Fronds

Friends of the Australian National Botanic Gardens
Number 100 April 2022

Celebrating 100 issues

Friends of the Australian National Botanic Gardens

Fronds is published three times a year. We welcome your articles and photographs. **The deadline for articles is mid-February for the April issue; mid-June for the August issue and mid-October for the December issue.** Email material to the *Fronds* Committee at the above email address or place in the Friends letterbox, located inside the Gardens Visitor Centre, between 9.30 am and 4.30 pm, Monday to Sunday. Editorial messages: telephone (02) 6250 9548.

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Jill More

Friends Lawn: View of plantings and the new deck area of Pollen Café from re-aligned Main Path

In this issue

Cover: Flannel flowers, *Actinotus helianthi* by Brenda Runnegar. From the Photographic Group exhibition. This photo was purchased by the Friends Council and presented to the Gardens.

Friends Lawn now open

Craig Cosgrove

The Friends Lawn project introducing many new features to the café deck and lawn is now complete and open to visitors, despite some challenging circumstances such as the COVID-19 lockdown and extensive rain throughout the project.

Stage one works encompassing an expanded café deck, surrounding landscaping with associated paths, plantings and retaining walls and the concrete terraces were completed and opened to the public by the end of 2021. Installation of the lawn, the remaining retaining walls and Main Path, secondary paths, signage, additional planting, pram ramp, ceremony garden, underground services and the intersection leading to the National Conservatory site were all part of Stage two.

As the project evolved, design changes included three additional pathways, more planting spaces and supplementary lighting. The Main Path includes lighting which will continue through to the Ian Potter National Conservatory for night-time events.

The new intersection at the northern end of the Ellis Rowan Building will improve access to some of the Gardens' key attractions including the Paperbark Treehouse, the Children's Trail, the Banksia Garden, the National Conservatory and Main Path.

The lawn was planted out with a Canberra Blend lawn mix selected to withstand the expected high use by visitors. Surrounding plantings include Tasmanian species of *Spyridium*, *Nothofagus*, *Anopterus*, *Eucryphia*, *Athrotaxis*, *Eucalyptus* and *Lomatia*. A small fogging system has been installed to create a microclimate for these plants and aesthetic appeal for visitors. Other plant species include *Poa* and Kangaroo grasses, Australian *Frangipani*, *Grevillea*, *Telopea*, *Prostanthera* and many more - come and see for yourself!

The lawn project was made possible by the generous contribution from the Friends of the Gardens. An inlay with the words 'Friends Lawn' in the concrete terrace has been installed to publicly acknowledge this contribution.

David More

The redeveloped East Core Precinct has been named 'Friends Lawn', to acknowledge the contribution made by Friends to this project.

New deck area is a hit with guests

Managing Director of Pollen Café, Tracey Keeley, reported that feedback about the new deck has been positive, with guests loving the area.

"The increased space has enabled everyone to enjoy our great Canberra outdoors, surrounded by beautiful gardens. It makes for a wonderful escape for family and friends who enjoy gathering outdoors in the fresh air. And for those who enjoy great food and great company, it provides the much sought-after dining combination."

Tracey also said that the service window, initiated in response to COVID-19 requirements, has actually been a wonderful addition.

Guests can now also order and pay for meals and beverages on their phones using an app.

"We are able to offer contactless ordering and payment services to our guests, where we can deliver meals and drinks to you at your table. Less time lining up and more time spent with friends and family."

The Pollen menu is constantly being refreshed: each month little tweaks are made to various menu items.

"Most items on our menu have become draw-cards for people returning to our cafe to experience a dish that they have been craving for. Our constant changing backboard menu is also a wonderful way for our chefs to create new dishes to enjoy," said Tracey.

A new take on the scientific value of the ANBG Living Collection

Brendan Lepschi, Curator at the Australian National Herbarium
Rosemary Purdie, Honorary Living Collections Botanist, ANBG

For centuries, dried plants held in herbarium collections have underpinned plant taxonomy and systematics. The physical characteristics of the specimens (leaf size and shape, flower colour, number of petals etc) have allowed scientists to distinguish between different species and describe them (taxonomy) and explore the evolutionary relationships between groups of plants (systematics).

In recent decades scientists have been revisiting the dried specimens to extract tiny leaf samples that can be used to determine their genetic makeup through DNA analysis. The Centre for Australian National Biodiversity Research (CANBR), that brings together the plant collections of the Australian National Herbarium (ANH) and the ANBG, regularly receives requests for genotype samples from plant specimens held in the Herbarium. Increasingly, ANBG receives similar requests, but for samples from plants growing in the Gardens. Use of the herbarium and living collections in this way means scientists across the world can access genotype material without the need to do their own field trips and collect in the wild, saving time and money.

The value of using living collections in botanic gardens as a major source of genotype material was recently recognised with the establishment of the Global Genomics Initiative for Gardens (GGI-G). The Initiative aims to preserve and understand the genomic diversity of life on Earth. GGI-G is an international partnership of botanic gardens and arboreta that is tapping into and preserving the genotype resources of their living collections. In early 2021, CANBR was one of 14 institutions across the globe to receive a small grant to initiate this work. The grant meant collecting between 250 and 300 genotype samples from the ANBG Living Collection, storing them permanently in ANH and making them accessible to the global scientific community.

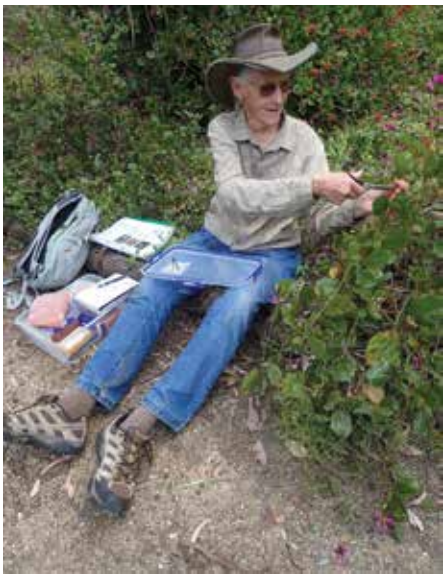
Exactly what did the grant involve? The basic criteria for selecting taxa were deceptively simple:

- each living plant from which a genotype sample was to be taken needed to have a voucher in the herbarium with a known provenance and collection date;
- for plants collected after 20 October 2014, when the Nagoya Protocol came into effect, certainty was required that both the herbarium specimen and live material collected for propagation in the Gardens were obtained under an appropriate permit; and
- the plants needed to be species that occur naturally in Australia's eastern seaboard, which we defined very broadly as plants from anywhere in Queensland, NSW, ACT, Victoria, Tasmania, Norfolk Island and Lord Howe Island.

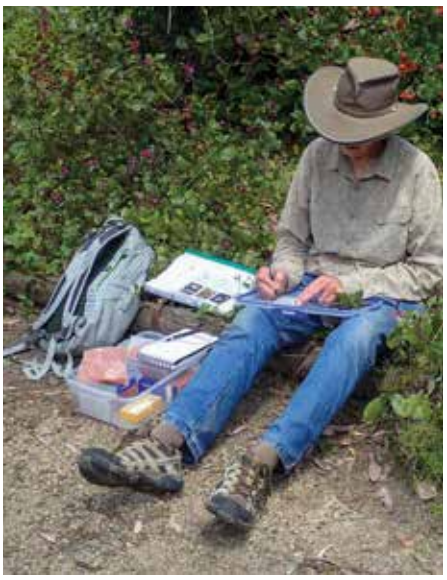
Meeting these requirements was going to require a lot of background checking before a target list of plants could be compiled, but where to even start when

Murray Fagg

Rosemary Purdie checking location of target species (*Kennedia retrorsa*) on iPad using *Find A Plant*



Removing leaf sample from plant



Writing information (species name, Purdie collecting number and collection date) on glassine envelope

there are 4,300 species in the ANBG living collection (and many, many more accessions) to choose from?

We decided to tap into recent ANBG work to prioritise the conservation value of all plants in its Living Collection, and build our GGI-G target list on Priority 1 and 2 species. These cover the Gardens' highest conservation value plants, and include species listed as critically endangered, endangered or vulnerable in the wild; very narrow endemic taxa (including undescribed or recently described species); species with restricted distributions known to have been severely affected by the 2019–20 summer bushfires; and montane species whose habitat is threatened by global warming. This approach narrowed the task down to checking the details of just under 1000 Living Collection accessions. The work was carried out progressively in May, June (P1 species), July and August (P2 species), by interrogating the ANH Specimen Information Register database for herbarium specimens and ANBG's Integrated Botanical Information System database for the living collections. By late August we had a target list of 327 species that met the three criteria.

Deciding which taxa to take genotype samples from was more straightforward than finding out where they grew in the Gardens, how to find the correct plant, and how to collect the samples efficiently! To provide a basis for this, tables were compiled during July and August showing, for each species, the plant's name and target accession numbers, a photo of the flowers and/or foliage (most from ANBG's Australian Plant Image Index), a list of locations, and, for those not in the nursery or glasshouses, a screen grab from *Find a Plant* showing the within-section location of accessions. The screen grabs were 'translated' onto hand annotated maps showing the collective locations in the Gardens of all the target species. The annotated maps ranged from specific sections that included many target species (e.g. section 189b or section 191) to general maps where the targets were more spread out (e.g. southern rainforest, northern rainforest, central-eastern beds, western beds etc).

Genotype sampling commenced in late September when ANBG approved special access to the Gardens during the COVID-19 lockdown. The work involved systematically searching for all the target plants in a given section/area, finding the name tag to be sure the plant was the correct accession, removing suitable leaf material for a single layer to fill one 7 x 9.5 cm envelope, and then immediately placing the envelope in an air-tight container filled with silica gel to start a rapid drying process. The DNA in leaves dried in this way is of higher quality than oven-dried leaves or herbarium specimens, and can be stored indefinitely under appropriate conditions. Back in the Herbarium, the envelopes were left in larger containers of silica gel until the leaf samples within had dried completely. The envelopes were then removed and placed in other airtight containers for permanent storage.

By mid-November genotype samples had been collected for 278 taxa and stored in the Herbarium. Nineteen species on the original target list have been omitted: some plants could not be found or had recently died, some were too sickly or small to remove any leaves, a few plants had lost their name tag, and a couple of *Eucalyptus* plants were too tall to reach their leaves (even with a long-handled extension pruner!). Collecting continued into early December, to 'mop up' the remaining target species, with the project completed in late December 2021.

The GGI-G project highlights the important value of the ANBG Living Collection as a source of genotype material for scientific genomic research and has facilitated the establishment of a new storage system for such material in the Herbarium. The project's success is also a tribute to the data storage systems ANH and ANBG have maintained over many decades that in turn have helped facilitate this new way of using the Gardens' living collections.


Placing leaf segment into envelope


Adding envelope to container with silica gel


Target species *Kennedia retrorsa,* (Coral Pea)

APII ©

Friendly Chatter

Botanic Art Groups

The Botanic Art Groups are looking forward to presenting their 14th annual exhibition *Growing in the Gardens* at the Visitor Centre Gallery. The exhibition is open to the public from Saturday 9 April, but there is a special preview for Friends from 2.30 pm the day before when artworks can be purchased before the public opening. In past years a number of people have queued to have first pick of artworks on sale, so don't be disappointed – come to the preview.

The Committee was delighted that so many members have been able to contribute to this year's exhibition despite the interruptions that have occurred. Artists have worked in a variety of media from watercolour, coloured pencils, graphite and even digital illustration. We encourage members to feel free to explore new mediums to interpret native flora. The exhibition is open everyday until 8 May.

Members of Friends are welcome to join the Botanic Art Group which meets three times each month, circumstances permitting. We paint and draw native plants collected from the Gardens for us by the horticulturalists. There is no formal instruction and the atmosphere is friendly and informal.

Contact:
www.friendsanbg.org.au
or email
botanicart@friendsanbg.org.au
for more information.

We hope you enjoy the bookmark advertising the exhibition sent with this edition of *Fronds* and the images of some of the beautiful works for sale. Please come to the Gardens and visit the gallery during the exhibition. The artists appreciate and are encouraged by comments from the public. Bring your family and friends.

Kate Ramsey

Glenda Shelley
Anigozanthos 'Landscape Tangerine'

Helen Fitzgerald
Eryngium rostratum

Magdelena Dickinson
Corymbia 'Summer Red'

Growing Friends

Time certainly has flown, it was Xmas cards and tree decorations, and then, voila, it's February and another year. And with the abundance of rain, everyone's gardening regimes have changed with hand watering almost a memory!

Although some plants are suffering from the excess of rain, our current propagating sessions will be looking at plants that are best suited to drought and the normally dry heat of Canberra.

Some of the less familiar plants best suited to Canberra's dry conditions are *Callistemon* and *Telopea*. Others, such as *Myoporum montanum* (common name 'water bush' or 'western boobialla') are specifically resistant to fire. These plants also attract bees and birds. All are currently being grown in the Growing Friend's igloo and will be for sale in the near future.

Growing Friends thanks the public for their continued support. For more information on future plant sales, check the Gardens and Friends websites for announcements of upcoming sales, or email:

growingfriends@friendsanbg.org.au.

Donna Growcock

M Fagg APII ©

Callistemon pinifolius,
ANBG November 1988

Nature Journaling

The Nature Journaling Group meets the first Monday of the month, from 10.30 am to12.30 pm. An email is sent out the week before, asking for expressions of interest. At the time of writing there is a limit of 25 persons due to COVID-19 restrictions.

You can contact me at:
lespage26@gmail.com

Lesley Page

Photographic Group

The Photographic Group aims to support photographers in capturing and understanding the beauty of nature with planned activities and presentations. The focus of our photography is the ANBG. The annual Exhibition and the Calendar produced for the Bookshop not only showcase our work but provide a valuable contribution to the Gardens. Show and tell, at our meetings, gives members an opportunity to share their images with other members. Each month we produce a newsletter which details planned activities. COVID-19 has impacted us, but we head into 2022 with new ideas in mind.

In December we held a very successful exhibition with awards selected by three judges external to the photographic group (see review p9). The exhibition was skilfully organised by a subcommittee headed by long-standing committee member Jim Gould. Just over $1500 was raised for the Friends to be used for future development of the Gardens.

To join, send us an email at
photo@friendsanbg.org.au

Alternatively, you can collect a Photographic Group brochure from the foyer of the Visitor Centre, fill it out and place it in the Friends mailbox located in the counter at reception.

Helen Dawes

Volunteer Guides

It's always an exciting time for the guides when ANBG embarks on the task of recruiting and training a new cohort of guides. Now, three years since the previous recruitment, the process is once again underway. Existing guides work with ANBG to provide an excellent training program, with lots of practical components. The existing guides also enjoy mentoring and hearing the fresh ideas the new group brings. We are looking forward to introducing the new guides to Friends later in the year, once their training is complete.

At the same time, the first months of 2022 have given guides much cause for sadness. As you will read in this edition of Fronds, two of our star guides have died. The history of the guides, written in January, pays tribute to Don Beer (p8). Then, in early February we lost Jonette McDonnell.

Jonette was one of the most positive and knowledgeable of guides; she was delightful to work with. She always contributed enthusiastically to the guides group, including teaching and inspiring many guides about birds; and she enriched the experiences of many ANBG visitors (see tributes on p22).

Lesley King

Plant Science Group

Having been in abeyance since early 2020 the Plant Science Group monthly talks are planned to recommence from April on the SECOND Monday of each month (please note change) at 10.30 am in the Theatrette. At this stage the speaker and topic are still under consideration.

If you wish to receive notification of these talks, please email

plantscience@friendsanbg.org.au.

Lesley Harland

Award winning photo from Friends Photographic exhibition:
Thick-lip Spider Orchid by Bill Hall

provided by Helen Dawes

Photographic Group exhibition organiser, Jim Gould, with his award winning photo of eucalypt flowers. *Baby Blue Flowers*

Friends history

The Volunteer Guides

It's 30 years since the first group of volunteer guides started at ANBG. Many of the other botanic gardens volunteer guide groups across Australia, as well as volunteer guides in other national institutions in Canberra, were established around this time, between 1988 and 1992. There was an emerging appreciation that volunteers could offer different qualities and expertise that was otherwise not available to an organisation, and the Gardens had become interested in fostering public engagement with its work. In 1990 the Gardens appointed Anne Joyce to develop a Friends organisation, who in turn established volunteer guides as a core activity. Following recruitment and training, the first guided walks commenced at Easter 1992.

One of the original guides, Doreen Wilson, has only recently retired as a guide (December 2021). As this suggests, there has been exceptional continuity amongst guides, so that the current 2022 team of guides comprises guides from every previous recruitment cohort, including four from 1999, one from 2001, two from 2002, and five from 2005. This has meant that a great depth of expertise and experience has been shared amongst each generation of guides. In 2014 there were 72 guides: the number of guides we aim to maintain.

From the beginning, guides have been a well-connected group, with some engaged in other Gardens activities (such as Growing Friends), and others linked with other Canberra organisations (such as Landcare, National Art Gallery of Australia). They have also been keen contributors to biennial Australasian conferences of botanic gardens volunteer guides. In 2001 and again in 2017 ANBG guides were the conference host and relished the opportunity to showcase our organisational skills as well as the Gardens' wide-ranging collection of Australian flora.

Over time, guides have developed and adapted tours to meet visitors' interests. This adaptability has been possible because of a substantial range of behind-the-scenes organisational systems that we have put in place. Since 2004 the guides group has collected and analysed data on the numbers of visitors taking guided tours, so we know the patterns related to season, time of day and weather, and annual changes, for example.

New technologies have also been transformative: including web browsers and access to an amazing array of resources. Progressively developed by Jill More and other guides from 2010, our own online resource system offers more tailored information to support our roles. Now known as 'Guidesweb', the system offers easy access to distilled and relevant information on many topics, including plant species, stories, guiding themes and tips, and historical information.

Technology continues to change how we work: we have moved to an online system for rosters; and now use small voice amplifiers on walk tours. With the advent of the 'Flora Explorer' electric vehicle in 2012, our repertoire of guided tours was expanded.

While the original set of guides were involved in providing educational tours for school children, later generations have been focused on all visitors providing enjoyable leisure-time excursions through the Gardens with interpretation angles that add interest, such as plant uses, how the plants were named, challenges in developing the Gardens and some quirky stories. There are now seasonal, specific 'themed rostered walks', designed to appeal to regular visitors interested in fresh perspectives or out of the way routes. In 2021 we added a family oriented hybrid bus and walk tour, 'Secrets of the Australian Bush', operating on selected dates in school holidays. For many years guides have made themselves available for booked walks, where groups take a tour at a time of their choice.

Importantly, though, across the 30 years, the basics of guiding and engaging with visitors remain consistent. By guiding visitors, each guide seeks to add something new and fresh to inspire visitors.

Lesley King,
Convenor, Volunteer Guides

The Guides wish to pay tribute to Dr Don Beer, who died on 4 January 2022. Don was Convenor of the Guides in the period 2007 – 2011, and established the role as it currently operates. As an historian, and author of the recently published history of ANBG, *Miracle on Black Mountain*, he was the perfect person to contribute to this article on the history of volunteer guides at the Gardens; and a few days before he died, he and I had made plans to collaborate on an article. Of course, he was still able to contribute, as his book is the main reference for this article.

Don was widely respected by all guides, as a mentor, organiser and friend.

Recovery: photographic exhibition

The *Recovery* photographic competition and exhibition, which ran from 25 November to 12 December 2021, was the eighth annual exhibition of images taken by the Friends of the ANBG Photographic Group but their first competition.

The exhibition supported and raised awareness of the aims and values of the ANBG and highlighted the Gardens' wide-ranging diversity of flora and fauna through photography.

The competition was made possible by a generous donation from the family of the late Friend David Cox and the efforts of Jim Gould, who organised and coordinated it.

There were four categories of images, with monetary prizes of $400 and $200 for winner and runner up prizes in each category.

A total of 48 framed prints by 20 artists were on display, along with a digital display of revolving images of plants, birds and animals in the ANBG.

Award winners and runners up by category are:

- Portraits of a single plant, or group of primarily the same species – Ulli Brunnschweiler and Stephen Playford
- Wildlife images (in the Gardens, but also outside due to COVID restrictions) – David Bassett and Graham Gall
- Creative compositions of banksia plants – Pam Rooney and Irene Lorbergs
- Images of rare, threatened or endangered plants – Bill Hall and Jim Gould.

The award winners in other categories were:

- Council Award – Helen Dawes
- Ranger's Choice – Phil Green
- People's Choice – Graham Gall

One of the three judges and Friend of the ANBG, Brian Rope, wrote a review of the exhibition in which he described the appeal and merit of the winning entries. The review is available from the Canberra Critics Circle website at ccc-canberracriticscircle.blogspot.com/2021/11/recovery

A 2022 Calendar of images produced by members of the Photographic Group is available at the Botanical Bookshop.
The Group encourages potential speakers and new members.

Award winning *Acacia pravissima* by Ulli Brunnschweiler

Award winning *Bejeweled Qualap Bell* by Steve Playford

Award winning *Banksia* by Irene Lorbergs

If you would like more information on the Photographic Group email photo@friends.org.au

Sharon Abrahams

Flowers visited by the Metallic Green Carpenter Bee in the Gardens, 2017–22

Roger Farrow and Tim Leach

The only known breeding population of *Xylocopa aeratus,* the Metallic Green Carpenter bee, in inland southeast Australia is in the ANBG, although the bee is common along the east coast of New South Wales and Queensland. It is now extinct in Victoria and mainland South Australia, although a small population exists on Kangaroo Island that has been threatened by the recent fires.

This conspicuous bee was first noticed in the Gardens by the author on 5 April, 2017. A single female was seen visiting flowers at the top of a small rainforest tree, *Acronychia littoralis*, growing on the edge of the rainforest gully and visible from the main path. On a return visit on 18 April, a female, possibly the same individual, was seen feeding lower down on the same tree and photographed. The origin of this bee is unknown but subsequent isolated sightings outside the Gardens in places like Gundaroo, suggest that the bee arrived under its own volition, as it is a strong flyer.

Female visiting a *Crowea* cultivar flower, autumn 2019

Female carpenter bees were seen in the Gardens in the following summer (November to February 2017–18) suggesting that the bees had successfully overwintered but many more were seen in autumn (March to May 2018). They were photographed on the flowers of a range of different plant species, mostly in the Rutaceae section in the upper part of the Gardens, but also at the edge of the rainforest on the *Acronychia* species. This suggested that the bee was successfully breeding in the gardens although we have never located a nesting site

Female visiting Senna flower, *Senna barronfieldii*

By 2018, contributors to Canberra Nature Map were alerted to the bee's presence and more records came in from different parts of the Gardens, notably the Sydney Region Gully, where the flowers of *Senna barronfieldii* were regularly visited in spring 2018. Males were also observed undertaking courtship activities. The numbers of sightings declined in the following summer (2018–19) but then picked up in autumn, especially on the *Crowea* flowers in the Rutaceae section.

Sightings for the period 2017–22 reached a maximum in spring 2019 but it is not clear if this is due to more frequent visits by observers or more actual bee numbers, although the same bee could have been photographed on a number of different occasions at different places. Numbers of sightings declined in the following summer and autumn (2019–20) but picked up in the following summer of 2020–21. Sightings remained low throughout 2021–22. It should be noted that the *Acronychia* trees were heavily pruned and did not flower between spring 2019 and 2022.

Sightings are both opportunistic and directed. The latter involved searches of a range of plant species in flower during any particular month for visiting carpenter bees. For example, female carpenter bees have never been observed visiting eucalypts in flower or leptospermums, melaleucas and callistemons

Female visiting *Hardenbergia* flowers, spring 2019

as well as many other species. Males are using flowers for an energy source whereas females collect pollen and nectar to provide a food supply for their offspring. The males visit a wider range of species than the females. The most frequently visited species in spring and summer by females are members of the Fabaceae, notably *Senna barronfieldii*, *Callistachys lanceolata* and *Oxylobium robustum* and the Rutaceae, namely the flowers of *Acronychia* sp., when present. In autumn, it is the turn of the *Crowea* cultivars (Rutaceae) to be the dominant species in flower at that time. One of the few peas still in flower in autumn and visited by the bee is *Podolobium aciculiferum.*

The presence of a succession of abundant nectar and pollen sources from September to May is a possible reason why our Gardens can support a breeding population of this species of carpenter bee, although the presence of suitable nesting sites may also be important but these are yet to be identified.

Acknowledgements Thanks to the many contributors to Canberra Nature Map for their sightings of the carpenter bee on different plant species.

Photos by Tim Leach

List of plants whose flowers are visited by the carpenter bee for nectar and pollen

Family	Scientific name	Common Name	Sightings
Fabaceae	*Callistachys lanceolata*	native willow	Frequent
	Hardenbergia violacea	sarsparilla	Occasional
	Oxylobium robustum	golden shaggy pea	Frequent
	Podolobium aciculiferum	needle shaggy pea	Moderate
	Senna barronfieldii	fragrant senna	Frequent
Rutaceae	*Acronychia littoralis*	scented acronychia	Frequent
	Acronychia imperforata	Fraser Island apple	Frequent
	Crowea exalata cultivars	wax flower	Frequent
	Philotheca myoporoides	wax flower	Occasional
	Zieria compacta	a zieria	Occasional
Proteaceae	*Lomatia silaifolia*	fern-leaf lomatia	Occasional
	Persoonia pinifolia	pine-leaf geebung	Occasional
Myrtaceae	*Calytrix tetragona* [1]	cross leaved heath	Occasional
	Leptospermum sp. [4]	tea tree	Occasional
Asteraceae	*Coronidium* sp.[2]	everlasting	Occasional
Rhamnaceae	*Spyridium parvifolium*	dusty miller	Occasional
Hemerocallidaceae	*Dianella* longifolia [1,3]	flax lily	Occasional
Xanthorrhoeaceae	*Xanthorrhoea concava* [4]	grass tree	Occasional

Sightings: Frequent: 10+, Moderate: 3-10, Occasional: 1-2.

1 Not in ANBG (Tuggeranong Hill & Yarralumla), 2 Courtship, not feeding, 3 Not feeding, 4 Male only.

Banksia: the long history of an iconic genus

Elizabeth Truswell

As the Banksia Garden at ANBG is now well established it seems timely to celebrate the history of *Banksia* which has a fossil history richer than almost any other genus of the Australian flora.

The first record of what resembled fossil *Banksia* pollen was published in 1950 by pioneer palynologist, Isobel Cookson. Since then many research papers have dealt with *Banksia* fossils, showing in fine detail leaf shape, leaf cuticle and epidermis, pollen, and more rarely the fruiting body or infructescence. An earlier version of the fossil history was published in the book *Banksias* by Kevin and Cathy Collins and Alex George (2008). Much fossil *Banksia* research published since has been assisted by developments in technology. Better recovery, recording and photographing of fossil banksias, particularly with the Scanning Electron Microscope (SEM) has contributed to a better understanding of their evolution through time.

The functions of fossil leaves from the geological record are not always easy to interpret. They may either be responding to low levels of nitrogen and phosphorous (sclerophylly) or else to dryness, or low water availability (xerophylly). Features such as the way leaf margins are enrolled, offering protection to the stomata – the pores on the leaf through which gases are exchanged or the structure of the stomata themselves, have been used to infer dry climates. Some species show the stomata opening into deep pits (crypts) or grooves. This feature, the encryption of stomata is generally thought to be linked to dry climates, but this is not always clear.

Here I present a selection of species, from five sites, that contribute most to the understanding of *Banksia* evolution. I do not include phylogenetic studies. The relative ages of sites are shown in the Stratigraphic Chart on p14.

Google Maps, Liz Truswell.

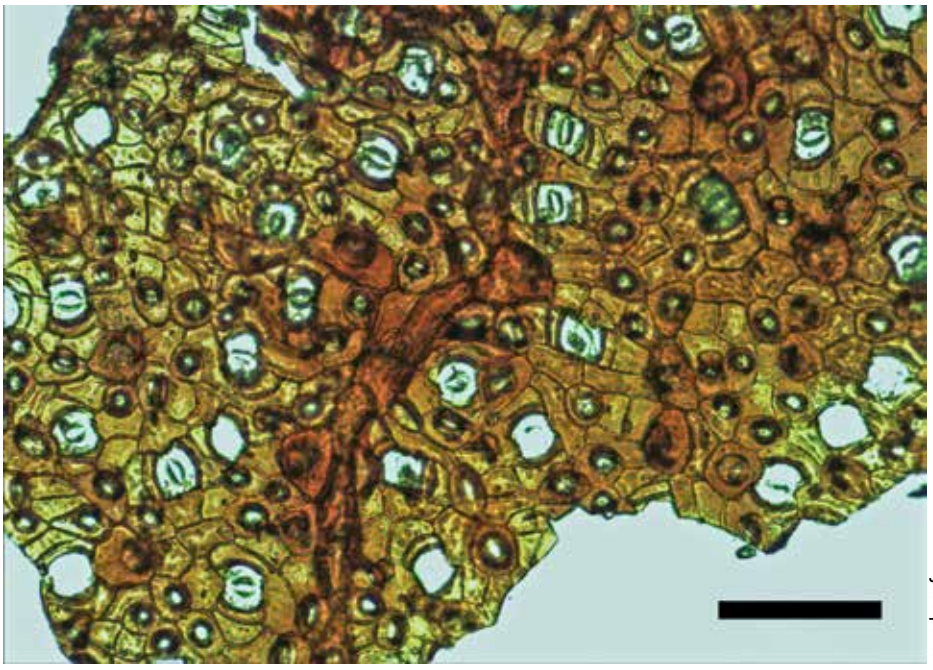
Fossil sites
1. HUC11 Borehole Central Australia.
2. Lake Bungarby, SE NSW;
3. Kojunup, WA;
4. Zanthus Borehole, Southern coasts WA and SA;
5. Merlinleigh Range in northwest WA.

The oldest known *Banksia*

Which are the oldest fossil *Banksias*? This is an evolving story.

In 1987, a borehole, HUC11, drilled in the Bundey Basin in central Australia, northeast of Alice Springs, penetrated siltstones and coaly sediments with abundant pollen, leaf fragments and charcoal. These were dated as Late Cretaceous, somewhere between 66 and 80 million years old — into the age of the dinosaurs. Proteaceae dominate the remains, suggesting an open, sclerophyllous vegetation – a heathland subject to burning. Ray Carpenter, lead author of the study, on examining these tiny leaf fragments, cautiously reported some with features consistent with those of *Banksia*, but they are yet to be formally described.

Further South, geological mapping around Bombala in southeastern New South Wales revealed a volcanic landscape, where basalts flowed over a mountainous surface during the Late Paleocene. Sediments from lakes and rivers deposited on these landscapes yielded a rich fossil flora, including woody debris and leaves attributed to *Banksia*. At one site at 'Lake Bungarby' (a site with lacustrine sediments in the Bungarby region near Bombala) the fossil flora also included podocarp conifers, *Eucryphia* (Eucryphiaceae), *Nothofagus* (Nothofagaceae), Proteaceae, Lauraceae and other plants reflecting Australasian rainforests and perhaps also Australian sclerophyll vegetation. The fossil woods showed clear annual growth rings, with



RJ Carpenter.

Leaf Fragment, from Bundey Basin Central Australia, showing leaf stomata and leaf hair bases consistent with *Banksia*. Scale bar 100 microns (0.0001 metre)

little variation from year to year, growing probably in a cool moist climate. This reflected the high latitudes, around 60° South, when these trees were growing.

Banksia specimens recovered were described as a new species, *Banksia taylorii*, named for sedimentologist, Graham Taylor, who mapped the geology of the area.

RJ Carpenter.

Banksia taylorii from Lake Bungarby, NSW. Part of holotype showing lobed leaves with pointed apices

RJ Carpenter.

Specimen photographed with low angle light to show the venation.

Banksia taylorii has long leaves, with deeply lobed leaflets on either side of the midrib, and a sharply pointed apex. On the under surface the leaf margins are conspicuously recurved. The stomata, viewed with the SEM, are superficial and small. There are no crypts or grooves, but abundant hair bases. The leaves are similar in shape, size and venation to living *B. speciosa* from coastal southwestern Australia and to *Dryandra* (now *Banksia*) *dryandroides* also from that coast. These living species grow in areas with 700 – 800mm annual rainfall in the case of *B. dryandroides*. The fossil species *B. taylorii* could have been growing in a similar, or an even wetter climate. The features of the species are tentatively regarded as sclerophyllic, showing mechanisms for dealing with poor soils, those low in nitrogen and phosphorous, rather than low water availability. It has been suggested that features adapted to drier, xerophyllic environments emerged later in the fossil record.

Banksias of the Eocene

The Kojonup Sandstone flora

Banksia fossils from the Late Eocene in Western Australia apparently flourished under conditions drier for at least part of the year, similar perhaps to those of the south-west today, although summer temperatures may not have been so extreme. Fossil leaves were collected from scattered outcrops of the Kojonup Sandstone, which occur along old drainage lines in the southwest.

A number were collected in the vicinity of the small towns of Kojonup and Walebing. They occur as impressions in silicified sandstone, but the preservation is excellent and allowed detailed examination of preserved cell structures. These were viewed and photographed with an SEM at the University of Adelaide.

The fossil species *B. paleocrypta* was described by Ray Carpenter and colleagues.

The leaves of that species have recurved margins, prominent midveins and teeth on the sides and apex. Veins on the lower surface form a mesh surrounding deeply depressed crypts. The stomata are confined within these crypts, along with thickened leaf hairs. The sunken stomates suggest that *B. paleocrypta* probably grew under a climate with some seasonal dryness.

Sunken stomata or crypts are not however confined to *Banksia.* Indeed, they occur in diverse plants growing in environments from arid to periodically flooded. Traditionally they have been considered to reduce water loss during transpiration. However, some experiments with *Banksia* suggest that

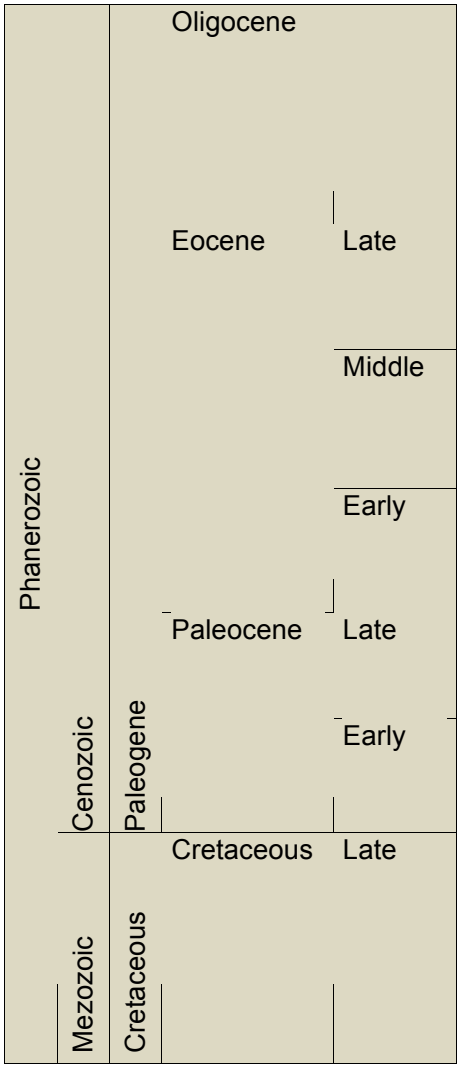
RJ Carpenter.

Banksia paleocrypta. Holotype showing venation.

RJ Carpenter.

Banksia paleocrypta. Light microscope image showing pit locations in 3D

Banksia: the long history of an iconic genus (contd.)



Stratigraphic Chart showing time periods (Ma – Million years ago) and fossil sites. Based on the International Commission on Stratigraphy Chart 2021.
www.stratigraphy.org

they may have other functions, including helping CO_2 diffuse from the lower surface into cells of the inner part of the leaf. They may also protect the stomata from dust-laden winds, and keep them open longer and for many thus allow higher growth rates in summer.

Plants found preserved with this fossil *Banksia* include *Nothofagus plicata*, thought to be a deciduous southern beech, a species of a seasonal climate. Conifers present included Araucariaceae, *Podocarpus* and species of genera such as *Dacrycarpus*, *Dacrydium* and *Phyllocladus*.

The fossil species *B.paleocrypta* was closely compared to leaves of two living species, *B.burdettii* and *B.menziesii*.

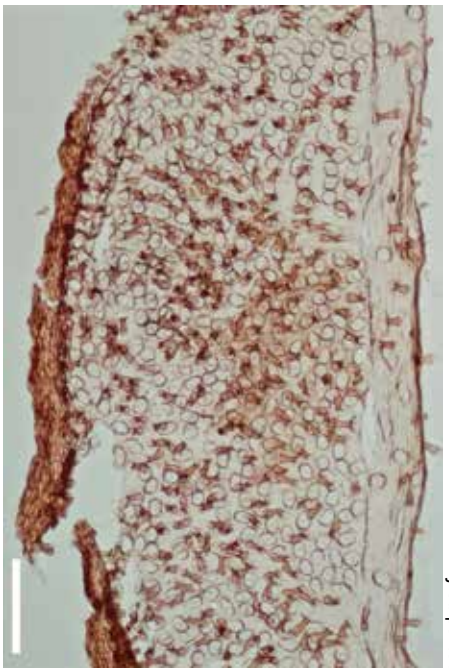
The Zanthus borehole flora: leaves and pollen

Late Eocene lignites or coaly sediments in the Eucla Basin, a large artesian basin straddling the southern coasts of Western and South Australia, were drilled in the 1980s. The sediments probably reflect an estuarine environment and yielded both leaf and pollen fossils relevant to *Banksia* history.

Leaf fossils found in the Zanthus 11 borehole are fragmentary, but enough detail is preserved to show they were extremely narrow – the first record of such leaves in the fossil record. *B. microphylla* has a thick midrib, the leaf margins are revolute, and the

RJ Carpenter.

Banksia microphylla. Type specimen showing revolute form of the leaf margins. Scale bar 500 microns



RJ Carpenter.

Banksia microphylla. Light microscope image of region between midrib and leaf margin with scattered stomata.

stomata confined to narrow channels alongside the midrib. There is some similarity to living species of the *B. spinulosa* complex. The small leaf size in *B. microphylla* might have been an adaptation to nutrient-poor soils, but the tightly rolled in leaf margins suggest more a relation to water stress.

A diverse assemblage of pollen grains was recovered from the same borehole, in or near the levels where *B. microphylla* was found. The pollen suite allowed the lignites to be dated by comparing it with pollen-based zones in Eastern Australia. Among the pollen recovered *Nothofagus* was common with a variety of gymnosperms, some Myrtaceae, and some 50 species of Proteaceae.

Pollen grains with a distinctive barrel shape show the clear features of *Banksia* pollen. They have two apertures or pores, where the pollen tube emerges on germination. There is a distinctive collar around the pores, where the inner pollen wall forms a sharp notch.

They are described as a new fossil species, *Banksieaeidites zanthus.* Pollen species have previously been described as *Banksieaeidites arcuatus* from older sediments in a number of sites in eastern Australia, but differ structurally from those described here, and probably come from *Musgraveinae*, a rainforest relative of *Banksia*.

L. Milne

L. Milne

Pollen grain *Banksieaedites zanthus* stained with safranin and, bottom, unstained *B. zanthus*

What of Banksia 'cones' (infructescences)?

Cones, the fruiting bodies of *Banksia* are of sturdy construction, yet uncommon in the fossil record, with only a few formally described. Their rarity may be due to the cones often being retained on the tree. Best known is *Banksia archaeocarpa*, of Middle to Late Eocene age, from the Merlinleigh Sandstone in the Kennedy Range in northwestern Australia. This specimen has sparse follicles, some slightly open, and one missing, perhaps due to a hungry bird. Others are known from the Miocene Etadunna Formation in the Lake Eyre Basin, and are recorded too from Miocene and younger sediments in Victoria and Tasmania.

V.Roland: Wikipedia.

Banksia archaeocarpa
External mould of 'cone' showing floral bracts and several follicles. 109mm x 43mm.

Where else have fossil Banksias been found?

Outside Australia, a single leaf species has been described from New Zealand, from lignites of Late Oligocene to early Miocene (21 – 25Ma) age, deposited in a warm, wet environment. This species, *Banksia novae-zelandiae*, may be a member of an extinct lineage only distantly related to modern species.

No *Banksia* fossils have yet been recorded from Antarctica.

In Australia many sampling sites from southern states have yielded evidence of *Banksia*, but most have not been described in cellular detail.

Conclusions

Finally, what does the emerging detail of the fossil record tell us?

First, *Banksia* was probably established by the Late Cretaceous. The HUC 11 Borehole shows that it was part of a heath-like vegetation, prone to fire. A little later, some early *Banksia* grew near a lake in Bungarby, in moist Paleocene environments in a high-latitude Australia. Then, by the Eocene in Western Australia, *Banksia* were showing features that suggest at least seasonal dryness, including sunken stomata, enrolled leaf margins, and some with small leaves, as evident in material from the Kojonup Sandstone and the Zanthus borehole.

Acknowledgements

I heartily thank palaeobotanists Ray Carpenter and Bob Hill at Adelaide University, who with others, provided the information and imagery on which this brief account of Banksia history is based. Lynne Milne of Curtin University provided pollen images.

Author

Elizabeth Truswell has spent much of her working life as a geoscientist, with an Honours degree from the University of Western Australia and a PhD from Cambridge University. After postdoctoral study in the US, she worked as a palaeontologist and environmental geoscientist with Geoscience Australia. She was elected a Fellow of the Australian Academy of Science in 1985, and a Fellow of the Geological Society of Australia in 2009. In 1984, Liz examined fossil pollen brought to her lab from 'Lake Bungarby' and identified and dated it.
In 2000, Liz received an Honours in painting from The Australian National University and has held a number of solo exhibitions since then.

Gardens Shorts

Report from Executive Director

We are well into autumn and the Gardens has had a relatively good start to 2022, particularly considering disruptions due to COVID-19 throughout the second half of 2021. We continued to have strong visitation for the first part of this year with domestic visitors seeking outdoor activities combined with the favourable weather conditions produced by a second La Nina summer.

It seems the plants also responded to the milder, wetter weather with a profusion of flowering over summer, accompanied by an explosion of weeds (which staff are getting quite creative at controlling).

We are thrilled at the result of the redevelopment and construction of the Friends Lawn project, which is a considerable enhancement that brings a sense of space and modernity to the area. I commend Gardens staff who invested much planning and design to accomplish the work. Thank you to the Friends for your ongoing support, in particular the generous contribution to make this new visitor space possible. I'm hoping everyone is able to enjoy this new landscape in the next months – it looks inviting.

We are also happy to see the progress on construction of the Ian Potter National Conservatory. In addition to the building development, our Nursery and Living Collections teams are advancing with the horticulture plan for the internal displays. We recently received some new northern Australian *Melaleuca* trees and *Phalaenopsis* orchids for showcasing in the Conservatory. Interpretation plans and preparations for visitor experiences within the space are well underway. The teams are getting creative with display ideas including plant library display pots/hangers and a fake rock 'pot' for the mangrove display.

While our education programs have been affected by COVID uncertainty with few groups booking for the first part of the year, we have been able to resume some of our events and public program activities including a special Enlighten event: a nocturnal event showcasing our new spaces in the lower Garden, and the resumption of Storytime on the first Friday of every month.

It is great that we have a new intake of Volunteer Guides who will be commencing their training in May – welcome to you all.

Our National Seed Bank team has been able to keep up essential summer collecting to enable delivery on our many targeted seed conservation projects.

Judy West

National Seed Bank and Gardens nursery provide hope for Australia's rarest eucalypt

The last 55 remaining Mt Imlay Mallee (*Eucalyptus imlayensis*) trees growing in the wild on Mt Imlay NSW were burned by the Black Summer bushfires that raged across the South Coast in January 2020.

While the 55 trees may recover (the trees are reportedly resprouting), only three trees are held in an *ex situ* collection anywhere in the world, and they're growing here in the Gardens. One is growing near the main stairs leading from the carpark to the Visitor Centre.

Only two seed banks hold *ex situ* collections for the species. The National Seed Bank currently holds the most seed of the species though it is a very small amount (<200 seeds), so expanding programs that act as insurance for losses in the wild due to habitat loss, ecosystem decline, or fires is critical.

The next step to save the mallee will be grafting cuttings onto rootstock from other closely related *Eucalyptus* species in our plant nursery.

The Imlay Mallee is one of 100 priority threatened species targeted for recovery under the new Australian Government Threatened Species Strategy Action Plan 2021–26.

Harvest time in the Seed Orchard

The Gardens' seed production area is a conservation garden used to grow threatened species to produce seed. Collecting seed from the orchard enables sustainable seed collection without pressure on wild populations. It's also more convenient and allows for a scientific approach, including pollination studies. Seed collection involves tying small bags over seed heads (after flowering so as not to affect pollination) and harvesting these when the seed has dehisced.

Two species currently in the seed production area are *Swainsona recta* (Small Purple-pea) and *Cullen parvum* (Small Scurf-pea). Both species are threatened in the wild, existing in only a few remnant populations. Gardens staff are working

View of the newly completed Friends Lawn

supplied by ANBG

with ACT and NSW state governments to establish populations of these species in the seed production area to generate seed collections for banking, and to propagate new plants for translocations.

Early results show higher germination rates of *Swainsona recta* seeds collected in the orchard compared to wild-collected seed. We're not yet sure how many viable seeds we'll collect this year, but the recent high rainfall appears to be generating a bumper crop.

Looking through the microscope

Students will have new opportunities to explore the world in miniature adding to their rich learning experience at the Gardens. Thanks to a generous contribution from the Friends, the Gardens has purchased a class set of stereo microscopes with inbuilt LED lighting and a projection microscope.

Images from the projection microscope can be digitally displayed on the Education smart board making it easier for preschool and primary school students to see things like oil glands on eucalypt leaves, the parts of a flower or tiny water bugs. Education rangers were trained in using the new equipment in late 2021 and are excited about integrating this technology into their programs in 2022.

supplied by ANBG

Small Purple-pea, *Swainsona recta,* plants with seed bags for collection.

Securing our high country flora

Good news for some of our most fire-affected high country plants.

Namadgi Tea-tree (*Leptospermum namadgiense*) is one of many high country plant species impacted by bushfire and climate change.

The Gardens and partners are collecting seed and cuttings of Namadgi Tea-tree and other threatened plant species from Namadgi and Kosciuszko National Parks as insurance against their extinction.

APII

Namadgi Tea-tree

supplied by ANBG

Education Ranger Bruce showing enlarged projection of *Microsorum diversifolium* spores thanks to the new microscope and digital camera combination funded by the Friends.

Dept. Agriculture Water & the Environment

Dr Judy West, Executive Director of the Gardens, shows the Hon Sussan Ley MP, Minister for the Environment and Paul Dela Liberato of Greening Australia, the rare Mt Imlay Mallee.

Gardens Shorts (contd.)

The National Seed Bank and Living Collections teams are working to unlock secrets to germinate and grow each species, enabling populations to be restored in the wild if needed.

This project is a joint initiative of the National Parks Conservation Trust, the Gardens and partners including WWF for Nature, the Australian Alps National Parks Cooperative Management Program, NSW Biodiversity Conservation Trust, the National Parks Association of the ACT. Further info: parkstrust.org.au/survive-and-thrive

The National Parks Conservation Trust is a charity with tax deductible status that provides opportunities for the community to support conservation in and around Australia's iconic national parks and gardens.

Nursery staff member, Kathryn Scobie, checks the growth of hanging plant 'chandeliers'

Nursery staff member, Mya Anlezark, examines the new *Melaleuca viridiflora* specimens from Kakadu National Park.

From artist's impression to reality

Work is well and truly underway both behind the scenes and on the construction site of the Ian Potter National Conservatory.

Pictured above are some of the plants growing in the glasshouses in preparation for planting once the building is completed.

Visitors can get a close-up view of the progress as it develops from the viewing platform at our National Conservatory construction site.

We look forward to opening the National Conservatory here at the Gardens in early 2023.

Booderee Botanic Gardens to provide safe haven for Eastern Quolls

The Eastern Quoll disappeared from the mainland as a result of disease, predation by foxes, feral cats, and persecution. It was last recorded in the Booderee (Jervis Bay) region in the 1920s. Fortunately, it managed to survive in Tasmania, giving us the chance to return the species to the mainland.

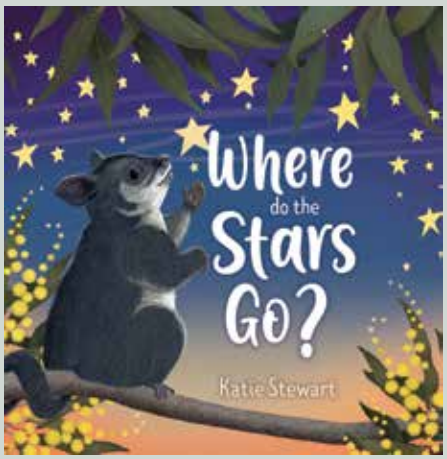
Following an initial pilot, the team at Booderee National Park and partners have a plan to rewild the Eastern Quoll to the park. The quolls will be released within a predator proof fence to be constructed within Booderee Botanic Gardens (situated in the park) where the population will be built up prior to soft release once threats to survival of quolls (predominately foxes) outside the enclosure are abated.

Traditional Owners of Booderee National Park are supportive. Members of the Wreck Bay Aboriginal Community believe that reintroducing the quoll will help establish a link with the past rich ecological community that supported their ancestors.

Parks Australia and partners are contributing significant funds to the project but support is needed for specialised construction and veterinary support to transit and settle the quolls into their new home at Booderee Botanic Gardens. You can help by making a tax-deductible donation at:

parkstrust.org.au/project/support-eastern-quolls/

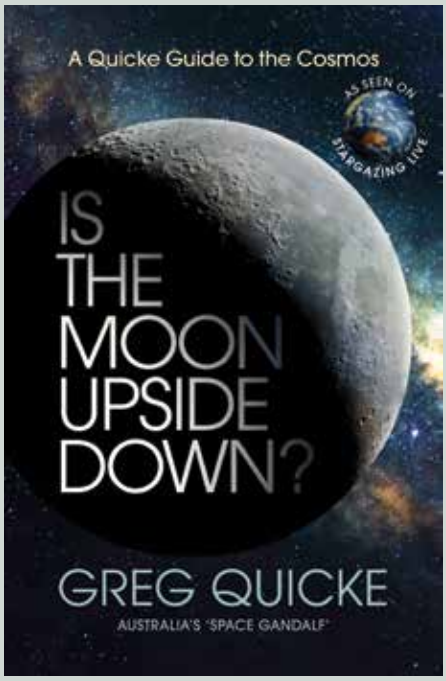
Parks Australia



Where do the stars go?
2021, Katie Stewart
Hardback, 34 pages, Colour illustrations, $25.00

Where do the Stars Go? is a gorgeous children's book about a little possum who wonders where the stars go in the daytime and so, decides to set out on a journey of discovery searching for the stars. Along with some helpful suggestions from Kookaburra, Rakali, Bungarra, Numbat and Galah, he finds a lot more stars than he expected and in many unusual places! Beautifully illustrated, this heart-warming story will hopefully encourage us all to look more closely at the wonders of nature hidden all around us.

Is the moon upside down? A quicke guide to the cosmos
2020, Greg Quicke
Paperback, 253 pages, $30.00



During his younger days working as a bush mechanic and pearl diver in remote WA, Greg Quicke spent countless nights lying in a swag and staring at the stars. That daily distraction grew into a passion that has seen him become one of Australia's best known and most engaging astronomers.

Is the moon upside down? is an inspiring guided tour of the cosmos as seen through Greg's eyes with clear, common-sense explanations and an indefatigable enthusiasm that keeps the reader engrossed and fascinated throughout the whole book. Greg tackles complex and mind blowing concepts and puts things into perspective…we learn about stars, planets, the moon, eclipses, supernova, nebulae, equinoxes, solstices, galaxies, tides, telescopes, and much more!

In recent years Greg – aka 'Space Gandalf' – has gained much popularity among audiences via his appearances alongside Professor Brian Cox in the hit TV series *Stargazing Live*.

A fabulous book and at 253 pages it definitely is "A Quicke Guide to the Cosmos" considering the mighty topic and the huge array of information Greg has packed into this guide. A wonderfully clear, fascinating, and exciting book. Well worth a read!

Friends Briefs

ACT Volunteers of the Year

The Friends were delighted to learn that our indefatigable volunteers Lesley Harland and John Fitzgerald were the winners of the 2021 ACT Volunteer of the Year award, and also, the People's Choice award.

The Seed Bank at the ANBG relies on volunteers like John to collect, sort, document and store seed to ensure that our native vegetation has a guaranteed future. The Friends rely on Lesley who manages the membership of the Friends of the ANBG; with 3000 members, this is a time consuming task. Lesley was awarded Life Membership of the Friends of the ANBG in 2020 for her work as Membership Secretary.

But Lesley and John do not just volunteer at the ANBG. Their passionate commitment to the environment sees them working with ACT ParkCare in Pinnacle Nature Reserve, spending many hours weeding, monitoring native plants, collecting litter, caring for this area that is close to their home. They also help in the Umbagong Landcare Group and Friends of Black Mountain. They regularly monitor water quality for Waterwatch. Their extensive knowledge and efforts help Friends of Grasslands, Greening Australia, The Eastern Long-necked Turtle Project, Climate Watch, and more. They help preserve and maintain the environment in the Bush Capital so that it can flourish and be enjoyed by many.

And in their spare time, they help out at organisations like The Canberra Repertory, The U3A and Thursday Daytime Squash Competition that enrich the lives of Canberra residents.

Congratulations and sincere thanks to Lesley and John.

(Our thanks to Pam Cooke who shared this information from her nomination of Lesley and John for the award.)

Ben Calvert

Worth her weight in gold

Brian Moir-Ford

The fact that the ANBG Friends finances are so healthy is due in no small measure to our Treasurer, Helen Elliot. Helen has diligently monitored our income, expenditure and investments over time to ensure optimal outcomes for the Friends. Chasing the best interest rates on our term deposits has been a way of life for Helen.

As well as contributing significantly to the work of the Friends Council, Helen has also been a hard-working member of the Friends Public Fund Management Committee. Project analysis, cash flow forecasting and financial reporting for the Public Fund have all been part and parcel of Helen's contribution. She has been worth her weight in gold.

But all good things come to an end. After more than seven years of service as our dedicated Treasurer, Helen has decided to step down in order to free up time for her other interests and commitments. On behalf of Friends members and Friends Council I offer heartfelt thanks for a job well done. Thank you Helen. And all the very best to you and your family in the days to come.

Neville Page

Generous donation to the Gardens

The late John Wanless loved the natural world. He joined the Friends of the ANBG in 1999 and was an active member of Growing Friends from 2004 until 2011. John passed away in October 2020 aged 86, and a wake was held for him on the Brittle Gum Lawn.

His three children, David, Erica and Ian, have made a very generous donation to commemorate their father and honour his love for the Gardens. David Wanless said that the family was honoured to be able to assist the ANBG because it meant so much to his dad and plays such a critical role in conserving native plants.

Thanks to this donation, the Gardens is able to give back to volunteers through learning and development opportunities and purchase more specialist equipment for the new National Seed Bank, including a seed moisture detector and seed counter. The Wanless family will be acknowledged on the National Seed Bank Honour Board, which will be permanently displayed within the new facility.

A Memorial Seat and commemorative plaque dedicated to John Wanless has also been installed, situated near the Melaleuca forest and with excellent views into the Banksia Garden.

Who was John Wanless?

Born in Sydney and raised in western NSW, his love for the great outdoors went back to his youth. He enjoyed bushwalking, mountaineering, cross country skiing and caving in Australia (especially Tasmania and the Snowy Mountains), New Zealand and the Himalayas.

The family had a small farm near Colinton in NSW, where John planted many native trees, but he had to give up the farm as he began to slow down.

John was a science graduate of the University of Sydney and spent some early years working at the then CSIRO Division of Plant Industry. He went on to have a career in the public service, working at the Public Service Board, and the departments of finance and health.

As a member of Growing Friends, John used his considerable energy in the plant propagation work undertaken by the group and learnt a lot about native flora. He created and maintained an impressive native garden at his home. At the first Growing Friends' meeting after he left, the minutes record that someone asked, 'Who's going to do all the things John Wanless used to do?'.

His interest in the Gardens and its vital role in conservation of native plants continued after he left the Growing Friends group. John was in the habit of going for a walk in the Gardens, eating his lunch in the Friends' Lounge and then attending a Thursday Talk. This continued even when he had to start using a walker and (unwelcome) hearing aids.

While admiring the whole Gardens, John particularly loved to visit the Tree House and the *Melaleuca* forest area, which reminded him of his beloved Tasmania. He also used to growl at the Tasmanian Devil and took a keen interest in the development of the new Banksia Gardens.

Kath Holtzapffel

D.Wanless/C.Hutchinson

In December. Ian Wanless was able to bring his mother, Jenny, to see where the Memorial Seat had been installed and take in the view that John loved so much

John in the Gardens

Donald Beer, 1940-2022

Dr Don Beer was a professional historian at University of New England in the field of Canadian History. His scholarship was recognised in awards by the Ontario Historical Society, Canadian Airlines and the International Council of Canadian Studies. When he retired in 1998, he was Associate Professor of History.

Don was also a gifted administrator and mentor in the field of academic international relations, serving on the Executive of the Australian and NZ Council of Canadian Studies for many years.

These were skills and talents which he brought to the Gardens in 2005, where he became a member of the Friends, a volunteer guide and member of the Friends Council. His legacy has been greatly beneficial both to the Friends and to the Gardens.

Don made an important and long-lasting contribution to the administration of the Friends as an organisation and to the professional development of the Volunteer Guides Program. In 2013, Don commenced work on researching and writing the history of the Gardens. He felt that this work represented "his gratitude for the pleasure he received from the Gardens and his association with it."

Miracle on Black Mountain – A History of the Australian National Botanic Gardens was published in 2020 (Halstead Press 2020) and was Don's treasured gift to the Gardens.

As the President of the Friends, Neville Page said in his review of Don's book: "It is clear that Don Beer has spent many thousands of hours searching through library documents and government archives in compiling this book. To my mind, Miracle on Black Mountain is a significant and valuable contribution to our knowledge of the Gardens."

In the words of Glenys Bishop in 2012, when she took over from Don as the Guides' Convenor: "Don will be remembered for formalising professional development for the guides and for building a cooperative and professional relationship with the Gardens' staff".

Don will be sadly missed by his friends and colleagues at the Gardens.

Jonette McDonnell

Jonette had a deep love of nature that was evident throughout her life. She was an active member of the Australian Native Plant Society and the Canberra Ornithological Society (COG). For many years she was a volunteer at Tidbinbilla Nature Reserve and a member of COG's bird survey team.

After a career as a medical record professional, the last years spent in the ACT and federal health departments, she retired and became a guide in 2010.

Jonette was involved in most aspects of guiding at the Gardens. She frequently took booked walks as well as the free guided walks, mentored new guides, and contributed to the Guides' *Asteraceae Garden handbook.*

Combining her love of art with her love of nature, she was instrumental in developing one of the first Guides themed walks, *Turned on* to complement the *Turner at the Tate* exhibition running at the time, and more recently worked on the *Water, Fire and Tree-House* walk.

Jonette enjoyed finding out more about all aspects of native plants and birds and did so both informally and by regularly attending activities such as the Thursday Talks and the Biennial Volunteer Guides Conferences. She was always ready to share this knowledge – not just on the walks she led but also with her fellow guides.

Jonette was involved in a number of Friends activities. She was a Council committee member for two years and helped organise and lead walks for both *Breakfast with the Birds* and its replacement, *Wake Up With the Birds.* Her great knowledge of birds and gentle training style encouraged others to start leading these walks. She helped out at *Enlighten* and the *Summer Sounds* concerts and was one of the volunteers manning the VIC desk.

Jonette was a generous, caring person who touched many lives, both at the Gardens and elsewhere. She leaves behind her husband John, daughter Siobhan and grandsons Flynn and Will.

Naarilla Hirsch

Calling for your thoughts on the Friends constitution

Our Constitution sets out the basic principles and practices of our organisation that guarantee its smooth operation.

There have been changes in legislation and best practice since the Friends Constitution was amended in October 2015. A review has found some inconsistencies between it and current practice.

A discussion paper setting out details of these inconsistences can be found on the Friends website. The paper not only identifies the inconsistencies but also proposes amendments to address them. The main change is to allow proxy voting. Other changes include updating definitions, language and procedures.

Council would welcome your comments and/or questions on these suggested changes, so please email the Secretary by 30 April 2022.
ayliffelynden@gmail
Council will consider any comments and formalise resolutions for any changes to the Constitution at the next General Meeting of Friends.

Volunteer Recognition ceremony

At the Volunteer Recognition ceremony on 7 December 2021, Warwick Wright received an award for his 25 years of dedicated and very active service to the ANBG as a Guide. Warwick and Pat Wright make many opportunities to promote the ANBG and share their enthusiasm for Australian plants. Jonette McDonnell was also one of the group of volunteers who were presented with certificates acknowledging their years of volunteering for the ANBG and/or the Friends.

The stunning caterpillar of the Wattle Notodontid Moth on a Silver Wattle in the Gardens on 23 January was seen on two very enjoyable and successful walks led by Suzi Bond. The groups spotted ten different species of butterflies.

Suzi Bond

A major output of Leah Dann's research for the Norfolk Island plants project is the publication of a plant handbook released in December 2021. The Friends supported Leah Dann from UQ's research through a top-up to her PhD scholarship.
You can download the Handbook at
nespthreatenedspecies.edu.au/publications-and-tools/a-guide-to-propagating-norfolk-island-s-native-plants-and-seeds

Botanic endeavour

The Florilegium Society celebrates the Banks and Solander Collections

The Florilegium Society at the Royal Botanic Gardens Sydney will present an exhibition of 52 recent botanical paintings linking the historic Banks and Solander specimens held in the National Herbarium of NSW with the Living Collection of the Royal Botanic Garden Sydney, Blue Mountains Botanic Garden Mount Tomah and the Australian Botanic Garden Mount Annan. This project was created to mark the 250th anniversary in 2020 of Captain Cook's voyage in the Endeavour and the botanical contribution of Joseph Banks and Daniel Solander.

Some of the newly digitised Banks and Solander collection images will be displayed along with more treasures from the Daniel Solander Library including some of the Banks' Florilegium plates and his specimen cabinet.

Pictured here are works by Canberra artists Nilavan Adams, Cheryl Hodges, Halina Steele and Helen Fitzgerald which have been included in the exhibition.

The free exhibition will be on show from 7 May to 22 May, 10 am to 4 pm at the Lion Gate Lodge in the Royal Botanic Garden, Sydney.

Acacia longifolia Cheryl Hodges © RBG&DT

Corymbia gummifera Helen Fitzgerald © RBG&DT

Leptospermum squarrosum Nilavan Adams © RGB&DT

Telmatoblechnum indicum Halina Steele © RBG&DT

What's on at the Gardens

April to August 2022

Details of events are correct at the time of printing. For changes and updates please check the Friends website or the Gardens website at: www.friendsanbg.org.au or www.anbg.gov.au

Free Guided Walks
11.00 am for one hour, daily

Enhance your visit to the Gardens by taking a free guided walk with a volunteer guide. Tours are available for up to 10 people.

Book a Private Tour
Costs apply

Tour the Gardens with your own tailored guided walk or Flora Explorer bus tour to suit your special interests, or purchase as a gift. Tours can be booked for up to 12 people. Conditions apply. For more information contact:
bookedwalks@friendsanbg.org.au
floragroups@anbg.gov.au

Storytime
First Friday of the month from February 2022,
10.00 – 11.00 am
Storytime in the Gardens
$5 for one child or $10 per family
Crosbie Morrison Lawn

Join us for family fun with our entertaining storyteller weaving stories about Australian plants and animals. Each themed session is packed with stories, songs and crafts, just perfect for pre-schoolers.

Heritage Festival - Indigenous Plant Use Walks
Wednesdays 13, 20 and 27 April
10.30 – 11.30 am
$5 per person

This Ranger-guided walk will take you along the Aboriginal Plant Use Trail where you will learn about how Australia's plants are used for food and medicine, to make tools and weapons, and for ceremonial practice.
Meet outside the Visitor Centre.
Numbers limited. Bookings essential.

Flora Explorer Bus Tours
Saturday, Sunday and Public Holidays, 11.30 am
$8 adult, $5 child & concession

Sit back, relax and be taken on a 45-minute highlight tour of the Gardens. Tickets from the Botanical Bookshop.

Canberra International Music Festival – Tree of Life
Friday 29 April
11.30 am – 1.00 pm
$60 adult, $55 concession

Canberra's early history as a national centre for tree research lives on through its many parks and sites. The ANBG never fails to offer one of the most enjoyable and stimulating outdoor experiences of the festival. Start the festival with a magic walk – through nature and through music.
www.cimf.org.au

Canberra Tree Week – Connection with Trees Children's Outdoor Exhibition
Free
30 April – 8 May,
8.30 am – 5.00 pm

See Canberra's budding artists' work on display in a special outdoor exhibition showcasing the winning entries from the children's 5 – 12 years *Connection with Trees* drawing competition.

Canberra Tree Week – Flora Explorer Tours
Saturday 30 April, Sunday 1 May and Saturday 7 May,
11.30 am
$8 adults, $5 child & concession, child under 3 free

Take a seat and be transported around the Gardens during our special Tree Week guided bus tours. Sit back, relax and explore the secrets and stories of some the Gardens' iconic trees.
Numbers limited. Bookings essential.

Canberra Tree Week – Music and More with Lucky Jim
Monday 2 May, Thursday 5 May, Sunday 8 May,
10.00 – 11.00 am
$8 adults, $6 child & concession
Crosbie Morrison Lawn

Prepare to be entertained and amused by the ever-youthful Lucky Jim during his special curated shows for Canberra Tree Week. Kids and carers will be treated to activities and live performances full of toe-tapping tunes, ridiculous stories, imaginative lyrics and general silliness.
Numbers limited. Bookings essential.

Canberra Tree Week – Storytime in the Gardens
Friday 6 May,
10:00 – 11:00 am
$5 for one child or $10 per family
Crosbie Morrison Lawn

Celebrate Canberra Tree Week with special tree-themed stories and activities in the Gardens.
Suitable for pre-schoolers
Numbers limited. Bookings essential

Hakea Scoparia, by Cornelia Buchen-Osmond, Botanical Art Groups' exhibition, ANBG Visitor Centre, 9 April – 8 May

What's on (contd.)

Reconciliation Day Weekend Walk
Sunday 29 & Monday 30 May
10.30 – 11.30 am
$10 per person

Join Wiradjuri Man Adam Shipp as he shares his passion for native plants. His adoration for his culture and people drives him to share his abundant knowledge of the food and medicinal plants that grow in the ACT.
Meet outside the Visitor Centre.
Numbers limited. Bookings essential.

Botanic Gardens: Plant Passions
23 May – 5 June
Self-Guided trail / Free

Discover Gardens staff's 'Plant Passions' and fascinating stories of Australia's plants on a unique self-guided trail. Trigger the short video stories using your mobile phone QR reader. Pick up the trail map from the Visitor Centre.
Part of Botanic Gardens Australia New Zealand Botanic Gardens Day celebration.

MEGAfauna: myths & legends!
1 – 31 July
8.30 am – 5.00 pm
Free

Discover stories from Australia's prehistoric past in this family-friendly discovery trail combining nature, art, culture, science, history and fun. Get up close and see some of the giant animals that once roamed Australia during the Pleistocene era.
Pick up your map from the Visitor Centre.

Exhibitions

Visitor Centre Gallery, Open Daily 9.30 am – 4.30 pm
FREE

Until 3 April

Bimblebox 153 Birds
Inspired by the birdlife of the Bimblebox Nature Refuge, Bimblebox 153 Birds is a unique installation of artist prints, poetry, prose and musician's birdcalls by over 450 people worldwide. Each of the 153+ bird species is given voice by a writer, an artist and a musician.

9 April – 8 May

Growing in the Gardens
An exhibition of botanical art representing Australian flora by members of the Friends of the ANBG Botanic Art Group. Artworks depicting some of the extensive native plants grown in the Gardens.

11 May – 5 June

Inspiration from the Gardens
An exhibition by Canberra-based artist Leigh Murray capturing the beauty and diversity of native flora, encouraging a keener appreciation of the importance of the Gardens' Living Collection.

8 –26 June

Siblings - Botanical Inspirations
An exhibition celebrating the connection of siblings to nature, strengthened by shared interests and practices. The exhibition demonstrates artistic expression of indigenous flora using mosaics and recycled plant materials.

3 – 28 August

Gardens Near & Far
An exhibition depicting flora and landscapes inspired from visits to public, private and overseas gardens and from the artist's local region of Yass, NSW. Ruth Dodd's art is representational, working from close observation and the use of colour to dramatise essential elements.
www.ruthdoddartist.com

Helen Cross

Thursday Talks, 23 June 12.30pm
Michael Mulvaney and Chris Davey 'Gang-gang nesting ecology'

Thursday Talks: April to August 2022

Lunchtime talks are held at 12.30 pm every Thursday from February to November in the Gardens' Theatrette. Talks last for one hour. Admission is by gold coin donation. The Friends use the donations received to support Gardens' programs and development and thank all those who have donated.

The talks are in line with COVID-19 guidelines which can change rapidly. Bookings can be made from the Friday before the talk until Wednesday night before the talk. Bookings are essential, and the booking link for each talk is on the entry for the talk. www.friendsanbg.org.au/calendar

The Friends of the ANBG thank the speakers who volunteer their time and talents to further the knowledge of all attending events in the Gardens. Some summaries or PowerPoint presentations of Thursday Talks are available to Friends from the ANBG library. A donation to the Friends for the use of this material will be gratefully accepted. Please direct queries to the Thursday Talks Team: talks@friendsanbg.org.au

April

Thursday 7 April

Geoffrey Dabb 'The Strange Story of Ellis Rowan's Bird of Paradise pictures'

To mark the centenary of Ellis Rowan's death, Geoffrey, a long-time bird observer and photographer, has investigated the last years of this famous flower painter's life, when she made and exhibited pictures of various species of birds of paradise which are held in the National Library of Australia

Thursday 14 April

Emeritus Professor Patrick De Deckker 'Australia was much wetter and warmer than today some 8 to 7 millennia ago. Can we learn from this knowing future climate predictions?'

Patrick, from Research School of Earth Sciences, ANU, will provide insights to consider.

Thursday 21 April

Dr Stuart Rae 'The Little Eagle – a botanical perspective'

Stuart, a visitor at the Research School of Biology, ANU, has been with the Little Eagle Research Group, which has amassed a wealth of data on the breeding ecology and range of the eagle, and a botanical perspective helps explain the bird's distribution.

Thursday 28 April

Nancy Tingey '27 years in the Garden – The story of Painting with Parkinsons'

The first *Painting with Parkinsons* class was held in the ANBG on 4 November 1994, and has continued. Nancy says that one of the driving forces behind the program is the knowledge that creative ability is not affected by Parkinson's and may even be enhanced by it.

May

Thursday 5 May

Dr Lydia Guja 'Rising from the ashes: seed germination in response to fire'

The talk will look at immediate impacts of some Black Summer megafires, and share findings about responses to heat and smoke chemicals by seeds of alpine flora, grassy ecosystems and endangered shrubs.

The Great Forest: The Rare Beauty of the Victorian Central Highlands **by David Lindenmayer, Chris Taylor, Sarah Rees, Steve Kuiter (2021)** is on sale from the Botanical Bookshop. **David is happy to sign copies of the book after the talk.**

Thursday 12 May

Lindy Butcher and Corin Pennock 'ACT Wildlife and its wombat programs'

Lindy and Corin, of ACT Wildlife, will share some of the journeys in the care of, and the mangement program to treat, the most endearing of our wildlife.

Thursday 19 May

Mr Anthony Whalen and Ms Anne Fuchs 'Global alignment of biodiversity informatics systems'

Anthony and Anne, from ANBG, will talk about keeping up with published names and taxonomic concepts, including work that has been done for threatened species management, environmental assessment approvals and biosecurity threat monitoring.

Thursday 26 May

Professor David Lindenmayer 'The great forest'

David, from Fenner School of Environment and Society, ANU, will present intimate insights into the biology and ecology of Mountain Ash and Alpine Ash forests and outline how human and natural disturbances can interact to threaten these magnificent environments. David concludes with important initiatives to reshape the future trajectory of these tall, wet eucalypt forest ecosystems.

June

Thursday 2 June

Professor Peter Kanowski 'What's the future for forests?'

A range of pressures and changes are impacting on forests globally and nationally. Peter will review recent work that considers what these might mean for forests.

Thursday 9 June

Ian Walker 'Climate resilient environments and communities'

Ian, from ACT Government, will talk about looking after our natural environment as we face climate change with increased fire risk and different patterns of rain, and how communities will cope with the impact of climate change.

Thursday 16 June

Dr Sophie Lewis 'Climate change and Australia's extreme events'

Sophie, ACT Commissioner for Sustainability and the Environment, will discuss human influences on past, present and future extreme climate events in Australia. Are our recent extremes a sign of a new normal and how bad could it get?

Thursday 23 June

Michael Mulvaney and Chris Davey 'Gang-gang nesting ecology'

Chris and Michael will reveal how citizen science research by hundreds of Canberrans contributes to the scientific and wider understanding of Gang-gangs and how this research is to be continued with a focus on trying to answer why the Gang-gang numbers have been stable here, but declined in other places.

Thursday 30 June

Dr Liz Truswell 'Banksia: the fossil history of an iconic genus'

Liz, formerly a Chief Research Scientist with Geoscience Australia, will reflect on the long fossil history of Banksia, showing they are of greater antiquity than formerly imagined, and their suite of features in increasingly challenging climatic environments.

July

Thursday 7 July

Con Boekel 'Local extinctions of birds from Canberra's inner north nature reserves'

Con, formerly of the environment department and now a citizen scientist since retirement, studied the patterns of occurrence of six woodland species in 16 inner north natural and semi-natural fragments. He will present the study findings and discuss some implications for the urbanisation of the Lower Molonglo.

Thursday 14 July

Professor Justin Borevitz 'Precision landscape regeneration'

Justin, from Research School of Biology, ANU, will introduce precision landscape regeneration, including methods in Eucalyptus foundation species to re-build agro-ecosystems, methods for boosting soil carbon with microbes and management, and the outsized role Australia can have for world's planetary health and resilience.

Thursday 21 July

Damien Wrigley 'Australian Seed Bank Partnership – Post bushfire recovery across the country'

Damien, of Australian Seed Bank Partnership, will illustrate some of the efforts by people from Seed Banks and botanic gardens in burnt areas and the unanticipated complexities during COVID-19 restrictions.

Thursday 28 July

Lori Gould 'Latham's Snipe along the flyway'

Lori, Principal of GrassRoots Environmental, will describe the surveys and research into the movement and migration of Latham's Snipe between Australia and Japan.

Latham's Snipe

Friends Benefits

As a Friend you are entitled to:

- Three issues of *Fronds* a year
- Three hour free parking pass
- Discount at:
  - Botanical Bookshop (most items)
  - Pollen
  - Jindii Eco Spa
  - Cool Country Natives in Pialligo
  - Australian Choice, Canb. Centre

You also receive:

- Advance details of lectures
- Advance bookings for some events
- Discounts on some events
- ANBG library membership – borrow books, serials, videos, DVDs plus use of computers and interactive CD ROMs
- Function facilities – special rates for functions at ANBG

And opportunities to:

- Join Botanical Art Groups
  - Growing Friends
  - Photographic Group
  - Nature Journaling Group
- Assist with Gardens' research projects
- Become a Guide
- Relax in the Friends Lounge in the Ellis Rowan Building, open to members 9.30 am to 4.30 pm. Relax with tea/coffee and lots of interesting reading.

August

Thursday 4 August

Dr Penny Olsen 'The Norfolk Island Morepork: rebuilding a population from the last survivor'

Penny is an Honorary Professor in the Division of Ecology and Evolution, ANU. In 1986 she organised a group to visit Norfolk Island and conduct a search for the Morepork. But what do you do with only one owl? A recovery program began and today a small population persists.