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Front and back covers: View from Counts Point lookout, West MacDonnell Ranges, Northern Territory, with Mount Sonder in the far distance. Photo: Ralph Cartwright

Australian Plants articles

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Sydney Sandstone Flora in Penguin, Tasmania

Dick Burns OAM

Dick is a Sydney escapee. He purchased his home in Penguin, Tasmania in 1976. This article is adapted from an irregular series, My Rave Plant, written for the APS Tasmanian journal Eucryphia.

For the first few years, I had a scattergun approach to the plants for my first and, as it turned out, my only garden at Penguin, Tasmania. Among the bulbs, fuchsias and natives, I established some plants that represented my Sydneysider origin and *Ceratopetalum gummiferum*, *Lambertia formosa*, *Banksia serrata*, *Persoonia pinifolia* and *Grevillea buxifolia* are some that remain. Here are my experiences with four special Sydney plants

Angophora costata, Sydney Red Gum

The plant that typifies the Sydney sandstone flora to me is the tree *Angophora costata*. These open spreading trees dominate two of the Sydney bush areas I wandered through as I grew up, Kurnell and the Royal National Park. The widespreading branches curve away in all directions, creating a unique shape for each tree. The blotched pink bark swells where branches drop away and, most strikingly, seems to flow over the abutting sandstone. While the family walked back along the bush track to the ferry at Kurnell, my mother and the aunts would gather armfuls of 'gum tips', the burgundy-coloured new growth of the angophoras – it was a long time ago.

Angophoras were also involved in my first botany 'lesson'. At a Boy Scout meeting, my scoutmaster showed us angophoras can be distinguished



from 'gum trees' by looking at the stems: angophoras have opposite leaves and the other genus, *Eucalyptus*, has alternate leaves.

I found my plant in 1977 in a Launceston nursery, and planted it at the top of my driveway. It wanted to grow straight up, but I wanted it to spread, so, each year, I'd cut off the leader. Each year, the angophora would continue on its own erect way.

Angophora costata, Summer, 2013, with its beautiful burgundy coloured flush of new leaves.





Angophora costata, 2018

Eventually my tree did start to branch, but the foliage grew dense so I still wasn't seeing what I remembered. Some summers, the massed white flowerings only formed on scattered branches while other years, all of the crown would turn white. In Penguin, flowering coincides with the annual bark-shedding. Large thick plates of the old browned bark would fall away revealing delicate pinks and creams that would turn red and yellow during summer rain.

Eventually a lot of the small branches died, opening up the tree, and a true Sydney Red Gum was revealed. It is there, in full view from my

living room windows. I can watch it through the day as the travelling sun changes the light-and-shade patterns on my beautiful tree.

For those who like a tidy manicured garden, *Angophora costata* is not for you, but it suits my rambling bush garden.

***Xylomelum pyriforme*, Woody Pear**

The northern side of my house, where I have the kitchen, is close to the boundary, leaving a very narrow strip for plants. Over the forty plus years of my gardening, some spots are into their third generation of plants. *Xylomelum pyriforme*, however, has endured.

Xylomelum pyriforme is a member of the Proteaceae family. Its species and common name describe the fruit, a pear-sized woody follicle resembling a giant hakea fruit, even though the two genera are not closely related within the family. The typically proteaceous flowers are in a spike, like small creamy bottlebrushes with a dusting of brown. It was the pear-shaped fruits that first caught my attention as a Scout in the Sydney bush and it was one of my first attempts at plant photography. The plant is not common, so many years elapsed before I saw the clusters of flowers at Kurnell. The last feature I noticed to make this a

rave plant were the leaves. They are large, stiff, glossy green and shot through with an interlocking network of yellow veins which light up in the morning sunshine.

Patience was required: things are not so rushed at Penguin. For instance, an early obligatory planting of *Doryanthes excelsa* (Gymea lily) flowered after twenty years and has not flowered since. It took longer for flowers to form on my *Brachychiton acerifolius*, the Illawarra Flame Tree, but every few years now, masses of red develop on the sunny side of the tree. The last flowering season yielded copious fruits so the Tasmanian Arboretum can now establish a copse of flame trees.

I grew my woody pear from seed; I cannot find a record of when, but I know it was very early on. For many years, it just sat there, 10 cm tall with a few pairs of healthy-looking leaves. After a decade or so, the plant decided that it was time to look up a bit. The spindly leader developed a lean, and then a new leader formed. Now the plant is a joy. I assume the long-awaited growth spurt was due to a suitable root fungus attaching itself to the plant's root tips.

Each spring, new pairs of leaves appear, all a reddish bronze. As I stand in the kitchen, preparing breakfast, then sit in my favourite chair to eat, I look out at my *Xylomelum*. In December 2008, I saw it had four flower



Fallen leaves and seeds of *Brachychiton acerifolius*, the Illawarra Flame Tree





heads. For a couple of years, I thought that would be all I would see. The woody pear flower is dull coloured with a very narrow tube leading down to the nectar, which obviously evolved to suit a special Sydney pollinator.

One morning at the end of January 2011, I looked and thought one of the leaves was coiled – perhaps it's a fruit? Ever hopeful, I went out, reached up and touched this furry brown woody, pear-sized and pear-shaped fruit. The number of fruit gradually increased so that in summer 2018, there were now dozens of fruits. I have seen Little Wattlebirds feeding on the flowers, so they would be among the pollinators. *Xylomelum pyriforme* is not a graceful tree. If you tend to move house frequently, or like instant results, this plant is not for you.

Of the six species in the genus *Xylomelum*, two are in Western Australia, with the rest in New South Wales and Queensland. Those who have been to Kalbarri in Western Australia, would remember *X. angustifolium*, a tree covered in small grey fruit, whose appearance leads tour guides, including myself, to call it the 'dead mouse tree'.



The flowers and fruit of *Xylomelum pyriforme*, Woody Pear



The beautiful rust coloured leaves of the new growth of *Xylomelum pyriforme*.

***Telopea speciosissima*, NSW Waratah**

I found my first plant of *Telopea speciosissima* in a local nursery and the spot I chose for it was open and grassy. Later plantings of the species have not been successful, possibly because of root competition with already established plants. I have been trying to grow other specimens because the first plant produced disappointing flowers: the flower heads were smallish with overlarge bracts and it did not flower most years. However, a few years ago, I had a nearby *Eucalyptus sideroxylon*, another Sydney reminiscence, cut down. In 2017, the waratah produced about a dozen flowers.



I have had more success with some hybrids. The original red-coloured *T.* 'Shady Lady' flowers well each year and *T.* 'Braidwood Brilliant' had six flower heads in its first year. My most reliable species, however, is *Telopea mungaensis*, which was planted in 1980.

Telopea speciosissima,
NSW Waratah





Persoonia linearis, Narrow-leaf Geebung

The bright green, rounded leaves of *Persoonia levis* glowing as the sun shines through them make this species my typifying geebung of Sydney. Unfortunately, my garden plant has never been happy. The following story of how I chose *Persoonia linearis* for my garden helps make this a rave plant to me.

One year, on a visit to family in Sydney, I spotted fruits dropped around a small tree of *P. linearis* so I gathered a pocketful. I had heard how difficult geebungs were to propagate so I tried one of the suggested methods. I tied my booty in a Terylene bag and suspended it in the toilet cistern: the alternating immersion and exposure to air were supposed to replicate rainfall. After six months I put the seeds in a propagating mix and left it in my greenhouse. After another twelve months, one seedling emerged, which I subsequently planted in my garden.

Persoonia linearis is described variously as an open shrub to a small tree. In addition, *Flora of Australia* states that it could be procumbent. I have seen it as a dense upright shrub.

My plant grew as a straight-trunked small tree with pendent branches and leaves. One of the most remarkable features of the species is the bark on the trunk; flakes of chocolate-brown paper can be peeled back to reveal salmon-pink unweathered bark. Small yellow flowers, typical of the genus, hang in spikes at the tip of branches, followed by fleshy blotched green fruits.



The fruit and bark of *Persoonia linearis*



The Nullarbor

Maree Goods

Maree is a Life Member of the Wimmera Growers of Australian Plants. She and her husband, Graham, have travelled extensively to many areas of inland Australia. All photos in this article are by Graham and Maree Goods.

The Nullarbor never ceases to amaze me. Since 1997 we have crossed the Nullarbor Plain many times in either an east/westerly or north/southerly direction, and each time it is different and spectacular in its own way.

The Nullarbor is a flat plain gently sloping from the Great Victoria Desert in the north to the ocean and the Great Australian Bight in the south. It is bordered by the goldfields in the west and the Eyre Peninsula in the east and covers an area of approximately 250,000 square kilometres. It is one of the largest limestone karst systems in the world formed many millions of years ago below an ancient sea bed and has many underground caves and sinkholes.

Nullarbor, from the Latin 'nullus arbor', means treeless plain and this is true for the majority of the plain. Small trees and large shrubs can be seen in the circular depressions called 'dongas' which dot the landscape, and also in some coastal regions and where the Nullarbor merges into the bordering regions.





Rainfall rarely exceeds 200 millimetres a year and the evaporation rate is extremely high. Plants have adapted exceptionally well to the arid conditions and are very limestone tolerant. After rain, the Nullarbor comes to life with carpets of brilliant coloured annual flowering daisies, herbs and grasses.

The most dominant plants on the Nullarbor are the chenopods including *Atriplex* (saltbush) and *Maireana* (blue bushes) genera. Chenopods are succulent plants, which store water in their leaves and stems. In extreme drought conditions, they can shed some or all of their foliage and will respond with new growth after rain. Saltbushes are usually uniformly spaced with strong root systems, which allow very little growth in between.

Maireana sedifolia is grown commercially both in Australia and overseas for the cut flower trade and in home gardens where it grows well in a variety of soils.

Maireana sedifolia is known more for its foliage than its fruit while *M. erioclada* and *M. trichopoda* are recognised more for their brightly coloured, winged fruit.



Maireana sedifolia



Over 30 species of eremophila grow on the Nullarbor. Some of the larger shrubs, *Eremophila latrobei*, *E. scoparia*, *E. serrulata* and *E. alternifolia*, are so spectacular when in flower they stand out like beacons above the surrounding vegetation. *E. battii* and *E. dendritica* are two of the smaller gems.

It is always a delight to see the many annuals and ephemerals in full flower. Some of the small treasures are the brightly coloured *Velleia arguta*, *Rhodanthe floribunda*, *Gnephosis tenuissima* and the many pink to purple *Swainsona* species.

The striking red winged fruit of *Maireana erioclada*



Eremophila latrobei





Eremophila battii

The white flowering *Brachyscome tatei* and the round leafed pigface *Disphyma crassifolium* with its large bright pink flowers both grow on the cliffs which overlook the Great Australian Bight. *Pomaderris forrestiana* grows extensively along the coastline in Western Australia but is considered rare in South Australia. It covers itself in cream flowers and grows amongst *Westringia rigida*, several varieties of pea flowers and other shrubbery.

An important food source for the Aborigines on the Nullarbor was the fruit from *Nitraria billardierei*, commonly known as Dillion or Nitre bush. Its deep red-brown berries are grapelike and very juicy.

Most species of eucalypt, such as the goldfield and Great Victoria Desert mallees, grow on the extremities of the Nullarbor. Those which do grow on the Nullarbor are shorter and are sometimes very windswept and stunted. The low spreading mallee *Eucalyptus yalatensis* is found mostly along the coast. *E. gracilis* is also common on the coast but does grow on the northern and western boundaries of the Nullarbor.

Melaleuca lanceolata must be one of the most widespread melaleucas extending from the west coast of Australia through to the eastern



Acacia papyrocarpa

states. They never seem to suffer from drought and flower profusely in good years. They vary immensely in size on the Nullarbor from very low forms along the coast to large shrubs or small trees further inland.

Acacia papyrocarpa is one of the largest acacias to grow on the Nullarbor and the oldest trees could be over 500 years old.

The Nullarbor has a vast array of plants. It is also known for its whales in the Great Australian Bight around July and August, and the many caves which have revealed fossils of fauna and reptiles which existed well before our time. Next time you drive across the Nullarbor, take the time to stop and explore. You will be amazed at the treasures you find!

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FloraBase – the Western Australian flora: florabase.dpaw.wa.gov.au

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Will our native plants survive the 21st century?

Doug Rickard

Doug spent his working life in the instrument industry. As a result, he acquired an in-depth understanding of the instrumentation and systems used to monitor the state of the environment.

The threats to the very existence of the native plants in Australia are increasing. This article explores the main reasons why much of our unique flora is threatened with extinction.

Population pressures

The main driver of all the threats to our native plants is population growth. By 2050 it is forecast that the population of Australia will be over 40 million with over 75% of those people living in cities. By mid-century the populations of Greater Sydney and Melbourne will each be over 9 million. With increased populations the cities of the future will have a far greater footprint on the land – even though the population density will be greater with a higher proportion of people living in high rise apartments. Not all the additional urban area will be used for housing. Land will also be needed for everything else that makes a modern city tick such as shopping malls, hospitals, infrastructure, services, places of work, sports fields and airports. Cities will grow to cover much of the surrounding land that is now used to grow food or is still bushland.



Part of the Lucas Heights tip on the southern fringe of Sydney. This once was 165Ha of native bushland. It will be full by 2037, after which it will not be returned to its original condition; instead it will be transformed into parkland. Image: Courtesy Sutherland Shire Council

There are signs the world's population growth is slowing. However, to significantly slow growth the world has to raise the standard of living of billions of people and reduce birth rates. But here's the Catch 22 – with a higher standard of living, more people will live longer and consume more food and other resources, putting even more demands on major exporters of food and raw materials such as Australia.

A related problem is disposing of all our waste. Our existing waste disposal areas are filling up rapidly, so more and more sites will be needed for the mountains of rubbish we throw away every day. More people means there will also be a lot more rubbish, resulting in even more native bushland being cleared for new waste sites which have to be near cities. After a waste site becomes full it is unlikely the native bushland that originally covered the area can ever be fully restored. However, it is hoped that by the middle of the century we will have more recycling and cease to be a throw-away society so that the volume of rubbish will have decreased dramatically.

Habitat loss

In addition to the loss of habitat due to the growth of our cities, more and more land will have to be used for agriculture just to feed and clothe the increased number of people. One way to increase production is to plant more crops which means clearing more land and trees. Hopefully the use of more intensive farming methods such as hydroponics will actually reduce the amount of land needed to grow some crops – but wheat, rice or grapevines do not grow in a greenhouse!

An increasing population also needs more materials to build more houses, hospitals, schools, roads and shopping malls and to provide the domestic appliances, cars, smart phones, furniture and all the other elements of our modern lifestyle. The raw materials for these products come from forests, mines and quarries across the country. Not only will more holes be dug in the landscape but more areas will be cleared and planted with pine trees, all resulting in even more habitat loss.

Soil degradation

A recent study has shown that 40% of the soils used for agriculture are now classed as degraded and this will increase. Clearing native bushland for agriculture means we lose millions of tonnes of topsoil each year – either blown away by wind or washed away by rain – and it takes millions of years for the weathering of rocks and natural processes to replace those losses. Repeated cropping reduces soil fertility by stripping the soil of carbon and making it less robust as well as weaker in nutrients. With more of our soils degraded, we will need to





Part of the Ravensworth Open-Cut Coal Mine in the Hunter Valley, NSW. This once was fertile farm land
Image: Max Phillips

clear an even larger area to grow the food we need. We would not have to clear so much land if we ate all the food we produced and stopped throwing away about a third of it!

Decline in the number of insects and soil microbes

Current farming methods together with the use of chemical fertilisers, particularly the widespread use of pesticides, have resulted in a worldwide decline in the number of insects and soil microbes. Of particular concern is the decline in bee populations due both to the spread of the *Varroa* mite and the use of pesticides. The decline in bees and other insects means there are fewer pollinators, not only for many of our crops, but also for many native plants.

The fertility of our soils is very dependent on the insects, fungi, worms, grubs, microbes and bacteria that live there. Any decline in their numbers could seriously affect the amount of food we grow per hectare and increase the amount of bushland we have to clear for agriculture.

Decline in numbers and even loss of some of our native fauna

When considering the role that pollinators play in the survival of our native flora we cannot ignore the importance of the protection of the native fauna. The survival of flying foxes, cassowaries, possums and a lot of other bird and animal species is vital for the pollination and continuing existence of many of our native plants.

Water shortage

Ignoring Antarctica, Australia is the driest continent on earth with a national average rainfall of only 472 mm per year. Rainfall is unpredictable and unreliable and is spread unevenly across the nation. Agriculture uses about two-thirds of Australia's water, but up to about a third of the water is wasted through inefficient watering of crops and evaporation from farm dams and irrigation channels which has led to the spread of pest plants



The rejuvenated Snowy River downstream of Jindabyne Dam.

and large areas affected by soil salinity. However, most soil salinity is caused by removing deep-rooted native vegetation and replacing it with shallow-rooted crops and pastures. The water table rises bringing salts to the surface and the surface water then evaporates leaving the salts behind. The gradual build-up of salts in the topsoil renders the area unsuitable for growing crops and prevents the regeneration of the native flora. Some progress is being made in addressing both the salinity problem and increasing water efficiency in agriculture.

Although much of eastern Australia sits on top of the Great Artesian Basin, it is a limited resource and much of the water used by agriculture is extracted from rivers, reducing the flows in many of our river systems. Without an adequate flow, native plants suffer as water tables adjacent to rivers are lowered, and there are problems of increased salinity, turbidity and blue-green algae blooms exacerbated by the run-off of fertilisers, pesticides and herbicides from farms along rivers. The good news is there has been a significant improvement in the health of the native vegetation along the Snowy River since more environmental water has been released.

Climate change

There is general agreement that climate change is real and is the direct result of the actions of humankind. Many positive steps are being taken to try and limit CO₂ emissions from the burning of fossil fuels which is the main driver of climate change. By the middle of the century most of the world's power will be generated by renewables and most cars will be electric. Australia will still have over 100 million head of sheep and cattle, plus large numbers of goats, camels and alpacas, all eating grass and producing thousands of tonnes of methane, which is an even more potent greenhouse gas than CO₂. However, at least our cows and sheep fertilise the soil.

But even if we stop burning fossil fuels, eating meat and wearing woollen clothes it will take hundreds of years, and probably much longer, for the temperature to come down again. Australia will get warmer, storms, cyclones and droughts will become more intense across the nation and southern regions will almost certainly get drier. As our native plants have evolved to grow in particular soils and under specific weather conditions many could suffer.





Native plants growing in low-lying coastal areas could be under another serious threat. With global warming, sea temperatures will increase and water will expand as it gets warmer. The increase in sea temperatures will cause sea levels to rise and inundate many coastal areas, killing a number of the plants species in these areas.

Noxious weeds out-competing the native vegetation

Another serious threat is the many noxious weeds that are out-competing the local native vegetation. Weeds are so well established it is impossible to eliminate them. To the ever-growing list of noxious weeds must be added the garden escapees that pop up in the bush.

... So will our native plants survive the 21st century?

Maybe, perhaps – but I'm an optimist! Hopefully, many will survive climate change and all the other threats that are likely to confront them in the coming years. To give our native plants a reasonable chance of survival we must:

- Set aside sufficient areas of natural habitat and take all the actions needed to preserve as much of Australia's native flora as possible.
- Radically change our farming methods.
- Rein in global warming.
- Stop being a throw-away society.
- Above all – control the global population.

It's up to us!



Of these two rare and endangered plants, the *Pterostylis* sp Botany Bay (left) has a reasonable chance of survival even though it is only found in a few isolated spots – but these are in areas that are already protected. However the West Australian *Grevillea calliantha* (right) could be lost in the wild as it is critically endangered as it is only found in two locations both of which are threatened by habitat loss, invasive weeds, herbicide over-spraying, grazing animals and phytophthora dieback. Photographs courtesy Margaret Bradhurst (left) and Alexey Yakovlev (right).

The Pink Flannel Flower, *Actinotus forsythii*

Lloyd Hedges

Lloyd Hedge is a Life Member of the Menai Wildflower Group and a former industrial chemist. He is an expat New Zealander who has embraced Australian native flora with a passion. Lloyd is leader of the tube stock nurseries at Lucas Heights Waste Recovery Centre and the Illawong Rural Fire Station, Sydney, which supply free plants to schools and other community groups, National Parks programs to rehabilitate the Five Islands, Dharawal National Park and the Save the Glossy Black campaign in the Southern Highlands.

Enigmatic denizen of high places

Wreathed in smoke, fire and ash,

Mystical perhaps mythical

Unfindable, ubiquitous then non-existent

This is the Pink Flannel Flower





Equipment for making smoke water

My interest in the genus *Actinotus* started with *A. helianthii* in the 1990s when I first heard the revelation that smoke was the vector that stimulated the germination of seed of many species after bush fires rather than heat.

I decided to investigate smoke water and constructed several improbable devices from whatever bits and pieces I could lay my hands on. After settling on a successful design of two

interconnected gas cylinders I suspect I can produce enough smoke water for the entire Australian nursery industry.

The *A. helianthii* seeds responded well to smoke water treatment (for the most part) and I was able to produce a regular supply of seedlings.

The Pink Flannel Flower (*Actinotus forsythii*) moved from being a figment of my imagination to a reality when, in 2014, I saw a few plants at Narrow Neck, near Katoomba, NSW. In 2015 ecologist Roger Lembit mentioned to a bushwalking friend that they were flowering near a coal mine near Lithgow. The following weekend I went to the site where I saw them en masse and was able to collect seed. *A. forsythii* was growing in burnt out scrub heath near where the land steeply dropped away. There was little soil formation, with the soil being no more than decomposing sandstone. *A. forsythii* was clambering over the blackened skeletons of banksias, petrophiles and casuarinas. The emerging seedlings beneath seemed to be dominated by *Banksia ericifolia*, stylidiums and cyperaceae. There was some moss evident on the burnt soil and the aspect was southerly.

A. forsythii is quite different from *A. helianthii*. It is a procumbent annual herb with green, glabrous, parsley or trachymene-like leaves. The inflorescence is similar in architecture to *A. helianthii* but is variable in size, about halfway between *A. helianthii* and *A. minor*. The flowers have a tinge of pink in the centre that varies between plants and deepens with age. The bracts have a pinkish tinge, which is covered by long silky white hairs.



David Forbes, left, and ecologist Roger Lembit, right, examining *A. forsythii* in its natural habitat in the Blue Mountains, NSW.



A closer look at the growth habit of *A. forsythii*





A closer look at the stamens of *A. forsythii*

It has a very restricted distribution in a few areas above 900 metres in the Blue Mountains, adjacent to Sydney, inland from the Shoalhaven River and also in the Victorian Alps. The distribution of *A. helianthii*, on the other hand, stretches from Victoria into Queensland and from the east coast to as far west as Narrabri, NSW. Its habitat is more variable than that of *A. forsythii* and ranges from coastal dunes, to rocky ledges and open forests.

A. forsythii is one of many Australian native plants that are seldom seen. It spends most of its time as a seed and, apparently, it can be years, even decades, before the seeds

germinate. They only emerge after fires, but not after every fire. In contrast, *A. helianthii* can be seen at any time and puts on a magnificent display after fires; it also comes up after any disturbance to the bush. It may well be that, while *A. helianthii* is well adapted to fire, *A. forsythii* may be dependent on it.

At the tube stock nursery, which I run at the Lucas Heights Waste Recovery Centre in Sydney, I treated some of the fresh seed I collected the same way I did *A. helianthii*. I soaked them in a small quantity of smoke water for 15 minutes or more, added perlite, giving a vigorous stir, and then surface sowed them on a medium mix of 1:1 perlite and vermiculite. The trays were then placed on heated glasshouse benches.

The result of the test was poor, with few seedlings emerging. With the preliminary test out of the way it was time to plan an approach to try and unlock the nature of *A. forsythii*'s dormancy.

The factors I identified that may affect germination were:

- fire and smoke
- altitude, since they appear restricted to over 900 metres
- temperature, because they are likely to be subjected to cold to freezing conditions in winter and at night
- age of the seed, as they seem to still emerge after a decade or more
- possibly water, because several opinions suggested that they only appear after fires that were followed by heavy rain.



The bud (top) and flowers (bottom) of *A. forsythii*.





With these factors in mind, together with the limitations of working with an ageing nursery rather than a laboratory, I set up sowing trials using seed stored at room temperature, in the fridge (4°C) and the freezer (-4°C). The seed was treated with smoke water before and after storage. I used seed of five different ages: fresh, 3 months, 6 months, 9 months and 12 months after collecting it.

All trial results for seed aged up to 9 months produced no germination whatsoever. Surprisingly, a very good response was obtained from seed stored at room temperature for 12 months and treated with smoke water.

The seedlings of *A. forsythii* are smaller than those of *A. helianthii* and were initially slower to grow with high losses. A weak solution of Aquasol sprayed over the leaves appeared to be beneficial and achieved some growth, however it must be used sparingly as it encourages moss and mould.

It was over a month before the seedlings were (only just) big enough to handle. They were tubed up in *Australian Growing Solution* potting mix cut with 30% perlite. I prefer to add a coarse sand as the seedling stems are soft and weak and need support until they get going.

Once they start, they grow quite quickly and were fertilised heavily with Osmocote Pro. The mature plants can be deceptively large and in a 300 mm pot they can reach 1.5 metres across and be covered in hundreds of flowers that set plenty of seed. As they finish flowering the plants are already beginning to die; they are true annuals.



2017 was a very successful year for propagating *A. forsythii*.

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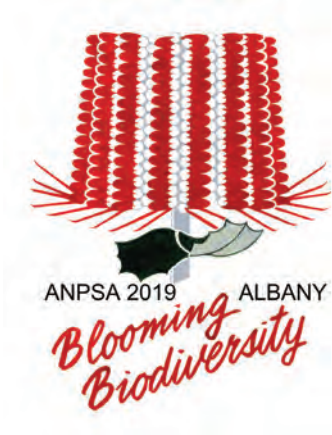
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ANPSA Biennial Conference Albany, Western Australia 29 September – 4 October 2019



Every two years the Australian Native Plants Association (Australia) (ANPSA) holds a national conference, which is organised by one of its member Societies, at a different location around Australia. These conferences afford members the opportunity to meet members from other states, and learn about the native flora of different regions of Australia. The program usually comprises a series of lectures by expert speakers relating to Australian native flora interspersed with field trips to gardens and natural areas.

Other features of the Conference/ program are guided pre- and post-Conference tours, which allow participants to experience the diversity of the flora of the host State and are usually of 5 days duration.

The *Wildflower Society of Western Australia* is hosting the 2019 Biennial Conference in Albany, W.A., from 29 September to 4 October 2019. The theme of the conference is 'Blooming Biodiversity'.

The National Conference is still in the planning stages, but will include a series of tours to and from Albany, the host town, and a variety of day excursions during the conference, taking in native flora in bushland settings as well as gardens and landscaped areas. Since the south-west of Western Australia is known for its pristine bushland, there will be an emphasis of native flora in its natural setting.

The 2018 Spring issue of *Australian Plants* will contain more information about the conference.

Further information about the Conference can be found on the *Wildflower Society of Western Australia's* website at:
www.wildflowersocietywa.org.au



A closer look at
A. forsythii in its
natural habitat

Potting up *A. forsythii* offers similar challenges to *A. helianthii*. As the roots break easily, timing is important. It is important to ensure there is enough root growth to hold the mix together but not so much that teasing is necessary to get roots to grow outwards. I am conducting some trials to get a better understanding of root treatment.

2016 was a successful year and a good seed crop was obtained. In 2017, many plants were sold and many more were given away. John Siemon from The Australian Botanic Gardens, Mount Annan was very appreciative of a gift of a tray of them and a horticulturist from the Australian Botanic Gardens drove to the Illawarra Grevillea Park, Bulli, to purchase more. Several flower growers have taken quite a few and I know some work is going on to try and hybridise or use tissue culture to get the pink genes into *A. helianthii* to produce an inflorescence as large as the white flower but with pink flowers.

There is still a lot to be learnt. While I have been sowing *A. helianthii* for decades and generally obtain good results, sometimes I do not. For reasons I cannot fathom the seed will not cooperate. Why? I suspect population variations or possibly seasonal variation could be the cause.

In order to get people with the right skills and equipment to study the problem, the Menai Wildflower Group of Australian Plants Society NSW gave a grant of \$2,000 to the University of NSW to establish a scholarship at the University's Centre for Ecosystem Science in the School of Biological, Earth and Environmental Sciences to support research into the dormancy and germination mechanisms of *Actinotus*. We look forward to the results.





Totness Recreation Park

Max Jahn and Egon Shore

Max is a retired primary and secondary teacher, lecturer in TAFE, and long time member of SGAP, now APS SA.

Egon is a retired horticulturist, who trained at Adelaide Botanic Gardens and has worked at BHP Whyalla, Enfield and Tea Tree Gully Councils.

Most photographs and the article was designed by Max with a few photos and reserch by Egon..

In 2009, Egon Shore, who lives in the nearby town of Mt Barker, introduced me to Totness Recreation Park, a little known “gem” in the Adelaide Hills.

Totness Recreation Park is a 41 hectare area of native bush located within the localities of Mount Barker and Totness in central Mount Loft Ranges, South Australia. The park was proclaimed as Totness National Parks Reserve in 1970 and re-proclaimed in 1976 as Totness Recreation Park. The Park, which is classed as a Stringy Bark and Manna Gum Woodland, is administered by the Department of Environment Water and Natural Resources.



Above: There are no facilities at the Park - just wild bush.

Left: *Drosera macrantha ssp. planchonii*, the Climbing Sundew



Stackhousia monogyna, Creamy Candles



Dampiera rosmarinifolia, Wild Rosemary

The park consists of podsolic soil, which are strongly leached and rock outcrops are quartzite and sandstone.

The region has a Mediterranean climate. It receives 80% of its average 740mm rainfall mainly during the winter months of April to September. Temperatures range from 7°C, with frost some nights in winter, to a few low 40°C in summer.





flowers en-masse



Helichrysum apiculatum,
Yellow Buttons



Dista bricata, the Weed
Orchid, an unwelcome
South African invader



Brunonia australis,
Blue Pincushion



Ripe moss capsules



Goodenia blackiana,
Primrose Goodenia"



Dillwynia hispida,
Red Parrot Pea



Scavola aemula,
Fairy Fan Flower



Hibertia sericea,
Twiggy Guinea-flower

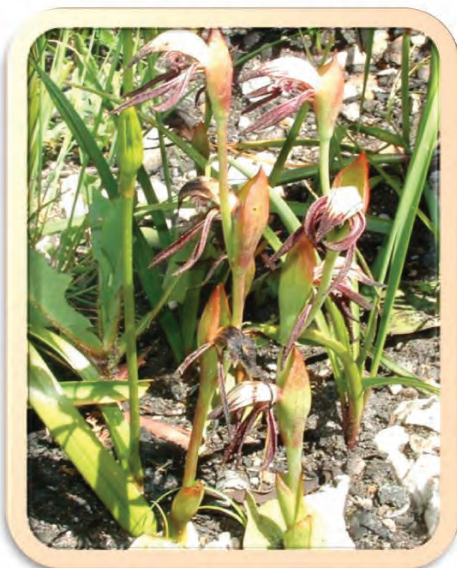
Totness can be easily reached from Hahndorf. From Adelaide pass into Hahndorf, turn right into Pine Ave, pass under freeway bridge, turn left into Paechtown Rd, follow for 3km bitumen, then 1km dirt road to the entrance. Do not attempt to approach Totness Recreation Park from Mt. Barker or to leave in that direction during wet weather, as the road is a summer time road only.





The natural bush is at its most colourful in late winter to spring: September to November.

During 2008, some of the park was control burned. We visited the area in October 2009, 12 months later. The following views, show the bush 12 months after the control burn.



Lyperanthus nigricans, the Fire Orchid



The fruiting capsules of
Lyperanthus nigricans



The Park in 2015,
7 years after the burn,
with most of the same
wild flowers, but no
Fire Orchids.



Above: The ever present Milkmaids: *Burchardia umbellata*,
Left: *Caladenia dilatata*, the Green Spider Orchid



Helichrysum scorpioides,
Button Everlasting



Myriocephalus stuartii,
Poached Egg Daisy

We believed that the *Lyperanthus nigricans*, the Fire Orchid, existed in Totness, so we looked very carefully through the recently burnt areas. Our luck was in and we found it were growing out of the ash and charred wood, amongst the quartzite rocks. We have found no more since, even after mixing ash into the soil by hand at exactly the same site.

The detail of paper daisies found in Totness are also worth looking at very closely.





Walking the Larapinta Trail, Alice Springs

Ralph Cartwright

Ralph is a keen photographer who enjoys travel to new places. In the winter of 2012, he went on a guided bushwalk along the Larapinta Trail in the Northern Territory.

The 223 kilometre long Larapinta Trail begins at the Alice Springs Telegraph Station and heads in a westerly direction to the end point at Mount Sonder. At 1,380 metres, Mount Sonder is one of the highest peaks in the MacDonnell Ranges, which extend for 500 km in an east-west direction across the centre of Australia.

The ranges were formed by folding at least 1,000 million years ago, but the sediments in them are 1,400–2,400 million years old. Originally about 4.5 km high, after millions of years of weathering and erosion the ranges are now only a shadow of their former selves, averaging just 400–500 metres high.

I chose to walk the most scenic parts of the Larapinta Trail over 6 days and 5 nights, covering 10 to 15 km each day. The winter day time temperatures were a comfortable 25°C, dropping to about zero at night. The path is quite rough and requires sturdy footwear, but is



Trekkers walking up the spine of Euro Ridge, Larapinta Trail. The ridge offers wonderful views of the tilted folds and weathered peaks of the West MacDonnell Range as it stretches out towards the horizon.



Flower and red seed pods of *Acacia tetragonophylla*

well marked and follows the edge of the escarpment in many places offering stunning vistas. We only carried day packs with snacks, water and camera. Everything else stayed at our semi-permanent campsites.

The vegetation along the walk is described as Desert and xeric shrubland, in which evaporation exceeds an annual rainfall of usually less than 250 mm, growing on sandy plains and rocky highland. We saw acacias, eucalypts, eremophilas, hakeas and more, many species with important food and medicinal uses.

Acacia tetragonophylla (Dead Finish) was observed in several places. The plant takes its common European name from being the last plant alive in drought times and the last to be eaten by stock. If a landowner only has those plants left, he is finished!

It is also a very important medicinal plant used by Indigenous people in a variety of ways, including for circumcision ceremonies. For healing of wounds, bark free wood is burnt to ashes and then applied. It is said to be antiseptic but causes acute pain, which subsides after about half an hour and healing of the wound then occurs rapidly.

The species name *tetragonophylla* refers to the phyllodes which are almost square in cross section, very hard and sharp. They are used to control warts. Points of the phyllodes are inserted under the wart and about an hour later the wart has withered and may be pulled out. It is a long-lived wattle, estimated to live between 50 to 100 years.

Acacia spondylophylla, or Curry wattle, as the name suggests, exuded a strong and quite pleasant curry smell when the leaves were crushed.

Around our second campsite, I noted a good variety of hakeas including *H. lorea* (Bootlace Oak) and *H. divaricata* (Corkwood).





Acacia spondylophylla



Hakea grammatophylla



Flower and fruit of *Eremophila latrobei*

Hakea grammatophylla, when in flower, bears stunning bright pink inflorescences and was my favourite plant of the whole trip. It is quite rare and while it is confined to the MacDonnell Ranges, it is common there. The species name *grammatophylla* is from *grammatus*, Latin for striped with fine lines and *phyllum*, Latin for leaf, a reference to the fine striations on the leaves of this species seen clearly in these photographs.

The flower colour of the 38 species of *Eremophila* in Central Australia ranges from dark pink to red, sometimes even yellow. In the early stages of the trail, we saw *Eremophila latrobei*, *E. christophori*, *E. freelingii* and *E. gilesii*. *E. freelingii* is an important medicinal plant for the local Arrernte people who use it as an antiseptic for skin ailments or for

headaches. A rubbing medicine is also made from the leaves to treat colds and flu. The plant contains pinene, which is the primary constituent of turpentine and is highly repellent to insects.

Very common on many *Acacia* and *Eucalyptus* species are mistletoes. There are over 30 species of mistletoes in the Northern Territory. The flowers and fruit are usually conspicuous and many contain a large sticky seed spread by the Mistletoe bird. The fruits when ripe are locally called 'snotty gobbles', which is also the name for the fruit of *Personias*.

The ruby saltbush, *Enchylaena tomentosa*, is common and widespread. The fruits are edible and were apparently eaten by the explorer Sturt to combat scurvy.



Fruit of *Enchylaena tomentosa*



Solanum quadriloculatum



Senna artemisioides





On the rocky hillsides was *Solanum quadriloculatum* (Wild Tomato). The fruits were also eaten by early explorers to ward off scurvy. There are a couple of very similar looking Solanums in the area, some quite poisonous. Also seen were several species of *Senna*, including *Senna artemisioides*, which was my favourite.

An important bush tucker food, *Leichhardtia australis* (Bush Banana), can be eaten raw or cooked and the flowers are also edible. A plant grown as pasture for livestock is *Cullen australasicum* (Native Scurf-pea) as it is relatively high in nutritive value with leaves comparable to lucerne. It can be identified by the black glands, which are used as a genus field character.

The walk passed through Simpson's Gap, one of several very scenic gorges where many other species were found, which included *Petalostylis cassioides* and *Prostanthera striatiflora*.

Petalostylis cassioides (Butterfly Bush) was particularly interesting. It has a very attractive flower, but according to my research, it is said to contain hallucinogenic alkaloids similar to LSD, which can be distilled out with a fair amount of chemistry. *Prostanthera striatiflora* (Striped Mintbush) is one of 90 *Prostanthera* species and also a local medicinal plant.



Above left: *Petalostylis cassioides*
Above: *Prostanthera striatiflora*
Left: *Indigophora basedowii*



Ptilotus exaltatus



Ptilotus macrocephalus

Several species of *Indigofera* were noted, in particular *I. basedowii* (Showy Indigo), *I. georgei* (George's Indigo) and *I. leucotricha*.

During the trip, I observed a good variety of *Ptilotus* species at many locations including *P. exaltatus* (Pink Mulla Mulla, above left, *P. macrocephalus* (Green Pussytails), above right, and *P. obovatus* (Silver Mulla Mulla).



Photographs of Northern Territory plants would not be complete without *Triodia* (Spinifex). There are 17 species of *Triodia* in the Northern Territory, with four main species split into hard and soft groups. It looks quite pretty – from a distance anyway. The photograph on the left shows why many aboriginal painting use dots to signify the vegetation.

Arguably the best vista of the trip was from Counts Point lookout, one of the highest points on the trail at 1,140 metres. It also gave us our first view of Mount Sonder in the far distance. The view from Counts Point can be seen in the photo on the front and back covers of this issue. The last day of our walk started out very early, boarding the bus around 2.30 am at our camp site to drive to the start of the Mount Sonder path. The summit is climbed at night – our ascent was done under a full moon – to be able to watch the sunrise. At dawn, the shadow of Mount Sonder stretches westward over the plains which makes for a dramatic scene, and a fitting end to walking the Larapinta Trail.





The Tasmanian Bushland Garden, Buckland – the first Regional Botanic Garden in Tasmania

Keith Corbett

Keith is a geologist with a love of Tasmanian plants, and is a Life Member of Australian Plants Society Tasmania (APST). He has been part of the Management Group of the Tasmanian Bushland Garden since its inception in 1999, and President for the last four years.



The Tasmanian Bushland Garden at Buckland, north-east of Hobart, is a 22 hectare Regional Botanic Garden showcasing the indigenous plants of South-East Tasmania. The garden has been open to the public since 2010. It was visited by four groups from the recent Australian Native Plants Society Australia (ANPSA) National Conference in Hobart in January 2018. Features of the garden include about 1 hectare of display gardens of plants from woodland and dry sclerophyll communities, 20 hectares of bushland with walking tracks, a large landscaped quarry with

a pond and waterfall, a series of sculptures around the gardens, and picnic facilities and toilets. The garden is owned and managed entirely by a volunteer group, is open daily with free entry, and funded by donations. The garden is about an hour's drive from Hobart, on the Tasman Highway to the East Coast.

History: The idea for a Regional Botanic Garden in Tasmania was first raised in 1999 by Graham and Ingrid Roberts, APS Tasmania members whose travels had taken them to many such gardens interstate. The Maroochy Regional Bushland Botanic Garden in Queensland and the Australian Arid Lands Botanic Garden at Port Augusta, had made strong impressions. The Hobart Group of APS Tasmania was supportive, and a like-minded group rallied around, including the Corbetts. The group decided to focus on the dry sclerophyll floras of South-East Tasmania, since these are poorly preserved in our National Parks and Reserves (unlike our rainforests and alpine areas), and have generally been



The site of the proposed garden, March 1999.

much affected by clearing, logging, sheep grazing, bushfires and illegal wood collecting.

The search for a suitable block of land arrived at Buckland after a suggestion from Les Payne, who ran Pulchella Nursery there. Les's brother-in-law, Alan Gardner, owned the surrounding sheep property, which included a wooded dolerite hill and Nelson Creek, with a pleasant terraced frontage on to the Tasman Highway. The group walked over the site, and we all liked it – it had a welcoming feel, interesting topography, reasonably good quality bushland, permanent water, easy access to the highway, a large old quarry – and a well-established native nursery next door.

A call for donations to buy the 22 hectare block was answered by Glad Dodson, an elderly APST-SGAP member, who wrote us a cheque for the purchase price – and became something of a 'patron saint'. Buying the Crown Land quarry block from the government was much more complicated, but a letter to the Premier, Jim Bacon, prompted his intercession and a lowering of the price to something we could afford.

Ten years of development: After purchase, there was ten years of development work by the volunteer group, before we were able to open to the public in 2010. Some of the important steps along the way were:





The excavator ripping up the deep dolerite clay.

Ripping the clay and making the 1 hectare display gardens: A large rock crusher had operated for years on the site, and much of the ground was compacted like concrete. We employed an excavator with a ripper to dig up the deep dolerite clay, which came up in great ugly lumps but thankfully broke down to friable soil after several months of drying and wetting. Dolerite is an igneous intrusive rock, very common in South-East Tasmania (but not in the other states), with a composition similar to basalt, producing clay-rich soils and many loose rocks.

Addition of some sandy loam topsoil gave the new young plants a good start. The numerous local rocks and old logs were used extensively in the landscaping, which was supervised by Sib Corbett. The various beds were planted in natural communities such as Sheoak Groves, Native Grasslands, Rocky Dolerite Shrubberies and Wet Gully Floras, and laid out in an informal pattern (no straight lines!), with gravelled paths between. Beds featuring plants from the sandstone and granite areas were also added, with appropriate rocks for landscaping, and a bed featuring some of the rare and endangered plants of Tasmania. Explanatory signs give context for each community. Most of the plants came from Pulchella Nursery, sourced from the local region – a wonderful synergy for us (but the nursery sadly closed in 2016). Some of the rarer plants were donated by the Royal Tasmanian Botanical Gardens in Hobart.

A grant from the Australian Open Garden Scheme enabled us to install a watering scheme for the gardens from two dams, critical for the new plantings in this dry area, with average rainfall about 600 mm. This became less critical as the plants got their roots down into the deep clay.

Fencing to keep out the wallabies (and rabbits) was essential for the display gardens, and this fence was also taken around the quarry and

car park – a challenging task in some of the rocky terrain. The rest of the block was fenced to keep the sheep out, resulting in significant regrowth of many plants, particularly *Poa* grasses. Walking tracks were constructed around the bushland area, which features some fine *Poa* grassland on the hill top, some large white gums (*Eucalyptus viminalis*) down the main valley, and a natural creek with a permanent wading pool.

Sealing of the car park and access road was quoted to cost \$60,000 by a contractor, but we did it ourselves, using a bitumen spreader welded up by Graham Roberts, for less than \$20,000. But it was hot hard work over two days. At one stage, the old tractor/loader we were using to pull the spreader broke a front axle, and the project was only rescued by the truck driver offering to pull the spreader behind his truck. Somehow, all the problems we faced had a solution.

Landscaping the quarry: The old dolerite (bluestone) quarry, about an acre in extent, was a mess when we bought it, with piles of old rotting guide posts and rusty steel cables. Cleaning it up and landscaping it was one of our biggest tasks. We hired a 20-tonne excavator and a skilled operator for the job, done over five days, supervised by Keith and Sib Corbett. Loose rocks on the cliff walls at the back were first brought down, then a 2-metre high mound, or bund, was formed around the foot of the cliff, to contain any further rock falls. This bund was then carefully landscaped with the big rocks, the surplus rocks becoming a small 'scree field' at the top end. A pond area was excavated at the same time. Planting of the bund softened the rocky appearance, and the quarry has become a focal point for the gardens. A waterfall now tumbles down the cliff face above the pond, driven by a recirculating pump. The natural amphitheatre has proved to be an ideal venue for open-air live music concerts, as well as weddings and birthday parties.





The Quarry after planting.

Building the picnic shelter. We did this ourselves also, with Graham Roberts persuading many companies to donate materials, such as roofing. Pre-cast concrete panels were lifted into place with an excavator. The final stage was installation of a waste treatment system, which pumps filtered water around the quarry plantings.

The Grand Opening 2010: Nearly 250 people attended the joyous opening of the gardens in April 2010, when Senator Christine Milne unveiled a plaque on a large dolerite boulder at the quarry, and popular French Mayor Bertrand Cadart opened our new entry gates – kissing the frogs on the gateposts! The gates have been automated since then, closing for the night and hence avoiding any vandalism problems. We always wanted entry to be free, so that no-one felt excluded – and to save the hassles of collecting fees. The free entry seems to encourage people to donate, however, and our donation boxes are well used. These days, we receive over \$10,000 per year in donations, sufficient for most of our needs. The local Council gives us a \$2,000 annual grant to maintain the toilets. Our Visitor Comments Book receives many entries from visitors, including many from interstate and overseas, and we are encouraged by how positive and truly complimentary the comments are.

The sculptures: The garden provides an excellent setting for naturalistic sculptures, and we have run a number of Sculpture Trails with this in mind. We have been able to purchase a number of the most suitable works, and these add a significant extra interest for most visitors. Our three earliest purchases – Brian the Dinosaur, the Wedge-Tailed Eagle and the Thylacine – are popular features at the quarry.



Wedge-Tailed Eagle sculpture with the water fall which tumbles down the face of the old quarry in the background.



The gardens, October, 2010.





Some favourite plants:

Of the hundreds of plants in the Display Gardens and around the quarry, here are some of our favourites, which are also suitable for gardens.

South Esk Pine (*Callitris oblonga*). An attractive small pine very suitable for gardens. The Tasmanian subspecies is endemic.

Southern Grevillea (*Grevillea australis*) is Tasmania's only native grevillea, very hardy, with creamy white flowers.



Juvenile *Callitris oblonga*



Grevillea australis

Matted Bushpea (*Pultenaea pedunculata*), a very attractive sprawling groundcover.

Dusty Daisybush (*Olearia phlogopappa*), a vigorous free-flowering shrub.



Above: *Olearia phlogopappa*
Left: *Pultenaea pedunculata*

Visit our website at sites.google.com/site/tasbush

Chiloglottis orchids – masters of mimicry and deceit

Margaret Bradhurst

Margaret has had a life-long interest in native orchids and is author of the field guide, 'Native Orchids of Southern Sydney: an Identification Guide'.

I find that Chiloglottis orchids are some of the most fascinating of Australia's native terrestrial orchids, particularly in the way they are able to deceive their pollinator to achieve pollination.

They obtain their name from the Greek cheilos = lip and glottis = opening of the windpipe – referring to the shape of the flowers that, as they close, look like baby birds waiting to be fed.

Chiloglottis orchids, which have also been given the common names of Ant, Wasp, Bird or Turtle orchids, can form quite large colonies. Each plant has a pair of ground-hugging basal leaves about 5cm long and 1.5cm wide. I usually find it much easier to locate them by looking for their leaves rather than the flowers. Although they can grow in quite large colonies, sometimes there are only a few plants which bear flowers and in many instances, there may be no flowering plants at all.

Chiloglottis orchids can be found growing in moist shaded eucalypt forest. The small, solitary flowers are a dull brown or greenish colour on a short stem between 6cm and 8cm tall. Occasionally you may come across a plant with a predominantly green flower.

Each species of Chiloglottis orchid is pollinated by a different species of thynnine wasp. To a male wasp, the arrangement of calli on the



A colony of *Chiloglottis* orchids.



A pair of *Chiloglottis* leaves





labellum looks just like the female of his species. Also, the flowers produce a special scent, called a pheromone, which mimics the scent of a female wasp.

The male is attracted by the scent, sees what he thinks is the female of his species and attempts to mate with her. In so doing he unwittingly picks up a dab of pollen. Frustrated, he then flies off. When he finds another *Chiloglottis* flower he once again attempts to mate and in so doing the pollen is deposited on that flower and pollination is achieved.



Above left: *Chiloglottis seminuda* (Turtle Orchid) showing insect-like arrangement of calli on the labellum.

Above: *Chiloglottis diphylla* (Common Wasp Orchid) showing the arrangement of insect-like calli on the labellum. Flowering: February to April

Left: Green form. Flowering: March to April



Left: *Chiloglottis formicifera* (also known as *Myrmecophila formicifera*), Common Ant Orchid.

Above: The green form. Flowering: August to October



Chiloglottis trapeziformis (also known as *Myrmecophila trapeziformis*), Broad-lipped Bird Orchid. Flowering: September

After pollination the stem of the *Chiloglottis* orchid elongates, raising the seed capsule higher above the ground. This enables the seed to be dispersed over a far wider area.

All photos by the author



