



*fostering research into
the biology and cultivation
of the Australian flora*

Newsletter

No. 17 *New Series*

January 2013

Celebrating 30 Years

In recognition of our 30th anniversary, the AGM and preceding Council meeting were held in November at the Australian Botanic Garden Mt. Annan.

The attendees were treated to a sumptuous lunch and afternoon tea prepared by Alison Goodwin. After the meetings we enjoyed a tour of the seed bank facilities conducted by Dr Cathy Offord, Manager of Horticultural Research at Mt. Annan.

In his President's Report to the AGM, Peter Goodwin outlined the Foundation's history from humble beginnings to the position now, where we have recently made our 101st grant. Since 2000 we have awarded more than \$500,000 in grants. See page 2 for Peter's full report.



The Council meeting at the Bowden Centre, Australian Botanic Garden, Mt Annan. Left to right: Jenny Jobling (Treasurer), David Murray, Peter Goodwin (President), Michelle Leishman, Charles Morris (Vice President), Richard Williams (Vice President), Paddy Lightfoot, Ian Cox (Secretary), Ross Smyth-Kirk. (Absent: Tina Bell).



Cathy Offord explaining the procedures of seed collection and processing to Council members.

President's Report (1982 to) 2012

This report aims to summarise events over the past 30 years under three headings

1. Communication with members
2. Funding for grants and administration
3. Impact of our grants

1. Communication with our members

Over the past 30 years the Council has used a number of methods to communicate with members.

A. Initially Annual Reports were produced, probably under the guidance of Bill Payne.

1982: The 1982 Annual Report announced that in April 1982 the Foundation was recognised as an 'approved research institute' for the purposes of the Income Tax Assessment Act: donations became tax deductible on condition that grant applications were reviewed by an external Research Committee approved by the CSIRO.

1983: The good news in 1983 was that the organisation was formally incorporated.

1984: In 1984 it was decided to switch from invited members, to accepting membership from anyone who supported the aims of the Foundation, and 143 members are listed in the 1984 Annual Report. However, the President's Report asks more members to pay their membership fee (\$5).

1986: A similar problem of people not meeting their commitments was made in the Board of Directors report in 1986, there apparently being no President at the time this Annual Report was produced. However in 1986 grant applications were called for for the first

time, and grants to begin in 1987 were awarded. Grants have been awarded every year since.

B. Newsheets and Annual Reports. The problem with the type A Annual Reports was that they were very expensive to produce, and the Foundation had very limited funds for administration, so none were produced after 1986. In 1988 Malcolm Reed became Vice President of the Foundation, and produced a new type of report, which he called a Newsheet, typed on A4 paper, and readily photocopied and distributed. In 1988 the first final reports were received, and the results made available to members via a Newsheet. This evolved into an Annual Report, starting in 1990, and produced in 1991, 1992, 1993 and 1996. In early 1998 Malcolm became ill, and had to drop out of Foundation activities.

C. Newsletters. Beginning in 2003 Ian Cox took on the responsibility of producing a Newsletter, initially one per year, but since 2007 two per year. This is emailed or posted to all members of the Foundation. It provides information on grants, the findings from research supported by the Foundation, and research of interest to people interested in Australian native plants.

D. Website. In 2004 a site developed by Peter Goodwin, with the assistance of Val Williams, was launched. The website lists all grants and their Final Reports since the inception of the Foundation. It contains a brief history of the establishment of the Foundation, and much else as well.

2. Funding

The Foundation's research funding ability, as measured by its level of assets, has gone through three phases, the first what could be called the pre-bequest era, lasting 11 years from 1982 to 1992. Funds came from membership subscriptions (about 30%) and donations (about 70%) and of course interest on these amounts. For the first four years the Foundation was unable to offer research grants, but at the fourth AGM (1986), with over \$10,000 in total assets, the decision was made to call for applications for grants, and after review of the applications by the Research Committee, three grants were awarded. By 1992 the Foundation had reserve funds exceeding \$20,000, and had given grants totalling \$30,000, on average two grants totalling \$4,000 per year.

The next era could be called the major early bequest era. Between 1993 and 1999 the Foundation received the Bowden bequest, the Carver bequest and the Armitage bequest, totalling over \$500,000. These greatly increased the ability of the Foundation to fund research on Australian plants, and as well over these years, due to the initiative of the President, Malcolm Reed, funding for grants was received from the RIRDC (\$34,450) and the Lord Mayor's Bush Fire Appeal (\$56,336).

This brings us to what could be called the present era. Since 2000 the Foundation has given grants totalling over \$500,000, on average three and a half grants totalling just under \$40,000 per year, ten times the research grants in the early years. This year we awarded the 101st grant.

Membership fees: The auditing of our accounts between 1986 and 2009 was carried out by Peter Kellaway on an honorary basis. The Foundation is in his debt. This service was important in enabling the build up of funds in the pre-bequest era, and enabled the administration expenses of the Foundation to be met from membership subscriptions until Peter retired. Since then, due to audit costs, this is no longer the case: subscriptions (at \$25 unchanged since 1988) meet only half the cost. Accordingly the membership subscription has had to be increased to \$30.

3. Impact of the research you have funded.

A. *Publications arising from grants:* Excluding grants made in the past 5 years, a total of 64 publications have resulted from grants. Looking at it another way, over 56% of grants have led to publications, usually in refereed scientific journals. All grantees have produced Final Reports, and only 12 of the 82 grants failed to achieve their objectives.

High profile publication: The most noted publication has to be that following the grant to Bruce Webber (2002) on *Ryparosa javanica*. The publication is: 'Cassowary frugivory, seed defleshing and fruit fly infestation influence the transition from seed to seedling in the rare Australian rainforest tree, *Ryparosa* sp. (Achariaceae) by Bruce L. Webber and Ian E. Woodrow in Functional Plant Biology, 2004, 31: 505-516. This has been cited in scientific papers 18 times, was commented on in New Scientist and was also included in a recent BBC TV program on the world of plants.

B. *Major contribution to new industry:* The work by Sandra Lacey on the grant 'Investigation of the cultural requirements for the development of *Helichrysum diosmifolium* [now *Ozothamnus diosmifolius*] (Native Paper Daisy)' in 1987 laid the basis for the Rice Flower industry. The grant was for \$1,500, but enabled her to collect the material, and provided the basis for larger grants from RIRDC to develop it as a cut flower crop. In 1996 500,000 blooms were exported to Japan. This work possibly helped trigger the RIRDC to make a major investment in research on native Australian plants.

C. *Supporting the development of scientists working on the Australian flora:* Virtually all grants have been directly or indirectly used to fund young scientists to carry out research on Australian plants. Most of these people continue in this area, as is seen by perusing their publications in succeeding years, for example Ms Elizabeth James was given a grant of \$4,050 in

1999 to work on the breeding systems of *Grevillea*. No papers came from this project, but she has gone on to produce four papers on the genetics of *Grevillea*, and at least twelve papers on the genetics of native Australian plants. Bill Loneragan was given a grant of \$2,750 in 1997 for a project on conserving *Banksia* woodlands. One publication came from the project, and he has since published three more papers on *Banksia* woodlands, and at least twelve other papers on conservation of Australian plants.

D. Aiding the conservation of Australian plant diversity: A series of grants has been made for projects examining the sensitivity of seed germination to the higher temperatures to be expected with global warming, e.g. Amelia Martyn (2010) with support from the APS Canberra studied the germination requirements of twenty Australian alpine species. These studies have identified species particularly vulnerable to climatic change. Other grants have examined *the threats to particular ecosystems*, e.g. Carolyn Ireland (1992) showed that regeneration of Western Myall (*Acacia papyrocarpa* Benth.) requires a combination of a number of relatively rare events: seed shed coinciding with the co-occurrence of inundation with its consequent overland sheet flow of water, scarification of seeds by the tumbling action of soil and water and the burial of the seeds away from harvester ants.

This President's Report is getting long, but note that development of Australian plants for horticultural use has been the subject of forty four Final Reports, and the role of mycorrhiza in native plants has been the subject of fifteen. You can find out what these or any of the other 88 Final Reports say by looking them up on the Australian Flora Foundation's website: <http://www.aff.org.au/>

What for the future? Over the next thirty years we will strive to better communicate with our members and the wider public; to welcome more members, and to increase our ability to fund grants. We need your help for this and are currently exploring the potential of social networking.

Finally it is my pleasure to thank all who have been members, donors or made bequests to the Foundation over the past 30 years. Without you there would have been no Australian Flora Foundation. Thanks to three groups which have been critical to the functioning of the Foundation: the Australian Plants Society, whose members played a key role in the establishment of the Foundation, and who provide ongoing support; to members of the Research Committee, past and present, and to the research workers who have made good and faithful use of the funds the Foundation has provided.

Particular thanks to those who have done the work of the Foundation: the members of Council, and particularly members of

the executive over the years. A special thanks to three people who have made very valuable contributions. Firstly Bill Payne, a major force in the establishment of the Foundation, and a member of the Council from 1981 till his death in 2005. Secondly: Malcolm Reed, Vice-President from 1988 to 1990, and President from 1991 to 1997. He came to a Foundation that appeared to be in terminal decline, and left one in a good financial and functioning state. Finally, Richard Williams, a founder member, Chair of the Research Committee since its formation and President for eight years.

In conclusion, my thanks to all present for attending the 30th AGM of the Australian Flora Foundation, and to Caz McCallum for enabling us to meet at the Royal Botanic Gardens Mt Annan.

Peter Goodwin
26th November 2012

Royal Botanic Gardens Cranbourne Victoria completes the Australian Garden.

By Dr Paddy Lightfoot, AFF Councillor, Life Member of the Australian Plants Society NSW, and a founding Director and Life Member of the Hunter Wetlands Centre.



Red Sand Garden – Royal Botanic Gardens Cranbourne. Photo: David Lightfoot

On Sunday 21st October I was fortunate to attend the opening celebration – a Family Day - of the completion of the Australian Garden at Cranbourne.

This Garden must surely rank as one of the 'Wonders of Victoria'.

The support and response from Victoria's public was overwhelming. The car park rapidly filled and the Cranbourne Racetrack was opened for parking with a shuttle bus service to ferry visitors to the Gardens.

Which features impressed me?

- The overall scale of the project is overcoming from the massive and stunning Red Sand Garden to the Weird and

Wonderful Garden together with the superbly designed water features.

- The water features include a seaside garden, an expanse of white sand lapped by the lake, demonstrating plants the public can grow in coastal situations. There is an interesting waterlily pad bridge with an associated explanation of continental drift. There is an area for kids with life saving flags and notice 'Paddle between the Flags' – dozens of paddling kids.
- Demonstrations of streetscapes or promenades (using amazingly large figs as street trees), different housing type gardens (including backyards), green walls, water-wise gardens, experimental gardens with differing mulches, lifestyle gardens, greening cities gardens and Australian plants which can be grown in pots on patios or verandahs. The list is endless.



Some of the plants in pots

Photo: David Lightfoot



Espaliered *Eucalyptus gregsoniana*

Photo: David Lightfoot

There is evidence of interesting experimentation:

- Who amongst we Australian plant lovers has ever thought of espaliering Eucalypts to keep them at a restricted height or as a fence?
- Green walls? With closer suburban living, why have a solid brick or wooden fence between you and the neighbours? Why not build a metal support and cover with Australian vines such as Kennedias or Pandoreas? Much more aesthetic and soothing!
- Huge rocks, with plants at their bases, have been introduced to demonstrate those plants existing only at the edge of granite outcrops surviving on run off from the nocturnal condensation in dry Western Australia.
- Food gardens to promote our Australian bush foods.
- The Weird and Wonderful Garden with mass plantings of some of our most extraordinary plants. This mass planting of a multitude of species is in sharp contrast to most Botanic Gardens. They usually feature a couple or only single plants of many species.
- There is extensive use of mass plantings of cultivars. Remember the Roses in our gardens at home have been developed over centuries from an original fairly insignificant specimen of the Rose family. Cultivars may be the way to the hearts of future Australian gardeners.
- A Gondwana Garden.
- Various Eucalypt type Gardens – Stringybark, Bloodwood, Peppermint, Box and Ironbark. They are all there in groups.

- Alongside the Red Sand Garden are a Desert Discovery Camp, an Arid Garden and a Dry Riverbed Garden.
- Rare and Endangered Garden helps protect our rarities.

This is only a brief description of the wonders of this 21st century creation. The splendid creation is a credit to the Horticulture and Land Management staff at the Gardens.

When in Victoria do as the locals do and visit these Gardens. You won't regret the day out. Entry is free. Cranbourne is about 45 minutes drive South-east of Melbourne. There is a pleasant café at the entrance and a kiosk on the far side of the newly opened section. Surrounding the Gardens is a large buffer of natural bushland with a walking track to Trig Point Lookout.

Research projects we have recently approved

Two research projects to commence in 2013 were approved for funding at the August 2012 Council meeting.

One of these grants, for \$11,550, was awarded to Mr G. Huang, a PhD candidate at the University of Western Sydney, for the project titled "Climate change impacts on genetically differentiated *Telopea speciosissima* (NSW Waratah) coastal and upland populations".

The other grant, for \$23,220, was awarded to Mr Edward Tsen, a PhD candidate at the University of Melbourne, for the project titled "A spatial genetic study of historic gene flow and demographics of a rare tropical tree *Ryparosa kurrangii*".

In defence of the humble ant, champion of biodiversity

Reproduced from <http://theconversation.edu.au/>

By Matt Christmas, PhD Student in Ecological Genetics at University of Adelaide, and
Andrew Lowe, Professor of Plant Conservation Biology at University of Adelaide

Ants might be a pain ... but they play a vital role in maintaining the variety of plant life we see around us.



You'd be hard pressed to find many people who hold ants in high regard. That might be due to their destructive behaviour towards lawns, their ability to infest your house in no time at all, or a willingness to provide you with a nasty formic-acid-filled bite if you inadvertently step on their nest.

But before we write off ants completely, we should give some consideration to the invaluable work they do for biodiversity. Several studies in recent years – including [this one](#), [this one](#) and, most importantly, [this one from 2009](#) – show ants play a key role in seed dispersal for around 11,000 flowering plant species worldwide.

The ants don't do this hard work purely out of the goodness of their hearts – they do it for a reward. That reward is a nutrient-rich appendage attached to the seed, known as an [elaiosome](#) (see image below), which the ants feed to their larvae.



Bloodroot seeds with elaiosomes (the gelatinous, white-speckled part) still attached.

The benefits to the plant come when the elaiosome has been removed and the seed is discarded among the fertile waste around the ant nest, which provides perfect growing conditions.

Mutualistic relationships between ants and their flowering plant counterparts appear to have evolved independently more than 100 times, with the elaiosome being an excellent example of [convergent evolution](#) – that is, different species evolving similar traits or characteristics independently of each other.

The 2009 study mentioned above – by biologist Szabolcs Lengyel and colleagues – sheds light on the significance of this mutualistic relationship in terms of the diversification of flowering plant species (it is estimated there are roughly 300,000 flowering plant species on Earth today).

Seed dispersal is vital to the connectivity of plant populations – the greater the distance a seed can be dispersed, the greater the level of connectedness between populations. But ants only transport seeds over very short distances – up to 200m but usually only over 1-2m. Therefore, any plant relying on ants to disperse its seed will be limited in its ability to spread out over large distances. This limited dispersal distance will lead to geographically isolated populations – the perfect conditions for diversification and speciation.

Indeed, the 2009 study found that flowering plant groups that were ant-dispersed contained more than twice the number of species than closely related species that did not rely on ants for seed dispersal. By dispersing seeds only over short distances, ants have directly assisted in increasing the global diversity of plants.

So, ants have a significant impact when it comes to the diversification of flowering plants. And, with ants outnumbering humans by roughly 1.4 million to one, we shouldn't be too hasty in writing them off as a pest. Without ants, the world would lack a lot of the floral beauty we see around us today.

Grevillea and Hakea - one genus or two?

By Peter Olde, leader of the Grevillea Study Group and a joint author of *The Grevillea Book*.

Peter Olde took the above subject for his talk to the Australian Plants Society NSW meeting at Ermington recently.

Peter discussed the basis of many of the name changes in recent years, pointing out that species are an evolutionary unit and that each has its place on the tree of life. In order that this is accomplished, botanists now resort to more information than can be found in the visible characteristics of a plant.

The important science of genetics provides the tools which are applied to the molecular analysis of a plant's DNA. Millions of bits of

seemingly insignificant pieces are analysed. What the analysis reveals is not always what we want to hear. The characters on which we previously relied to distinguish our genera may not be as important as we once thought, as they cannot always explain what the DNA is telling us.

A recent analysis of 5 informative genes from a large sample of *Grevillea* and *Hakea* species has revealed that *Grevillea* is paraphyletic with respect to *Hakea*. *Hakea* is nested within some species that have previously been called *Grevillea*. Unfortunately, the results of all molecular analyses have to be interpreted.

What this means is that either *Grevillea* will have to be split up or merged with *Hakea*. If it is merged, then *Grevillea* disappears. (*Hakea* was named first and has priority in the nomenclature).

An alternative interpretation will see *Grevillea* split and both genera retained, with additional genera recognised mainly in Western Australia.

One result of the second alternative is that there could be two genera in the Sydney region, one taking in the toothbrush species, the 'true' Grevilleas, (e.g. *Grevillea longifolia*) and another taking in the spider Grevilleas (e.g. *Grevillea sericea*). All the Hakeas would remain.



Grevillea sericea

Photo: Wikimedia Commons

Financial

These statements have been extracted from the Foundation's audited accounts for the year ended 30th June 2012: -

| | |
|--|---------------|
| Income | \$ |
| Donations | 5,670 |
| Membership fees | 2,100 |
| Interest, investment income and change in value of investments | 19,971 |
| Imputation credit refunds | 3,089 |
| Grants unclaimed/returned | 7,900 |
| Total Income | 38,730 |
| Expenses | |
| Accounting and audit fees | 3,278 |
| Grants | 29,317 |
| Young scientist awards | 1,000 |
| Promotions | 297 |
| Postage, printing, general expenses | 645 |
| Total Expenses | 34,537 |
| Surplus for year | 4,193 |

| | |
|--|----------------|
| Assets | \$ |
| Investments and bank accounts | 814,184 |
| Debtors | 8,156 |
| Total Assets | 822,340 |
| Liabilities | |
| Grant commitments | 16,945 |
| Net Assets | 805,395 |
| Accumulated funds | |
| Balance 1st July 2011 | 801,202 |
| Surplus for year | 4,193 |
| Balance 30th June 2012 | 805,395 |

The Australian Flora Foundation is a not for profit organization with the sole objective of fostering scientific research into Australia's flora. We are totally independent, and all office bearers are volunteers.

The Council (*governing body*):

- Dr Peter Goodwin (President)
- Professor Richard Williams (Vice President)
- Associate Professor E. Charles Morris (Vice President)
- Mr Ian Cox (Secretary)
- Dr Jenny Jobling (Treasurer)
- Dr Tina Bell
- Associate Professor Michelle Leishman
- Dr Paddy Lightfoot
- Dr David Murray
- Mr Ross Smyth-Kirk

The Scientific Committee:

- Professor Richard Williams (University of Queensland) - Chair
- Professor Kingsley Dixon (Kings Park & Botanic Gardens, WA)
- Associate Professor Betsy Jackes (James Cook University)
- Associate Professor Peter McGee (University of Sydney)
- Dr Trevor Whiffin (LaTrobe University)

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