

CALEYI



NORTHERN BEACHES GROUP

austplants.com.au/northern-beaches

April 2019

Australian Plants Society Northern Beaches
northernbeaches@austplants.com.au

President

Dr Conny Harris (02) 9451 3231

Vice-President

David Drage (02) 9949 5179

Secretary

Penny Hunstead (02) 9999 1847

Minutes Secretary

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Treasurer

Lindy Monson (02) 9953 7498

Regional Delegate

Harry Loots (02) 9953 7498

Librarian

Jennifer McLean (02) 9970 6528

Website Administrator

David Drage (02) 9949 5179

Membership Officer

Jan Carnes 0416 101 327

Talks Co-ordinator

Russell Beardmore 0404 023 223

Walks Co-ordinator

Anne Gray (02) 9402 4797

Catering Officer

Georgine Jakobi (02) 9981 7471

Editor

Jane March 0407 220 380

CALENDAR

APS Northern Beaches meeting Thursday April 4, 2019 at Stony Range Botanic Garden, Dee Why. **7.00 pm Committee meeting. 7.30 pm Plant family. Asteraceae. - David Drage. 7.45 pm Show & Tell.** Please bring specimens and stories. **Supper: Penny & Jan.C.**

APS Northern Beaches walk at North Head 10.30 am Sunday April 14. Lunch following at Bella Vista. Anne will email full details later.

APS NSW Quarterly + AGM at Blaxland. Saturday May 18, 2019. (See p.3).

APS NSW Get-Together Newcastle Sat 17 & Sun 18 August, 2019 (See p. 3)

2019 ANPSA 'Blooming Biodiversity' Sunday 29 Sept. to Friday 4 Oct. 2019 Albany, WA. (See p.9).

TALK BY HANNAH MCPHERSON

Royal Botanic Gardens, Sydney



Hannah is a member of an RBG team engaged in a project called "Restore and Renew". There are up to 14 people involved directly with the project including a number of volunteers. The Project also involves collaboration with many organisations outside the RBG. This is a project with a big scope.

The focus of the project is landscape scale restoration. It is filling a knowledge gap that will help improve success.

Ultimately, "Restore and Renew" aims to give restoration managers a set of tools enabling them to make informed choices as to the plant species most likely to succeed, not just in the short term but taking a long term view that accounts for expected climate change.

The Project "flow chart" is complex to say the least and involves many elements that include:

- Identification of species to be studied – currently over 250.
- Mapping of species distribution using inputs from historical data and intensive in-field sampling.
- DNA analysis of leaf samples to look for genetic differences across populations (modern DNA analysis techniques make the whole project possible).
- Relating species distribution to ecological zones and predicting how those zones might change under the influence of future climate change.
- Development of an App available to restoration managers that will provide them with the information they need to implement effective restoration.

Hannah presented her talk with a set of beautifully prepared slides with which she guided us through a conceptually difficult topic.

Russell Beardmore
9 March 2019

GUINEA FLOWERS ARE FIERCE AND GOLDEN

Theconversation March 15, 2019 Betsy Jackes



Hibbertia. pic. J. Arney.

I first became interested in guinea flowers when I heard of a plant growing in Queensland's White Mountains nicknamed "excruciating" by all who handled it, because of the pungent needle-like leaves which attached themselves to fingers and clothes.

This species is a guinea flower, now scientifically named *Hibbertia ferox*, meaning "fierce". Guinea flowers grow across Australia, from the rainforest to semi-arid areas.

Guinea flowers belong to the genus *Hibbertia*, which dates back to Gondwana. Members of the genus are easy to recognise, but individual species are hard to tell apart. Their brilliant yellow (or sometimes orange) flowers have petals with a notch at the apex, and they were thought to resemble the appearance of the 18th-century coin known as a golden guinea. As usual there are a couple of exceptions – at least two species have petals that lack a notch.

All too often these small shrubs and woody climbers grow in areas likely to be razed for urban sprawl or mining.

What we know about Hibbertia

English merchant and amateur botanist Henry Charles Andrews named the genus *Hibbertia* after his friend George Hibbert (1757-1837). Andrews was an artist and engraver as well as a botanist, and the first species he named was based on a plant collected around Port Jackson.

Around 200 species are recognised but there are many unnamed varieties, particularly in tropical areas. Probably the most widespread species and one of the few cultivated is the climbing guinea flower (*Hibbertia scandens*). It can be grown readily from cuttings but germinates slowly from seeds.

Most species have hairs covering the leaves, which can be critical for identifying a species. Under a good hand lens or a simple microscope their variety and beauty is obvious. In some species the hairs are straight. In others they are branched with arms resembling the spokes on a star, the so-called "stellate hairs". Some species have scales – flat, plate-like structures – on their leaves and flowers. Sometimes there are large and small scales on the one surface.

The leaves are also diverse in shape and form: some leaves are shaped like spear and thick, as in *Hibbertia banksii* of the eastern Cape York area, others are needle-like with margins rolled towards the lower midrib, with a sharp, blood-drawing tip, as in *Hibbertia ferox*.

The flowers are usually solitary and roughly 2cm in diameter, but in some of the northern species they grow in spikes roughly 4-5cm across. Five sepals surround the five petals, which are broadest towards the top. The flowers usually close at night and reopen the next day.

A distinctive feature is the arrangement of the stamens (the male parts). These may be all on one side of the carpels (the structures containing the

unfertilised seeds at the centre of the flower) or may form a ball in the centre. The number varies between species from fewer than 10 to more than 100.



H. ferox was nicknamed 'excruciating' because of its needle-like leaves. Shutterstock

Floral frolics

For a plant to be involved in sex of a floral kind it needs to offer rewards for services rendered. Sometimes guinea flowers grow sterile stems, which add to the floral display and provide a food source, particularly for beetles. They are messy eaters, chewing on various plant tissues as they wander around the flower's surface, but they do help to transfer pollen to the stigmas, or female parts (and no doubt are involved in sex with their own kind).

Guinea flowers don't produce nectar to tempt pollinators, but people have reported them producing weak fragrance. There's some dispute over how pleasant the smell is, with some describing it as sweet and others insisting it smells like cow dung. There have been only a couple of reports of what this smell resembles, so we need you to go and stick your nose in a freshly open flower. (Make sure to check – is the fragrance there all day or only in the morning?)

However, there is plenty of pollen. If you look closely at the anthers, those yellow sacs on the top of a thin stalk, you will see either an opening or pore at the top, or a slit down the side through which pollen can escape. Whether the marauding bug causes the pollen to spray out through the top or it accidentally falls on the bug through the slit, the bug gets dusted in pollen and then this can get brushed off on the female parts or stigma. Bees and flies are the most common bugs seen around guinea flowers.

The fruit is composed of 2-5 loosely adhering capsule-like follicles, surrounded by the five sepals, which remain and do not fall off.



Hibbertia scandens, commonly known as snake vine. Shutterstock

The fruit contains one or two seeds that are covered by a reddish coating or aril. This nutritious tissue is a valuable food source for dispersers such as ants and birds; birds have been recording spreading the seeds of *Hibbertia scandens*. However, in the drier areas where these plants are commonly found, ants appear to be the common dispersers.

So next time you are in the bush don't just ignore that small shrubby plant with yellow flowers and notched petals. Stop and admire their beauty.

NEW ENGLAND HAS A NEW EUCALYPT

www.une.edu.au March 19, 2019

Botanical detective work has brought the Dalveen blue box out of the taxonomic shadows.



Tim Collins examines a specimen of *Eucalyptus dalveenica*.

New England officially has a new eucalypt — the Dalveen blue box, which occurs over a small range in the Granite Belt, on the NSW-Queensland border.

Eucalyptus dalveenica was painstakingly identified as a separate species by University of New England (UNE) Honours student Tim Collins, who looked at factors like DNA and eucalypt oil composition to arrive at his conclusion.

In persuading the botanical world that Dalveen blue box is a separate species, Mr Collins has taken the number of named eucalypt species in New England to more than 70.

Dalveenica was long considered to be an outlier population of *Eucalyptus magnificata*, found in the New England gorge country, until Mr Collins and his supervisors, UNE botanists Professor Jeremy Bruhl and Dr Rose Andrew, took a closer look at the Granite Belt population.

Along with size and shape differences, Mr Collins said the leaves smelt different when crushed to release their oils. This proved to be an important clue to direct the botanical detective work that he needed to prove that Dalveenica was a different species.

"When you buy eucalyptus oil, you're usually buying more than 90 per cent cineole, which is the compound everybody associates with eucalyptus oil," Mr Collins said. "But there are many other compounds in the natural oils, and the ratios of those compounds can vary between species."

In analysis, dalveenica oils proved to have a different suite of compounds to magnificata. The clincher came with DNA analysis, showing that dalveenica has a demonstrably different genome to the more southern population.

Mr Collins spent a year on developing his dalveenica thesis, and many months more going through the rigorous scientific publishing process in order to introduce the new species to the world.

He hopes it won't be his last. "It's estimated that we've only named 60-70 per cent of the plants in Australia, and most people only know our native flora through a handful of common names. In the eucalypts, people might be able to name river red gum, ironbark, stringybark, mountain gum — yet there are more than 850 named eucalypts in Australia, and presumably many more we don't know about."

"It's important that we name and describe new species because this is the foundation upon which all other research is built."

"Australia's biodiversity is unique and diverse and represents opportunities for the discovery of new medicines and industrial innovations amongst the myriad of novel compounds produced by plants and animals."

A type specimen of *Eucalyptus dalveenica* — the reference against which all future comparisons with other species will be made — has been lodged in UNE's NCW Beadle Herbarium, joining about 100,000 other plant specimens from the region and further afield.

APS NSW QUARTERLY GATHERING & AGM Saturday, 18 May 2019

Our AGM and May Quarterly Gathering is being hosted by the Blue Mountains Group.

Start the day with a guided walk through the **Glenbrook Native Plant Reserve** (10am) or a guided walk along **Pippa's Pass Blaxland** (9.45am **Blaxland Community Centre Carpark**).

Our **AGM** will be held from 12.30 to 1pm.

The highlight of the day will be a talk on **Australian carnivorous Plants** by Mt Tomah Botanic Garden manager and curator, **Greg Bourke**, who has an unbridled passion for these highly unusual plants, will answer all your questions including on how to care for them. Greg's talk starts at 1pm. You will also be able to purchase a carnivorous plant on the day.

SAT, 18 MAY AT 09:45

AGM Quarterly Gathering

Blaxland Library 33 Hope St, Blaxland, New South Wales

SAVE THE DATE - 17 TO 18 AUGUST 2019 APS NSW GET-TOGETHER IN NEWCASTLE AREA

21 Dec 2018 Heather Miles (APS NSW Administrator)



You are cordially invited to the 2019 APS NSW Get-Together. This not to be missed event is being held at a varied range of locations in the Newcastle area.

There are a range of different native vegetation communities available to explore. Your visit will take you to some of the gems of the area and you will be able to see the spectacular coastal flora at its peak.

Highlights will include a visit to the Hunter Wetlands Centre where you will be welcomed to the Newcastle Groups home base, this will also include the opportunity to purchase from the wide range of native plants produced by the "Thursday Mob". <https://wetlands.org.au>

A visit to the award-winning Hunter Region Botanic Gardens and herbarium is also on the agenda. <https://huntergardens.org.au>

There will be some gentle bushwalks included, these will feature some of the special places that can be found in the Newcastle area. There will also be an evening dinner to look forward to on the Saturday night. More details including registration forms and prices will be covered in the next issue of Native Plants.

GOVERNMENT URGED TO SAVE CARNIVOROUS PLANT SPECIES

thewest.com.au 28 February 2019 Toby Hussey



The Albany Pitcher Plant

Scientists have warned a little-known WA carnivorous plant could soon be extinct without immediate action.

The Albany pitcher plant is an insect-eating plant found only in the moist soils of south-west WA between Augusta and Cheynes Beach, but it is under threat.

Like most carnivorous plants, it feeds on insects including ants by luring them into its pitcher-like trap with a sweet nectar. Once the insect is inside there is no escape, and the plant absorbs it.

However, in a worrying sign Curtin University's Adam Cross warned land clearing and controlled burning had eradicated about 75 per cent of the 55-million-year-old species in a century.

He said the plant had also become prized by poachers wanting an exotic plant for home — or a profit on the black market. "Surveys we've done suggest that fewer than 5000 plants are left in total, in less than 20 populations," he said.

"The current (Department of Biodiversity, Conservation and Attractions) estimate is there's only about 3000ha of that habitat left. "It grows in an area that is just wet enough but not too dry, so it has a very narrow window of opportunity to grow within that rare habitat."

Dr Cross and colleagues at the University of Adelaide hoped their new book, *Cephalotus — The Albany Pitcher Plant*, would help educate about the plant and convince governments to grant it endangered status.

It is a move Dr Cross said was vital to protecting the remaining native habitats. "Our entire intent (was) to highlight the species as a beautiful and unique element of the Australian flora but also highlight its plight and provide an impetus for conservation and management," he said.

"The first and foremost thing is protection of the remaining habitat ... there are still swamps that have been bulldozed in the past 12 months that have the plant."

THE HOLLY FAMILY HAS AN ANCIENT AUSTRALIAN LINEAGE

Australian Geographic March 12, 2019

Holly is as Australian as the old man banksia.

WHEN YOU THINK of the holly plant, you probably think of the ultimate European Christmas: snow, carols and a decorated tree. But like mistletoe, of which Australia is home to more than 90 species, holly has an ancient Australian lineage, one that rivals its European descendants.

Fossil angiosperm leaf types described from the Paleocene Cross Valley flora. *H. Illiciphyllum* sp. IMAGE CREDIT: Tosolini, A.-M.P., Cantrill, D.J. & Francis, J.E



In 2001, Melbourne University palaeobotanist Anne-Marie Tosolini collected holly leaves fossilised in Antarctica that were over 50 million years old. This dates back to a time when Antarctica was attached to Australia's southern end, forming the ancient supercontinent known as Gondwana.

But this wasn't the oldest holly fossil known to science. Rather, the oldest came from Victoria, at around 90-94 million years old, making it the oldest holly fossil pollen ever discovered.

This, according to Anne-Marie, says a lot about the ancient migration of holly and its Australian origins. "What's amazing is that it appeared here and spread across the whole world, and many of these other early flowering plants didn't do that," she says. Tasmanian mountain pepper (*Tasmania lanceolata*), another flowering plant that, like holly, has an ancient presence in Australia, only moved across Gondwana. "It's a really big survivor and must have had a great reproductive strategy making it good at dispersal," Anne-Marie says.

The explanation for this lies in the way ancient holly was pollinated. "Today, holly is pollinated by insects, but back then it was likely pollinated by wind, which is why the pollen is very abundant in the fossil record," Anne-Marie explained.

"Looking at the fossilised pollen, the oldest is from Australia, then from Africa, then it spread north up into Asia and Europe."

Australia is now home to just one species of holly (*Ilex arnhemensis*), one subspecies in Arnhem Land in the Northern Territory, and second subspecies in the Cape York Peninsula in far north Queensland.



Ilex arnhemensis. pic. Flickr.com

"In Australia, today, holly live in humid conditions. However, the family does have a wide range and they're not just tropical, they can spread into cold temperatures as well," Anne-Marie says, but the fossil record suggests they loved the humid weather. "We know from fossils during the Early to Late Cretaceous Period that it was very warm and there wasn't much ice in Antarctica. Carbon dioxide was plentiful, and so they would have thrived."

For such a successful plant, the fact that their Australian origins is relatively unrecognised is disappointing. "More well-known are the Proteaceae and Antarctic beech. They formed the big forests, so they get more recognition, but holly is even older than those plants."

MARIA SIBYLLA MERIAN PROVED CATERPILLARS BECOME BUTTERFLIES. THEN HISTORY FORGOT HER

Theconversation.com February 21, 2019 Tanya Latty



A colour portrait of Maria Sibylla Merian by Dutch artist Jacobus Houbraken, circa 1700. Wikimedia Commons

Most school kids can describe in detail the life cycle of butterflies: eggs hatch into caterpillars, caterpillars turn into cocoons and cocoons hatch. This seemingly basic bit of biology was once hotly debated. It was a pioneering naturalist, Maria Sibylla Merian, whose meticulous observations conclusively linked caterpillars to butterflies, laying the groundwork for the fields of entomology, animal behaviour and ecology.

Maria Sibylla Merian was born in 1647 in Frankfurt at a time when the scientific study of life was in its infancy. Although she was trained as an artist, Merian is arguably one of the first true field ecologists. She studied the behaviour and interactions of living things at a time when taxonomy and systematics (naming and cataloguing) were the main pursuit of naturalists.

Like most modern entomologists, Merian's passion for insects started early. At 13, she began collecting and raising caterpillars as subjects for her paintings. She often painted by candlelight, awaiting the moment when a caterpillar formed its cocoon or a newly formed butterfly later emerged from it.



Image from Merian's *Metamorphosis Insectorum Surinamensium*. Wikimedia Commons.

Merian painted caterpillars feeding on their host plants and predatory animals feeding on their prey. She was intent on capturing not only the anatomy of her subjects, but also their life cycles and interactions with other living things. Rather than working from preserved specimens (as was the convention of the time), she captured the ecology of species, centuries before the term even existed.

The fact that Merian found the time to conduct her studies is a testament to the power of a curious mind. Unlike many male naturalists of her day, Merian did not have the freedom to devote all of her time to the study of insects.

In 1665, at the age of 18, Merian married her stepfather's apprentice, painter Johann Andreas Graff. Her first daughter, Johanna, was born in 1668 and in 1670 the family moved to Nuremberg. Her second daughter, Dorothea, was born in 1678.

Merian's marriage appears to have been an unhappy one. In 1685, she left Graff to live in a religious community, taking both daughters with her. In 1692, Graff formally divorced Merian.

As a mother of two, Merian was responsible for home-care and child-rearing. She secured her family's finances by teaching painting to the daughters of wealthy families. In many ways, she was one of the first "science moms", trying to balance the challenges of her research against a demanding family life. All of this at a time when women were still being burned as witches – being a curious, intelligent woman was very hazardous indeed.

In Surinam with her daughter

Merian's work on caterpillars was a key contribution to an ongoing debate of her day.

On one side were those who believed that life arose from inanimate matter; flies, for example, arose from rotting meat; other insects formed from mud, and raindrops produced frogs.

On the other side were those who believed that life arose only from pre-existing life.

By breeding butterflies from egg to adult for several generations, Merian showed definitively that eggs hatched into caterpillars, which eventually turned into butterflies.

Merian's books on caterpillars (published in 1679 and 1683) would have been enough on their own to earn her a place in science history. But in 1699, at the age of 52 and with her youngest daughter (then aged 20) in tow, she embarked on one of the first purely scientific expeditions in history. Her goal was to illustrate new species of insects in Surinam, a South American country (now known as Suriname) only recently colonised by the Dutch.

After two months of dangerous travel, the two women arrived in an entomologists' paradise. Surrounded by new species, Merian was itching to collect and paint everything she could get her hands on. She immediately ran into problems, however, as the Dutch planters of the island were unwilling to help two unaccompanied women collect insects from the forest, a mission they believed to be frivolous.

So Merian forged relationships with enslaved Africans and Indigenous people who agreed to bring her specimens and who shared with her the medicinal and culinary uses of many plants.

For example, Merian writes that enslaved Amerindian women used the seeds from particular plants to abort fetuses in order to spare them from the cruelty of slavery. It is a stark reminder of the unmitigated horrors of 1600s colonialism.

Merian and her daughter worked in Surinam for two years before Merian's failing health forced her to return home. The book that resulted from her time in Surinam, *Metamorphosis Insectorum Surinamensium*, was well known in both artistic and scientific circles. Merian's eldest daughter Joanna eventually made the journey to Surinam and would send her mother new specimens and paintings until Merian's death in 1717.

Charles Darwin's grandfather cited Merian

I am an insect ecologist and a field biologist, and Merian's work forms the very foundations of my discipline. Yet I am ashamed to confess that until



Maria Sibylla Merian, illuminated copper-engraving from *Metamorphosis Insectorum Surinamensium*, Plate XXIII. *Solanum mammosum* 1705. (Wikimedia Commons)

relatively recently, I was unaware of the magnitude of Merian's contribution to biology. It has only been in the past few decades that recognition for her scientific contributions have had a resurgence.

How did such a scientific superhero all but disappear from science history?

Merian was well known in her time. Karl Linnaeus, famous for developing a system for classifying life, referred heavily to her illustrations in his species descriptions.

The grandfather of Charles Darwin, Erasmus Darwin, cites Merian's work in his book *The Botanic Garden*. But after her death, inaccuracies began to creep into the hand-painted copies of Merian's books. New plates with imaginary insects were added while others were recoloured to be more aesthetically pleasing. The careful attention to detail that made Merian's work so incredible was gradually eroded.

In the 1830s, naturalist Lansdowne Guilding — who had never visited Surinam — wrote a scathing critique of Merian's work in a book entitled *Observations on the Work of Maria Sibylla Merian on the Insects, of Surinam*.

He uses words like "careless", "worthless" and "vile and useless" to describe Merian's engravings, which he felt were riddled with inaccuracies. Many of the errors Guilding attacks were added after Merian's death and were not faithful to her original work.

There is also a strong undercurrent of sexism in Guilding's critiques — in one place he accuses Merian of ignoring facts "every boy entomologist would know".

Guilding attacks Merian for relying too heavily on the knowledge of African slaves and Amerindians, people he regarded as unreliable.

'Flights of fancy' not fanciful after all

The fact that Merian was an artist who had no formal scientific training also played a role in the efforts to discredit her.

By the 1800's, biology was practised by university-trained academics and self-trained naturalists like Merian were now treated with an air of disdain.

Gender gap in science

It could take centuries to bridge the gender gap in academic fields like physics and maths, according to new research which has found women continue to be significantly underrepresented in the hard sciences.

Never mind the fact that women of Merian's day were barred from university educations. It didn't help that some of Merian's observations sounded fantastical — she claimed that in Surinam there lived tarantulas that ate birds, and ants that formed bridges with their bodies.

These claims seemed too odd to be true and so began to attract considerable scepticism. Other authors began to see Merian's observations as the flights of fancy of an old woman far outside her depth.

And so Merian ceased to be remembered as a pioneering naturalist, and was instead dismissed as an old woman who painted beautiful — but entirely unscientific — pictures of butterflies.

Although her work continued to inspire and influence generations of artists, her contributions as a scientist were largely forgotten. Modern scientists have since confirmed the "bird-eating" tarantula's habit of occasionally consuming small birds and we now know that army ants do indeed build bridges out of their living bodies.

Merian's "flights of fancy" were not fanciful after all

NOT JUST FOR LOOKING AT: THE RELATIONSHIP BETWEEN PLANTS AND PEOPLE

landscapeaustralia.com February 24, 2017 Matthew Higgins

Gardens are one place where people have a close relationship with plants. But these relationships happen in other places too, where they can be quite different and can change significantly over time. This article looks at the uses of some native plants by Indigenous and European Australians before the declaration of parks and reserves from the mid-20th century onwards.



A stand of ancient, bowed snow gums. Image: Matthew Higgins

When we enter national parks, our relationship with plants is essentially a visual one. We look at plants, sometimes feel them, and some of us study them. So there can be an intellectual and an emotional connection with plants. But of course we cannot use them, as the plants are protected in these conservation estates. For previous generations of both Indigenous and settler Australians in these areas, the relationship between plants and people was very different. It was a utilitarian one. People used these native plants for a range of purposes, and their survival depended on native plants.

In this article we take a wander in Australia's southeast. Our route from Canberra up into the high country is conservation estate for most of the way. It includes parts of the ACT's Canberra Nature Park at around 700 metres elevation, the Murrumbidgee River Corridor, Tidbinbilla Nature Reserve, Namadgi National Park, and Kosciuszko National Park in NSW with the nation's highest point at 2228 m.

A long history

Ngunnawal, Ngambri, Ngarigo and Wolgalu peoples knew this area for thousands of years, while the Gundungurra, Yuin and Wiradjuri visited. Indigenous use of plants, whether for food, tools, ceremony or other purposes, was vast. Knowledge of some of that use has been retained in the excellent book *Ngunnawal plant use*, compiled by Ngunnawal elders and published by the ACT Government in 2014. Indigenous rangers too keep the knowledge alive and lead walks for visitors. So although the way of life changed hugely for Aboriginal people following contact, many elements of this key aspect of culture have been retained and increasingly are being shared.

Collecting food plants was the work of women and children. Tubers, an important food source, included yam daisies (*Microseris lanceolata*), known as dharaban in Ngunnawal, mewan in Ngarigo, or murnong. They were cooked for eating, as were tubers of the bulbine lily (*Bulbine bulbosa*), found in grassy woodlands over an extensive elevational range along our route.



Yam daisies were an important food for Aboriginal people. Image: Matthew Higgins

Cherry ballart or native cherry (*Exocarpos cupressiformis*) – mummadya in Ngunnawal – yielded food and timber for implements. The food was the small red fruit stalks (pedicels) which appear in summer. The tough native cherry timber was used for spear throwers and also by some nations for a cultural device, the bullroarer. Bullroarers were whirled around the head to make a vibrato sound during initiation and burial ceremonies, the sound representing that of a Dreaming ancestor. Bullroarers are found in African, Asian, European and Native American cultures, as well as in Australia.

Grass trees (*Xanthorrhoea australis*) had multiple purposes and are found in dry sclerophyll forest (forest dominated by eucalypts and wattles), as at Tidbinbilla. Ngunnawal people soaked the plant's flower spike in water to make a sweet drink, and ate the soft leaf bases and the growing point of the flower stems. Flower stems were also used to make a base for a drill for fire-making, and the resin produced by the species was utilised as a glue in weapon production.

Reeds and rushes may be found along the Murrumbidgee, in Namadgi and Kosciuszko. Indigenous women sought them to weave baskets which were used to carry plant foods. Grasses and fibrous bark were used to make string for nets, bags and mats.

Numbers of plants had medicinal uses. Native geranium (*Geranium solanderi*) leaves gave relief from burns and blisters, false sarsaparilla (*Hardenbergia violacea*) leaves made a mouthwash helpful with ulcers and chest infections, and blackwood (*Acacia melanoxydon*), or nummerak in Ngunnawal, had bark which when heated and infused in water was used for rheumatism.

Other plants were used as a flavour enhancer, like the well named mountain pepper (*Tasmania lanceolata*). Cauliflower bush (*Cassinia longifolia*) was burned to cleanse places or spirits during ceremony.

Fire in the landscape

The major land management tool used by Aboriginal people was fire, and it was used to control plants in various ways. The bush was burnt in a

mosaic of cool burns to promote grass and attract game for hunting, to flush out prey animals, to stimulate growth of certain plant foods (eg tubers and grass seeds), to maintain access and control fuel, to define territory, and for ceremony. Just as the relationship between Indigenous Australians and plants was intimate, so was the way they used fire in that relationship. 'Cultural burns' are being reintroduced by Indigenous rangers in the high country today. As ACT Aboriginal Fire Project Officer Dean Freeman said, 'We are keen and enthusiastic about reintroducing cultural burns to the Australian Alps to continue a process of maintaining country'. Understanding of Aboriginal use of fire continues to grow, as does Aboriginal use of plants, with writers suggesting Aborigines were not simply gatherers but actively practised agriculture by sowing, harvesting and storing plant foods.

As Europeans settled this part of Australia they learned about some of its plants. Given that settlers brought their food culture with them, little use was made of native plants for food, and the relationship was mostly one of plant utilisation for feeding the stock they grazed and for building the structures that made the Europeans' life on the land possible.

Native grasses were important sources of food seeds for Aborigines. They also provided the settlers' first pastures – kangaroo grass (*Themeda triandra*), which declined in palatability as it matured; the more nutritious wallaby grass (*Austrodanthonia*); and snow grass (*Poa sieberiana*) which (like kangaroo grass) responded to burning to bring on new growth. So, burning of grasslands became the norm. Burning by graziers also kept woody plants at bay and grasslands open. So extreme was the practice that its deleterious impact on catchments was a major factor in the NSW Government's decision to terminate grazing in the highest mountains in 1944 and declare the then Kosciuszko State Park.

Timber trees

Along our route, red stringybark (*Eucalyptus macrorhyncha*), red and yellow box (*E. polyanthemos* and *E. melliodora*) and snow gum (*E. pauciflora*) were all used for fencing, and stringybark for shed and yard building. Higher up in the mountains, near the majestic cool-climate stands of alpine ash (*E. delegatensis*), straight-grained ash built many of the huts and homesteads of the mountain people.

A high-country eucalypt with an interesting cultural story is black sallee (*E. stellulata*). Its name to mountain people was muzzlewood, because it was the desired timber for hand-carving calf muzzles. These oval-shaped plates were hung over the mouths of calves to wean them from cows. So prevalent was the practice that not only did the tree get a local name, but places where the tree grew abundantly were sometimes named after it as well – there's a Muzzlewood Flat on the Alpine Way.

Commercial use of forests was seen in the Brindabellas during the post-war years when Canberra badly needed construction timber. Logging at Bulls Head saw brown barrel (*E. fastigata*) felled – initially with axes and crosscut saws, then with chainsaws – and trucked to Canberra sawmills for more than a decade. Few people realize that Namadgi's mountain forests helped build modern Canberra.

Aboriginal and settler Australians used fire in various ways to manage the land, using fire for cooking and warmth. As Alps bushfires like those of 2003 showed, almost anything in a park will burn if enough heat is applied, but certain fuels are better than others, and Aborigines and Europeans in the mountains selected their firewood accordingly. Apple box (*E. bridgesiana*) burns very poorly and black sallee makes indifferent firewood. But snow gum, like its lower altitude eucalypt cousin yellow box, burns well.

When Aboriginal people gathered among the peaks to harvest bogong moths and have ceremony and trade with other clans, and when the newcomer Europeans camped with their stock or sat by hut hearths, the sweet smell of snow gum smoke would have been a familiar and satisfying aroma to both.

For these earlier generations, the bush was a place of utilitarian connection, a place where people closely interacted with plants and variously modified the landscapes in which they lived.

WOLLEMI PINE OVERSHADOWING HIS OWN RARE TREE FIND

ABC Gold Coast December 22, 2018 Tom Forbes



Photo: Botanist David Jinks in 2018, returned to visit the Springbrook Leatherwood he discovered in 1993. (Supplied: David Jinks; ABC Gold Coast: Tom Forbes)

If you have never heard of the Springbrook Leatherwood tree it may be because it was discovered around the same time as another living fossil — the headline-grabbing Wollemi Pine.

Botanist David Jinks was walking through a remote section of the Springbrook National Park, west of the Gold Coast, in 1993, when he came across an unusual looking rainforest tree.

"I never expected to discover a tree," he said.

Dr Jinks collected samples and testing revealed it was an undiscovered species of *Eucryphia*, an evergreen plant that is only found in Australia and South America. "It's one of the few trees we have that link us directly to the supercontinent Gondwana," said the botanist. "There's *Eucryphias* in Tasmania, *Eucryphias* in far north Queensland and now we've got *Eucryphias* in south-east Queensland, so it links up the extent of them over the latitude."

A second stand of the subtropical trees was then discovered inside the National Park and it is estimated there are as few as 400 plants in existence. "The fact that there are so few left now, probably means that they were on a decline naturally and they're hanging on here because it's a relic — the conditions are just perfect enough for them to survive," Dr Jinks said.

Former Queensland Herbarium botanist, Dr Bill McDonald said the discovery of the Springbrook Leatherwood cannot be underestimated. "It was one of the most significant botanical discoveries, in certainly eastern Australia, in probably the last 50 years," he said.

To the untrained eye, the Leatherwood, which grows up to 30 metres in height, resembles many other rainforest trees, but Dr Jinks said the species has some physiological anomalies. "It really is a quite a unique tree," he said. "There some really strange physiological things it does with its leaf, it changes leaf sizes and shapes when it flowers."

The more 'iconic' Wollemi Pine

A few months after Dr Jinks found the Springbrook Leatherwood, a former New South Wales National Parks and Wildlife employee, David Noble discovered the Wollemi Pine.

Located in a series of steep-sided gorges inside the Wollemi National Park, west of Sydney, the coniferous tree was thought to be extinct. The critically endangered tree attracted international attention and a recovery plan was drawn up, outlining strategies to manage the fragile population.

Dr Bill McDonald, who retired from Queensland Herbarium after 40 years service, said a decision was made 25 years ago to keep the location of



Photo: Adult Wollemi Pines in the wild. (Supplied: J Plaza/Van Berkel Distributors)

the Leatherwood sites secret. "Being a conifer, the Wollemi Pine had that little bit more, whatever you want to call it, iconic status and this [Springbrook Leatherwood] really slipped under the radar," he said.

David Jinks said he was happy for the Wollemi Pine to grab the headlines. "My concern was more for the tree," he said. "I was happy that it was protected and didn't have people traipsing after it. "There are collectors that will come from all around the place to try and find a rare plant, and I know that the Queensland Herbarium and National Parks are very concerned that this would be a 'let's go find the *Eucryphia*' situation."

Dr Jinks agrees the discovery of the Wollemi Pine was significant, but he believes the Springbrook Leatherwood or *Eucryphia Jinksii*, which was named after him, is more beautiful. "One thing that New South Wales should be jealous about is that the *Eucryphia* has a beautiful big white flower," he said. "The Wollemi doesn't have a flower, so this is a much nicer plant than the Wollemi Pine."

Threats to Springbrook Leatherwood

The Springbrook Leatherwood may be safe from indirect human intervention, but Dr Jinks is worried about its long-term future.

"The threats that they're facing now relate to water, I am convinced they are dependent on permanent water," he said. The botanist believes rainfall patterns are changing and the Springbrook National Park is experiencing drier periods than it once did.



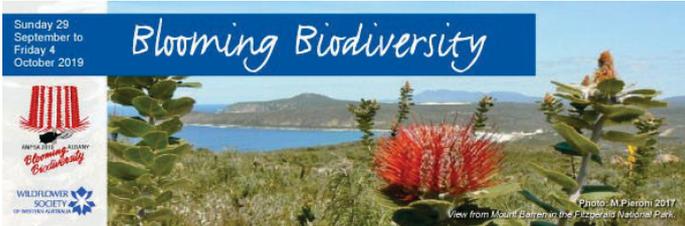
Photo: A Springbrook Leatherwood tree. (Supplied: David Jinks)

He also said the level of cloud rain, which can supply up to 30 per cent of the rainforest trees' water, is gradually lifting and nearby water extraction may be impacting on the ancient species.

Queensland Parks and Wildlife ranger, Ebony Hall manages the 6,197-hectare Springbrook National Park and said she is aware of the ancient species and its significance. "It's been given World Heritage status for a reason and we're here to maintain that status," she said. "Everything is a threat to this area and it's such a smaller area that it needs that level of protection."

Future prospects

Dr Jinks estimates the Springbrook Leatherwood has been growing on earth for up to 40-million years. He said there have been multiple efforts to propagate the tree, with just one successful planting, which occurred inside the national park. "I'd like to find a PhD student to answer some of the theories we've got about why it's here and why it's not somewhere else," Dr Jinks said.



ANPSA – Albany 2019 – Overview

Why come to Albany, Western Australia?

- Biodiversity – extraordinary range on impoverished soils
- Fascinating vegetation communities
- High proportion of endemic plants
- Knowledgeable tour and trip guides
- Stimulating program of speakers
- Study Group gatherings

When

- **Sunday 29 September to Friday 4 October 2019**
- Tours the week before and week after

Getting to Albany

Fly to Perth

- Albany is 420km south east of Perth by road
- Take a one-way pre-conference tour from Perth to Albany
- Take a one-way post-conference tour from Albany back to Perth
- Regional flight with Rex Airlines between Perth and Albany
- Transwa Government bus, 3 routes – comfortable and cost effective

Driving from the East

- Turn south at Norseman on Hwy 1, via Esperance – 650km
- Continue west from Norseman, good gravel road through the Great Western Woodland to Hyden, then sealed – 680km



Tours

- Three pre-conference tours from Perth and finishing in Albany, and three post-conference tours from Albany finishing in Perth:

East – Sorry, but the Eastern tour will not take place due to lack of accommodation.

North – Perth to Mt Lesueur, then Wongan Hills and an inland route to Albany (and reverse post-conference) – 6 nights

South-western – Perth, the Swan Coastal Plain to Busselton, and through the forests to Albany via Pemberton (and reverse post-conference) – 4 nights

South-eastern – Perth through Dryandra and Kojonup to Albany (and reverse post-conference) – 1 night

One tour beginning in Albany and finishing in Albany, both pre and post conference **Albany to Ravensthorpe**, Esperance (including Fitzgerald River NP) and return to Albany - 5 nights

Half-day pre-conference tour:

Two half day tours will be offered for Sunday 29 Sept 2019. One of these tours is envisaged to be a bus/coach hop-on hop-off tour around Albany to see the natural highlights and the other one is a 2 coach tour to Torndirrup National Park and the Whaling Centre, with a maximum of 50 people in each of the 2 coaches.

ALL REGISTRATIONS MUST OCCUR ON SATURDAY OR SUNDAY AS TOURS COMMENCE ON MONDAY MORNING.

Draft Programme (subject to change)

- **Sat 28/9** – Albany Wildflower Show last day (early registration available)
- **Sun 29/9** – Short local tours, Registration, AGM, Welcome Reception

- **Mon 30/9** – Day excursion (see below)
- **Tues 1/10** – Talks and AJ Swaby lecture
- **Weds 2/10** – Day excursion (see below)
- **Thurs 3/10** – Talks and Conference Dinner
- **Fri 4/10** – Conference talks and Farewell

During the Conference, two days will be allocated to full day excursions. We will be running 3 destinations both days with a maximum of 100 guests to each destination. **Conference attendees will be able to go on only two of the tours.**

Full day Conference Tours:

1. Stirling Tour

Stirling National Park 30 Sept and 2 Oct 2019

Take in the majestic sights of Stirling Range National Park. The Stirling Range stretches for 65 kilometres from east to west and is regarded as an area of great biogeographic and evolutionary interest. The area supports 1,500 plant species, of which at least 87 occur nowhere else in the world. The park is home to five major vegetation communities: thicket and mallee-heath on the higher ground; and woodlands, wetlands and salt lake communities on the lower slopes and plains.

2. Mt Barker Tour

Greens Pool, Mt Barker, Tenterden 30 Sept and 2 Oct 2019

This excursion will take you to some of the lesser known gems that lie to the south and north of Albany. You'll visit William Bay National Park and see the aquamarine waters of an iconic beach and learn about coastal vegetation. You'll stop at an old quarry between Albany and Mt Barker that is rich in native flora, and visit the Banksia Farm in Mount Barker with its famous botanic garden. You'll also be shown a secret orchid spot and visit a private property in Tenterden, situated on a biodiverse woodland west of the Stirling Range.

3. Porongurups Tour

Porongurups and Cheynes Beach 30 Sept or 2 Oct 2019

On this excursion you'll travel north and east of Albany to visit a community conservation reserve at the base of the ancient granite domes of the Porongurup National Park. This reserve has a rich diversity of soil types and therefore habitats, and you'll hopefully see spectacular fields of wildflowers. You'll also visit the lower slopes of the Porongurup National Park to look for the delicate orchids that flourish there. Lovers of the coast will enjoy the rugged Cheynes Beach, where you might spot whales and birds after you've finished hunting for wildflowers in the coastal heath.

Accommodation

Albany a popular holiday city.

Full range of accommodation options close to conference venue. Early booking of accommodation is advised. Conference week is the first week of WA school holidays.

- Conference rates at selected places.
- Recommend Albany Visitor Centre for bookings.

For registration and full conference details:-

<https://meetingmasters.eventsair.com/QuickEventWebsitePortal/bloomingbiodiversity/eventinfo>