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This edition of Australian Plants has been produced by members of the Warrnambool & District SGAP. Our aim is to promote our region to the rest of Australia and showcase the many indigenous plants that occur here. Thank you to our team of writers and proofreaders.

Our group recently published the book *Plants of the Great South West* and here we reproduce 2 of its articles. The first by Dr. John Sherwood describes the origins of the various soils that occur and how native plants have evolved to flourish within these soils. The second by Andrew Pritchard covers the bioregions and vegetation communities. Much of the south west was cleared for agricultural purposes but many reserves still exist where original vegetation can be found. The book covers an area in SW Victoria roughly from Port Campbell through to the South Australian border. The Ecological Vegetation Classes (EVC) referred to are unique to Victoria although similar systems exist in other states.

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Front cover: Point Danger - Portland (K. Sparrow)

Back Cover: *Correa reflexa* var. *speciosa* (K. Sparrow)

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The Southwest's Physical Environment

Dr. John Sherwood

Associate Professor of Aquatic Science, Deakin University, Warrnambool

Plant communities of Victoria's southwest vary from grasslands (dominated by low growing grasses and herbs) to heath (in which shrubs up to 2 metres tall are predominant) and forests or woodlands (in which trees form a canopy perhaps 5 metres or more above ground level). These plant communities and the species they contain are not randomly distributed across the landscape. Two important factors combine to influence 'which plants grow where' – soil and climate. The interaction of these two factors produces a series of habitats, each suitable to a select group of plant species. Even within a particular habitat local conditions may vary for example tall trees may reduce wind speeds and increase shading at ground level. Thus a series of 'microhabitats' may influence plant distribution within a relatively small locality. The challenge for gardeners and others interested in re-vegetation is to identify the soil types and microhabitats at their location and select appropriate species for planting.

(a) Climate

'Climate' refers to the long-term average weather conditions at a particular locality. Southwest Victoria has a 'Mediterranean' climate characterised by a summer / autumn dry period and a winter / spring 'wet'. The moisture content of soils, water table levels and stream flow are all higher in the wet season than the dry. Temperatures are higher when water is in shortest supply adding to the stress on plants and so shortening their growing season. Many plants flower in winter and spring due to their more moderate conditions. Reducing water loss is a major challenge for plants which all have openings on leaves (called stomates) to allow gases to exchange with the atmosphere. Carbon dioxide needed for photosynthesis enters leaves via stomates and a waste product of this reaction, oxygen, escapes (along with water vapour) out of the stomates. To reduce water loss some plants have tiny hairs on the leaves (to trap a layer of humid air close to the leaf) or thick waxy coatings on the leaf (to prevent water loss directly from the cells). Others reduce the size of their leaves – some plants, such as Casuarinas or the pea flower *Daviesia*, have lost them completely and use their green stems for photosynthesis.

Winds increase water loss by removing the layer of humid air built up close to the leaf. Near the coast they may also transport sea salt inland and this can be deposited on plants and on soil. Coastal plants need to be more tolerant of wind and salt. Strategies to reduce exposure include growing in dense clumps (so your neighbours act as wind breaks) or close to the ground (although small plants have to be able to cope with increased shading by taller plants).

Winds from the SW-SE quadrant are dominant in Southwest Victoria and are more common in the afternoon and evening. Sea breezes are caused by the more rapid warming of the land than the sea. Air over the land rises as it is warmed and cooler air sweeps on-shore to replace it (the sea breeze). Superimposed on the sea breeze is the prevailing southwesterly air stream resulting from the mid-latitude 'roaring 40's', which circulate around Antarctica.

Right and facing page:

Panorama of Tower Hill - see page 60

Due to drought, the lake has been mostly dry in recent years

Photos: K Sparrow



Left: Cliffs of pale yellow Port Campbell limestone near Port Campbell. An old sand dune (reddish in colour) sits on top of the cliff.

Photo: K Sparrow

Right: A red terra rosa soil developed from the underlying limestone in south west Victoria

Photo: J Sherwood





Below: *Solanum laciniatum* (p. 61)
Photo: K Sparrow



(b) Soils

Soils are the link between the Earth's rocky crust and its terrestrial biosphere. A complex series of physical and chemical changes collectively known as weathering converts 'solid rock' into a crumbly mixture of predominantly clay minerals and quartz grains. Incorporation of organic matter through the actions of plants, fungi, bacteria and other animals (such as worms) converts this mineral mixture into a soil. The dark colour of many soils is due to the build-up of organic matter. Soil formation is a very slow process, measured typically in centuries. Development of a soil is the result of the interaction of climate, local topography, the actions of organisms and bedrock geology.

Rocks provide the raw materials for soil formation. In the Southwest there are three dominant rock types:

1. Limestone deposited on the floor of a shallow sea that covered the region in the Miocene (5-15 million years ago). These rocks form prominent yellow cliffs in the Port Campbell region and along the Glenelg River estuary. The limestone underlies much of the Southwest – the Miocene shoreline was inland near Hamilton and older rocks in the Grampians and Otway Ranges would have formed coastal bluffs or islands in this sea.
2. After the seas retreated, the Southwest became a centre of volcanic activity. In the last 4 million years over 400 volcanoes have erupted across Victoria and in the southeast of South Australia (on average an eruption every 10,000 years). Significant volcanoes in our region occur at Mr Richmond, Cape Bridgewater, Mt Clay, Mt Eccles and Tower Hill. Younger eruptions are clustered in the southwest with the most recent eruptions at Mt Schank and Mt Gambier in South Australia occurring less than 6,000 years ago. Scientists have no evidence that the volcanic activity has ceased.

Volcanic activity produced extensive sheets of lavas, which cooled to form basalt rock overlying the Miocene limestones. Basalts are a dark grey to black rock easily distinguished from limestone in the region. It forms impressive cliffs at Cape Bridgewater and Lady Julia Percy Island as well as rocky coasts at Port Fairy and Killarney. Basalts weather to produce the clay-rich soils fundamental to the region's agricultural wealth. Close to

volcanoes loose deposits of ash and scoria accumulated and weathering of these has produced some of the region's richest soils (e.g. around Tower Hill). The open texture of the ash deposits allows air and water to penetrate readily and weathering releases a rich mixture of plant nutrients.



Above: Basalt lava flow from Mt Napier (background) partially fills a valley. Mt Napier is one of the younger volcanoes in western Victoria

Photo: J Sherwood

3. The coast is fringed with lines of limestone sand dunes having very different ages. As well as those forming at present, older dunes were deposited at times in the past when the sea level was similar to today's. For most of the last 2 million years, the sea level was lower than now and only at times when the sea level was high (due to a milder global climate) did dunes accumulate close to the present coast. This last happened about 100,000 years ago. Over time sand dunes from these older periods of high sea level hardened as rainwater transported natural cements to bind the sand grains together. The rock produced, calcarenite, can be seen at Warrnambool, the Craggs and near Yambuk. Sand blown onto cliffs at Cape Bridgewater has been weathered so completely that all the original limestone has been dissolved - leaving only quartz grains. Sand dunes contain few minerals and this limitation means only the hardiest plants ('pioneer species') can grow in them.

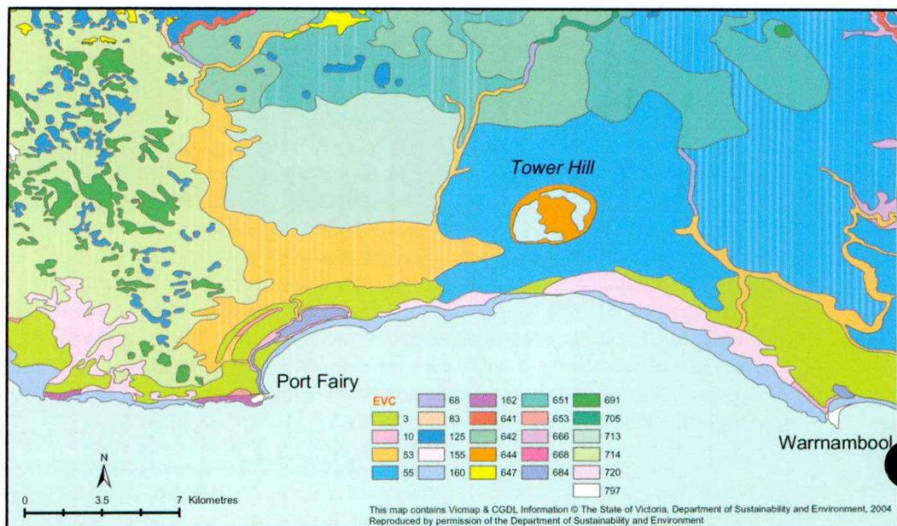
Each of these rock types can produce soils of varying thickness and type depending on climatic and other factors. Limestone can produce the deep red soils (terra rosa soils) sought after by wine-growers or dark black soils (rendzinas) desired by pastoralists depending on the degree of aeration or water logging present. Soils on hill slopes are unstable and wash into hollows where thicker soils can develop.

Planning a garden requires determination of some basic soil properties to guide plant selection:

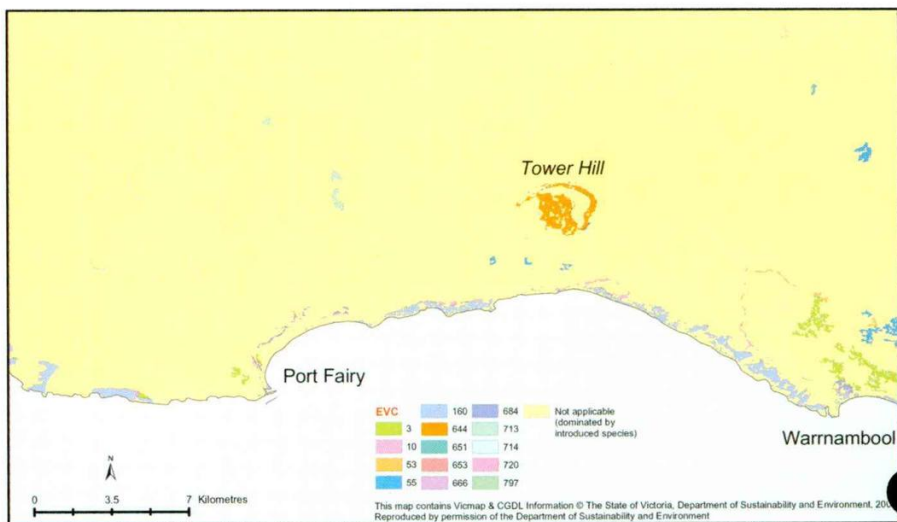
- (i) **Soil texture** – determined by the proportion of clay and sand. Clay-rich soils are rich in minerals but may not readily admit air and water. Sandy soils have the reverse properties. Friable mixtures of these basic ingredients are better for most species (known as sandy or clay loams).
- (ii) **Soil pH** – basically the acidity or alkalinity of a soil. A pH of 7 is 'neutral', less than 7 is 'acidic' and over 7 is 'alkaline' or 'basic'. Soils typically have a pH in the range of 4 to 9 and some plants are adapted to acid soils while others prefer alkaline ones. The availability of some trace elements such as iron is greatly affected by pH. Plants unable to access iron may develop a yellow colour (chlorosis).
- (iii) **Moisture content** – is greatly influenced by the clay and organic matter content of soil. Some plants prefer almost permanently moist soil (e.g. those found along streams or around or in wetlands). Others are adapted to well-drained soils – such as those found on sand dunes. Moisture retention in soils can be improved by applying a mulch while drainage can be improved by creating raised beds.

So, in summary, the native plants of the Southwest have evolved to flourish within its soils and climate. Across the region though, there are local variations in these key parameters, which resulted in a pre-European patchwork of plant communities and their species. The challenge in any attempt to restore part of these ecosystems is to identify the characteristics of the area and select the most appropriate species for it.

Ecological Vegetation Classes before European Settlement (pre-1750)



Remnant Ecological Vegetation Classes



Above: Ecological Vegetation Class maps showing the losses of indigenous and current dominance of introduced species since settlement - see opposite

Right: The City of Warrnambool constructed a boardwalk to protect the Coastal Headland Scrub vegetation community at 'Granny's Grave'.

Photo: K Sparrow



Bioregions and Vegetation Communities within Southwest Victoria

Andrew Pritchard

Threatened Species Officer with the Department of Sustainability and Environment
(DSE) Victoria based in Warrnambool

Four bioregions occur within Southwest Victoria; they are the Glenelg Plain, located near the South Australian border and traversing to near Portland and Heywood, the Bridgewater Plain, which is restricted to the coastal strip from the South Australian border to south of Portland, the Warrnambool Plain occurring from Port Campbell in the east through to Portland and into the hinterland, and finally the Victorian Volcanic Plain which covers the majority of the inland area north of Warrnambool through to Portland, Heywood and nearly to Dartmoor.

The boundaries of these four bioregions are determined by geology, topography and the rainfall that occurs throughout the western region. The greatest weight when defining bioregions has been placed on geology since little variation exists in the topography and rainfall. Overall in Victoria there are twenty-six bioregions covering all of the state.

Since European settlement vast changes have occurred to vegetation communities within the landscape. Land clearance for agricultural activities, hydrological changes with the installation of drains and weed invasion from both introduced plants and environmental weeds have severely altered the way the natural landscape is viewed today.

Where there has been a reserve set aside for conservation such as the Lower Glenelg National Park, the intrinsic value of the natural environment for both flora and fauna is high. However in the east of the region biodiversity is at its lowest, only remnant patches of vegetation like the Ralph Illidge Sanctuary are linked by roadside corridors which allow for minimal fauna transfer.

When you view the maps included (opposite) and compare the pre 1750 extent to the current day it is quite easy to see the amount of vegetation removal that has occurred in the past two centuries. A number of vegetation communities are listed as endangered and vulnerable within the surveyed area, including here within the City of Warrnambool at an area known as 'Granny's Grave' where a vegetation community called Coastal Headland Scrub is located. This community is listed as rare within the West Victorian Comprehensive Regional Assessment. Prior to European Settlement there were approximately 5,500 hectares but only a little over 3,000 hectares remain and this is highly modified due to weed invasion and development.

Within this vegetation type there are a number of significant species that occur only within this vegetation community and only within the city of Warrnambool. One such plant is *Correa reflexa* 'Granny's Grave'. There are less than a hundred of these plants left and they are being pressured by

competition from environmental weeds and human disturbance. The Coastal Headland Scrub vegetation community would have been widespread through the dune system prior to disturbance by grazing stock and this has had a detrimental effect on this community. Re-vegetation along suitable soil types and the removal of weed pressure will help in the preservation of this valuable plant community.

Other vegetation communities are under threat from land use practices, industry expansion, and housing development. One of these communities is unfortunately named Swamp Scrub; this community is dominated by *Leptospermum lanigerum* (Woolly Tea-tree) and occurs within all of the bioregions in our survey area. Prior to 1750 there were approximately 53,500 hectares with currently only 2,400 hectares remaining (or 5%). The name 'scrub' conjures up the image of unwanted type plants, however this community is home to three nationally listed threatened orchid species, one state listed mammal species and two fish species that have national listing and 1 fish that is state listed.

The major threat prevailing upon this vegetation community is altered hydrology. When 'blasting' took place to drain 3,000 acres of 'worthless waste' to form southwest Victoria's Korongah Drain a large component of Woolly Tea-tree would have been lost due to the altered hydrology and land clearance. Today this vegetation community is still suffering from clearance either through grazing stock or when the hydrological balance is disturbed by drainage. This drainage can be caused by agricultural means or by timber plantation development.

Within the Bridgewater and Glenelg Plain Bioregions there has been in recent history large scale clearance of native vegetation and its replacement by *Pinus radiata* or Pine trees. Where the plantations come into contact with spring aquifers that feed wetlands and their Swamp Scrub vegetation community, the pines can reduce the outflow of water and the vegetation communities are severally affected. When this occurs, weeds invade and the quality of the community is reduced.

What is left of this vegetation type is restricted to wetter areas that occur along the Curdies, Fitzroy and Surrey Rivers and the Brucknell Creek as well as the Long Swamp area within the Discovery Bay Coastal Park.

As written by Dr John Sherwood, "Basalts weather to produce the clay-rich soils fundamental to the region's agricultural wealth." This basalt soil type is known as the Victorian Volcanic Plain Bioregion. This bioregion is represented within our survey area at Portland, Port Fairy and Warrnambool and throughout all of our zones. Within the State of Victoria the Victorian Volcanic Plain Bioregion occurs from Melbourne westward to Portland. Of the total amount of Volcanic plain grasslands that existed pre 1750 there is less than 0.5% left today.

Biodiversity 'Hotspots' - A World First.

The Federal Government has recognised that:

The Victorian Volcanic Plain is a flat to undulating area stretching west from Melbourne to Portland. It is characterised by fertile volcanic soils that

were originally covered with open grasslands, grassy woodlands, large shallow lakes and wetlands. After European settlement most of the plains were converted to pasture, and the region is still dominated by grazing with extensive agricultural crops and plantation forestry.

This hotspot includes 65 species listed as nationally threatened with 173 threatened in all of Victoria. Nine lakes are recognised as internationally important under the Ramsar Convention on Wetlands and 26 lakes listed in the Directory of Important Wetlands in Australia. Coastal Saltmarsh provides important over-wintering habitat for the endangered Orange-bellied Parrot. The remaining areas of native vegetation, although fragmented, are crucial for the continued existence of endemic orchid species.

The degradation of vegetation and habitat, predation by foxes and cats, changing fire patterns, weed invasion and the total grazing pressure of domestic stock, kangaroos and feral rabbits all pose major threats to this region's biodiversity.

(Fact Sheet Minister for the Environment and Heritage, Dr D Kemp 3 October 2003)

Within our survey area the remaining basalt plains grassland communities predominantly occur along roadsides, from where they are under threat from grazing, weed invasion and road-works. Agreements with Local and State and Federal Government bodies are critical for the long-term survival of this community. Developing strategic directions and management practices for the preservation and expansion of this vegetation community are the responsibility of us all.

We have but touched on a small number of vegetation classes within our survey area, as seen in the two maps on page 56, of the 26 vegetation communities that existed pre 1750 only 15 remain today, and the size of each community has diminished considerably.

We have the opportunity as a society to protect what we have for our children. We have been privileged in the south west to have had a number of environmentalists and field naturalists who contributed to the natural reserve system, by assisting in the creation of the Lower Glenelg National Park, Mt Richmond National Park, Discovery Bay Coastal Park and the Narrawong State Forest and Flora Reserve. Add to these the Bay of Islands Coastal Park and Port Campbell National Park, as well as the privately owned Kurri Kurri Co-Operative Society Reserve and Trust for Nature owned, Ralph Illidge Sanctuary and Pallisters Reserves. Without these reserves and other smaller reserves imagine what our vegetation maps would look like. And to think that our survey area as researched by Kevin Sparrow, "contains 935 species of which 118 or 12% have some sort of threatened classification", without these reserves in place, this number of vegetation classes would be very much reduced.

Tower Hill Reserve

Kevin Sparrow

An Extinct Volcano

Tower Hill is a volcanic formation believed to have erupted about 32,000 years ago. Its formation is known as a nested caldera and it is the only example of its type in Victoria. During formation, molten lava pushed its way up through the earth's crust and encountered a layer of water-bearing rock. Violent explosions followed creating a shallow crater which later filled with water to form a lake. Further eruptions occurred in the centre of this crater, creating the islands and cone shaped hills.

Victoria's first National Park

Grazing, cropping, quarrying and rubbish dumping compromised the park, and by the 1930's the hills and islands were bare and little wildlife remained. In the late 1950's the first stages of revegetation began. The area was declared a State Game Reserve in 1961.

The revegetation has provided a new habitat for many animals such as koalas, emus, kangaroos, echidnas and possums, and many birds.

Today the Visitor Centre is managed by the Worn Gundidj Aboriginal Co-Operative and visitors are able to view their cultural displays and enjoy any of a number of short walks.

A famous painting depicting the vegetation of Tower Hill by Eugene von Guerard commissioned in 1855 is on display in the Warrnambool Art Gallery.

Reference: *Tower Hill Reserve Visitor Guide* Parks Victoria - November 2006.

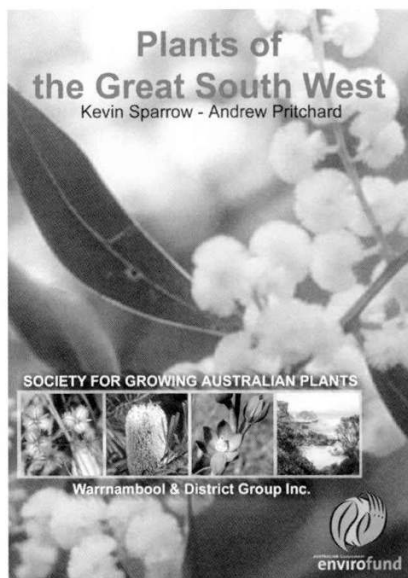
Plants of the Great South West is published by Warrnambool & District SGAP and provides comprehensive information on indigenous plants found right across South West Victoria.

At the time of printing of this journal, the book can be purchased for \$15 plus \$3 postage by writing to:

Editor, 35 Swan Street, Warrnambool, VIC 3280

or,
by downloading an order form at:
www.warrnambool.org/sgap

For more information contact Kevin Sparrow at sparrows1@hotmail.net.au



Creating a Garden of Indigenous Plants

Lou Hollis

Warrnambool & District SGAP member

As I read the articles written by people across Australia, I am constantly amazed at the resilience of our native flora. Our garden is on the north rim of Tower Hill, directly across the road from Tower Hill State Game Reserve, (an extinct volcano) and with a view to Antarctica, if one could see that far. We get thumped by the south westerly gales, and what grows at our place has to be tough.

We have such wonderful drainage that watering, if we did so, would be all-consuming both in time and \$\$\$\$. With this in mind, we planted the southern part of our garden with indigenous plants which cope with excellent drainage and salty gales, such as *Allocasuarina verticillata*, *Acacia pycnantha*, *A. myrtifolia*, *A. stricta*, *A. paradoxa*, *A. verticillata*, *Correa reflexa*, *C. alba*, *Melaleuca lanceolata*, *M. squarrosa*, *Poa labillardierei*, *Solanum laciniatum* (photo p. 53), *Carex appressa*, *Banksia marginata*, *B. integrifolia*, *Indigofera australis*, *Bursaria spinosa*, *Leptospermum continentale*, *Myoporum parviflorum*, Warragul greens, *Acaena novaehollandiae*, etc.

Eucalyptus viminalis forms a stand at the northern boundary (down the hill a bit, too), interspersed with various subspecies of *E. globulus* and a second-hand *Cordyline australis*. Interestingly, the Manna gums (local species) haven't noticed the low rainfall, and are quite devoid of borers and other critters, whilst all of the Blue gums (introduced) have had at least their fair share of such visitors, with some totally succumbing to them. Amongst all of this is a *Rhododendron lochiaie*, which flowered last spring and around which has been placed a wire cage to prevent possums dining on it.

We have frequent over-nighting of a particular Swamp wallaby, which has become very tame. It even stopped to sniff Mick and the cat (on her lead) at close quarters, as it wandered through the garden one afternoon. Swamp wallabies belong to a different genus to other macropods, as they are browsers and don't eat grass. A bit of a challenge for us.

Our lawn consists of *Lippia nodiflora* and *Dichondra repens*, through which coriander, daffodils and thyme pop up. We don't mow, nor does our 'Swampy'

Editor's Note: *Cordyline australis* is commonly known as the New Zealand Cabbage Tree. The genus consists of approximately nineteen species distributed in Southeast Asia, Australia, New Zealand, Norfolk Island, Mauritius and the Reunion Islands and South America. There are approximately eight Australian species with the majority occurring in Queensland. The most widespread and common tropical species is *Cordyline petiolaris*, growing in rainforest and wet eucalypt forest from south-eastern Queensland to north-eastern NSW. There are approximately six New Zealand species including *Cordyline australis*, a species that grows to a commonly reported height of fifteen metres.

friend, who has assisted with the demise of Waratah 'Braidwood Brilliant' and a couple of camellias. He/she is very welcome to the quantity of parsley that is consumed, and many other shrubs that seem to be nibbled a little bit. In drought times, we can't really afford to be precious.

Mentha australis appeared on our respectably small list of plants which keeled over in the drought, but is now called Lazarus, unlike the common mint and apple mint which have been lost.

On looking at the rather small list of what we have lost, some were at the end of their life span, and others came from soils vastly different to the shallow topsoil over volcanic ash ('tuff' - pronounced 'toof'). The tuff goes rock-hard when very dry, and the roots of plants that come from sandy soils with a dry climate don't seem to cope with it, even though the label often says that they are drought tolerant.

A beautiful *Correa reflexa* form from sandy Mt Clay, not far from us, gave up the ghost whilst the C. 'Dusky Bells' next to it is thriving. Also thriving are the blue-tongue lizards, common skinks, blue wrens and New Holland honeyeaters, all which are breeding in our garden, and which keep various pests at manageable levels. Echidnas leave trenches behind them as they devour ants, but they are much nicer than the bull-ants that they eat.

A neighbour keeps replacing 'like with like' plants as they turn their toes up in answer to his placing them in the path of the salty gales. We have a rather more cavalier attitude, and replace with something different, after first finding out what might have led to a particular plant's demise. After all, we prefer not to be disappointed.

The man who delivers truck-loads of mulch knows us well after about 20 truckloads, and more to come. As the carbon content of our soil increases (after over 100 years of being tilled, prior to our ownership), so does the moisture-holding capacity.

My answer to anyone who suggests that he/she should purchase topsoil to improve their garden is that the pH is probably different to their soil, and seeds of weeds that they don't currently have will probably be in it. Mulch is cheaper, easier to move around, and improves your soils moisture-holding capacity, with a much lower chance of adding more weed species to your garden. Oh, and if you water, you don't need to water as much or as often.

Gardener's Tip:
Don't bring in
topsoil – use
mulch instead

We describe our garden as semi-organised chaos, though one friend says that it is a 'gorgeous wild garden, with flowers at any time of the year'.

Growing *Xanthorrhoea* (Grass Trees)

Lorraine Deppeler*

Proprietor, The Bush-House Nursery

A mature *Xanthorrhoea australis* with its black trunk made up of old leaf bases held together by resin, and its masses of grass-like leaves on top makes a stunning specimen. The tall spikes covered in masses of white flowers, are followed by black seeds which make these ancient plants look even more spectacular. These stunning plants have been known to live for hundreds of years, but have a reputation for being very slow growing. It can take at least 10 years for the trunk to start forming. After this, a growth rate of about 1–2 cm per year is normal for the trunk. The flower stalk grows much faster, sometimes 2–3 cm per day to a height of 2–3 m or more.

I have been experimenting and growing *Xanthorrhoea* sp. from seed for many years. This interest began after seeing Grass Trees being taken from the bush to be planted in gardens, sometimes with very poor results. This made me realise just how many of these ancient and magnificent plants were being lost forever. I determined to look into growing these plants from seed, even though I had been told it would be a waste of time and not a good commercial venture. Fifteen years later I am still experimenting, but consider I have learnt enough to be able to pass on a little knowledge to other growers.

My biggest learning curve began when I realised that I could grow from seed quite large specimens (minus the trunk) to flowering stage in 4–5 years. My technique involves sowing the seed in trays, and pricking out into deep native tubes as soon as the first shoot is about 2 cm high. As soon as the roots begin to show at the bottom of the tube (even though there are usually only 2 or 3 small leaves) it is planted out in the ground.

It is very important not to disturb or damage the roots when removing the plant from the pot and planting it in the ground. Observation of the roots will reveal 2 types. The first noticed is a large, thick white or brown almost succulent type of root. The other is fibrous, dark and much smaller. Damage to the larger root either at pricking out, or at planting may cause root fungal infection and lead to death of the plant. Therefore it is important to remove the plant from the pot very carefully without disturbing the roots. If necessary, the pot may need to be cut or broken apart so that the plant is removed cleanly and placed immediately into the previously prepared ground.

A sunny to partly shaded position in well drained soil is required. After planting out, I protect the plant with a plastic tree guard and then leave it undisturbed apart from the occasional water when necessary. After 12 months the plant does not require any further supplementary water. For the first 12 to 18 months after planting, there appears to be very little growth, but if you were to dig the plant up at this stage you would notice a large increase in the size of the root system. About 18 months to 2 years after planting out, the

* Should you wish to contact Lorraine Deppeler for further information her E-mail address as at the time of printing is: bushhousenursery@yahoo.com.au

leaves begin to grow and multiply much faster and at 4-5 years old a flower stalk will begin to grow.

Currently, I am trialling deep peat pots as an alternative to native tubes. They have the advantage of being able to plant directly into the ground without having to remove the plant from the pot, thus reducing the possibility of root damage.

I have a number of *Xanthorrhoea australis* and *Xanthorrhoea quadrangulata* that were planted out as 1 year old seedlings and have formed substantial tussocks about 1m wide and up to 1m high by the 4th year. Flower stalks begin to grow in the 5th year and my plants have since flowered either every year or occasionally second yearly since the first flower stalk appeared. This season, some 7-year-old plants that have flowered each year since their 5th year are now producing 2 or even 3 flower stalks per plant.

It was all very well for me to plant out a tube with only 2 or 3 small leaves and know it would grow into a large Grass Tree, but it was difficult to convince my customers that the same would happen for them. So, I decided to try growing them into larger plants in very large pots.

With young plants in tubes, it is very important not to obstruct the growth of the roots in any way. If this occurs, growth of the plant is delayed. Thus, potting up of the plant is of utmost importance before the roots touch the bottom of the tube and become entangled in the drainage holes. If this should occur, damage to the roots is almost inevitable when removing the plant from the pot, resulting in a likely fungal infection or rotting of the roots and probably the demise of the plant.

Gardener's Tip:
Do not obstruct
the growth of
Grass Tree
roots in any
way

When potting on, it is important to choose a large, deep container to allow the large developing roots as much space as possible. I also make certain that the roots are not disturbed in any way when potting into a larger pot. A low-phosphorus, 9-month slow-release fertiliser is incorporated into the potting mix. A good-sized plant in a 300 mm pot can be achieved in 4-5 years. If they are planted into the ground at this stage with no root disturbance or damage, they are likely to come into flower in the next 12 to 18 months.



Growing *Xanthorrhoea*

Left: *Xanthorrhoea australis* in full flower 7 years after planting out as a 2 year-old seedling



Above: *Xanthorrhoea quadrangulata* 5 years after planting out as a 2 year-old seedling

Left: Same plant as above (reverse angle) 7 years after planting out

All photos: L Deppeler



Above: *Xanthorrhoea australis* of considerable age, in the Southwest
Photo: K Sparrow

Left: *Xanthorrhoea quadrangulata* sending up 3 flower spikes
Photo: L Deppeler

Right: Trials are being conducted using peat pots that can be planted straight into the ground.

Photo: L Deppeler



Left: Plants in large tubs 30 cm wide x 28 cm deep are ready for sale after having been potted up from the 25 cm deep square pots

Photo: L Deppeler



Left: Healthy root system ready for planting out or potting on into a larger tub

Right: From tubes, plants are planted into 25 cm deep square pots at approximately 2–3 years of age. Once roots fill these pots, they are potted into large tubs

All photos: L Deppeler



Example of growth rate of seedlings to two weeks after germination





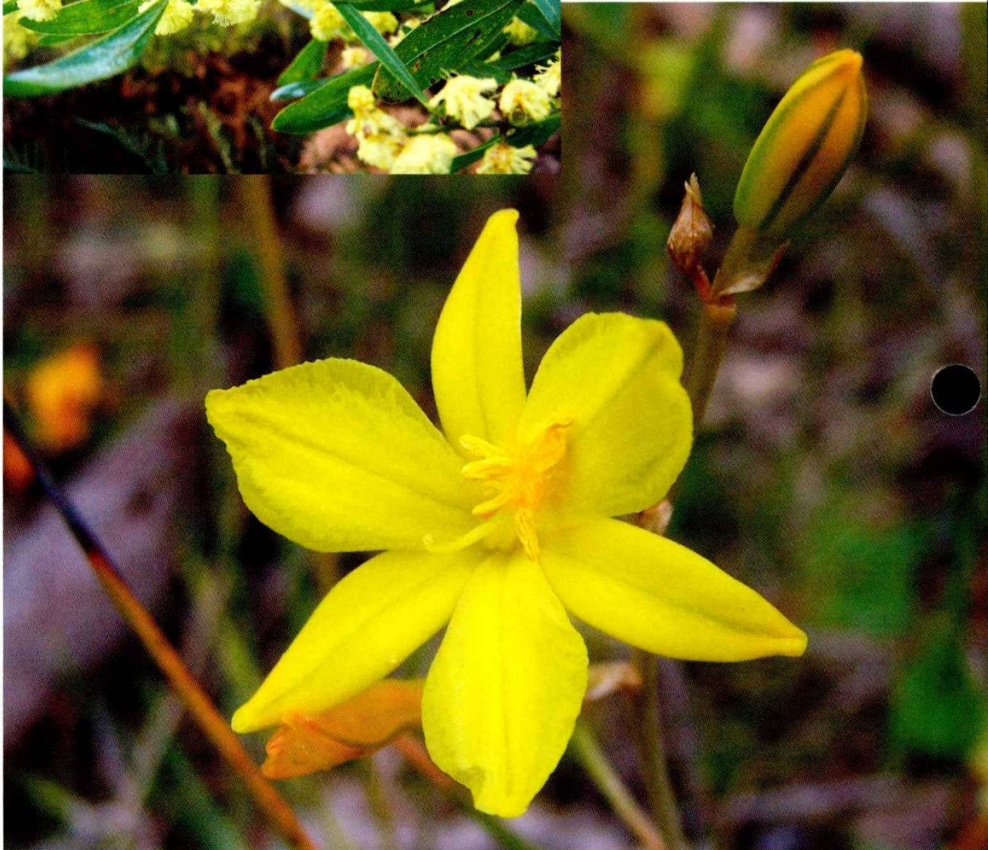
Creating a Garden of Indigenous Plants

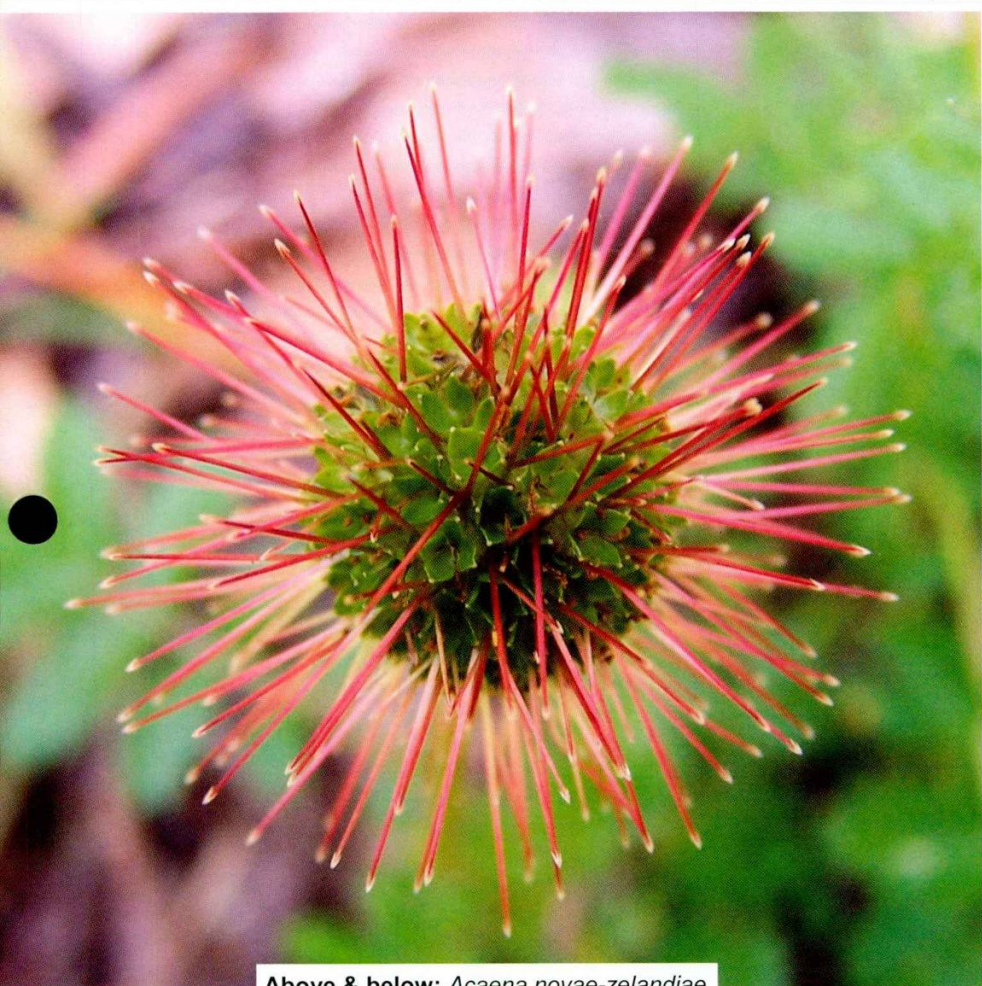
Above right: *Carex appressa*

Above left & below: *Bulbine bulbosa*

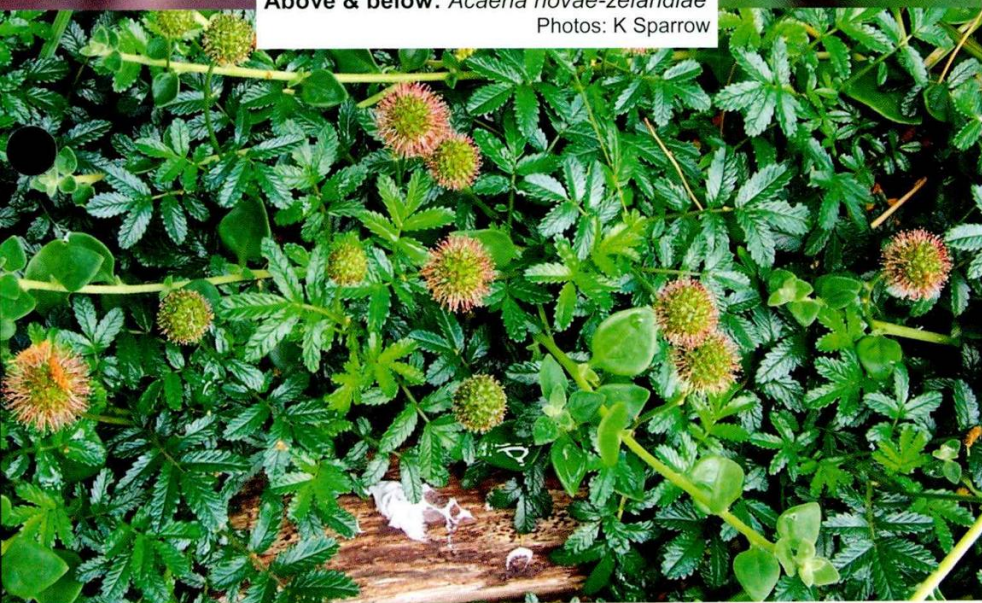
Left: *Acacia stricta*

All photos: K Sparrow





Above & below: *Acaena novae-zelandiae*
Photos: K Sparrow





Plants of Southwest Victoria

Above: *Brunonia australis* (Blue Pincushion)

Left: *Viminaria juncea* (Golden Spray)

Below: *Astroloma conostephioides* (Flame Heath)

All photos: K Sparrow





Above: *Goodenia ovata*
(Hop Goodenia)

Above right: *Tetratheca ciliata*
(Pink Bells)

Right: *Brachyscome parvula*
(Coast Daisy)

Below: *Chrysocephalum apiculatum*
(Common Everlasting)

All photos: K Sparrow

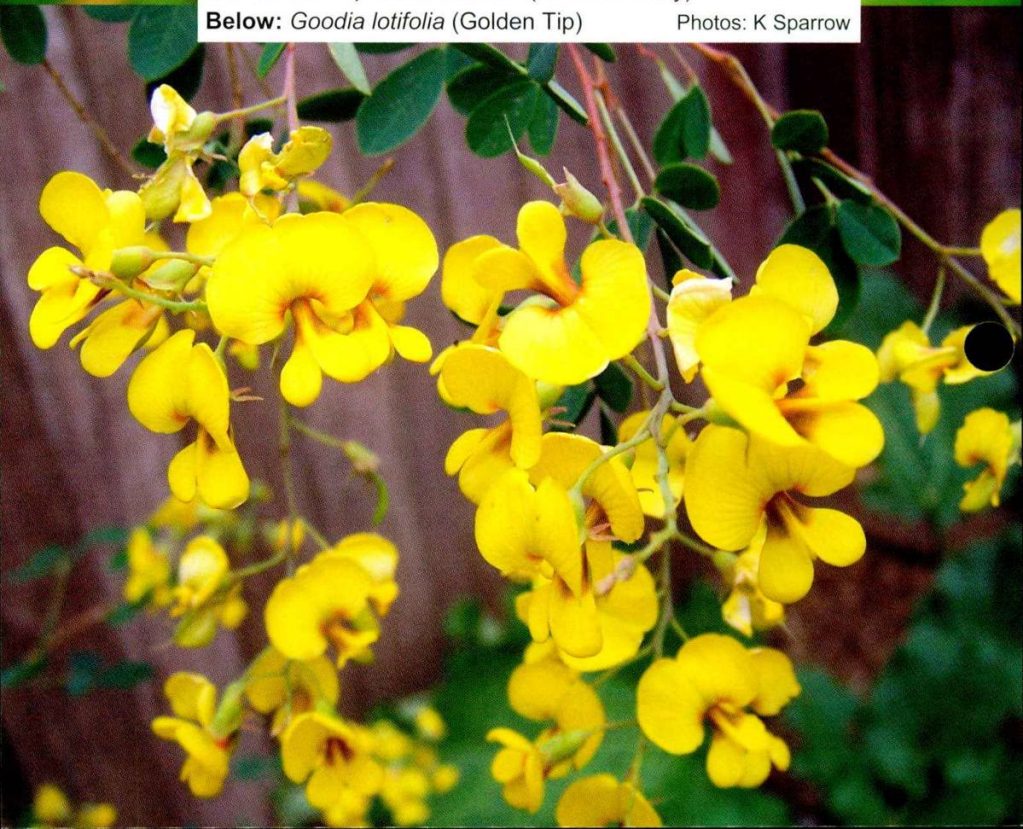


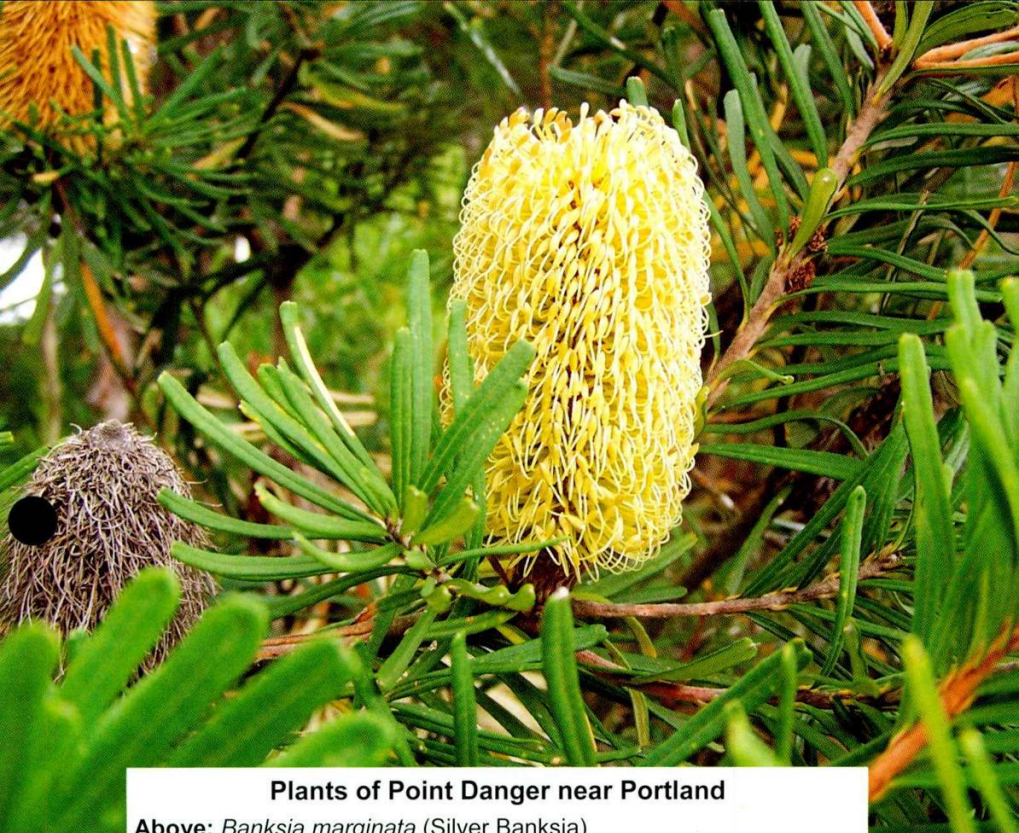


Above: *Arthropodium strictum* (Chocolate Lily)

Below: *Goodia lotifolia* (Golden Tip)

Photos: K Sparrow





Plants of Point Danger near Portland

Above: *Banksia marginata* (Silver Banksia)

Both photos: K Sparrow

Below: *Eucalyptus baxteri* (Brown Stringybark)





Left: *Epacris impressa*
(Common Heath)

All photos: K Sparrow

Below: *Astroloma humifusum*
(Cranberry Heath)



Below: *Correa alba* var.
pannosa (White Correa)



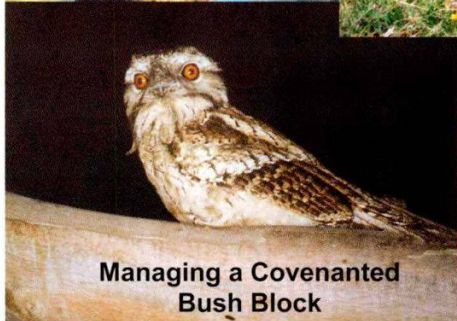


Above: *Olearia glutinosa* (Sticky Daisy-bush)

Photo: K Sparrow

Below: Dense *Acacia longifolia* ssp. *sophorae* aligns both sides of the road at Point Danger, Portland. This area was once characterised by diverse coastal heathlands





Managing a Covenanted Bush Block

Top left: White-throated Tree-creeper

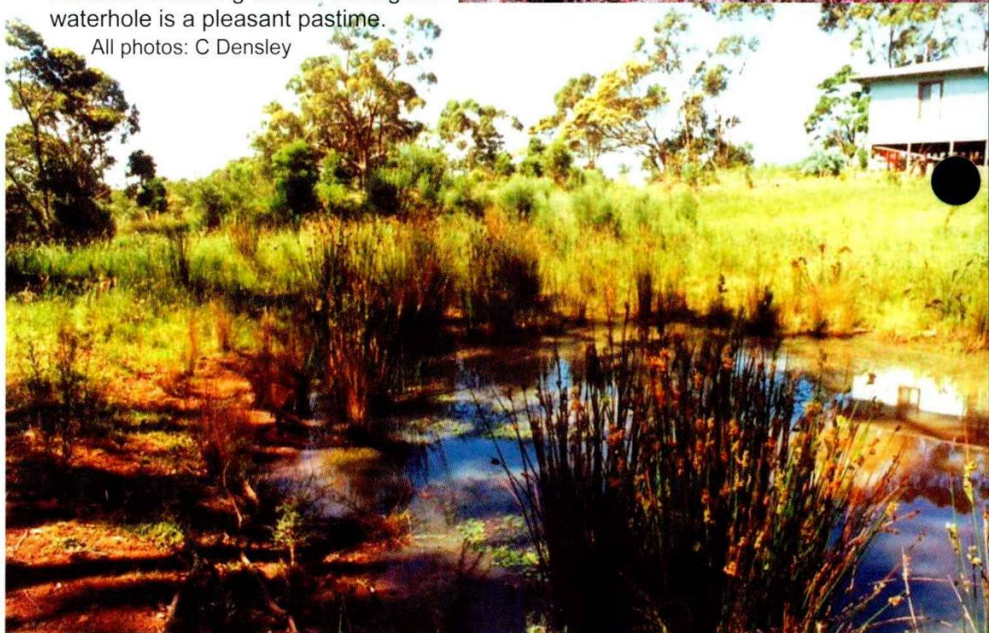
Top Right: Prolific flowering of *Hypoxis pumilis* (Yellow Star) growing in an open woodland area.

Centre Left: Tawny Frogmouth

Centre right: *Tetratheca ciliata*

Bottom: Watching wildlife visiting the waterhole is a pleasant pastime.

All photos: C Densley





Above left: *Eucalyptus ovata* (Swamp Gum)

Above right: *Gleichenia microphylla* (Scrambling Coral-fern)

Below left: *Correa reflexa*

Below centre: *Boronia pilosa* (Hairy Boronia)

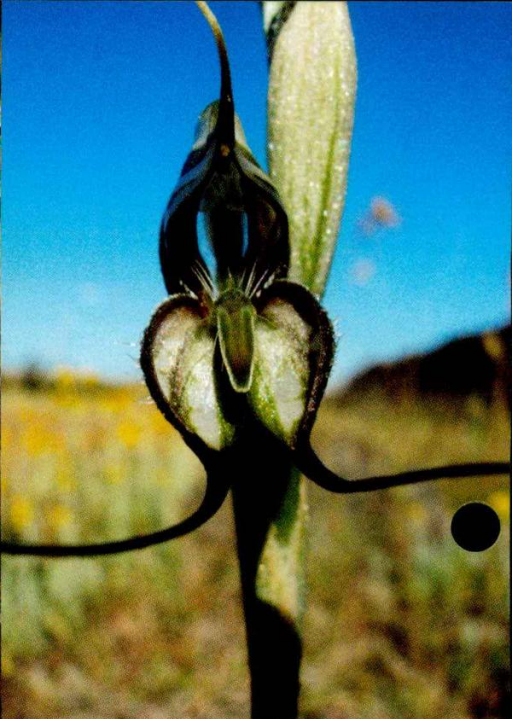
Below right: *Thelymitra aristata* (Great Sun-orchid)

All photos: C Densley





Glossodia major (Wax-lip Orchid)



Pterostylis basaltica (Basalt Greenhood)

Caladenia species (Spider-orchid)

Threatened Flora Recovery in Southwest Victoria

All photos both pages: K Vlcek

Paracaleana disjuncta (Duck-orchid)







Above Left: The endemic *Prasophyllum forsteri* (Shelford Leek Orchid) occurs on a single roadside

Above Right: Translocation of *Caladenia hastata*

All photos: K Vlcek



Below Left: *Caladenia hastata* (Mellblom's Spider-orchid)

Below Right: *Caladenia calcicola* (Limestone Spider-orchid)



Threatened Flora Recovery in Southwest Victoria

- An overview _____ Kate Vlcek*

Threatened Species Project Officer with the Department of Sustainability and Environment (DSE) Victoria, based in Warrnambool

Introduction

Roughly triangular in shape, the area covered by the Department's south-western region follows the coastline from Geelong across to Nelson (near the South Australian border), extending inland to the Horsham/Little Desert area incorporating the Great Otway National Park (NP), Port Campbell NP, Grampians NP and Lower Glenelg NP among others. Such a large area encompasses a diverse range of species, ecosystems, landscapes and land uses. The objectives of Threatened Species Recovery are to minimise the probability of extinction and increase the probability of self-sustaining populations. This is achieved by increasing plant/population numbers and minimising both current and potential threats through effective management.

Project Background

The Threatened Flora Recovery Project aims to conserve and promote the region's botanical biodiversity, this is primarily achieved via the protection of threatened species and their associated habitats. The project is federally funded by the Natural Heritage Trust and is managed and implemented by D.S.E. in partnership with a variety of organisations and community groups. Partners include Parks Victoria, National Herbarium Victoria, Royal Botanic Gardens (RBG) Melbourne, Field Naturalists Club of Victoria, Country Fire Authority (CFA), Australasian Native Orchid Society (ANOS) Victoria, Universities, TAFEs and other educational institutions, International Student Volunteers (ISV) Program, Catchment Management Authorities, local Shires, private landholders, Landcare Groups, 'Friends of' groups and other native plant enthusiasts.

All Nationally Threatened Species have a corresponding Recovery Plan written by scientists at the Arthur Rylah Institute (DSE) with input from field staff. The Plan addresses the specific requirements of the taxon, outlines and addresses threats to the species and provides a list of recommended actions to be undertaken. Actions are prioritised, aimed at halting decline and are often of an ongoing nature. A Recovery Team is established for each species which may function at a regional or state-wide level, represents a network of relevant groups and includes a Project Officer. A co-ordinated interstate approach focusing on the exchange of knowledge is also applied and may involve workshops.

There is always more work to be done than time and funding allows. These gaps are often filled by community groups, by our volunteers, who

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make a significant contribution to rare plant conservation by assisting with and conducting surveys, collecting data, offering expert horticultural and botanical knowledge and skills and providing general on-ground labour such as fencing.

The Plants

A high proportion of the region's threatened plant species are endemic to the area - this is particularly true for the flora of the Grampians Ranges which contains 26 species found nowhere else (Wettenhall, 2006). Examples of threatened endemics include; Grampians Rice-flower (*Pimelea pagophila*) and Grampians Pincushion Lily (*Borya mirabilis*).

The southwest of the state also contains many remnants of Western Basalt Plains Grassland (itself a threatened community), a native grassland usually dominated by *Themeda* occurring on the rich basalt soils of the volcanic plain. This community is host to it's own suite of threatened taxa; the endemics Basalt Greenhood (*Pterostylis basaltica*) and Shelford Leek Orchid (*Prasophyllum forsteri*), Matted Flax Lily (*Dianella amoena*) and the Hoary Sunray (*Leucochrysum albicans* subsp. *albicans* var. *tricolour*) among others.

Approximately half of all Victorian orchids are threatened (Backhouse & Jeanes, 2006). The state-wide Threatened Orchid Recovery Team (TORT) is the network which specifically addresses this situation. Orchids are often highly specialised and may display complex relationships with pollinators, mycorrhizal fungi or both.

Orchids are used as flagship species to promote wider conservation values. Research aimed at filling vital information gaps is an essential component of orchid conservation and may target subjects such as; habitat requirements, population dynamics, ex-situ invitro propagation techniques, mycorrhizal fungal isolation and cultivation, ex-situ cultivation, fire ecology, translocation, reintroduction and pollinator identification.

Threats and Threatening Processes

Identifying, addressing and reducing threats is obviously the key to the Projects objectives. Threats may be site or species specific and are often related to habitat degradation. Typical threats include; grazing (stock and both native and introduced herbivores), weed invasion, low recruitment levels, inappropriate fire regimes, roadside-related issues such as earthworks and maintenance, trampling, illegal collection, site disturbance and lack of natural pollination. Threat abatement actions are supported by underpinning legislative protection provided by the Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 and at a state-wide level by the Flora and Fauna Guarantee (FFG) Act 1988. Community education also plays a role in raising public awareness of the impact these threatening processes have on fragile plant populations.

Recovery Actions

Recovery actions vary depending on the species/site and generally address threats outlined in Recovery plans. Typical management actions might include; seed collection, detailed population monitoring (tracking and measuring individuals), hand pollination, research, reviewing and clarifying taxonomy, surveying suitable habitat for further plants/populations, developing and distributing educational material (such as Threatened Species Fact

Sheets), managing environmental weeds, incorporating species into local/regional planning schemes, controlling introduced animals, protecting populations using fencing or cages, collecting and analysing data, liaising with government agencies, restoring habitat, propagation, translocation, reintroduction, installing signage and maintaining site confidentiality. Ex-situ collections are established and maintained as a safeguard and the project also supplies material for the international Millennium Seed Bank Project managed by RBG Kew.

Some of the actions we'll be undertaking in the region over the next year are; reintroducing ex-situ grown Yellow-lip (*Caladenia xanthochila*) and Candy (*Caladenia versicolor*) Spider-orchids, *Prasophyllum* mycorrhizal fungi research, pollinator research (incorporating the use of a digital recording device fitted with infrared detection technology), continuation of surveys for Square Raspwort (*Haloragis exalata* subsp. *exalata*) and woody weed removal for *Caladenia hastata* (Mellblom's Spider-orchid) near Portland.

Recent Highlights

- DSE and partners were announced the winners of the 2006 Banksia Environmental Awards in the Land & Biodiversity Category for the Threatened orchid recovery program.
- Post-fire orchid surveys in the Grampians area conducted by DSE with assistance from ANOS Vic members, located new plants and populations of threatened species.
- Searches in the southwest for Square Raspwort confirmed its continual presence in Victoria, where it had not been recorded since the early 1980's (Carter, 2005).
- Successful translocation of Mellblom's Spider-orchid, in conjunction with ISV.
- Pollinators investigated for 4 species of threatened Spider-orchid.

For more information please contact Andrew Pritchard, Threatened Species Project Officer (03) 5561 9965

References

1. Backhouse, G and Jeanes J 2006, *Wild Orchids of Victoria Australia*, Aquatic Photographics, Seaford, Australia
2. Carter, O 2005, "Draft Recovery Plan for *Haloragis exalata* subsp. *exalata* (Square Raspwort) in Victoria and New South Wales 2006 – 2010", Department of Sustainability and Environment, Heidelberg, Victoria
3. Wettenhall, G 2006, *Gariwerd: Reflecting on the Grampians*, Em Press, Ballarat, Australia

Managing a Covenanted Bush Block

Cherree Densley

APS Victoria Secretary & Warrnambool & District SGAP member

I purchased with my superannuation 10 years ago, 77 hectares of bushland on the western slopes of Mt Clay, an extinct volcano about 10km from Portland in the far SW of Victoria. The block is 45 minutes travelling from where I live so I do try to get there once a week and stay overnight. Five years ago I put a small relocatable house on the block with water, a septic tank, gas cooking and refrigeration and wood heating. The vegetation is solid bush made up of 5 different types of forest - 50% is herb rich foothills forest, 20% is lowland forest, 10% damp heathy woodland, 9% is heathy woodland on white sand and 11% is grassy woodland.

The purchasing and studying of this wonderful bushland is definitely one of the best things I have done in my life and the overall aim now is to compile a complete biodiversity database. However, I now know that that aim is very presumptuous - complete biodiversity is complex to say the least and covers the seen and unseen. To date, I have recorded nearly 300 different species of native plants (including 9 acacias, 6 eucalyptus, 25 different orchids) on a data base, 98 birds, 15 mammals, 6 reptiles, 5 bats, 7 or 8 frogs and I am working on the fungi and ants. The last few dry years has called a halt to the studying of fungi although the rains this last autumn did result in lots of fungi again. Every time I see a different insect, I photograph it and try to get a name and record on which plant on which it was feeding - a whole fascinating study in itself and let me tell you -photographing up close angry bulldog ants is a whole new experience.

The block is undulating with old rocky lava flows forming the top ridges (the grassy woodland) and these areas are easiest to explore and species rich with orchids, bulbs, grasses, lomandras, daisies and smaller herbs. The gullies cut down steeply in some areas and the vegetation along the lowest areas is dominated by ferns. The lowland forest can be swampy and thickly vegetated with sedges, gahnia and dense shrubbery.

The block has not been burnt, to the best of local knowledge, for about 30 years and the trees are rich in habitat hollows for possums, gliders, bats, wood ducks, sacred kingfishers, parrots, owls, kookaburras, cockatoos and galahs and other hollow dwelling creatures. Visits include a few hours each night spotlighting when the bush comes alive with the sights and sounds of the owls, bats, gliders, koalas, frogs and others. One has to be quick to pick up the flights of the sugar gliders - they are very agile and elusive but fearless if you do manage to get up close to them. It helps to know that they seem to have regular flight patterns as they make the rounds of their favourite food trees - the black wattles.

When I had a half-hectare of the block cleared to put in the house, a small waterhole was dug in full view from the back deck. Because it is the only water for quite a distance (it has held water for the 5 years it has been dug, despite the drought), the kangaroos and wallabies quickly found it causing the

edges to erode. I collected and propagated seed of sedges, grasses, gahnia and other damp loving plants and put them around the rim of the waterhole to slow down the erosion. I also cut and dragged branches of the Prickly Teatree (*Leptospermum continentale*) around the edges of the water - the seeds have germinated well and the roots of these now prevent the clay soil from slipping into the water. The waterhole is a constantly busy area for the 26 'always seen' birds, the mammals, the occasional echidna, snakes and anything else which needs a drink. A whole morning can easily go by just watching the wildlife that is attracted to the water. For example up to 30 Crimson rosellas at a time in full glorious colour can drink and splash at their morning ablutions before flying off looking like drowned rats to preen and dry themselves on the nearby tree branches.

I have made a study of what is flowering and fruiting as the seasons change and always find something of interest in my weekly walks. There are some outstanding flowering plants now recorded and the white sandy heathland is perhaps the most floriferous with epacris, xanthorrhoea, acacias, melaleucas, boronias, daisies and orchids well represented.

There are problems- the alarming spread of *Pittosporum undulatum* - not indigenous to this area - but a native of the eastern side of Victoria needs constant work to eradicate. I can pull, cut and poison up to 500 in a few hours work and barely scratch the surface. Given that the understory is made up of mostly prickly shrubs - Prickly Teatree as mentioned, Sweet Bursaria (*Bursaria spinosa*), Prickly Current-bush (*Coprosma quadrifida*), the ever present Saw Sedge (*Gahnia sieberiana*), it can all make for lots of very uncomfortable work to even get to the *Pittosporum* plants. Also one must take into account the other things which make this work difficult - the wet months are dominated by leeches and the spring, summer and autumn by snakes - well, you get the picture. But it is all well worthwhile to try and keep this bushland pure.

I work hard at keeping good relations with my neighbours and I also have one and a half sides of the block adjacent to the Narrawong State Forest.

Getting around is not easy - I decided long ago that tracks only allowed weed and other alien species to get around more easily so I follow the kangaroo tracks. This can be quite challenging and I always carry a compass, phone and GPS to help me find where I am. Kangaroos can jump sideways, crawl under very prickly undergrowth, leap over fallen logs too wide for me and of course are much more agile than me so following the tracks has its drawbacks. However, it is all a lovely challenge not to get too lost. It can also be exhausting slogging through dense bushland and trying not to go around in circles!

Soon after I purchased the block I took out a covenant with Trust for Nature. This means that the flora and fauna on my bush block are permanently protected- a wonderful thing.

Range expansion of *Acacia* *longifolia* ssp. *sophorae*

The change in distribution of *A. longifolia* in SW Victoria _____ Jenny Emeny*
PhD Student, Deakin University, Warrnambool Campus

When we think of the impacts of European settlement on plant communities, we typically think of the drastic losses in plant population numbers. However, in some cases, an outcome of European settlement has been an increase in the range and abundance of some opportunistic native plant species. Whilst dramatic fluctuations in the relative abundance of a species can be a normal response to resource fluctuations, in the fragmented landscape of south-eastern Australia it can result in significant impacts on local plant diversity.

A large scale example of this can be found in the Glenelg Plain bioregion of southwest Victoria, where the coastal species *Acacia longifolia* ssp. *sophorae* has increased in range and abundance. *A. longifolia* ssp. *sophorae* is typically associated with the coastal dune environment, hence the common name 'coast wattle'. Recent encroachment of coast wattle into diverse coastal heath-lands and inland woodlands has resulted in significant impacts on plant diversity and fauna habitat. Anecdotal evidence has long suggested that the range of this species has been expanding; however until now there has been little quantitative evidence.

In 2002 I mapped the current distribution of *A. longifolia* across the region using satellite images (Emeny et al. 2006) (yes, there is enough of it to be seen from space!). It was apparent that *A. longifolia* was now very common in the region, covering an estimated 11 000ha. However, there was yet to be any solid evidence that the species had actually changed in distribution, and if so, what may be responsible for the change.

Research I am currently undertaking has used aerial photographs to show that *A. longifolia* has indeed increased in range and cover, and that this change is most likely associated with human-induced changes in disturbance regimes in the 1960s and 1970s. The following discussion will highlight some of the characteristics of *A. longifolia* occurrence in this region, and describe key outcomes of this recent research.

The species

Acacia longifolia comprises two subspecies, ssp. *longifolia* and ssp. *sophorae*. The two sub-species have at various times been considered separate species i.e. *Acacia sophorae* (Labill.) R.Br. and *Acacia longifolia* (Andrews) Willd. (e.g. Murray et al. 1978), as well as varieties of *A. longifolia* (e.g. Willis 1972). The most recent version of Flora of Victoria (Walsh and

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Entwistle 1999) considers the two sub-species, which will be the taxonomic status adopted in this discussion.

Subspecies *sophorae* typically grows as a dense, rounded shrub, although its form can vary with environmental conditions. It has elliptic phyllodes and produces cylindrical yellow flowers between late July and October, depending on location.

Prior to the mid 1900s, *A. longifolia* ssp. *sophorae* was associated almost exclusively with the coastal dunes of south-eastern Australia. Here it occurs as a dune colonising species following initial establishment by sand binding grasses and small herbs. In the absence of fire and other disturbance, it may be replaced by longer-lived species. In southwest Victoria, these include *Leucopogon parviflorus*, *Melaleuca lanceolata* and finally, open *Allocasuarina* woodland.

From the mid 1900s, there have been increasing reports of *A. longifolia* shifting range in near-coastal areas of Victoria, South Australian and New South Wales. The apparent change in *A. longifolia* distribution in southwest Victoria was one of the first reported cases. Although the causes for these changes are largely unknown, fire suppression practices are often blamed.

The region

The Glenelg Plain bioregion is bounded by the Southern Ocean to the south and South Australian border to the west. This area has recently been identified as a national 'biodiversity hotspot'. This corner of Victoria also represents a 'cross-over' zone of eastern temperate elements and western Mediterranean elements. The result is a high diversity of plant species and elevated levels of endemism. The Lower Glenelg National Park in this region contains more than 600 plant species alone. However, impacts since European settlement have also led to the bioregion being listed on a 'Global 200' conservation priority list.

The dominant vegetation community in the region is heathy woodland. Dune scrubs and woodland are common along the coast. Diverse heathlands also occur in the Lower Glenelg National Park and in isolated coastal pockets near the city of Portland.

Change in *A. longifolia* distribution

A number of field naturalists and local residents have long asserted that *A. longifolia* has increased in range and abundance in the Glenelg Plain bioregion to the detriment of local vegetation communities. However, a lack of quantitative evidence has led to vigorous debate over whether this had actually occurred, and if so, what an appropriate management response should be.

Research I am currently completing has used aerial photography to map the change in *A. longifolia* distribution at seven sites in this region. Results have clearly shown that *A. longifolia* has shifted from its coastal dune habitat into 'non-traditional' heathland, woodland and grassland habitats. This has included a geographic range expansion inland. In addition, net cover of *A. longifolia* has increased by approximately 20% over a 55 year period.

Further investigation of the disturbance histories of these sites has suggested that dramatic changes in disturbance regimes during the 1960s and 1970s probably played a key role in the initial spread of the species. Whilst a reduction in fire frequently is the most common theory for the change in *A. longifolia* distribution, it appears that changes in grazing regimes and other disturbance factors may also be important.

Impacts of *A. longifolia* spread

Encroachment of *A. longifolia* often results in significant structural vegetation change due to the tendency of the species to encroach into vegetation communities with no large shrub layer e.g. open woodland, grassland and heathland.

A number of studies undertaken in coastal heathland near Portland have documented significant impacts on plant diversity and animal habitat as a result of coast wattle encroachment. Researchers Clay and Scheider (2000) used ant diversity as an indicator for broader impacts on fauna habitat, and concluded '...if the changed and depauperate nature of ant communities are indicative of what has happened to other faunal groups... it has serious implications for faunal biodiversity in the coastal heaths that have been, or are being, invaded by coast wattle'. McMahon and colleagues (1994) estimated a loss of 60% of heathland plant diversity after approximately 10 to 15 years since *A. longifolia* encroachment. Mitchell and Wilson (2006) documented a loss in small mammals, which they attributed to the loss of plant diversity relating to *A. longifolia* encroachment. As such, *A. longifolia* has been labelled a 'weed' in many non-traditional habitats of the region.

The broader issue of native species acting as 'weeds' outside traditional habitats

Over the past decade there has been increased reporting by both scientists and plant enthusiasts that a small group of native plant species are behaving as 'weeds' when distributed outside their indigenous range or are increasing in abundance in their native range in response to human-induced changes to environmental conditions. These occurrences appear to be largely concentrated in southern Australia, particularly Victoria. Whilst it is not a pleasant thought to place an Australian native plant in the same category as 'exotic' weeds, it is becoming increasingly recognised that some native plant species can cause impacts on biodiversity as severe as any exotic weed when planted beyond their previous range. The most commonly cited species include *Pittosporum undulatum*, *Leptospermum laevigatum*, *Sollya heterophylla*, *Acacia baileyana* and *Acacia longifolia* (both subspecies). These species are also serious environmental weeds in more than one country outside of Australia.

All of these species now appear on weed lists across different parts of southern Australia. Yet, due to their native status to other parts of Australia, they are still sold and distributed freely. Home gardeners and public land managers need to be conscious that planting these species *outside* of their previous indigenous range may have serious impacts on local flora and fauna if the species subsequently spreads. There are many other suitable alternatives in the wonderful and diverse Australian flora that are less likely to end up as 'garden escapees'.

Continued on page 91



Above: A dense shrubland of *Acacia longifolia* ssp. *sophorae* on what was once open limestone woodland

All photos: J Emery



Above: *Acacia longifolia* ssp. *sophorae* in flower



Above: Very little grows at ground level under the dense *Acacia* shrublands

Correa 'Portland Belle'

— lost and re-found and now given a name! _____ Cherree Densley

About five years ago, Andrew Pritchard of Warrnambool located and took cuttings of a superbly different correa near Deans Heath Walk in the heath-land behind the Alcoa Smelter at Portland, Victoria. He found it growing between heaps of wonderful *Correa reflexa* var. *speciosa* and *Correa alba* var. *alba*. He gave many of our SGAP Warrnambool and District members plants from those cuttings. It is such a distinctive flower with a carmine red split bell with green tips and a white throat.

A few things have happened since - cuttings have made their way into the trade - I know of at least 3 Nurseries growing it and, as well, APS members are helping to spread it around via their meetings and garden visits.

Our District Group has made two further trips to this heath-land to relocate it again. The second trip was late May (2007) where Kevin Sparrow, Lorraine Deppeler and I patiently worked our way through dense head-high heath-land plants in the area to re-find the special correa with the split bell. This heath-land, like many, is suffering from rapid invasions of Coastal Wattle (*Acacia longifolia* var. *sophorae*) which smothers other plants completely. All natural flora - and there are some very wonderful plants here - just get overwhelmed by the wattle and it makes finding anything again quite difficult. This area is managed by Parks Victoria who are doing regular work to check the spread of this vigorous invasive plant, but it is difficult work.

Hopefully if we need further cutting material it won't take so long, this time we took a GPS - well two of them actually. It was a fine breezy day on the 25th May and perfect weather for being out on the exposed heath-land. The low slanting rays of the autumn sun made things a little difficult at times but the flora looked healthy and green - this area of Portland had had 50 mm of rain just one week prior to our visit.

Finally, we found not just one plant but a large patch. Flowering had just commenced. I think we went later in the year last time - on the Queens Birthday weekend. The plants had some old flowers, some out and plenty of buds. Kevin had his digital camera working overtime as we congratulated ourselves on our diligence and good luck. During the morning we had also found lots of reflexas in green, white, cream, pink, pink and white and lovely shades of red. In a band at the base of the old sand-dune the *Correa alba* var. *alba* were at their crystal white best. (It is a superb area.)

We are now in the process of registering the name of *Correa* 'Portland Belle' with ACRA. The plants that have been spread around in the last four years have had a good chance to be assessed and trialled. From all accounts - and we would like more - it is a superbly healthy small growing correa with attractive foliage growing strongly and densely and of course when it flowers - well it is easily recognisable. My own original plant from Andrew recovered very well from being eaten down to a few short sticks by rabbits and has now

had two healthy growing seasons to recover - no water and very dry years here at Killarney. But it is doing particularly well.

We hope you like the name of 'Portland Belle' - we canvassed a lot of people to get a suitable name. Some of the ideas were - Red Skirt, Do the Splits, Lady in Red, Pixie Skirt- but nothing seemed right - Split Bell (as it has been known casually for four years) is descriptive but pretty ordinary - then we went back to the need for incorporating the location in the name- and so the name evolved to be *Correa* 'Portland Belle'.

So this becomes the third *correa* which has been registered by Warrnambool & District SGAP - *Correa* 'Granny's Grave' (a coastal form of *Correa reflexa* has been most successful and a wonderful garden plant and *Correa* 'Western Pink Star' a superb ground cover (a pink coloured form of *Correa alba* var. *pannosa*). Both have been registered for many years with ACRA. By the way, we had a permit to collect the cuttings we took from this area.

Range expansion of Acacia longifolia *ssp. sophorae*

Continued from page 88

The research described in this article is being undertaken as part of a PhD project at Deakin University, Warrnambool, and was funded by the Australian Research Council and Parks Victoria.

References

1. Clay, R. E., and K. E. Schneider. 2000. The ant (Hymenoptera: Formicidae) fauna of coastal heath in south-west Victoria: effects of dominance by *Acacia sophorae* and management actions to control it. *Pacific Conservation Biology* 6:144-151.
2. McMahon, A. R. G., G. W. Carr, S. E. Bedggood, R. J. Hill, and A. M. Pritchard. 1994. Prescribed Fire and Control of Coast Wattle (*Acacia sophorae*) (Labill.) Invasion in Coastal Heath South-West Victoria Fire and Biodiversity: The Effects and Effectiveness of Fire Management Proceedings. Footscray, Melbourne.
3. Mitchell, E., and B. Wilson. 2006. The response of small mammals to the invasion of coast wattle (*Acacia longifolia* var. *sophorae*) in a fragmented heath-land, south-west Victoria. *Plant Protection Quarterly* 21:148.
4. Murray, D. R., W. J. Ashcroft, R. D. Seppelt, and F. G. Lennox. 1978. Comparative Biochemical Studies of *Acacia sophorae* (Labill.) R.Br. and *A. longifolia* (Andrews) Willd. *Australian Journal of Botany* 26:755-771.
5. Walsh, N. G., and T. J. E. Entwistle. 1999, *Flora of Victoria* Vol. 3: Dicotyledons. Melbourne, Inkata Press.
6. Willis, J. H. 1972, *A Handbook of Plants in Victoria*, v. 2. Melbourne, Melbourne University Press.



Above left: *Correa alba* 'Western Pink Star' was discovered growing in coastal vegetation east of Warrnambool in the 1980's by Pat Urbonas and was registered by Warrnambool & District SGAP in 1993

Above middle: *Correa reflexa* 'Granny's Grave' was a later registration, the name taken from its locally well known Warrnambool site

Above right: *Correa* 'Portland Belle' is now in the process of being registered

Below left and right: *Allocasuarina verticillata* has grown so thick in places that the walk through it is known as the 'Enchanted Forest Walk'

Below bottom right: The heathland is slowly being taken over by Coast Wattle

All photos: K Sparrow





Correas of Point Danger near Portland

Correa reflexa vary in size, shape and colour here and are all in one location.

Could the one middle left a hybrid between *C. reflexa* and *C. alba* var. *pannosa*?

All photos: K Sparrow



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