PENTACHONDRA

Journal of the Australasian Plant Society

NUMBER 63 DECEMBER 2019



Leptospermum grandifolium

AUSTRALASIAN PLANT SOCIETY

Promoting the cultivation and conservation of Australasian plants, and their closest relatives, in northern hemisphere gardens

Number 63

December 2019

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APS NEWS

AGM 2019

Saturday November 16th saw APS members gathered at the home of society President Tom Hart Dyke, Lullingstone Castle near Eynsford in Kent, for the 2019 annual general meeting and get-together. A big thank you to Tom and his mother Sarah for their wonderful hospitality, and to Tom for guiding us round the World Garden in his inimitable and enthusiastic manner on a chilly afternoon.

Business included reports from officers (all of whom were re-elected); discussion of the society's updated constitution and final revisions to it; and consideration of what the committee can realistically take on. There are lots more things we'd like the APS to undertake but all the committee members are volunteers and we can't do more than we can fit into our lives.

Another item that came up for discussion was the location of the 2020 AGM. The APS is exceptionally lucky to be able to hold our AGM at Lullingstone but the committee recognises that it's a not an easy place to get to for members who don't live in the south east of England. (Though Clare Reaney made it from near Dundee, so it can be done.) Until a few years ago the AGM venue usually varied from year to year. I can remember attending meetings held at the Royal Botanic Garden Edinburgh, Birmingham Botanical Gardens, Pershore College near Evesham, Cambridge University Botanic Garden and the National Botanic Garden of Wales near Carmarthen. Over the next few months the committee will look at the practicality of holding the 2020 AGM it at a venue that is at least north of London.

Full minutes of the 2019 AGM will be published on the website in due course, and also in the May 2020 issue of Pentachondra. The society's updated constitution will also be published on the website as soon as possible.

Events 2020

So far four events are planned for 2020, two definite and two likely but yet to be finally confirmed. There may be more to come, possibly at short notice, so do keep an eye on your inbox.

Please contact Gary Firth at meetings@anzplantsoc.org.uk to book for APS events, and to receive final details and notification of any changes. Gary and Maria would be grateful if you could let them know your intentions, ideally at least four weeks prior to any event that you are considering attending (you don't have to be absolutely certain), as this helps them establish whether the event will be viable. Obviously you will not be turned away if you decide to come at the last minute!

Sue Norburn's garden and Leonardslee Gardens, West Sussex
Saturday 16th May

This two location event comprises a visit to APS member Sue Norburn's garden in Horsham, West Sussex, in the morning, followed by an afternoon visit to nearby Leonardslee Gardens.

Sue's garden is several acres in size together with additional woodland, and is immaculately maintained. She grows a number of Australasian plants including *Acacia*, *Eucalyptus*, *Correa*, *Hebe* and *Pseudopanax*. Although there is little of great rarity the growth rate of these plus other plants such as *Tetrapanax* and *Dasylirion* is remarkable, given that she has only been

gardening there for six years. It is easily accessible from the Pease Pottage exit of the M23.

Leonardslee Gardens, only a few miles away, opened again in 2019 following ten years of closure to the general public. It is primarily a rhododendron, camellia, magnolia and woodland garden, but is one of the largest and most notable in the UK. There are also a number of *Eucalyptus* plus recently planted Australasian beds, although the latter need some updating. A new Head Gardener has recently been appointed; Stephen Herrington was previously at Nymans Gardens which we visited a few years ago, and will hopefully be free to meet us and discuss his plans for the garden.

Further Australasian interest comes from the large population of wallabies which are to be found in an enclosure close to the main house. There is also an extensive deer park. Normal entrance fees will apply; there is an early bird discount for tickets purchased online. For more information go to www.leonardsleegardens.co.uk.

Abbotsbury Subtropical Gardens, Dorset Saturday 13th June

The 30 acres of Abbotsbury Subtropical Gardens are filled with rare and exotic plants from around the world. A mixture of the formal and the informal, it is one of your editor's favourites for Australasian plants, not to mention the amazing view of Chesil Beach from the top of the site, and the laughing kookaburras.

We will be shown round by APS member Sean Boast. Sean is Assistant Head Gardener and his main role is to oversee the day to day running of the gardens. In addition, like all Abbotsbury gardeners, Sean is responsible for maintaining a five acre segment of the gardens. Sean's section includes the Australasian garden, the dry border, the Mediterranean bank, the grass border and the Chilean border. He also propagates seeds and cuttings for the gardens and looks after a collection of tender pot plants.

There is a restaurant but if you prefer a packed lunch there are plenty of pleasant spots to picnic. The plant centre is excellent, with many plants that are growing in the gardens offered for sale. Normal entrance fees will apply. A group rate is available for parties of 10 or more and if sufficient members book in advance we will try and take advantage of this. There is wheelchair access to approximately 50% of the site and one companion is admitted free of charge per wheelchair user or visually impaired visitor. Parking is free. For more information see abbotsbury-tourism.co.uk/gardens/ .

Specialist Plant Society Show, RHS Wisley, Surrey Saturday 20th and Sunday 21st June

The APS hopes to have a joint display with the Hebe Society at the annual Specialist Plant Society Show at RHS Wisley. This show offers an excellent opportunity to promote the APS and we successfully exhibited here in 2016 and 2017.

The show is open from 9am to 5pm on both days. If you think you can help with provision of plants and/ or staffing the stand at some time during the weekend Gary would love to hear from you; contact him at meetings@anzplantsoc.org.uk. No special expertise is required, just lots of enthusiasm for Australasian plants!

The RHS bills this event as a fabulous day out for plant lovers and gardeners of all levels. It features many specialist societies besides ourselves and so also provides an opportunity to learn more about garden plants you may not be familar with. Entrance to the show is free but normal admission to RHS Wisley applies.

Hampton Court Garden Festival 7th to 12th July

If you are visiting the 2020 Hampton Court Garden Festival please find time to come along to the Plant Heritage area of the Floral Marquee and say hello to Gary Firth (APS events organiser) and Steve Harding on the Hebe Society stand. They will be displaying a wide range of plants of New Zealand origin in addition to hebes.

Great Dixter Autumn Plant Fair, East Sussex 3rd and 4th October

The Great Dixter Autumn Plant Fair features specialist nurseries from across Europe. We hope to be present but nothing has yet been confirmed.

Photography competition

In 2020 the society will be holding a photography competition. The rules are as follows. The photo should be of a native Australasian plant or plants being grown in the northern hemisphere in a pot or in the ground; either is fine. Each member can submit one photo. The deadline for submission will be 2 months before the date of the 2020 AGM (still to be decided). The winner will receive a print of a Celia Rosser Banksia drawing. So please email your photo (not compressed), together with the name of the plant(s) and where the photo was taken, to Ben Ram at webmaster@anzplantsoc.org.uk. It's time to get snapping!

Please note that while copyright of images will remain with the photographer the APS will claim the right to exhibit the entries, and to use them to further its aims generally and to promote the APS and its photography competition. This includes publishing photos in APS publications, on the website, or on social media. All published photographs will be credited. The APS will also claim the right to edit or use images in combination with others.

Subscriptions are due!

Subscriptions are due on **1st January 2020**. A renewal form is enclosed with this issue for those who who do not automatically renew their membership. Please send it, together with a cheque payable to Australasian Plant Society, to APS Treasurer & Membership Secretary Jeremy Spon (his address is inside the back cover). Annual subscriptions are £15 for members resident in the UK and £18 for members resident elsewhere.

If you pay by standing order or PayPal, or you have already paid for 2020, you do not need to do anything, **unless** any of your details have changed. If so, please contact Jeremy directly.

Update on proposed Plant Heritage Dispersed National Collection of Grevillea

To remind you: the APS hopes to create this National Collection so that we can study ways of growing *Grevillea*, their

hardiness in different locations, species and cultivar availability and, of course, conservation.

The Plant Heritage database, Persephone, is now set up and ready to list our plants. Some members have already agreed to take part, and I will contact them with details. If you grow *Grevillea*, even one plant, we would love to include you. I am happy to do the necessary work, so all you need to do is tell me what plants you have. I will also send you a questionnaire asking for further details of your plants that would be useful for us to have.

To join in or for more information, please contact me, Jude Lawton, at conservation@anzplantsoc.org.uk.

Correction

On page 19 of Pentachondra issue 62 (May 2019) there is a photograph labelled *Eucryphia lucida*. Thank you to John Anderson who pointed out that the plant pictured is actually *Eucryphia milliganii*.

Seedlist news

We hope the 2020 seedlist will be ready by early spring. As soon as it is finalised it will be posted on the website so members who want to get an early start won't need to wait until the printed list is available with the May 2020 Pentachondra. Ordering early also helps Janet our seed manager to spread her workload. If orders come all at once it inevitably means that there will be delays in sending them out.

Recently we have had several contributions of seed from members, including a very generous donation of seven species from Jan-Willem Vos, for which we are very grateful. Donations are always welcome and donors are entitled to an extra packet from the seedlist for each species donated.

The seed challenges are still going because so far only Christine Yeo has managed to germinate and grow any of our challenge species. If at first you didn't succeed maybe you should try again. More and more information about seed germination is becoming available online including for *Ricinocarpus pinifolius* (**see page XX**).

In this issue you will find a short article by Jeff Laymen recording his successes and failures with germinating APS seed. More contributions of this kind from members are really welcome. I would emphasize that, as Jeff does, it is as important to record failure as it is to record success, because failures tell us what doesn't work!

Earlier this year seed of *Wollemia nobilis* was sent out to members who expressed an interest. Jude Lawton excitedly reported in November that she has three seedlings already (photo page 7). Has anyone else succeeded?

Twitter

In September 2013 the APS joined Twitter, under the user name @GondwanaPlants. Our account was set up by APS chairman Robbie Blackhall-Miles to promote the APS and the cultivation and conservation of Australasian plants and their closest relatives in the UK and Europe. It now has 832 followers, which is a lot of people interested in Australasian plants.

Just over 6 years later Robbie is still running the APS Twitter account, despite several calls for someone else to take over. Surely there is an APS member out there who is on Twitter already and could find a few minutes every few days to check the account,

retweet items of interest, tweet about APS activities and so forth. If you could do this Robbie is waiting to hear from you at chairman@anzplantsoc.org,uk.

Could you write for Pentachondra?

As always, many thanks to all those who have taken the time to contribute to this issue. I particularly welcome articles based on members' experience as that's how we increase our joint knowledge of cultivating Australasian plants in the northern hemisphere.

You could, as mentioned above, write about the results of your seed sowing. Or, as two members have done for this issue you could write about your garden, including information such as where it is, what the soil and climate are like, and what plants are successful. Perhaps you grow your Australasians in containers; what have you discovered that works? Or maybe you have a favourite plant that you would like to tell other members about. Length is not important, and if you don't feel like writing photographs on their own are fine, but please provide a caption.

Essentially, the only thing required of contributions to Pentachondra is that they have some connection with Australasian plants and their close relatives. So could you recommend a book, or a garden, or a nursery that you enjoyed visiting? Perhaps you've visited Australia or New Zealand and would like to tell readers about the plants you saw? Maybe you read something interesting that could be included in Bits and Pieces? If you have an idea but are not sure about it you can always contact me to check that it would be suitable.

The deadline for the next issue is **31st March 2020**. Please send contributions direct to the editor, either electronically or as typed hard copy. Please **don't** compress photos, and please **do** contact the editor (me, Judy Clark) if you have questions of **any** sort about contributing.

Pentachondra is going to need a new editor

I started editing Pentachondra in 2008 and this will be my 24th issue. It's a task that I really enjoy but I do find that as I get older I am getting slower. At the same time there are ever more things that I want to do; in particular I am finding that I would like more time to look after my garden with its ever increasing collection of plants. Then there is the journal itself. I believe it needs to evolve and would benefit from a fresh eye, rather than remaining under the stewardship of someone who is only likely to get more stuck in her ways.

So it is time to seek a new editor with new ideas to take our journal forward. I can't pretend that editing it doesn't take time but it is mostly a pleasurable task. I will be very happy to discuss what's involved with any member who wants to find out.

MEMBERS' GARDENS

Alastair McKie

It has now been ten years since myself and my partner inherited a medium-sized garden of around 300m^2 (about 3200 sq ft) in Stafford containing very little in the way of plants other than an overgrown apple tree and a vast expanse of weedy lawn.

I'm a geologist by training, so I took a keen interest in the soil underlying the garden. The geology here is glaciofluvial sheet deposits of sand and gravel which gives me a soil that is

relatively sandy and gravelly, and free draining. Many of the plants that I brought with me from our previous house such as roses and geraniums have found the going tough. However, rather than fight my conditions, I have to embrace them: as they say "right plant, right place". I now have sedums that do not flop, I have had success with bearded irises and cold-hardy succulents, I have established a 'prairie style' border, and I have begun to explore more tender and unusual plants.

The garden is relatively sheltered from strong winds, but it does face north, so the area close to the house gets hardly any sun during the winter. But with few trees in the garden and surroundings there is lots of light, and there is full sun from the middle to the far end of the plot. Being in Staffordshire the garden can be quite chilly especially in January and February with a record low of around -15^{0}C during the long winter of 2010- 11.

I have had an interest in the plants of Australia ever since visiting botanic gardens and visiting Australia several times but I didn't have either space or the conditions to try before. My parents had a *Callistemon rigidus* planted in the garden. As a teenager I can remember my mum rushing out with fleece to protect it from frost. I have since seen it growing in the middle of an exposed garden and at the base of an east-facing wall, both in rural Shropshire, and seemingly none the worse for wear, so I feel my mum didn't need to bother with the fleece.

After a trip to Australia in 2017, I became increasingly curious about growing Australian plants in the UK and after a Google search for 'Australian Plants ' I stumbled upon the APS. I got a further nudge after watching the BBC coverage of the RHS Hampton Court Flower Show where the APS was featured. I decided to join, completed my first seed order, and now I'm hooked, evangelising like a recent convert ever since to anyone who will listen.

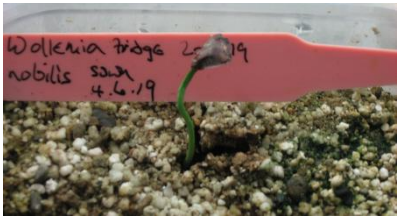
I now have several Australian plants present throughout the garden some in pots and some in the open ground including *Grevillea* 'Canberra Gem', *G. lanigera* 'Red Salento' (photo opposite), *Eucalyptus perriniana*, *E. pulverulenta* 'Baby Blue', *Lomatia myricoides*, and six callistemons: *Callistemon rigidus, C. citrinus, C. pallidus, C. pityoides, C. salignus* and *C. viridiflorus.* All seem to be settling in well, having gone two winters relatively unscathed and surviving the beast from the east of early 2018.

It is definitely with the Myrtaceae, especially the genus *Callistemon* / *Melaleuca* (if the powers that be can decide which plant belongs where) where my interest bordering on obsession seems to lie. An experiment germinating seeds from the same Callistemon rigidus in my parents garden using the 'bog method' was a roaring success and has given me as well as many of my friends and family a plant for their gardens. Now thanks to the APS seed list I have a greenhouse of plants of various ages I am considering, perhaps rashly, establishing a national collection of *Callistemon* /*Melaleuca* in time. So watch this space.

Being attached to my mobile phone on what my partner would consider a semi-permanent basis I often post pictures of my garden, and of plants, both successes and failures, if that would be of interest to anyone. You can find me on Twitter at @FiveGrnFingers and on Instagram at @Five_Green_Fingers.







clockwise from above:

Royal grevillea, *Grevillea victoriae* in Paul Felton's garden

Jude Lawton's babies: *Wollemia nobilis* seedlings

***Grevillea lanigera* 'Red Salento' in Alastair McKie's garden**





Paul Felton's garden
anticlockwise from left
Rosemary grevillea:
Grevillea rosmarinifolia
Norfolk Island pine:
Araucaria heterophylla
Tall kangaroo paw
Anigozanthos flavidus
below: ***Anigozanthos flavidus* near Albany, WA**







Paul Felton

Hi folks, I have not written in before but I hope my small article is of some interest! I live on the coast in Cornwall so I do not get much frost but the wind can be a problem.

2019 has been a good year with my Australian plants. I've lost one pin cushion hakea (*Hakea laurina*) for some unknown reason but otherwise all came through the Cornish winter quite well. My grevilleas have done well (photos page 7 and opposite) and my kangaroo paws (*Anigozanthos flavidus*) continue to spread nicely. I've had them at least ten years and they flower every year (photo opposite). My red flowering gum is just producing some flower bracts so I'm quite excited to have those flower. And I have just noticed one of my banksias is just coming into flower. The Norfolk Island pine (*Araucaria heterophylla*) which went into the ground about three years ago, has more than doubled in size and is now about two metres high (photo opposite).

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GREVILLEA ROSMARINIFOLIA: SUDDEN DEATH

Jeff Layman

I have been growing *Grevillea rosmarinifolia* for around 20 years. At our previous house in Horsham, I put a smallish (about 100cm tall) plant in the front garden in 2000, facing south, in full sun. By the time we left in autumn 2012 it was over 4m high and 3m wide. It flowered regularly, and often had a flower somewhere on it nearly every month of the year. It had no problem with the extreme temperatures of the first decade of the millennium.

So when we moved to south central Hampshire one of the first plants I put in the front garden - again facing south - was a *G. rosmarinifolia*. This was bought at a local garden centre and was a similar size to the previous one. Within a couple of years it had put on a good amount of growth, and by this spring was over 2m high and 1.5m wide, and that was after regular pruning. It had full sun all day, and was in a slightly raised bed with other plants. As we have had little rain here since the beginning of 2019 (150 to 250mm, depending on which local weather station observations are used) I have had to water all the plants at least once a week since early June.

About mid-June I was looking at the *G. rosmarinifolia* and it was doing well, with quite a few flowers out. However, at the end of the first week in July I was once again looking at the plants in the front garden and noticed that one of its branches, which was crossing another plant, was dead. I was most surprised at that, but astounded when I looked at the rest of the plant, and that was dead too! Even partly open flowers were brown and dry. All the leaves were dry. I didn't dig it up to examine the roots, but one of the main stems had a deep longitudinal split along most of its length (photo page 23). I have seen many other woody plants do this after being cut up for firewood and left to dry, but it takes months, and usually the longitudinal splits remain within the bark, which does not split. I wondered if the *G. rosmarinifolia* had dried out and died, but several plants within a metre or so of it – none drought-resistant – showed no sign of water shortage at all. So why did this plant die so quickly?

Of course, both the *G. rosmarinifolia* I have grown may not actually be the species but a hybrid between *G.*

rosmarinifolia and *G. lanigera*. That might especially be true of the first one as it was so vigorous, but it still does not explain the sudden death of the second plant in midsummer.

Postscript: I asked Judy Clark if she had heard of 'sudden-death' in a grevillea, and she replied that an unidentified grevillea of hers had died in somewhat similar circumstances in February or March of this year! However a second specimen planted in another part of her garden remains alive and well.



THE GENUS ASTELIA

Gary Dunlop

Like so many Australasian plants, the genus *Astelia* has its origins in what is now South America, before the break up of Gondwana, but its distribution is much more widespread than most genera of such early origin. The genus name was established by Banks and Solander, with a plant that they discovered in Tasmania (then called Van Diemen's Land) and which they named *Astelia alpina.* It also occurs in eastern Australia on Mount Kosciuszko in New South Wales, not far north of the state boundary with Victoria.

Astelia alpina forms a small rosette of silvery green leaves about 15cm long and 10mm wide and gradually tapering to a point. It is very slow growing; my plant has only 4 or 5 rosettes despite being at least 20 years old, and it has never flowered (photo page 14).

The genus originated in South America where there is only one species, *Astelia pumila*, which grows at high altitude in the southern Andes in Chile and Argentina, including Tierra del Fuego. It has also found its way to the Falkland Islands. It was discovered by J.R. Forster and named *Melanthium pumillum* but the name was subsequently corrected to *Astelia pumila* by the French botanist Gaudich in 1825. From an illustration it has a small dense flat cluster of narrow and tapering green leaves about 15cm in diameter, with a cluster of small white flowers in the centre.

Another species, *A. hemichrysa*, a rather larger plant with green foliage, is epiphytic, growing in clumps from where stout branches attach to tree trunks. It occurs on the small French Island of Reunion, which lies several hundred miles to the east of Madagascar. Reunion has a tropical climate and this species obviously would not be hardy in a cooler climate. Its isolated location confirms that the genus was established before the break-up of Gondwana.

Returning to the antipodes there are three species which occur on the Australian mainland: *A. alpina* as mentioned above, *A. australiana* and *A. psychrocharis*. *A. australiana* is a tall plant, about 1.5m, with green leaves. It is native to the south of the state of Victoria and is now considered an endangered species, so presumably it is not in cultivation in gardens even in Australia, apart from possibly botanical gardens.. The third species, *A. psychrocharis*, is a dwarf plant, with the short broad tapering leaves in layers of three equally arranged leaves. Small cluster of flowers give way to orange berries with one central one surrounded by six others. Images of all these species can be viewed with an online search (see vicflora.rbg.vic.gov.au/flora/search, for example).

Whilst the centre of diversity is New Zealand, the genus has an unusual and

widespread distribution further north in New Caledonia (*A. neocaledonica)* and New Guinea (*A. papuana*). The spread of species is even wider in the Pacific Ocean, with another species, *A. tovii*, in the Marquesas Islands, part of French Polynesia. The Marquesas are closer to South America than Australasia and on the same latitude as the southern tip of New Guinea. The next locations are Tahiti and Raiatea, part of the Society Islands south west of the Marquesas with the Tuamoto Islands sitting between them; both island groups are also part of French Polynesia. That is where *A. nadeaudii* is to be found. A third French Polynesian species, *A. rapensis* is on the island of Rapa Iti.

Three more species are found in the middle of the Pacific Ocean, but much further north, on the Hawaiian Islands. Two species *A. argyrocoma* and *A. waialealae*, are found on Kauai Island whilst the third species *A. menziesiana*, maybe more widespread.

As to how the genus *Astelia* became so widely dispersed in the Pacific Ocean, this can only be a matter of speculation, though birds would seem to be the most likely and plausible agents. It is almost certain that none of species from any of these islands in the Pacific Ocean would be hardy in more temperate climates, even if some grow at relatively high altitude.

In fact the only species of *Astelia* in cultivation are those from New Zealand, where in total 12 different species grow on the North and South Islands. A thirteenth, *A. chathamica*, which happens to be the largest one, grows on the Chatham Islands, a New Zealand archipelago about 500 miles (800km) to the east of the northern tip of the South Island. The plant in the Chatham Islands was originally described as a form of *A. nervosa*, var. *chathamica*, by the Swedish botanist Skottsberg in 1902, but was separated from *A. nervosa* and given its own specific name *A. chathamica* in 1966 when the botanist L.D. Moore revised the genus. (L. D. Moore (1966) Australasian asteliads (Liliaceae), New Zealand Journal of Botany, 4:2, 201-240; available free online.)

Astelia chathamica no doubt first came into cultivation in a botanic garden in New Zealand, but must soon have entered the nursery trade there. It was widely available in garden centres in Ireland by the late 1980s and no doubt the rest of the UK as well. It was actually the first *Astelia* that I acquired in 1987. The plants being sold were nowhere near full height, with the leaves only about 30cm long; they reach about 2.2m long or more at maturity. In large clumps the leaves splay outwards, and the oldest leaves can touch the ground around (photo page 13). I suspect that many gardeners who bought the plant did not realise just how large it would grow. It is the most widely available *Astelia* and at some early stage it was obviously micro-propagated to cope with demand. Only recently, probably about three years ago, a micro-propagated plant must have been micro-propagated again, as for the last couple of years at least plants for sale in garden centres exhibit a mass of small growth points barely 2.5cm in length. Such recently bought plants have been exhibited, shortly after being bought, at two different Alpine Garden Society Plant shows in Ireland.

The second most popular astelia in cultivation is *A. banksii*, judging from the number of nurseries listing it in the Plant Finder, again suggesting that it may well have been micro-propagated. It is another silver leaved plant from

coastal cliff tops on the North Island. It may be variable in height depending on where it grows, as some illustrations suggest it is only half the height of *A. chathamica*, but the description in the Flora of New Zealand (Vol. 2) describes the leaves as reaching between 1 and 2.5m so it could possibly be taller than *A. chathamica*. However *A. banksii* has rather narrower leaves, ranging from 3 to 4.5cm wide, and prone to flop over. It is unlikely to be fully hardy; I lost my plant in one of the two severe winters that occurred about a decade ago, when temperatures dipped down to –13°C.

Astelias are not grown for their unimpressive flowers, which are usually presented in a small upward pointing panicle at the base of the leaf growth points on a short stem. So they only reach about 25cm in height in some species, though others have much larger panicles. Most of the mature berries are usually orange coloured. One such plant is *A. skottsbergii*, probably the least attractive of the New Zealand species, and unlikely to be in cultivation. The green foliage of this medium sized species appears to grow in dishevelled clumps with the flower spikes on longer stems than most species, protruding from in between the clumps of leaves.

At the smallest end of the size range of astelias is *A. graminea*. It has narrow coffee coloured leaves barely 20cm long in the form I grew, but it is apparently quite variable in leaf colour with both yellow and silver forms. About the same size but with slightly broader green leaves is *A. linearis* with bright green leaves, with rather darker centres. It does not appear to be commercially available, no doubt because it would not make an attractive garden plant.

A. nivicola has two very different forms, One, *A. nivicola* var. *nivicola* is a relatively small plant with leaves 10 to 30 cm long and 1-2 cm wide. The second species, *A. nivicola* var. *moriceae*, is rather different with leaves being up to 2m long and 7cm wide. A distinct form, *A. nivicola* 'Red Gem', is presumably green leafed but in cold winter months the upper surface turns a distinct reddish colour. The form I grow is a small form of *A. nivicola* var. *moriceae*, as the foliage is only about half the maximum length for the species.

A. fragrans is a large light, almost yellowish, green leafed plant which usually sports a reddish brown central midrib. The green leaves can vary between 50cm and 2.5m long and 2.5 to 7.5cm broad. Rather than initially growing upwards they curve outwards from quite low down, whereas most of the larger astelias are relatively upright with only the top half of the foliage curving outwards (photo page 13). It is not particularly garden worthy, except as a background plant.

A. trinervia is another large green leafed plant, a duller shade of green than *A. fragrans* and with more upright foliage, with leaves ranging from 1 to 3m long and 2-4.5cm wide. The tops of the long leaves cascade outwards and droop downwards, whilst more upright ones curve elegantly outwards, with only a few growing more upwards than outwards. The few relatively upward growing leaves of the form that I grow (photo page 14) reach about 2.5m or a little more. It is not a plant for a small garden.

A. grandis is not particularly well named as it has plain dark green foliage, which can vary in length from 50cm to 2.5m long and is 4-12cm wide. I have two rather similar unimpressive medium sized forms with leaves about 1m long.



above: ***Astelia chathamica*, mature clump**
below: ***Astelia fragrans***







clockwise from above left

***Astelia alpina* (growing at the top of Mt Wellington, Tasmania)**

Astelia trinervia

***Astelia nervosa*, large form**



As with *A. fragrans* and *A. trinervia* above, it has little to commend it as a garden worthy plant.

A. petriei is a relatively small species with pale green leaves. It apparently grows on mountain tops from Nelson to Fiordland on the western side of the South Island of New Zealand, where the climate is often wet and windy. It is not likely to be in cultivation in even in New Zealand where the climate is warmer and much drier. The leaves can reach between 2.5cm to 1m long and 2-6.5cm wide.

A. solandri in New Zealand grows more often as an epiphyte than in the ground, but in fairly moist conditions. It can have leaves about 5cm wide and up to 2m long in such conditions, but in my limited experience of growing it in the ground, the upright growing leaves are little more than 75cm tall. It seems to be much slower to increase that the other species I grow, probably as my conditions are much drier than those in its native habitat. It has bright green leaves with a dense silver reverse.

Last but by no means least is the species *A. nervosa*, the most variable species both in size and colour of the foliage, and probably the most garden worthy species. The basic or most common colour is a silver grey. Forms of this species vary substantially from dwarf type s with foliage barely 30cm long, through larger forms with foliage 60 to 90cm, with the largest having foliage at least 1.2m long. This tallest form has a more upright growth habit with the tops of the leaves bending outwards from the centre (photo opposite). There are also two brown leafed forms. One. *A. nervosa* 'Alpine Ruby', was first discovered by an old bushman in the Catilins area who gave directions of where it was to Mr Thomas Carl Gdanitz, who introduced it into cultivation. It has leaves about 1m long broadly in all directions, like the medium sized silver leafed forms. In contrast a third form has golden coloured leaves about 1m long and 5cm wide, noticeably broader that all the other forms. I don't know if this form has ever been formally botanically described or named in New Zealand. It is still not common in cultivation in the British Isles, though the plant was first grown by the late David Shackleton in his walled garden south of Dublin, probably about 30 years ago.



APS SEED GERMINATION 2019

Jeff Layman

Seeds (see table next page) were soaked in smoke solution for 24 hours and sown on 20-04-2019 in 6cm pots. No other treatments such as soaking in hot water or scarification were used. The pots were placed in unheated propagators which were kept in a conservatory at 12 to 40°C. All pots were occasionally sprayed with water to keep the surface damp. Spraying of *Disphyma* was stopped after one month as there were so many seedlings and the plant is a succulent. All germinated pots were removed from the enclosed propagators and left in the open in the conservatory to help avoid fungal diseases.

After 3 months all pots that had not shown any germination were left to dry out. Watering was restarted 2 months later. After a total of 6 months from sowing, no subsequent germination had been seen in any of the pots.

In total, 9 of the 19 species showed germination (the *Richea* has not been

Jeff Layman: Germination results

Seed (number sown)	First seedling	1m	2m	3m	6m
Anigozanthos manglesii (30)	07/05/19	25	26*	26	26
Banksia spinulosa var. *spinulosa* 'Birthday Candles' (8)		-	-	-	-
Blandfordia punicea (6)		-	-	-	-
Boronia megastigma (40)		-	-	-	-
Caesalpinia gilliesii (4)	30/04/19	1	1	1	1
Disphyma crassifolium (200+)	26/04/19	50+	50+	50+	50+
Dryandra stuposa (Banksiastuposa) (5)	14/05/19	3	5*	5	5
Eucalyptus tetraptera (20+)	10/05/19	3	4*	4	4
Gastrolobium cuneatum (50+)	02/05/19	4	3*	3	3
Grevillea aurea (5)		-	-	-	-
Grevillea crithmifolia (5)		-	-	-	-
Grevillea eriostachya (5)		-	-	-	-
Hakea dactyloides (11)	10/05/19	7	9*	9	9
Hakea epiglottis (50+)		-	-	-	-
Isopogon petiolaris (*10*)	19/05/19	-	4	4*	4
Micrantheum hexandrum (30+)		-	-	-	-
Orthrosanthus laxus (9)		-	-	-	-
Richea dracophylla (8)	27/04/19**	1	1	1	1
Stylidium graminifolium (15)		-	1	1	1
Veronica formosa (10)		-	-	-	-

* Pricked out and potted on **Not a *Richea*.

Dates are those of first germination. Number of seedlings at 1, 2, 3, and 6 months after sowing are shown.

included). The Proteaceae showed variable germination, and it is particularly disappointing that no grevillea seedlings appeared. But *Hakea dactyloides* had excellent germination, and *Isopogon petiolaris* was good. It was unsurprising that *Boronia megastigma* did not germinate. The only time I have ever had seedlings appear is when I brought back a packet of seeds from my first visit to Western Australia in 1982 and sowed them immediately on my return to the UK. I was particularly pleased with the *Anigozanthos manglesii*, as on all previous occasions these have had variable germination, and the seedlings succumbed rapidly to 'Black Ink Disease'. So far none of the seedlings have shown any sign of this.

The Australian Flora Foundation

'Germination of grevillea seeds' appears by kind permission of the Australian Flora Foundation. It was first published in the July 2019 issue of their newsletter, *Research Matters*.

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GERMINATION OF GREVILLEA SEEDS

E. Charles Morris

I started investigating the germination of *Grevillea* seeds when I moved to the then University of Western Sydney (Hawkesbury Campus) in 1995. At the time I started my investigations, not much was known about what stimulated post-fire germination of these seeds. Early investigations tested seeds of *G. linearifolia* for a germination response to heat shock and failed to find one. However, work at University of Wollongong had found a germination response to a brief heat exposure from fire, and to scarification for *G. barklyana*, and the investigators hypothesised that seeds of this species had a 'hard' seed coat impermeable to water (similar to wattles and peas).

Peter Olde and Neil Marriott, in their book, describe *Grevillea* seeds as coming in three shapes, the 'winged' form found in many of the horticultural hybrids in which a membranous wing surrounds the flattened seed like a halo; the 'oats' form which lacks a wing, is longer than it is wide and has margins curled under the seed; and a hemispherical form with a convex upper surface and a flat lower surface. The native *Grevillea* shrubs found around Sydney have the oats-style seed.

I was able to collect seed from seven *Grevillea* species native to the Sydney region. The idea that these seeds had a hard seed coat that prevented water uptake was tested by comparing the water uptake of scarified and non-scarified seeds. Water uptake in both of these treatments was rapid and comparable, meaning that the *Grevillea* seed coat was permeable to water and did not behave in the same way as that of wattles and peas.

Awareness of the role of smoke and combustion products in stimulating germination was increasing rapidly during the 1990s, and so I decided to test for the effects of heat shock, smoke, heat and smoke combined, and scarification on germination of the *Grevillea* seeds. Smoke increased germination in all seven species, but in some species, the greatest germination occurred if both heat and smoke were applied. Using *G. buxifolia* as an example, untreated seeds showed zero germination, heated seeds showed about 12%, smoked seeds about 55%, and heated and smoked seeds about 75% germination.

In 1998 I was able to spend some time in Kingsley Dixon's lab at Kings Park, Western Australia. An experiment I did there showed the role of the seed coat in controlling germination in the east coast species *G. linearifolia* (photo page 21) and the west coast species *G. wilsonii*. Intact seeds of the two species either showed some germination response to heat shock and smoked water (*G. linearifolia*) or no response (*G. wilsonii*). However, removing the seed coat resulted in full germination in *G. linearifolia*, and up to 60% germination in *G. wilsonii*.

This finding focussed my attention on the seed coat and the role it might play in regulating germination. There are a number of known ways by which the seed coat can restrict germination. The seed coat can prevent water uptake, mechanically constrain the embryo from elongating, contain germination inhibitors, prevent the exit of germination inhibitors located in the embryo, or restrict oxygen uptake. The prevention of water uptake had been ruled out already but testing of some of the remaining mechanisms such as the mechanical constraint idea required greater knowledge of the seed coat.

There was no published information on the structure of the *Grevillea* seed coat so while on study leave in 2002 at Anne Ashford's lab at the University of NSW, I began to investigate the structure of the seed in conjunction with Candy Briggs using *G. linearifolia*. Dissection of the seed showed that it lacked an endosperm or food storage structure; the embryo and its two embryonic leaves (or cotyledons) fill up the entire space inside the seed coat (photo page 21). The seed coat had two major coverings, the outer testa and inner tegmen, and these two layers have further substructures within them. The innermost layer of the outer testa is made up of a single row of palisade cells, which are mechanically quite strong. The inner tegmen is composed of additional strengthening cells called sclerenchyma. Together, these two layers confer considerable mechanical strength to the seed coat, and so provide evidence for mechanical constraint.

There are internal waxy layers or cuticles on either side of the sclerenchyma which can act as barriers to diffusion of, for example, germination inhibitors in the embryo itself. Smoke has been shown to alter the permeability of the internal seed coat cuticle in a North American smoke responder (*Emmananthe penduliflora*), thus allowing germination inhibitors present in the embryo to escape with germination occurring subsequently. This idea was tested for *G. linearifolia*; however, neither smoke nor heat had much effect on the permeability of the seed coat to high molecular weight compounds such as germination inhibitors. It was concluded that heat shock and smoke do not have the same

effect on *Grevillea* seeds as for North American species.

The combination of features of *Grevillea* seeds revealed so far – strong, but water permeable seed coat and germination of the embryo if removed from the seed coat – occurs in other species and pointed me to a well known type of seed dormancy. In this case, seed dormancy can be controlled by the seed coat or the embryo, or the two acting in combination. Candy Briggs and I conducted further investigations to test the mechanisms of seed coat dormancy that had not been ruled out already, and whether heat shock and smoke were having any physiological effect on the embryo itself.

The mechanical strength mechanism operates in some species by constraining elongation of the embryonic root (or radicle) which penetrates the covering structures and appears outside the seed as the first visible sign of germination.

Removal of structures covering the part of the seed where the radicle appears can allow germination to proceed in such species. When we selectively removed parts of the seed coat of *G. juniperina* (photos page 22), germination did not occur if the seed coat remained intact and in place over the micropylar end of the seed where the radicle appears. If the seed coat over the micropylar end was removed, 80–95% of seeds germinated, depending on how much seed coat was removed. This was a dramatic illustration of the way a localised part of the seed coat can control germination.

We also tested whether heat shock, smoke, or the combined fire cues affected the physiology of the embryo itself by treating intact seeds with the fire cues, dissecting off the micropylar end of the seed coat to expose the radicle, and incubating the embryos on media with increasingly lower availability of water (measured as water potential, or negative pressure). This method allows assessment of the positive pressure, called the 'growth potential', that the elongating radicle can generate.

We found that treating the embryos with heat shock or smoke increased their growth potential, so that more of them elongated their radicles at lower water availability than the untreated control embryos. The maximum increase in embryonic growth potential occurred if they were treated with both heat and smoke. This pattern mirrored the observed germination behaviour of intact seeds. The increase in growth potential must be due to physiological changes in the embryo from the fire cue treatments; smoke is known to affect the hormonal system of plants.

Other dormancy-breaking stimuli such as red light and low temperatures have been shown to increase the growth potential of dormant embryos in other species. Our study shows that heat shock and smoke are doing the same in the *Grevillea* embryos, especially if they are combined. Heat shock, known for its physical effect in rupturing part of the seed coat in wattles and peas, appeared to be having a physiological effect on the embryo in *Grevillea*.

In summary, both the seed coat and the embryo itself appear to have roles in regulating dormancy and germination in 'oats' style *Grevillea* seeds. For the seed coat, the evidence points to mechanical constraint on elongation of the radicle by the micropylar region of the seed coat. For the embryo, heat shock and smoke appear to have physiological effects that increase the pressure the radicle can generate to force its way out of the seed coat.

However, some intriguing questions remain. Other research has identified germination-inhibiting compounds in the seed coat of species of *Grevillea* from Western Australia. These compounds have also been shown to inhibit germination of seed of agricultural species. Whether these compounds play any part in controlling germination of intact *Grevillea* seeds remains to be seen. Seeds can have multiple dormancy mechanisms that operate to allow germination under a range of conditions which can occur at different times, so that cohorts of seedlings can be spaced out in time, emerging in response to different stimuli. This can work as a long-term persistence strategy and may be operating in *Grevillea* seeds.

References and further reading

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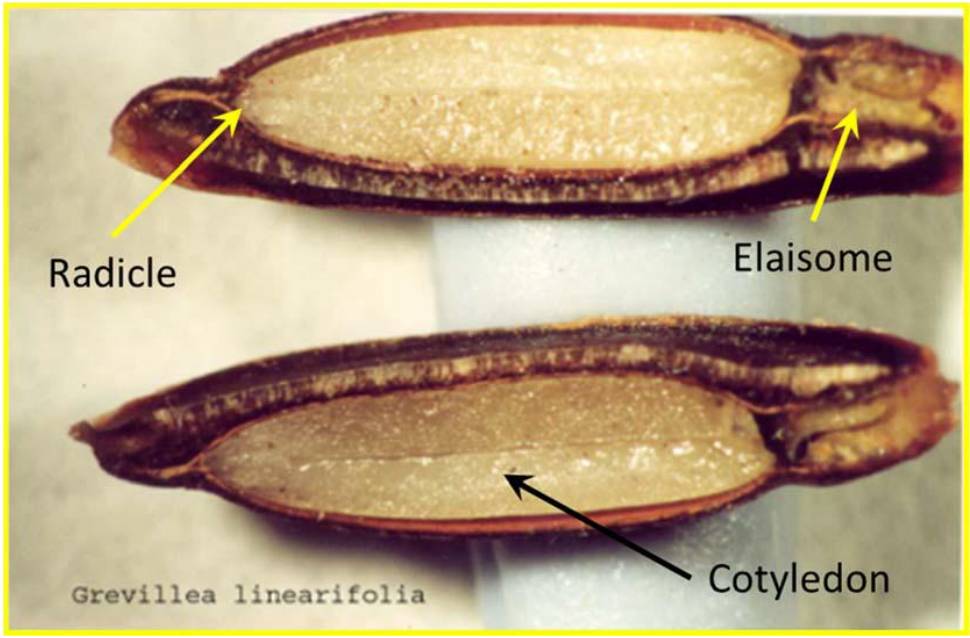
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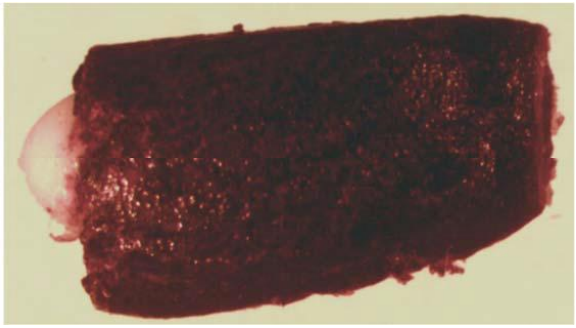


Left: Flowers and fruits of *Grevillea linearifolia*; right: an opened fruit and seed of *G. linearifolia*. A cream-coloured ant-attracting body (elaisome) can be seen at the righthand end of the seed.



Dissection of a seed of Grevillea linearifolia showing the elaisome (antattracting body), an embryonic leaf (cotyledon) filling the internal cavity of the seed, and the root of the embryo (radicle) at the micropylar end of the seed. The brown covering structure is the seed coat.





Left: Embryonic root (radicle) emerging from the micropylar end of a seed from *Grevillea juniperina*; right: the seed coat removed from the micropylar end of the seed, exposing the embryonic root (radicle). The elaisome was also removed from right hand end of the seed. This treatment increased germination.

Below: Flowers and fruits of *Grevillea juniperina*.









Above left

***Correa reflexa* var. *reflexa* from SW Victoria:**

Above right

Correa backhouseana* var. *orbicularis

Left

Dead *Grevillea rosmarinifolia* stems showing deep longitudinal splits



Correa flowers

above, left to right: ***alba* var. *alba*; 'Ivory Bells'; *alba* x *backhouseana*; *backhouseana* var. *backhouseana***

below left: ***reflexa* var. *reflexa* from Mt Wellington**

below right: ***C. alba* cultivars, 'Starlight' and 'Pinkie'**





IDENTIFYING WHITE AND CREAM FLOWERED CORREAS

Judy Clark

Correas are not the easiest plants to identify, even when in bloom. This is particularly true of those with white and cream flowers. Here I try to explain how to distinguish between the three often confused taxa (at least in my experience) shown in the photo opposite: *Correa alba*, *Correa backhouseana*, and the hybrid between the two.

Correas have tubular or bell shaped flowers. The petals (together termed the corolla) are usually united to a greater or lesser degree and the calyx is cup shaped. Distinguishing characteristics include the extent to which the corolla is split and how recurved (turned back) the four corolla lobes are.

The flower of *Correa alba* is split into four free petals which are turned back at the ends so that the flowers look rather like four pointed stars. Three varieties of *C. alba* are recognised - var. *alba*, var. *pannosa* and var. *rotundifolia* - but the only one that I have found in the UK is var. *alba*. I have three different types in my Plant Heritage National Collection (see photos opposite). The cultivar 'Starlight' is easy to tell from the others as it is the only one with variegated foliage. Like plain *C. alba* it has pure white flowers, albeit slightly smaller ones (13mm compared with 15mm).The cultivar known as 'Pinkie' has flowers with a pale pink blush spreading nearly to the edges of the petals, which are about 14mm in length.

At the other end of the spectrum so to speak is *Correa backhouseana*. As with *C. alba* three varieties are recognised: var. *backhouseana*, var. *coriacea* and var. *orbicularis*. Var. *backhouseana* always has creamy yellow flowers which are about 25mm long (measured from lobe tip to the top of calyx) and the ends are split into four lobes which are slightly recurved. If a fresh open flower is pressed between the thumb and forefinger the corolla does not split any further.

As well as the species I have a plant that came with the name 'Mt. Congreve'. It is said to be a very hardy selection from Mt. Congreve Gardens in Ireland. My specimen is identical to ordinary *C. backhouseana* var. *backhouseana* and shows no difference in hardiness, though this is not a trait that would be easily tested in the mild conditions in my garden. I have not so far been able to find a description of 'Mt. Congreve' which might resolve matters. If my specimen really is 'Mt Congreve' then I think a cultivar name is not deserved.

The flower of the hybrid between *C. alba* var. *alba* and *C. backhouseana* var. *backhouseana* is more or less intermediate between the flowers of its parents. The corolla lobes are more strongly recurved than those of *C. alba* and the corolla is more bell shaped compared with that of *C. backhouseana*, but is not split to the base as with *C. alba*. However, if a fresh open flower is pinched between the thumb and forefinger, the corolla lobes can easily be split to the base.

I have two of these hybrids (see photos opposite) in my collection. *Correa* 'Ivory Bells' was bred by Victor Reiter Jr in San Francisco in the 1940s and introduced into cultivation in 1979 by the Saratoga Horticultural Foundation Ltd[1]. It has a more compact and more upright habit than the rather sprawling plant named *C. alba* x *backhouseana* which I obtained several years ago from

Heather Angrave, and which I believe was bred by her father. The leaves of both are elliptical to ovate in shape but those of 'Ivory Bells' are somewhat narrower - to about 20mm wide - compared with about 25mm for *C. alba* x *backhouseana*.

The flowers of both taxa are identical in shape, and an off- white colour, but the flowers of 'Ivory Bells' are a little shorter in length (about 20mm, compared with about 23mm for the plain hybrid.). In my view 'Ivory Bells' is the more gardenworthy plant as not only does it have a more pleasing shape but it is also the more floriferous.

These is one other taxon that falls into the category 'white or cream flowered', the plant sold as *Correa reflexa* var. *nummulariifolia.* I say 'sold as' because recent research by Maria Hitchcock OAM, holder of the Australian National Correa Collection, has shown that in Australia the plant commonly known by this name is actually a form of *Correa reflexa* var. *reflexa* from SW Victoria. For many years it has been sold as *C. reflexa* var. *nummulariifolia*, which is what caused the confusion. The true *C. reflexa* var. *nummulariifolia* (see photos page 24) is not in cultivation[2].

The plant sold in the UK as *C. reflexa* var. *nummulariifolia* has also turned out to be *C. reflexa* var. *reflexa* from SW Victoria[3]. Presumably it was originally imported under the wrong name. Its flowers have barely recurved lobe tips and are off white in colour. Its leaves are small compared with those of most correas, being heart shaped to ovate and up to about 15mm in length (see photos page 23). It also has a distinctive low growing and spreading habit.

Misidentifications are not unsurprising as correas are mostly very variable. (In the northern hemisphere we see only a tiny fraction of this diversity.) *C. reflexa* is the most diverse[4] of the eleven species in the genus. Seven varieties are recognised and of these *C. reflexa* var. *reflexa* is in turn the most variable. In the wild flower colour ranges from white to yellow to green to pinky red, and often the ends of the lobes are a different colour. I have another *C. reflexa* var. *reflexa* in my collection which I believe came from the Mt Wellington area on the outskirts of Hobart. It has brighter green leaves in contrast to the rather dull green of those of the taxon from SW Victoria, and pale green cylindrical flowers covered in tiny white scales (see photo page 24).

Finally I would like to mention a correa that, although it does not have white or cream flowers, is also sold under the wrong name in the UK. I have obtained it as *C. reflexa* AGM, *C.* 'Federation Belle', *C.* 'Mary' (which could be a misnomer for 'Mary's Choice') and *C.* 'Poorinda Mary', but none of these cultivars have flowers of the right colouration[5].

My plant has shiny green ovate leaves with what look like tiny white spots on the top side but are actually stellate hairs. The flowers are deep pink for about half their length, shading into mustard yellow for the remainder (photo page 24). These flowers make it *Correa backhouseana* var. *orbicularis*, possibly a selection ('Redex' or 'Half'n'Half'), an identification that has been confirmed by Maria Hitchcock[6]. It would have been very nice if this plant had turned out to be 'Poorinda Mary', which has pink flowers with lime green tips, because this cultivar is thought to be lost to cultivation[7].

If any reader does know of a correa with pink flowers with lime green tips (not red flowers with green tips - this will be *Correa glabra* var. *turnbullii*) then I for

one would be incredibly grateful to receive a cutting. The same goes for any white or cream flowered plant that does not fit any of the descriptions above.

Notes and references

The names used in this article follow Wilson, Paul G,. (2013) Correa, Flora of Australia Volume 26, Meliaceae, Rutaceae, Zygophyllaceae. Melbourne: ABRS/CSIRO, pp 337-359. These names are accepted by the Australian Plant Census.

1. Saratoga Horticultural Foundation Inc. (not dated) Correa 'Ivory Bells'

2 Hitchcock M. (2016) National Correa Collection, *Genus* 24 (4), pp 2-4

3. M. Hitchcock, pers. comm., 17.11.2016

4. Hitchcock M. (2010) Correas: Australian Plants for Waterwise Gardens. New South Wales: Rosenberg Publishing Pty Ltd, p142

5. see Hitchcock ibid. for descriptions and photographs of these cultivars

6. M. Hitchcock, pers. comm,. 21.11.2016

7. Hitchcock op. cit., p83

A BIT OF HISTORY

Tony Entwistle, who died in December 1986, was an APS founding member. His interest in Australian plants predated the APS' formation in 1988, as the following article about the Australian section of the 1984 Liverpool International Garden Festival shows. I was alerted to it several years ago by APS member Nicky Zanen, who very kindly transcribed it from the original hard copy. Meeting the designer, renowned Australian landscape architect Lawrie Smith AM, at the ANPSA conference in Albany in October prompted me to include it in this issue.

Tony's article is reprinted here as it was first published in the September 1984 issue of the newsletter of the Society for Growing Australian Plants (SGAP) Victoria, with any name changes noted at the end. Since then the society's name has changed to the Australian Plants Society Victoria, and their magazine is now called *Growing Australian*.

Australia at Liverpool International Garden Festival 1984

Tony Entwistle

This Garden Festival, the first of its kind in Britain, runs from May to October this year. The site, on the bank of the river Mersey, occupies some 130 acres and is a remarkable achievement. Just over two years ago it was an unsightly area of old docks, disused oil storage depot and municipal refuse tip. It has been transformed into a landscaped area of gentle hills, promenades, lakes, streams and waterfalls, and in the centre a huge exhibition hall, an egg-shaped dome of plastic looking like some science-fiction creation.

Part of the Festival is a series of 20 ‘International Gardens’ and Australia is the only representative from the southern hemisphere. The site occupies a triangular area, some 30m each side, with earth banks 2m high on two sides separating it from the next International Garden and the Festival railway line behind it.The tops of these banks have been planted with robinias which act as a windbreak.

The garden has been imaginatively designed. The bank has been extended on one side to form a cliff, from which a waterfall descends into a rock pool, which in turn drains into a small pond under a path. An ‘island’ bed occupies the remaining side of the garden.

The designers of the garden had several problems which did not affect the other International Gardens.

Firstly, most of the other gardens were largely 'planted up' in the autumn of 1983, but few of the Australian plants would have survived the English winter and therefore had to be planted in the two months prior to the opening of the Festival.

Secondly, whereas British nurseries could supply some 80% of the plants for other International Gardens, only a small number (conifers, some eucalypts and acacias) could be provided for Australia and most plants had to be flown in from Australian nurseries (many still bear the labels, some certainly from WA). This has obviously put a limit on the size and maturity of the plants. Some tub-grown specimens of grass-trees and banksias have been brought in, I would imagine quite old, but otherwise the plants are of the 'large nursery stock' size.

Thirdly, there was the problem of the plants being 'six months out of step'. Plants do not in my experience adjust their time-clocks very readily, and therefore the Australian plants likely to flower during the Festival would be those that flower during your winter, or all the year round. Some English summers might well pass for an Australian winter, but in fact this year has been very hot and dry. Whether this has stimulated or just confused the plants I am not sure but I suspect it has made some flower now instead of waiting until September or October.

The Festival programme states that the Australian garden combines 'the arid wastes of the bush and the lush vegetation of the coastal areas'. I am not sure that this ideal could in fact ever be achieved, but nevertheless the planners deserve full credit for what has been done. In an attempt to add to the realism, taped bird and animal noises emerge from behind the trees. The programme seems to vary – on one occasion it was certainly the kookaburra and a solitary frog. On my last visit there was a cacophony of, I think, marsupial noises and frogs galore!

Now to the plants themselves. Not all are labelled, but I was fortunate in having with me on my first visit two Australian ladies from WA. Keen and knowledgeable SGAP members, who were staying with me whilst on holiday here, they were able to identify most of the plants for me.

The banks have been planted with many grevilleas. There are larger-growing hybrids 'Robyn Gordon' and 'Honeycomb' and *G. venusta*, the first two flowering well. There are dwarf kinds *G. lanigera, G. lavandulacea*, and some of the prostrate Poorinda hybrids, all full of flower at the moment (July).

Callistemons include the hybrids 'White Anzac', 'Western Glory' and one labelled 'Dawson River'. These had a few flowers originally but have now stopped. Growing alongside the waterfall are two plants of *Billardiera scandens*, full of flowers, and *Pandorea* is just emerging. Many eucalypts and acacias are planted at the back of the banks, but only *Acacia spectabilis* is flowering.

Banksia ericifolia, B. robur and B. collina are planted, and some young conifers – *Dacrydium*, *Athrotaxis*, *Diselma* – from Tasmania. There is a colony of *Telopea speciosissima*, surely much too small to flower yet, and several *Bauera rubioides.*

Part of the 'island' bed has been left sandy, presumably to indicate a dry coastal area, in which there are plants of *Calocephalus brownii, Atriplex nummularia* and some very dead

looking clumps of the sedge *Triodia irritans.* In this area are two very healthy plants of *Clianthus formosus* which are just showing flower buds. I am surprised they have done so well, as they are notoriously difficult to grow here.

B. serrulata, both flowering, and some *Crowea exalata* smothered in lovely pink flowers. There are many melaleucas (including a gold leafed *M. bracteata,* new to me) and *Thryptomene saxicola,* also flowering. Other plantings include *Pimelea ferruginea* and another unnamed species, a variegated hakea, quite handsome, ceratopetalum, eriostemon, *Prostanthera* 'Poorinda Pixie', hovea, olearia, cassia and *Hibbertia scandens* (syn. *H. volubilis*).

In the crevices of the rock cliff and on the ledges have been planted some carpeting plants – there are wide patches of blue and white pratias, full of flower and much admired by visitors; a dainty blue lobelia, several dampieras (including *D. diversifolia* now flowering) and several brachyscomes in various shades of blue and lavender, *Anigozanthos flavidus* by the port is flowering well.

There are scattered helichrysums planted, and I think many more Australian annuals could have been used to fill the gaps – they could have been readily raised from seed here, and given colour for many months. The less common sorts of 'everlastings' in particular come to mind.

I have not seen so many Australian plants growing together before, except in the Australian House at Kew. It seems a shame that in October it must all be dismantled, though the plants will doubtless go to various botanic gardens in the UK. It is all a very creditable achievement and there have been very few losses: a few of the plants did at first show scorch from the cold spring winds, but they have recovered very well.

I should also mention that this garden is not the only Australian effort at the Festival. Queensland has an exhibit in the International Pavilion, a 'tropical forest' of dicksonias, cycads and trees made of plastic pieces (which sounds horrible but is in fact quite effective) to which dendrobium and stag horn ferns have been attached. Plus numerous sorts of bird sounds.

There is also a Qantas shop in the Gardens Market, which sells souvenir macadamia nuts and dried flowers – mostly luridly dyed banksia heads. There are also some flower seeds (native) but at twice the Australian price!

Postscript: *Some four weeks later Tony sent some additional information which was published in the same newsletter.*

Since I sent you my report on the International Garden Festival there has (to my surprise) been quite an extensive further planting in the garden. This seems to have coincided with an exhibition of aboriginal art in the main hall.

The new plantings have helped considerably to 'fill the gaps'. There are many more grevilleas: *G. thelemanniana* in many of the gaps and several yellow hybrids, unnamed, and a quite beautiful orange one named *Grevillea* 'Ned Kelly'.

Most spectacular, however, is a fine clump of *Lechenaultia biloba* in full flower and also patches of *Anigozanthos manglesii* and *Macropidia fuliginosa* in full bloom. There are also plants of the orange form of *Lechenaultia formosa* in

the "rockery' and some more dampieras and *Darwinia oldfieldii*.

As predicted, the Clianthus formosus is now in flower and every visitor stops in admiration. *Pimelea graciliflora* is also a mass of pink flowers.

Note on names:
Banksia collina is now *B. spinulosa* var. *collina*
Clianthus formosus is now *Swainsonia formosa*
Calocephalus brownii still sold under this name but the accepted name is *Leucophyta brownii*
B. serrulata is presumably an error?
Eriostemon now only contains two species with many former *Eriostemon* now in *Philotheca*.
Pratia has been transferred to *Lobelia* but *Lobelia pedunculata* for example is still sold as *Pratia pedunculata*
Helichrysum: names have undergone various changes

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APS MEETINGS 2019

Judy Clark

For various reasons the APS held fewer events than usual in 2019. There was a terrible fire at Chester Zoo which meant our visit to seethe Plant Heritage National Collection of Nepenthes could not go ahead. A second event - RHS Garden Rosemoor and member Beth Smith's clifftop garden Foamlea - was reluctantly cancelled; events coordinators Gary and Maria Firth felt that they had received too few initial expressions of interest to be sure that there would be enough participants to make it worthwhile going ahead.

However on May 19th about ten of us spent an enjoyable day visiting Meon Orchard in the morning and County Park Nursery in the afternoon. The weather was warm and those who made the effort were rewarded by seeing a marvelous array of Australasian plants.

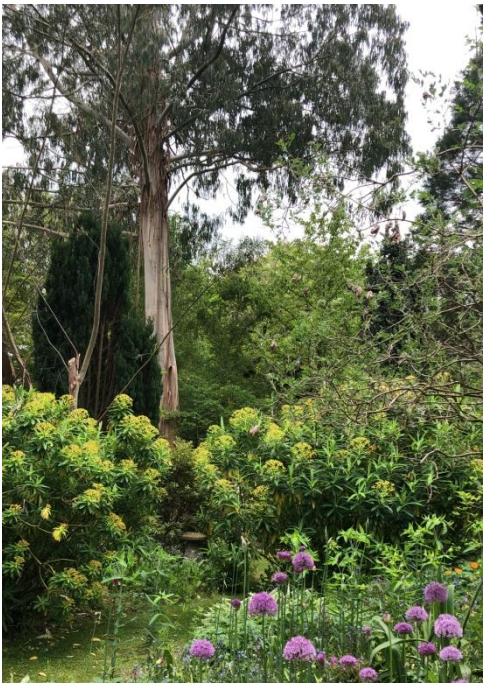
Meon Orchard at Kingsmead in Hampshire is home to Doug and Linda Smith's three Plant Heritage National Plant Collections: Eucalyptus, Araliaceae, and Podocarpus and related Podocarpaceae. I must admit to being more interested in *Eucalyptus* than the other collections and I was delighted to find *E. gregsoniana* in full flower (photo opposite). Two more Australasians that caught my eye as they were in full flower both have yellow flowers: *Sophora* 'Sun King' and an unlabelled *Corokia.* Most of the eucalypts have their crowns lifted which means a great range of plants can be grown underneath them. Full use is made of the space to provide an interesting mix of both Australasian and non-Australasian specimens (photo opposite).

Doug and Linda's hospitality was much appreciated by all of us; refreshments before and after and chairs to rest on after our exertions. For those who missed this event Meon Orchard is open in 2020 under the NGS on 31st May, 26th July and 6th September (for more information go to ngs.org.uk/view-garden/16912/).

More refreshments, again much appreciated, awaited us when we arrived at the new Hampshire home of County Park Park Nursery, including delicious cake made by Paul Boosey's sister Joanne. Paul is the grandson of Graham and Margaret Hutchins who ran the original County Park Nursery in Hornchurch in Essex. Unfortunately Paul has been unable to retain the range of plants that his grandfather used to sell but in consequence we APS memberswere the lucky ones, able to obtain some unusual and interesting plants for a donation.



Paul Boosey with *Leptospermum*



Meon Orchard







Lambertia inermis
yellow form, orange form, and in bud













clockwise from top left

Hakea victoria and close up of flower

Anthocercis littorea

Anthocercis viscosa

Banksia coccinea

Actinodium cunninghamii

One of Paul's main interests now is breeding new varieties of large flowered leptospermums, as his grandfather did. I was fascinated to hear Paul describe the process (photo page 31), how he leaves seedlings outside and ruthlessly culls those that don't survive the winter. When I got home I looked out an old County Park plant list. In 2010 Graham was offering over 40 *Leptospermum* species and cultivars, many of which were described as reasonably hardy. I wonder how many of his cultivars are still surviving, tucked away in someone's garden?



THE INTRODUCTION OF LEPTOSPERMUM INTO CULTIVATION

Gary Dunlop

The genus *Leptospermum* was founded by father and son J.R. and G. Forster, who discovered and named the new genus whilst accompanying Captain Cook on his second voyage around the world. The species they first named was *Leptospermum scoparium* (manuka), still the most popular species in cultivation, and with many named cultivars. The plant they discovered must have been either on the south of the North Island or the north of the South Island, as Captain Cook on his second voyage apparently only sailed twice through the Cook Strait between the two islands and did not approach them anywhere else. It was first described in the book they published of their plant discoveries after they had returned in 1775[1].

Currently 88 *Leptospermum* species are recognised by Kew Plants of the World online. The genus is not confined to Australia and New Zealand; members of it are also found in south-east Asia, in countries including New Guinea, Borneo, Thailand, Myanmar and the Phillipines[2].

The first species introduced into cultivation seems to have been the Australian species *Leptospermum laevigatum*. An illustration of it was published (as tab. 1304) in Curtis's Botanical Magazine in 1810[3], albeit under its original name *Fabricia laevigata*, a name given by the German botanist Joseph Gaertner who published it in 1788, three years before he died[4]. He seems to have had access to some of Banks and Solander's herbarium specimens, possibly some that Daniel Solander had not had time to describe before his untimely death from a stroke in 1782. How Gaertner came to identify this new plant I have not been able to ascertain.

The change to the genus *Leptospermum* was subsequently made by Friedrich Mueller in 1858. However a botanical specimen, as seeds or cuttings, must have been collected in Australia at a very early date after Cook's discovery of the eastern side of Australia, as the text in Curtis's Botanical Magazine said it had been in cultivation in the British Isles for 20 years, making its introduction to cultivation the 1790s. It seems to have first flowered in the Botanical Garden of the Dublin Society and the illustration was made in 1809. In its native habitat the species grows in coastal sand dunes on the south and south east coast of Australia, and the northern coast of Tasmania. It is white flowered and can reach a height of 9m. Its introduction to cultivation in the UK is likely to have been by the ships returning to the UK after delivering the first convicts and settlers to Australia[5].

The second species to be introduced into cultivation, published in the Botanical Magazine (tab. 1810) in 1815, was *L. pubescens*, albeit it under the wrong name of *L. grandifolium*[6]. However, according to the Plant Finder what is now in commerce as *L. pubescens* is now considered to be a synonymous with *L. lanigerum.* That species was first described and published by the Linnean Society in 1797[7] and so the latter name takes precedence.

The third species to be introduced into cultivation was *L. scoparium* in 1817, when seeds arrived from Port Jackson, near the north of North Island in New Zealand. However it was only mentioned rather later when a supposed form of it, *L. scoparium* var. *grandiflorum*, was described and illustrated in the Botanical Magazine (tab. 3419) in 1835[8]; this is now regarded as the basic species.

The Botanical Magazine did not have a monopoly on publishing and illustrating new botanical species entering cultivation at Loddiges Nursery[9]. It was one of several nurseries to commission people emigrating to new and far off places to collect seeds of plants growing there, for the nurseries. The Botanical Cabinet was published from 1817 until the demise of the nursery in 1853, and was really produced as a marketing ploy illustrating new plants being grown at the nursery, which had, in its prime, the largest hothouse in the world. In 1821 it was to introduce, name, briefly describe, and illustrate as tab. 514, the next species of the genus into cultivation, *L. grandiflorum*, the flowers being described as 1 inch (25mm) in diameter[10] (photo front cover).

The species *L. scoparium* has a very widespread distribution in both New Zealand and Australia. It was introduced into cultivation in 1817, from seed received from Port Jackson[11], on the opposite side of North Island from Auckland at the tip of the promontory which partially encloses the large bay called Hauraki Gulf. A supposed large flowered form of it, *L. scoparium* var. *grandiflorum* was first described in the Botanical Magazine in 1835, but is now considered to be the basic species.

It was almost 90 years later that a red flowered form of *L. scoparium* was discovered in New Zealand, and the origins of the plant were described in an article in Auckland Weekly News by a Mr Drummond, which was quoted by the Rev. A.T. Boscawen VMH[12]. It makes interesting reading as it also indicates that the new colour form was mis-named after the wrong individual.

"Only a single plant was found wild in New Zealand. It was a large shrub and it grew conspicuously in a white manuka copse (the native name for Leptospermum) on a sandy prominence at Chanley's about a mile from the River Styx, and about 6 miles from Christchurch, on a farm now owned by Mr W P Spencer. Mr Spencer first saw the crimson blooms 25 years ago. In the summer of 1905 he wore a spray in his buttonhole on going to Christchurch to discuss business with the late Mr W. Nichols. As Mr Nichols admired the flower, Mr Spencer presented the spray to him. On the same day (or soon after) Mr Nichols visited Mr R. Nairns's nursery with a spray in his buttonhole. He refused to state where the plants grew, except in a general way, but he supplied Mr Nairn with several cuttings. Mr Nairn eventually distributed the variety to many parts of New Zealand. He named it after Mr Nichols, and this seems to have given the impression that Mr Nichols had found it."

It thus entered cultivation with the name *L. scoparium* var. *nichollsii*. About 3 years later Major Dorrian Smith brought some plants home to England and gave one to the Rev. Boscawen. He also wrote about the plant in the Gardeners' Chronicle in 1908. An illustration of *Leptospermum scoparium* var. *nichollsii* was published in 1912 in the Botanical Magazine[13].

Needless to say, the discovery and widespread propagation of this new colour form led to much hybridisation giving rise to quite a few new cultivars including several with double flowers.

References

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9. David Solman (1995) Loddiges of Hackney, The Hackney Society
10. Botanical Cabinet 1821 Vol.6 tab.514
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IT GROWS IN MY GARDEN!

Judy Clark

I was very fortunate to be able to spend late September and half of October in the south west of Western Australia at the height of the wildflower season. I attended the ANPSA (Australian Native Plant Society Australia) conference in Albany and went on pre- and post-conference tours as well as excursions during the conference itself. In consequence I could not have had better guides: local botanists and ecologists, all with immense knowledge of the flora I had come to see.

The south west of WA is one of the world's 34 plant biodiversity hotspots with over 8000 flowering plants of which over 80% are endemic. I saw far more plants than I could ever remember, but I still only saw a small fraction of this mind-boggling diversity. There were far too many banksias to take in but I won't forget *Banksia coccinea* in its full crimson glory (photo page 32), or very dark flowered *B. violacea*, and I think I got the hang of *B. lemanniana* because its lemon to cream inflorescences hang down, unusual in banksias. There were hakeas galore too; *Hakea victoria* in full red, orange, yellow. and green foliage is even more stunning than illustrations suggest (photos page 32). Not to mention *Conospermum* and *Synaphea*, endemic Proteaceae new to me, and *Lambertia inermis* with its tight pink buds giving away nothing of the orange or yellow blooms within (photos page 31).

Nuytsia floribunda, which goes by the common name of christmas tree but which we saw in full flower in early October, is the world's largest parasitic plant. I saw so many weirdly exquisite orchids that I think I'd become an orchid nut too if I lived there; apparently south west WA has the greatest number of sexually deceiving orchids anywhere in the world. And it has the most species of *Drosera* too; the genus is easy to identify but the species ... not so much. Then there were Myrtaceae in abundance: *Melaleuca*, *Beaufortia*, *Calothamnus*, *Kunzea* and many more. The Albany daisy (*Actinodium*

cunninghamii) is also a member of the Myrtaceae but disguises itself as a daisy (photo page 32). I saw three different coastal *Anthocercis* (photos page 32), a genus in the Solanaceae completely new to me. And the peas, oh the peas, so many and so confusing that I mostly gave up on identification and just enjoyed their beauty.

Amongst all these wonderful new plants were a few that gave me a particularly special thrill because I grow them in my own garden (where, I must admit, conditions are mild, but there are warmer places in the UK). Annuals aside, perhaps the most successful of these south west WA endemics, in terms of flourishing and flowering without any winter protection, are *Anigozanthos flavidus, Boronia crenulata* and *Darwinia diosmoides*.

I grew my *Anigozanthos flavidus* from seed and it has been in the garden for nigh on 20 years, and even in years when all the foliage has succumbed to cold it has recovered, though not necessarily enough to flower in the same year. Interestingly, all the wild specimens I saw had only one flower spike (photo page 8). *Boronia crenulata*, common name aniseed boronia because of its aromatic leaves, is widespread in the wild and I saw it flowering in both coastal and inland areas. In my garden, where it has been in the ground since early 2017, it has sun most of the day and blooms most of year. It didn't like the strong cold winds of early 2018 but recovered well (photo opposite). *Darwinia diosmoides* is more of a coastal species, in the wild found mostly between Albany and Esperance. My plant came from Tim Darrington and has been in the ground in a sunny spot since 2015. It does flower, though not as prolifically as the plants I saw in bloom in the wild (photo opposite).

Another plant that has been successful in my garden (so far) is the carnivorous species *Cephalotis follicularis*, the Albany pitcher plant (photo opposite). I have to admit I didn't see it in the wild because I was on the excursion whose guide couldn't locate it, but I did see it at the Albany Flower Show. It is found in damp peaty soils and I grow it in a mixture of sand and peat (normally I don't use peat but this was left over from a bag I purchased many years ago). It has been outside since 2017 in a planter that is built into the low wall separating the terrace from the garden. Although it should take light frosts I do protect it with a plastic cloche if below zero temperatures are predicted because at the moment I only have one plant and I don't want to lose it. (I did have another but it died in my greenhouse). My plant hasn't flowered but then that's not what you grow it for.

Two other south west WA endemics that I grow - *Xanthorrhoea preissii* and *Hakea laurina* - haven't yet flowered either. Both have been in the ground, unprotected, for several years.Whether the former will ever flower is a moot point but even if it does it's unlikely to be for a very long time as grass trees are extremely slow growing. I saw quite a few grass trees in flower on my trip but didn't see *H. laurina* (known as the pincushion hakea) in flower as autumn and winter are its seasons. My plant, which is sheltered from the wind, has produced buds for three years in a row. Previously the buds have aborted but just maybe this year's crop will produce a flower. In the wild it grows in sand or sandy clay; clay soil with sand in the planting hole is what it gets in my garden.

Although it's found in South Australia as well as WA I have to mention *Melaleuca cuticularis*. Its common







clockwise from top left

***Darwinia diosmoides*, near Albany**

***Melaleuca pentagona*, Lucky Bay**

***Boronia crenulata*, Kings Park, Perth**

***Cephalotus follicularis*, Judy Clark's garden**

***Boronia crenulata*, Judy Clark's garden**









above and right

***Libocedrus plumosa*, well grown tree and close up of foliage**





Pseudowintera colorata

right in shade

above in full sun

name is saltwater paperbark which tells you quite a lot about it. It prefers wet conditions (though they don't have to be saline) and it has the most wonderful soft flaky bark. It didn't disappoint when I saw it in the wild (photo back cover). I grew my plant from seed and it's been in the garden since 2012. It's slow growing; the first flowers came in 2018. *M. pentagona* is another species that didn't disappoint in the wild (photo page 37), as it didn't in my garden. I lost my original plant to the 'beast from the east' but its successor is doing well so far.

Two other melaleucas that I saw on my trip - *M. fulgens* and *M. nesophila* - I grow in pots. Since the pots have got too big to move far these two have had to take their chances in winter and so far they've managed. I think *M. nesophila*, common name showy honey-myrtle, is particularly gardenworthy; it never fails to flower well for me.

I feel very lucky that I was able to see some of south west WA's amazing flora but had I gone 20 or 30 years ago I might have seen even more. Phytopthera caused dieback is now a serious problem, especially in the Stirling Ranges. Agriculture is no longer taking land but road verges which give refuge to native vegetation are being cleared apace to allow the transport of crops. Mining remains an ongoing threat, as does a drying climate. Will my grandchildren have the same opportunities as I have had?

NEW ZEALANDERS AT POUND HOUSE

Judy Clark

Earlier this year APS member Juliet Alderdice contacted the APS to ask if somebody could help identify some New Zealand plants in a friend's garden. Her friend's husband, the gardener, had died, and the friend believed the plants to be interesting, but didn't know what they were. As the garden in question is not far from where I live I volunteered to go and have a look and a visit was arranged for early August.

Now I am not the greatest when it comes to New Zealanders and while I could recognise a few species I quickly realised that the plants in this garden called for more expertise that I possessed. I also realised that the garden contained some rather fine specimen trees, including a tall and well grown red beech (*Nothofagus fusca*). So I asked Owen Johnson if he could help and a second visit was arranged.

Owen confirmed my impression that the garden at Pound House is indeed worthy of note. He was particularly excited by finding one of the best specimens he has seen of *Libocedrus plumosa* (photo opposite), a conifer endemic to New Zealand and rarely grown in the UK. In fact as the list on page 39 shows the garden is full of New Zealand endemics not often grown in the UK. Plants that caught my eye included *Hoheria sexstylosa* in full flower, *Corokia buddleoides* with its red berries, and *Pseudowintera colorata* with two specimens planted in different spots showing why it does best in shady conditions (photos opposite). Owen was also impressed by a large and well-grown specimen of *Diospyros lotus* (date-plum); not an Australasian but uncommon in UK gardens.

The range of species grown is interesting because the site is not the most promising: inland East Sussex, facing north, and just below the top of a. ridge. Rainfall is not particularly high, with the two nearest weather stations

Plants at Pound House

Scientific name	Common names	Notes
***Cordyline australis*	Ti; Cabbage tree	
***Corokia cotoneaster*	Korokio; Wire netting bush	
***Corokia buddleoides* (most probably)	Hokataka	deep red berries
***Dacrycarpus dacrydioides*	Kahikatea; White pine	rarely grown in UK
***Dacrydium cupressinum*	Rimu; Red pine	rarely grown in UK
Dicksonia sp.	Tree fern	
***Hoheria angustifolia*	Houhere; Lacebark	
***Hoheria sexstylosa*	Narrow-leaved houhere	
**Leptospermum scoparium*	Manuka	also Australia; var. *incanum* is endemic to NZ
***Libocedrus plumosa*	Kawaka; New Zealand cedar	rarely grown in UK
**Muehlenbeckia complexa*		also Australia
***Nothofagus fusca* (*Fuscospora fusca*)	Tawhairaunui; Red beech	
***Nothofagus menziesii* (*Lophozonia menziesii*)	Tawhairauriki; Silver beech	
Olearia macrodonta	New Zealand Holly	in NZ regarded as a hybrid between *O. arborescens* and *O. illicifolia*
Pittosporum bicolor	Cheesewood	Australia
***Pittosporum eugenioides*	Tarata; Lemonwood	
***Pittosporum tenuifolium*	Black matipo	several cultivars including 'Tom Thumb' (dark leaves)
***Podocarpus totara*	Totara	
***Podocarpus totara* 'Aureus'		deep gold leaves in winter
***Podocarpus* sp.		bushy; could be *Podocarpos nivalis*
***Pseudopanax crassifolius*	Horoeka; Lancewood	
***Pseudopanax ferox*	Fierce lancewood	

***Pseudowintera colorata*	Horopito; Alpine pepper tree	needs shade to colour well
***Sophora prostrata*	Prostrate kowhai	not always prostrate
Tasmannia lanceolata (*Drimys lanceolata*)	Mountain pepper	Australia
** *Xeronema callistemon*	Tawapou; Poor knight's lily	

* New Zealand native

** New Zealand endemic

recording yearly averages of 750mm and 850mm (though it must be remembered that not everywhere in New Zealand gets the amount of rainfall common in the west and southwest of Britain). Trees had been planted which shield the garden from the worst of the north easterly winds, but it does get frost and snow in winter.

The sad part of this story is that the cultivator of all these wonderful plants cannot know how much Owen and I appreciated his garden. Harold Hartill was New Zealand born and when he retired to Pound House he devoted much time to his garden, growing from seed and also obtaining plants from County Park Nursery. Both the range of plants he grew and the growth achieved in a relatively short time (about 15 years) demonstrate his expertise. I would have loved to meet him



ACACIAS AND METHANE EMISSIONS

Bill Aitchison

John Boevink (Port Sorell, Tas) recently drew attention to an article that appeared in the French Newspaper Le Monde on 7 October 2018. It was reported in the article that a doctoral student from Burkina Faso in West Africa, Geneviève Zabré, had won an international competition by demonstrating how Acacias can be used to reduce methane emissions produced by the digestion of sheep into the atmosphere. It was noted that methane accounts for about 15% of global warming, with ruminants alone emitting 3%.

An extract from the article appears below (translated into English).

The count has just begun, the Burkinabe researcher has three minutes to convince. "In the rumen of the sheep, as in all ruminants, are housed methanogenic bacteria at the origin of a gas which is released into the atmosphere when the sheep burp. A real time bomb for our planet. So, can we prevent the sheep from burping? Not easy! One solution exists: eliminate these bacteria by using our medicinal plants, "explains the Ouagalaise, triggering laughter in the assembly of scientists and academics. The clock starts, a few "long minutes" later, public applause and sigh of relief.

Prove the virtues of African traditional pharmacopoeia, the idea came to her during her studies at the University of Ouagadougou, where she obtained a degree in chemistry and biology and a master's degree in plant protection and improvement. "Burkinabé breeders look after their animals thanks to plants. I wanted to test the qualities of *Acacia nilotica* and *A. raddiana*, called "gum Sahel", very abundant in the area of

Dori, in the north of the country", she says.

The student is also interested in climate change and methods to reduce greenhouse gases. "Methane accounts for about 15% of global warming, ruminants alone emit 3%," she says. One day, one of her professors proposes to her to realize her thesis with the support of the National Institute of the agronomic research (INRA) and the Institute of research for the development (IRD), within the framework of a tripartite program France – Africa - Brazil on the fight against desertification in Africa. "I jumped at the chance and I went down," she recalls. She goes to work. For four years, the doctor does not count her hours between field studies in the north and analyses at the laboratory of animal physiology in the capital. In June, the young woman gets her thesis, entitled "Use of medicinal plants in the fight against methane emitted by ruminants: the case of sheep". She demonstrates the role of the acacia in combating the pollution of sheep farming. To eliminate the methanogenic bacteria, which she calls "small animals", producing methane in the digestive tract of sheep, "it's very simple, just harvest a few leaves of trees and add them to the animal feed. These medicinal plants contain secondary metabolisms, small chemical machines that suppress bacteria", summarizes Geneviève Zabré. "The problem of methane emissions will become critical," she says. Especially since there are many ruminants in Africa and that global warming will reduce the quality of feed for animals."

The following are some of my thoughts and comments on this report.

- *Acacia nilotica* (now *Vachellia nilotica*) and *A. raddiana* (now *Vachellia tortilis* ssp. *raddiana*) are not Australian species (although *V. nilotica* is widely naturalised in Australia). But could there be Australian Acacia species that exhibit the same properties?

- The report of the recent research reminded me that in 2011, in our Newsletter No. 115, Study Group member **Matthew Alexandra** noted with interest the Australian Government scheme called the Carbon Farming Initiative that was designed to help farmers, forest growers and landholders earn income from reducing emissions like nitrous oxide and methane trough changes to agricultural and land management practices. Matthew suggested the establishment of wattle plantations may have qualified for funding under this Scheme.

- Inclusion of condensed tannins from bark of black wattle (*Acacia mearnsii*) in the diet of dairy cows has previously been shown to substantially reduce methane emissions (Grainger et al. 2009). However, milk yield and DMI were also reduced.

Reference:

Grainger C, Clarke T, Auldist MJ, Beauchemin KA, McGinn SM, Waghorn GC, Eckard RJ (2009) Potential use of *Acacia mearnsii* condensed tannins to reduce methane emissions and nitrogenexcretion from grazing dairy cows. Canadian Journal of Animal Science 21, 19–38.

This article first appeared in the ANPSA Acacia Study Group Newsletter of December 2018, No. 143, Page 5 and is reproduced here by kind permission of the leader, Bill Aitchison.



BITS AND PIECES:

compiled by Judy Clark

***Grevillea* 'Mason's Hybrid'**

The grevillea cultivar 'Mason's Hybrid' is thought to be a cross between *Grevillea bipinnatifida* and G. *banksii*. It has very similar foliage to *G*. 'Robyn Gordon', a cultivar of the same hybrid

origin, but 'Mason's Hybrid' has apricot flowers whereas those of 'Robyn Gordon' are red.

Other names under which *Grevillea* 'Mason's Hybrid' has been sold in Australia are 'Kentlyn' and 'Ned Kelly' and I recently bought a plant labelled 'Ned Kelly' from a UK nursery. However, according to the Australian Cultivar Registration Authority (www.anbg.gov.au/acra/) these two names are synonymous and the name 'Mason's Hybrid' takes precedence. This name should also be preferred to 'Jo Mason' , which has been given to plants sold in Europe.

Endangered eucalypts

The Global Tree Assessment, a BGCI (Botanic Gardens Conservation International) project, aims to assess the conservation status of every known tree species (approximately 60,000) by the end of 2020. Their latest analysis (December 2019) shows that 55% (32,994 species) now have a conservation assessment and of these 37% (12,145 species) are threatened in the wild.

The term 'threatened' includes categories ranging from critically endangered to near threatened. Of 723 *Eucalyptus* species assessed 306 fall into one of these categories, including some on the APS seedlist.

Both *Eucalyptus morrisbyi* , a Tasmanian endemic, and *E. crenulata*, found only in Victoria, are classed as CR (critically endangered); they both have very small, geographically restricted, and declining populations in the wild. The well known cider gum *E. gunnii*, another Tasmanian endemic, is regarded as endangered because numbers have decreased substantially in recent years due to due to dieback in eastern populations and sensitivity to grazing in some areas. Yet another Tasmanian endemic, *E. risdonii* (Risdon peppermint), is considered vulnerable because the species is declining, its populations are fragmented and it is threatened by urban and tourism development. In New England (New South Wales) the vulnerable *E. nova-anglica* is at risk from expanding agricultural activity.

And so it goes on. Near threatened species at risk from agriculture include *E. cordata, E. pauciflora* (snow gum) and *E. stellulata* while *E. pulchella* and *E. johnstonii* are also threatened by various sorts of development. And the still very common messmate stringybark (*E. obliqua*) is classed as near threatened as it is at risk from agricultural development and, believe it or not, from logging.

Visit www.iucnredlist.org/search to find out more. And if you can fit a eucalypt in your garden you might consider growing one that's threatened.

Tasmanian Seed Conservation Centre Germination Database

The Tasmanian Seed Conservation Centre (TSCC) is located in the Royal Tasmanian Botanical Gardens in Hobart. It was opened in 2005 as part of the global Millenium Seed Bank Project and its activities have transformed the conservation capacity of the gardens.

When I attended the ANPSA conference in Hobart in January 2018 I was lucky enough to hear a lecture by James Wood, the manager of the seedbank program. The second half of his lecture focussed on the challenges of getting native species to germinate, something that is sometimes very tricky indeed.

Now knowledge of how to germinate Tasmanian native species is accessible

to all, through the TSCC Germination Database (http//gardens.rtbg.tas.gov.au/tscc-germination-database/). . It currently holds data on 829 taxa and coverage is expected to increase with time. Germination information is obtained by selecting either a plant family or a genus from a drop down menu and pressing the report button. This generates a PDF file which can be downloaded. The report details the laboratory conditions under which seeds have germinated, together with the percentage germination rate. It includes failures as well as successes,

Now most of us don't have access to a laboratory and the kit used by seedbanks but the really brilliant aspect of this website is that you don't need to. There is a page which explains how to interpret the laboratory conditions to provide the best possible conditions for germinating seeds at home without using any specialist equipment. Try looking up *Ricinocarpos pinifolius*; as long as APS seed is viable then it should be possible to germinate it.

Grevillea cuttings

I am a member of the ANPSA Grevillea Study Group (GSG). Their thrice-yearly newsletter is always full of interest. Grevilleas can be difficult to propagate from cuttings, and in the following snippet, from newsletter 111 (October 2018), Linda Mason described a method she is trialling. A shadehouse is used to protect cultivated plants from excessive heat, light or dryness, and different conditions can be achieved depending on the type of shade cloth used.

"I work as a propagator at the Australian Native Nursery in Oakford, WA and have done for the past 12 years or so. I propagate any plant in the nursery but I have a particular interest in Grevilleas which are reasonably easy to do depending on the species, or they simply aren't. I have a particular interest in grevilleas which are reasonably easy to do depending on the species, or they simply aren't.

For those grevilleas that are reluctant to be propagated by the normal means ie cuttings put in the shadehouse until they have roots which can take some months, we are trialling an alternative method. We put the cuttings under an individual plastic bottle which has had the bottom removed and a hole drilled in the cap. These are then put into another shadehouse which has a warmer aspect because it is made of different shadecloth. So far I have successfully done many *Grevillea bipinnatifida* and *Grevillea tenuiloba* via this method and currently am waiting to see if I have the same success with the following: *Grevillea saccata* (which we can do under normal shadehouse conditions but success rate is too low); *Grevillea mccutcheonii*; *Grevillea insignis*; *Grevillea nivea*; *Grevillea nudiflora*; *Grevillea stenomera*; *Grevillea ripicola*; *Grevillea tenuiloba*; *Grevillea* 'Mason's Hybrid'; *Grevillea* 'Superb'."

Illustration acknowledgements

Judy Clark: page 8, centre right; page 14, above left; page 23; page 24, below left; pages 32, 37 and 38; back cover

Gary Dunlop: front cover, page 13; page 14, above right and below

Paul Felton: Page 7, top left; page 8, top left and below

Maria Firth: page 31

Jude Lawton: page 7, top right

Jeff Layman: page 23, below

Alastair McKie: page 7, below

E. Charles Morris: pages 21 and 22

Steve Peak: page 24 top and below right

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***Melaleuca cuticularis* growing at Lake Monjingup Reserve near Esperance, Western Australia**