OF PURPLE LAVER, TONGUE WEED AND HEDGEHOG SEAWEED

Common red seaweeds of the Cape Peninsula.

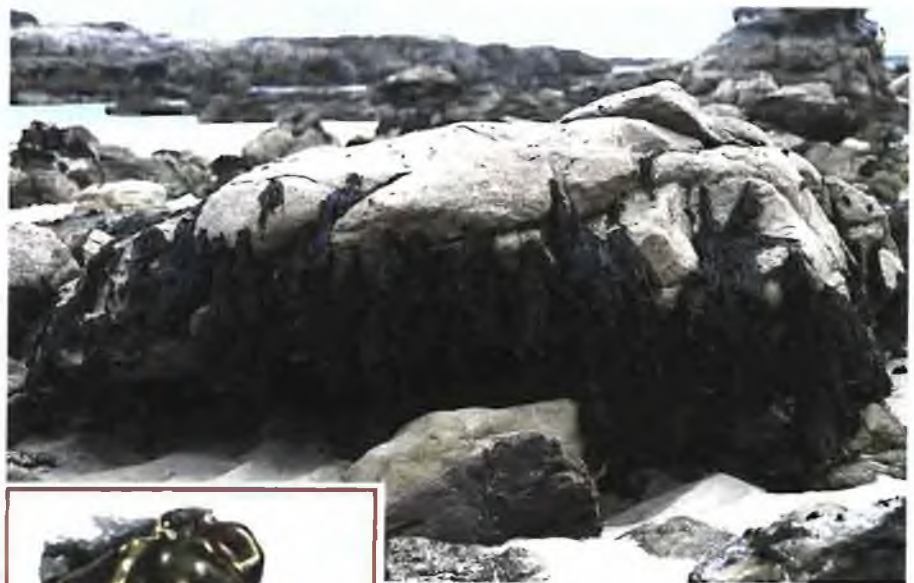
by ***Gavin W. Maneveldt****, Department of Botany, University of the Western Cape and,*
René Frans*, International Ocean Institute of Southern Africa, University of the Western Cape*

The fourth part of our series on the common intertidal seaweeds of the Cape Peninsula looks at the red seaweeds, which form by far the largest group of seaweeds on the Peninsula and dominate the mid to lower intertidal area to a large extent. Like the brown seaweeds, many of the reds are fleshy and bulky and generally occur lower down the shore because they are less tolerant of salinity and temperature extremes than some of the common green seaweeds.

Red seaweeds appear red because they possess pigments known as phycobilins that absorb blue and green light and reflect red light. Although they are commonly called red seaweeds, some may appear black, blue, yellow and even green. This is especially true for intertidal reds, the red pigments of which may become masked by the chlorophyll and other pigments present in them. As blue light penetrates water to a greater depth than any other light, the phycobilins present in red seaweeds allow these seaweeds to photosynthesize and survive at great depths - some as deep as 250 m.

The red seaweeds common to the Cape Peninsula and the South African west coast include *Porphyra* species, *Hildenbrandia lecanellierii*, *Aeodes orbitosa*, *Gigartina polycarpa*, *Sarcothalia stiriata*, *Nothogenia erinacea* and *Hypnea spicifera*.

Of all the seaweeds, the reds are probably the most economically valuable. The genus *Porphyra* in particular makes at least 80 % of all seaweed harvested all over the world. In Asia it is known as nori and is eaten as a whole seaweed either dried or in soups, or as tasty wrappings for sushi and rice. The iodine and high vitamin and protein content of nori makes it popular, as does the relative simplicity of its mariculture (sea farming), which began more than 300 years ago in Japan. Red seaweeds are also important for their phycocolloid extracts, which cause particles to remain suspended in solution and are therefore excellent as stabilizing



Porphyra **species, or purple laver** (above and left) **are extremely thin (only one cell thick), flat, membranous plants. This seaweed looks like a sheet of wrinkled cellophane when dry - all crumpled and folded upon itself. They vary in colour from yellow to purple to almost black.** ***Porphyra*** **is abundant high up on the shore where desiccation stress is at its greatest, and not many other species can survive. It has remarkable recovery capabilities - and can survive dehydration for a week.**

Hildenbrandia lecanellierii, **an encrusting red alga** (right), **is tolerant of the desiccation stress high up on the shore. Looking remarkably like splashed tar, this species covers large expanses in the upper intertidal area, in crevices and in places prone to sand inundation. Older parts of the plant often become detached from the substrate, but it recovers quickly from physical disturbance and can regenerate from but a few cells.**

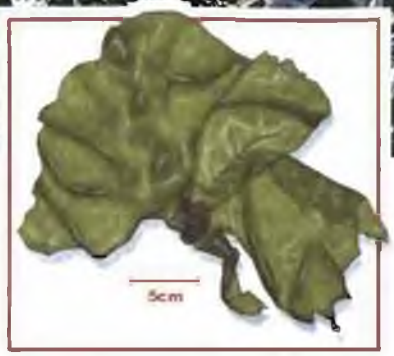
Nothogenia erinacea (left) **is aptly called the hedgehog seaweed. It consists of elongated leaf-like blades that are tough and leathery when wet, and papery when dry. The blades bear numerous densely packed tuft-like outgrowths giving the seaweed its hedgehog-like appearance. This species varies in colour from yellow-brown to almost black. It is also very common in the mid to lower intertidal zone.**

and gelling agents. The main phycocolloids derived from red seaweeds are carrageenan and agar. Carrageenan is important in the dairy industry – milkshakes, cheese, yoghurts and powdered milk (including baby formula) possess red seaweed extracts. Believe it or not, carrageenan is even used in pet food, cosmetics, shampoos, paints and toothpaste. A number of carrageenophyte seaweeds are being investigated in South Africa, including *Hypnea spicifera* and various species of *Gigartina*, *Sarcothalia* and *Aeodes*.

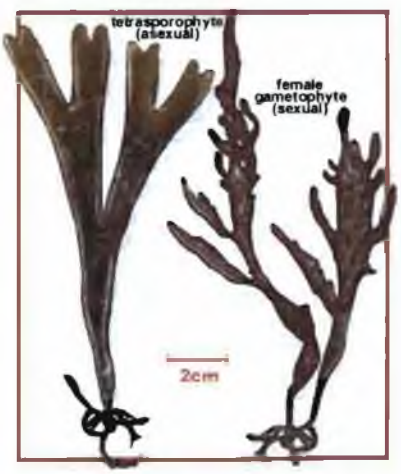
Agar on the other hand, has its most important use as a medium on which to culture fungi and bacteria in microbiological and medical pathological research. In food for human consumption agar can be found in baking and confectionary products and is also widely used to clarify wine, juice and vinegars because of its excellent protein binding properties. In larger industries, agar is used to make adhesives and capsules for tablets. South African agarophytes include the seaweed genera *Gracilaria* (which is harvested extensively in Saldanha Bay) and *Gelidium*.

There is another group of red seaweeds that are especially important in the formation of coral reefs, an activity with which they have been intimately involved for millions of years. These reef-building seaweeds are the encrusting coralline red seaweeds, which is the subject of my next and final chapter in this series.

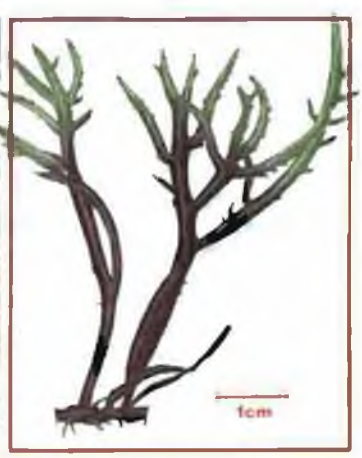
Acknowledgements
The graphic art for much of the seaweed series was adapted from the artwork by Margo Branch in the book *The Living Shores of Southern Africa* by Margo and George Branch.
For information about the authors, see page 125 of the September 2000 issue of *Veld & Flora*.



Aeodes orbitosa (in centre of photo above, and graphic on top left), **commonly known as slippery orbits, is a tough, flat, slippery, leaf-like seaweed. Colour varies from yellow-brown to reddish-brown. This seaweed is common in the middle to lower reaches of the intertidal area where it often occurs in large expanses. In sheltered intertidal pools, it can grow to 2 m in diameter - you could easily drape such a single plant over a standard bedroom door!**
Gigartina polycarpa (on left and right of photo above, and graphic on bottom left), **or tongue weed, is a tough, fleshy seaweed with oval blades. Individuals of this species are characteristically rough and bear numerous papillae (sometimes the blades are even rippled) giving the appearance of a rough tongue. The colour varies from yellow-brown to reddish-brown to almost black. With *Aeodes* it is quite abundant in the lower half of the intertidal zone.**



Sarcothalia stiriata (right) **or twisted gigartina (it was formerly classified under the genus *Gigartina*) is a fleshy, rubbery, translucent seaweed that often occurs in equally high densities with *Gigartina polycarpa* in the lower intertidal area. There are two distinct forms: asexually reproducing individuals are smooth, somewhat flattened and forked at their apices and sexually reproducing individuals are contorted (hence the name) into irregularly proliferating fleshy papillae. Both stages often occur side by side on the rocky shore. Colour varies from a translucent yellow-green to reddish-brown to almost black.**



Hypnea spicifera, (far left and left) **commonly called green tips, occurs as dense green and purple clumps on the lowest parts of the shore and is only visible during low water of spring tides. The upper parts of the clumps are covered with numerous short green fleshy spines. The colour in this species is characteristically purple-brown at the base and a luscious translucent green at the tips. The chlorophyll completely masks the red pigment near the upper surface of the seaweed. It is able to form extensive mats on the lowest reaches of the shore because of its rhizomatously spreading holdfast system.**