduces its photosynthetic capacity so would seem to be a disadvantage but maybe the sponge reduces the palatability of the seaweed or maybe the rough spicules repel snails and other grazers. It remains a curiosity.

Thamnoclonium dichotomum, a common species on both Little East Beach and South Beach, has a sparse cover of sponge spicules on its feathery branches which makes the whole plant feel a bit rough. The sponge spicules can only be seen under a microscope.

***Thamnoclonium* with a mixture of pigmented and unpigmented sections.**

Feathery flat-branched red algae group

There is a huge range of species with feathery segments and flattened stems.

Some of the more common ones seen on our beaches are pictured below.

Bladdery red algae group

The bladdery red seaweed group is comprised of jelly filled bladders of various sizes and configurations. They are quite common on our beaches although their generally small size means that can be easily overlooked.

The beautiful little beaded *Griffisthsia* sp. can often be seen on Little East Beach after rough weather, but you have to be there soon after it is beached as it desiccates and fades to nothing very quickly.

Gloiosaccion sp. is like a small jelly-filled balloon about the size and shape of your index finger. The outer skin is quite tough and tends to last a bit longer on the beach.

Botriocladia sp, as the name suggests, looks like a bunch of grapes

The red seaweeds are a very difficult group to identify with any confidence, but they are a beautiful and important part of the ecology of our southern coast and worth investigating.

Also, if you look closely amongst the washed-up seaweed you may find a Bear Seaweed Crab *Notomithrax ursus* (about 5cm across) stranded on the shore. It lives on the sea floor and camouflages itself by attaching living seaweeds to the hooked hairs on its carapace – a perfect camouflage.

If you find something you want to know more about, email me a photo and a short description and I will endeavour to work it out for you. jmiller3350@gmail.com