



# Isopogon & Petrophile *Study Group*

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*Isopogon teretifolius*, Hi Vallee farm, Badgingarra WA, October 2017.  
See page 10 for our profile of this species.

Back issues of the Isopogon and Petrophile Study Group Newsletter are available at  
<http://anpsa.org.au/iso-petSG/IPSG-news.html>

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Dear Members,

The traditional hot, dry summer reputation of Australia seems to have struck with a vengeance this year. Members have reported little useful rainfall for the entire summer with inland NSW and Victoria/South Australia suffering through one of their driest summers on record. Even here on the normally wet South Coast of NSW, we have had our driest summer since we moved here in 2010. Thankfully, the days are finally starting to cool. All we need is heaps of rain!

Over summer our four eastern petrophiles, *P. shirleyae*, *P. sessilis*, *P. canescens* and *P. pulchella* all flowered well. Our garden has coped pretty well with the dry, with most of our isopogons and petrophiles unfazed. Unusually, parts of our garden developed cracks and powder dry soil but our only loss was *P. pedunculata* which we are finding somewhat difficult to grow. All our isopogons are budded up for winter/spring flowering. The first of our *I. cuneatus* grafts on our 'new' stock *I. mnoraifolius* look set to flower soon. *I. cuneatus* is always the first of our isopogons to flower, often starting in May.

The first of our I & P grafts from our WA trip last October have been planted out. These include *P. teretifolia* (grafted onto *P. shirleyae*), *I. baxteri* and *I. gardneri\*divergens* which we collected from Corrigin Lookout. A number of other plants from this trip will be planted out over the next couple of months. The mild winters here with no frost provide great conditions for autumn/winter planting.

Since our last newsletter we seem to have spent lots of time travelling to promote I & Ps. In January, we attended the ANPSA bi-annual conference in Hobart, where we presented on the I & P Study Group and had a display (photo below). We inadvertently tested the concentration of attendees by stating that there were no isopogons naturally growing in Tasmania. It didn't take long for the Tasmanians to correct us by referring to *I. ceratophyllus* which grows on the Furneaux Group of Islands, a part of Tasmania.

Such conferences are always a great forum to meet like-minded people. Horticulturalists from both Royal Botanic Gardens Cranbourne and Royal Botanic Gardens Sydney expressed great interest in expanding their range of I & Ps through grafting. As a result, we visited Mandy Thomson and her team at

Cranbourne, and grafted plants are already in the pipeline. In this issue we provide reports on our visit to the 'Special Collections' at Cranbourne.

The next conference will be held in I & P heartland in Albany, WA in September 2019. So here is advance notice to put this date in your calendar as a great opportunity to see a large range of I & Ps at peak flowering time. A range of pre and post conference tours, as well as day visits from Albany during the conference will provide a unique opportunity to explore the amazing flora of WA, accompanied by experts who can identify the plants for you.

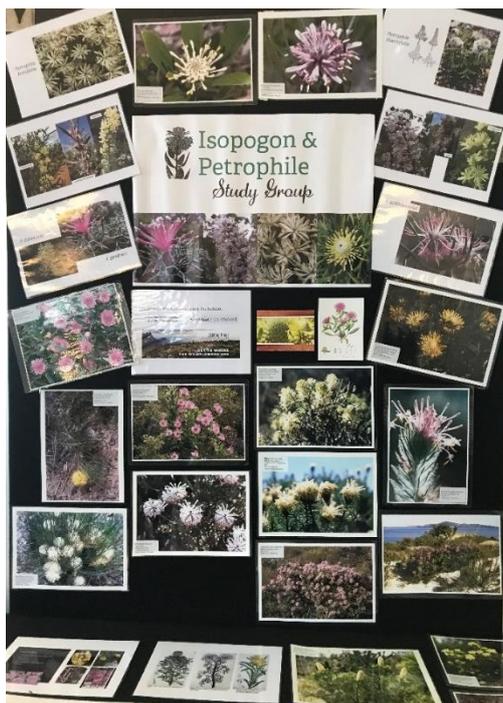
On our trip home from the Cranbourne visit, we called in to Robert Brown's spectacular garden in Nicholson near Bairnsdale. Robert has one of the best grevillea gardens in the country with over 200 species, but we were pleasantly surprised to see that Robert had squeezed in some isopogons and petrophiles among his grevilleas, all of which he grew from seed. *P. squamata* and *P. biloba* plants were thriving on their own roots as was *I. trilobus*. These were all planted in raised beds, obviously so important in an area which can have wet summers. While out and about we have also enjoyed massed displays of *P. canescens* in the bush near Nerriga just inland from us, as well as a range of isopogon species on mass display in the new Jurassic garden at the Australian Botanic Garden Mt Annan, west of Sydney.

A big thank you for the prompt and large response from members to our request earlier this year for photographs to assist WA botanical artist Marina Lommerse in her painting of *I. formosus*. She reports on progress on p.9. Member Margaret Pieroni has also done some beautiful I&P paintings. It's rare to see images of isopogons and petrophiles, an important tool to educate the public. There has also been some limited press coverage recently – see examples on p.25 of this issue.

Thanks also to everyone for contributing to this edition – it's what make a study group so useful and makes it so much more interesting for everyone!

Remember that autumn is a great time to propagate isopogons and petrophiles. So please take advantage of our seed/cuttings exchange to try to propagate some I & Ps for your garden. And don't forget to try eastern petrophiles like *P. sessilis* and *P. pulchella* that we report are thriving at Cranbourne.

Catriona & Phil



## From our members

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### Miriam Ford, Yarra Yarra APS VIC

I do not know much about Isopogons & Petrophiles other than that they are a most beautiful and unusual group of Australian Natives. I came to know more about them, was literally blown away by their beauty when doing a couple of tours of SW WA with Birdwing Tours (lead by Neil Marriott & Neil Macumber, Grampians Group). These tours went north of Perth (in 2015) and south in 2016. I would like to become more informed. I am now leader of my local APS group - APS Yarra Yarra - and am spearheading an effort to get more of our members growing and propagating. So how better to do that, in a well-informed manner, than with a study group who have all the inside goss on these matters. I was also inspired by your talk, your passion for these plants, their cultivation, preservation & propagation.

I am not sure whether something like this might fit the bill for one so recently joined and with only 1 iso in the garden but several in pots now (courtesy of recent visit to Kuranga). My memory was triggered by an article P10, issue 20, April 2017. Margaret Pieroni writes about a roadside display near Bluff Creek described by Neil Marriott. I was on that trip to WA - part of the Birdwing Tour and I filmed much of the trip and created short videos. My filming technique now is better (slower panning & less zoom!) however I think what I have filmed must be this site as I know Neil said Margaret had recommended it. Neil appears in one or two frames. One of our party described it as like being in Monet's Garden because of the lushness & density of colour and form. Hence the name. Here is the link - I was not sure I had the major Isopogon correct - *cuneatus*? [*Certainly is!*] There were others. Here is the link to this particular video:

<https://vimeo.com/217445237>

### Patrick Laher, Uralla NSW

In spite of an extremely hot and dry summer, my Isopogons *formosus*, *mnoraifolius*, *petiolaris* and Stuckeys Hybrid together with Petrophiles *biloba* and *teretifolius*, so far have pulled through without any problems. None of them were watered and they didn't seem to be affected by the intense UV. It does confirm to me that frost is the hurdle to overcome in being able to grow a good range of these lovely plants in Uralla.

### Paul Kennedy, Elliminyt (Colac) VIC

December 2017: Some time ago I mentioned that I thought I had two forms of *Isopogon formosus*. After reading your newsletter I can confirm that to be the case. The one that flowers up and down the stem is extremely showy (pictured right).



Over 100mm of rain in the last two weeks of November. Fortunately only 10mm in the last deluge predicted for Victoria. The drains have worked overtime in shedding the moisture as it all came in thunderstorms. So far all has survived but it will be a wait and see situation as the weather was very humid for at least a week. The summer flowering Banksias are now budding up.

March 2018: Another terrible day with winds up to 100km/hr. The Isopogons have withstood a terrible summer where we have had no rain above 3mm for 120 days. I have watered them weekly in the evening and all have put on new growth and *cuneatus* is budding up to flower. I will try some more as plants become available. The old Eucalypts along our front fence are dying, so that gives you an idea just how dry it is with no sub soil moisture.

### Keith Alcock, Kalamunda WA

Weather great over here - almost perfect lots of rain in Winter/Spring and a nice cloudburst in January.

Temperatures over summer have been at record lows, so everything ticking along nicely. The Marri trees are having a record bloom which is supposed to portend a great flowering season.

### Shirley Daniels, Wanniasa ACT

On a month long visit to South Australia, last September, we came across Nangawooka. This is a great little reserve in Victor Harbour. I am sure Nangawooka means something special to match this special place but I have not checked. Our visit was for about an hour, late in the afternoon, but we could have spent a lot longer. Lots of plants were flowering and were well labelled. Congratulations to the South Australian Plant Society



A lovely *I dubius*

and the Field Naturalists as well as other community groups who created this beautiful reserve. I was speaking to Ali from SA during the conference in Tassie and as well as checking the spelling she mentioned this reserve has a friends group. They could be worth checking with if you are passing that way.

I photographed a few plants. This *Petrophile biloba* (above) was flowering beautifully. As you would expect

the plants attracted lots of insects.

### Marjorie Apthorpe, Currowan NSW

I am a retired micropalaeontologist from WA, now married to Cliff Williams and living at Currowan Creek (off the Kings Highway, about 16 km west of Nelligen). You may have visited our messy garden and rainforest creek on an APS meeting last year.

I really don't know much about *Petrophile* and *Isopogon*, but saw some beautiful examples in the wild while we were touring WA in 2016. I have one young *Isopogon formosus*, on its own roots, growing here on the edge of a gravel bank in shade under a tree. I tried to replicate the "understorey" conditions where I saw these in the Stirling Range National Park. I don't know how it will go in the wet summers here, but the Stirling Ranges get pretty wet, so I am hopeful..... Having recently moved to NSW, I am interested in trying to grow WA natives on a steep bank of rock, gravel and clay, topped with coarse sand and concrete gravel, held back by small stone walls. Have had some success with coastal WA natives, by heavily modifying the pH of the sand, by including limesand and lots of concrete gravel. All plants are on their own roots so far. We don't seem to have a suitable local species here to graft cuttings on to, though I am keen to try at some stage. I look forward to learning more from the group about these beautiful plants.

### Mike Beamish, Boolarra VIC

My *Petrophile pulchella* still seems quite happy in the garden, it is about 2 metres tall and a bit straggly as it copes with the competition from its neighbours. There might be a little yellowing of the leaves, but I'm hoping some Bush Tucker fertiliser will help with this if/when we get an autumn break. Sadly, the largest *Isopogon buxifolius* plant did not like being potted up from a 250mm waterwell pot into a larger waterwell tub and died branch by branch over the summer months. I still have a smaller cutting-grown plant (actually a broken branch from the now dead plant, it's a brittle species) in a 250mm waterwell, that is still as healthy as you'd like and I planted another cutting into my Mother's garden in Morwell that is also still going strong. These are the only

species I have at present and I have not attempted to grow any others, even though I still have some seed from our WA trip in 2016. I must get around to sowing some of these, I hope it is not already too late.

As you say in your email, we are pretty dry at the moment, but I bet we're doing better than most. Our rainfall for 2017 was 839mm, slightly down on our 25 year average of 925mm. We had a couple of good rain events in January that put 60mm in the gauge, but since then virtually nothing useful or effective for the garden. The 15mm we received in February fell over 13 individual days, so barely wet the foliage let alone the ground, and March has been the same, just a couple of drizzles with no substance. Since I normally drown my non-indigenous plants, shouldn't the I & P's be loving it?

## Exchanging cuttings and seed

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The following four step process is a way to share cuttings and seed between study group members. We need to expand the species list available by including all species growing in members' gardens. If you can provide material from other species please let us know so we can add them to the list.

All States apart from Western Australia allow cuttings to be mailed from NSW. If you would like us to send cuttings or seed to you, here are the steps (may vary for seed-only requests):

1. Email us to check that material is currently available ([catrionaandphil@gmail.com](mailto:catrionaandphil@gmail.com)).
2. Once availability is confirmed, purchase a 500g Express Post satchel from Australia Post (costs \$10.55), self-address it, put in an envelope and send to:  
Isopogon and Petrophile Study Group  
PO Box 291  
ULLADULLA NSW 2539
3. We will then package up your cuttings/seed and send it back to you Express Post.
4. An email will be sent to you on the day the package is mailed so that you can be ready to propagate as soon as the parcel arrives!

**Isopogon** – anethifolius, anemonifolius (1.5m shrub, 0.3m shrub), buxifolius var. spathulatus (now *I. spathulatus*), cuneatus, dawsonii, divergens, dubius, formosus, latifolius, mnoraifolius, prostratus, petiolaris, sphaerocephalus, trilobus, 'Stuckeys Hybrid'

**Petrophile** – canescens, pedunculata, pulchella, sessilis, shirleyae

## Galls galore

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Plants with weird-looking galls are a common sight when out in the bush but have you ever seen one on an isopogon or petrophile? Recently, we found plants of *I. anemonifolius* densely covered with the distinctive protuberances all over its thick, flattened leaves which indicates galls. The location was natural bushland near Nerriga in Sydney sandstone country adjacent to Morton National Park on the escarpment of the Great Dividing Range.

Plant galls are abnormal outgrowths of plant tissues, similar to benign tumours or warts in animals. They can be caused by various parasites, from fungi and bacteria, to insects and mites. In this case the maker of the gall is reportedly a wasp, which is using the galls as habitat and food source (the interior can contain edible nutritious starch and other tissues) as well as a safe place for its larvae to develop. Other gall-inducing insects are midges, flies, aphids, scale insects, psyllids and weevils.

Insect galls are usually induced by chemicals injected by the larvae or the adults of the insects, and possibly mechanical damage. After the galls are formed, the larvae develop inside until fully grown. Timing is important in formation, as it must occur in the growing season when plant cell division is occurring quickly (spring in temperate climates). When we saw the results in late summer, the larvae inside must have been well-developed.

There are usually many insects to be found on an isopogon or petrophile plant, but as far as we know the presence of galls is unusual. *Isopogon anemonifolius*, like most isopogons and petrophiles, is not considered to be prone to disease or insect attack. In the whole area we covered, only this species seemed to be affected – and only a few plants of it (not necessarily close to each other). One plant was very heavily infested, with barely a leaf left untouched. Gall-inducing insects are usually species-specific and sometimes tissue-specific on the plants they gall.



In this instance the preferred site was the leaves but insect galls can occur all over a plant (stalks, branches, buds, roots, and even flowers and fruits). The leaves of *I. anemonifolius* are tough and despite the numerous galls they still looked reasonably healthy and green (although yellowing and spotted at the actual gall site). The host plant was still flourishing.

## Cranbourne I&P Special Collection

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Visitors to the huge site of the Royal Botanic Gardens Victoria at Cranbourne can view natural bushland areas as well as the centrepiece Australian Garden with its many plant collections and spectacular landscaping. The first stage of the Australian Garden opened in 2006 and the second and final stage opened in October 2012. It includes displays of mainly eastern isopogons (see our article in [Newsletter 17, September 2015](#), page 8).

Hidden away from public eyes is an entirely separate set of collections which predate the main part of the Garden. After the Royal Botanic Gardens Victoria were given several hundred hectares of bushland once used for sand mining in the outer Melbourne suburb of Cranbourne in the 1970s, local APS members became involved. A sand area denuded of natural vegetation due to mining was set aside for scientific study and the members of what was then known as SCAP established trial plantings of various native genera.

Planting at this study site began in 1980 and included mainly proteaceae such as dryandras, banksias, hakeas, lambertias and persoonias, plus adenanthos and even xylomelum (woody pear). Isopogon and petrophile plantings commenced in 1984. Plants were planted, watered in by bucket and then left to their own devices. They were arranged in neat labelled rows, up to ten individuals of each taxa, in a crescent shaped area on a northwest slope. The eastern species were on the southern side separated from the western species by a clear area of about three metres. Smaller and prostrate species were on the eastern edge of the plantings. There were subsequent plantings but not for at least the last twenty years.

The heyday of the Special Collections was around the early 1990s; although photos are scarce, the overall success of the plantings may be judged by images of rows of hundreds of spectacular dryandras in flower. The isopogons and petrophiles thrived well, so much so that they now dominate the plantings.

However, it has not been plain sailing. Rabbits and wallabies attacked plants and winds moved sand about, burying some. A grant helped fund a fence around the site against animals, and twenty litre drums were used in an attempt to protect from sand buildup. At one stage *Phytophthora cinnamomi* devastated western banksia plantings and some parts of the dryandras. Later, some species began reproducing too vigorously so the fence was opened to allow the animals to help control plant numbers. (Some persoonias actually had to be removed to ensure the indigenous vegetation was not invaded.) The long millennium drought finished off many plants. Over the years rabbits, erosion and wind disrupted the neat rows and smooth surface. Also, the local bush started claiming its own and indigenous plants spread back among the Special Collections.

When David Lightfoot, former Study Group Leader, visited the site in 2003 the plantation rows were still visible but now it resembles a rambling patch of bushland trying to regenerate – WA bushland at that – and when we visited recently we only knew that rows once existed by being told. Regardless, there are still many, many isopogons and petrophiles growing well there, mostly offspring and not the original plants, as might be expected over so many decades. Only five eastern species remain (*P. sessilis*, *P. pulchella*, *P. canescens*, *I. anethifolius* and *I. petiolaris*) – of these, only the first two are numerous. Of the western species, five could now be considered locally common (*P. squamata*, *I. baxteri*, *P. diversifolia*, *P. glauca* and *P. cyathiforma*). There are another twenty or so western species represented only by one or a few plants.

Nevertheless, this is still an important isopogon and petrophile collection. In terms of numbers it must be the largest collection of isopogons and petrophiles in cultivation, with hundreds of plants in total. Although once it would have also had the largest number of species, perhaps fifty, sixty or more, losses have reduced the range. Before Foreman's 1995 revision of both genera there were far fewer taxa so this would once have represented well over half of the known species (there are currently 122 taxa, 48 isopogons and 74 petrophiles, but there is still a lot of taxonomy work to be done). David Lightfoot counted at least forty I & P species in 2003, and fifteen years later in 2018 our initial count amounts to around thirty species. There are perhaps only a handful of other collections of greater range in existence, none of which have each species in any numbers and all are in private hands.

The collection is unusual in that it mainly features petrophiles, which are generally rarely grown in gardens. There are many more petrophile species than isopogon species so this is quite appropriate. Of special interest are a number of different flower colour forms of some species (notably *P. biloba* with white, grey, pink and pink-grey variations) noted by David. There is also one plant of a particularly attractive form of *I. formosus* with dense grey foliage. Different forms of *P. squamata* in one spot are very useful given that there are up to five subspecies identified in the wild, many yet to be formally named. One of the rarer species is *P. plumosa* which has priority three conservation status (poorly known and in need of further survey).

A tendency for weediness in certain species (in particular, some dryandras, and the eastern petrophiles *P. sessilis* and *P. pulchella*) and the current state of the collections means that this research garden is not part of the Gardens' forward planning. Special collections will eventually be returned to the original indigenous bushland and staff are working towards duplicating the rare and important plants before this happens. In the meantime we can continue to observe and learn about these plants.

In the future we may see more isopogon and petrophile species on display in the main Australian Garden at Cranbourne. A single *P. biloba* plant in flower in the Weird and Wonderful Garden there featured on TV's *Gardening Australia* in 2015, bringing petrophiles to the attention of thousands. The great news is that Gardens horticultural staff have joined our Study Group and have begun to try grafting in addition to their existing propagation activities. What a luxury to have such a ready source and range of good quality grafting

material on the spot! Grafted plants will be a huge advantage in the Australian Garden as the conditions there are very harsh, with heavier soil disturbed by landscaping work.

Thanks to Mandy Thomson, Chloe Foster, John Arnott and Warren Worboys at Cranbourne for showing us this wonderful collection, and to member Tony Cavanagh for further advice. Tony has covered the history of the Cranbourne Special Collections in the Dryandra Study Group Newsletter (most recently in Newsletter 72, August 2017, pp. 7-10). For David Lightfoot's account of his visit in 2003, see [Isopogons and Petrophiles Number 5 February 2004](#), page 8.

## Painting *Isopogon formosus*

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### Marina Lommerse

The bad news is that I did not finish the two paintings I was going to submit to Botanica Art Exhibition: Symbiosis in Sydney. The good news is that the big painting is 80% completed, and I have been invited to exhibit it at the following exhibition, which is being organised as part of the 60th State Conference of the Wildflower Society of WA.

*Beauty from the Bush: depictions of Western Australian flora*

*Botanical Art Exhibition Co-ordinator: Susan Radford, Avocado Gallery, Perth, Australia, June 2018*

I ran out of time to complete the Isopogon. I underestimated the time to develop and paint the complexity of the cone, buds and flowers. I plan to complete the big painting over the next month and get it photographed. I will share the photo with you when I have finished. I also plan to do a painting of a detail of the flower on a gold leaf background. However, I leave for Sydney (for the opening of the Botanica Exhibition) on the 20th of April and then on to Europe for six weeks. Therefore, the second painting will be developed when I return.

I thought your members might be interested in the development of the painting, so I've listed the steps below, and included some photos of the development. Below are my WEBSITE/SOCIAL MEDIA LINKS. I often post my development work on Instagram and Facebook if any of your members want to follow the ongoing development. [www.marinalommerse.com](http://www.marinalommerse.com)

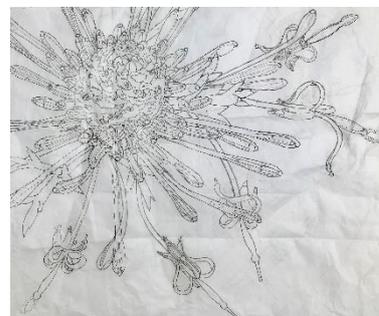
Instagram @marinalommerse #marinalommerse

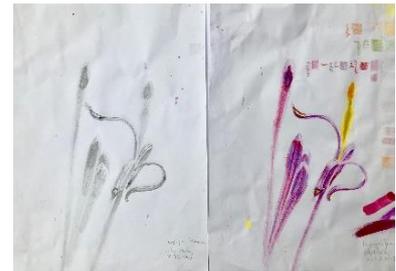
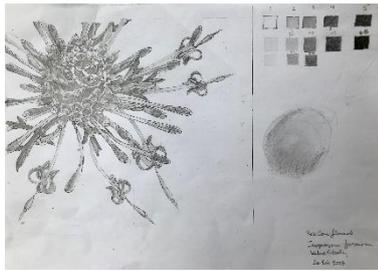
Facebook <https://www.facebook.com/marinalommerse/>

I am chuffed to tell you, as it is Australia's leading contemporary botanical art exhibition, that I have been selected to exhibit two of my Botanical flower portraits (Many-flowered fringe lily #1 and #2) for the Botanica Art Exhibition: Symbiosis, at the Royal Botanic Garden Sydney in April 2018. I'm the only Western Australian artist to be selected. See link: <https://www.rbg Syd.nsw.gov.au/whatson/botanica>

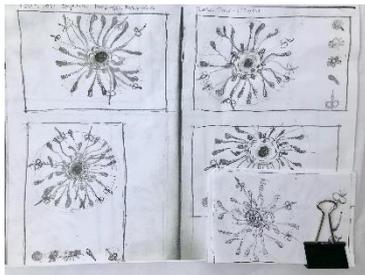
This is the process I've used to develop the painting:

1. first observing and sketching the subject-and how to light it
2. finding the pose, I am going to use
3. a transferable outline (Photo 1, right)
4. doing a detailed value study in graphite (Photos 2,3,4, overleaf)
5. doing a detailed value study in coloured pencil-really observing the mix of colours (Photos 3,4, over)





6. playing with various compositions to find the most powerful one (Photo 5, below)
7. doing a series of colour mixes and tests with watercolour (Photo 6, below)



8. and finally, transferring the outline and starting to paint—first washes—then drybrush—then detailing (Photos 7,8,9, below)

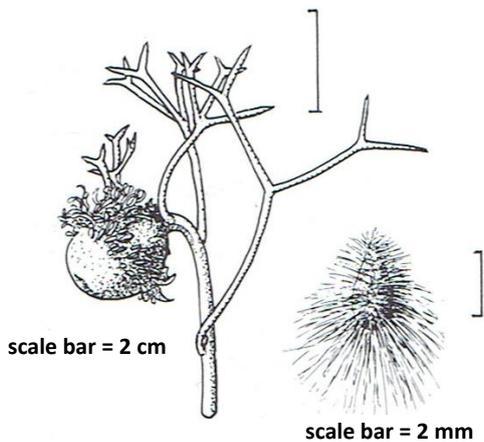


## Plant profile – *Isopogon teretifolius*, R. Br., *Trans. Linn. Soc. London* 10:71 (1810)

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Robert Brown first collected *Isopogon teretifolius* near Albany at King George Sound in 1801. Its common name is the 'Nodding Coneflower', in reference to its angled down, 'nodding' inflorescences. Although one would expect it to be named for this distinctive characteristic (i.e. nutans), it was an early collection named for the cylindrical or needle-like leaves which have turned out to be a very common attribute of both isopogons and petrophiles.

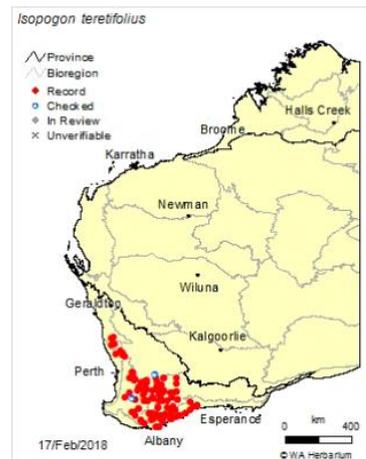
**Description** – A variable species, *Isopogon teretifolius* is an erect shrub up to 2 m in height but more often only around 30 cm. The rigid leaves are terete, generally 1-3 times divaricately divided, to a length of 12.5 cm. They have a pronounced point and are relatively prickly. The globular cones are large and slightly flattened, around 20-25 mm in diameter. Flowering



generally occurs from September to November, and flower colour is pale pink, often with white or cream tinges, or yellow (ranging from creamy-yellow to golden yellow). In flower the large nodding inflorescences have a flat top and the flowers (up to 15 mm long) are very hairy with longer hairs near the apex creating a tuft. They are unusual in that before opening the outer flowers have a characteristic bend or curve inwards. They open to about half way along the perianth tube and bend backwards.

**Distribution** – *Isopogon teretifolius* grows over a large range in South-West WA, from Alexander Morrison National Park north of Perth, south and inland all the way to the South Coast between Denmark and Hopetoun.

**Cultivation** – showy, large terminal flowers and nodding inflorescences make a spectacular display for an ornamental feature plant. This species is usually relatively small which is desirable for modern gardens. Rarely grown so far, it is a high priority for the study group to cultivate and make more available. It has been propagated from seed and cuttings. In the wild it grows in a variety of soil types and habitats from sandy heaths to open forests so should be reasonably adaptable. However, like most WA isopogons, grafted forms are probably required for reliable results in east coast gardens. There are variations in leaf type (from densely divided to simple needle-like leaves) and flower colour which could be selected for different effects.



**Similar species** – the obvious nodding inflorescences make this species easy to identify. However, it is confused with a relatively common Newdegate/Hyden species with nodding inflorescences, now known as *I. 'Newdegate'* or *nutans*. The deep pink flowers and simple leaves of this form combined with glabrous branchlets and leaves when young distinguish it from *I. teretifolius*. A simple leaved form of *I. teretifolius* does exist, but is rare (found only in the Stirlings). It has creamy-yellow flowers and intergrades with typical *I. teretifolius*.

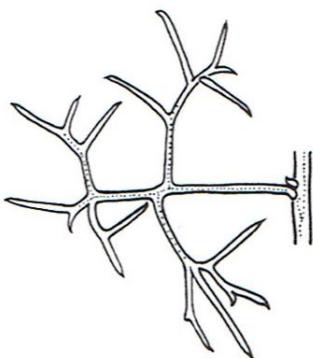


BOTANICAL NOTE: *Isopogon teretifolius* subsp. *petrophiloides* is no longer recognised (as of 2017). It related to simple-leaved forms of *I. teretifolius*: the main variant, found near Newdegate, has pink flowers and is now recognised as a separate species; another rare form from the Stirling Ranges with cream-yellow flowers is no longer separately recognised as it completely intergrades with the divided leaf form of *I. teretifolius*.

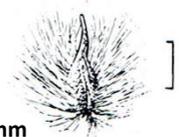
## Plant profile – *Petrophile sessilis*, Sieber ex. Schult. in J.A. & J.H. Schultes, *Mant. 3: 26* (1827)

*Petrophile sessilis* was first collected by the Czech botanist and collector F.W Sieber when he visited Australia in 1821. The species name refers to the sessile (stalkless) cones. A common name of Prickly Conesticks has been cited but the species can be easily handled and is not particularly spiky.

**Description** – *Petrophile sessilis* is a tall, sparsely-branched shrub to 3 m in height. Its long, straight, purplish-grey stems stand out against vivid, deep green leaves. It has terete leaves 3-10 cm long which divide several times into sharply pointed, divaricate segments. Divaricate means to spread widely and the leaves branch out from the stem at almost right angles, with further



divisions also at wide angles creating a three-dimensional space. These relatively even, wide divisions create an interesting effect full of angles which has been described as looking like a mass of hexagons. The cones are large and ovoid (egg-shaped, broadest below middle), to around 35 mm in length. It produces relatively short (10 mm) silky, cream-yellow flowers in late spring.



scale bar = 2 mm

**Distribution** – *Petrophile sessilis* is found in NSW over an area between the central coast south to the central and southern tablelands. Good places to find specimens include the Tianjara Falls lookout off Braidwood Road between Nowra and Nerriga, and Dharawal State Conservation Area inland from Stanwell Park in the Illawarra.



**Cultivation** – *Petrophile sessilis* naturally forms an erect shrub but can be heavily pruned to produce a dense, tightly branched shrub. This manages any unwanted zigzags in the stem at the old inflorescence and produces more flowers. Spent fruits can be used in floral decoration. While its flowers are attractive, *P. sessilis* is a particularly good foliage plant and can be used to great sculptural effect in the garden with its columnar habit and complex three-dimensional leaf structure, at any height. It is easily propagated by seed or cuttings. It is quite hardy in cultivation, being tolerant to a range of soil types and wet and dry summer conditions. It prefers good drainage and can suffer from borer but otherwise is easy to grow.



**Similar species** – *P. sessilis* is often confused with other common eastern petrophiles. *P. pulchella* can be distinguished by its long cones up to 6 cm (often in clusters) and its leaves which are pinnate or fern-like rather than divaricate and not sharply pointed. *P. pedunculata* has much longer leaves which are pinnate and arranged on a flat or single plane.

## Dryandra Woodland WA: discovering *P. circinata* and *I. villosus*

### Doug Sawkins

This article was first published online in *Foxes Lair Nature Reserve Foxypress* [www.foxeslair.org](http://www.foxeslair.org), November 2017

I found these plants on an unusual patch of yellow sand in Dryandra Woodland Candy Block, that has Drummond's Mallee and a large number of shrubs. In August I noted a low compact plant with lovely foliage that I called "carrot plant" while waiting for it to flower. Flowers in late October revealed it to be an uncommon species, *Petrophile circinata*. Circinate means curled around itself, presumably referring to the whorled leaf arrangement.



*Petrophile circinata* plant



*Petrophile circinata* bud; note overlapping scale bracts



*Petrophile circinata*: flowers opening up from edge



*Petrophile circinata*: flower finished, new growth

As this species was coming into flower I noticed that there were a few very similar plants that had beautiful red growth appearing on what I thought was dead flower stalks. Gadzooks! The local experts were confounded until the growth expanded into the flower of slightly later flowering *Isopogon villosus* (villous means hairy with long soft hairs). The flowers emerge from thickened scaly clumps of old growth.



*Isopogon villosus*: first sign



*Isopogon villosus*: second



*Isopogon villosus*: third



*Isopogon villosus*: mid flowering

To my uneducated eye, vegetative growth of both species is similar, but *Petrophile circinata* leaves are a slightly darker green, and leaf petioles have a distinctive linear fold in the petiole stem. I usually have no problem distinguishing Isopogons (smooth fruiting nut) from (scaly nut) Petrophiles, but these squat species

are a real challenge. After a fair bit of excavation in the prickly growth I eventually found a rather confusing nut on the stem below the flowering clump.



*Isopogon villosus*: post flowering growth



*Isopogon villosus*: nut deep in the plant

## Learnings from Cranbourne Special Collection

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***At the entrance to the Australian Garden at Cranbourne a large closeup image of an isopogon greets visitors with the word 'INSPIRE'. This is what its Special Collection does for lovers of isopogons and petrophiles.***

A research garden such as the Special Collections at Cranbourne provides the opportunity to study many aspects of particular species and genera. For example, the Dryandra Study Group has historically made good use of their collection to grow, identify and name new species, and they published the genus in the landmark publication *The Dryandras* in 2006. They found that plants grew bigger and bushier at Cranbourne than in their native habitat, and also had larger flowerheads and better seed production.

In 1998-99, horticulturalist Rob Cross undertook a survey of the Special Collections to map and assess the proteaceae. He considered potential for floriculture and landscape use as well as *Phytophthora* susceptibility (in his report he also raised the potential of *Phytophthora* tolerance in some proteaceae species but the discussion was inconclusive). Among the taxa then extant with good selections for floriculture he included *I. cuneatus*, *P. biternata* and *P. heterophylla*. These days *I. cuneatus* is the most widely used species in cut flower arrangements. Isopogons remain infrequently used by florists although they do last very well in vases (and petrophiles are not used at all).

Species identified for potential landscape uses for their habit, flower colour and leaf texture then growing well at Cranbourne included *I. cuneatus*, *P. biternata*, *P. fastigiata* and *P. canescens*. All of these factors are particular strengths of isopogons and petrophiles so landscaping is a great use for them. It's being done at the botanic gardens at Mount Annan in NSW as well as the Australian Garden at Cranbourne which both have mass displays of eastern species. And, of course, mass displays are common in the bush. The species named here are just some of many species with landscape potential.

We can still learn from this collection. The isopogon and petrophile specimens here are the result of plantings from twenty to thirty years ago, a very long period of time. This enables us to observe how plants behave over the long term when grown outside their natural bush environment.

As there has been little intervention over this period, natural factors have influenced survival. This is an excellent location in deep sand and was selected for this reason, such sites being highly sought after by those

who wish to grow WA species. Native plantings in pure sand in the Mediterranean climates of South Australia and Victoria have spectacular success and WA species do not require grafting. Rainfall has been adequate except during the long millenium drought. Drainage has been largely adequate for the isopogons and petrophiles which have not suffered from *Phytophthora*. Depredation by wallabies and rabbits was once a concern, but they have long been left to roam freely amongst the collections.

Plants were originally laid out with about two metres between plants and between rows, and while such order is long gone there is still plenty of space. This is a major departure from the bush setting where, especially in WA, plants of every description are crammed in, all competing with each other. Fewer plants to every square metre does, however, mean that small plants (new plantings or spontaneous seedlings) can be buried by moving sand, and wind was an early issue.

The long-term results of these growing conditions are fascinating. There is much to observe about the toughness, longevity, drought tolerance, height, pruning tolerance and ease of propagation of different isopogon and petrophile species. The great advantage of the Cranbourne site's deep sand has been diluted somewhat by prevailing conditions. The Cranbourne Special Collection situation is both better and not as good as our own cosseted gardens and carefully controlled hothouses and sheds.

Generally speaking, the isopogons and petrophiles have thrived. The number of species has greatly reduced over the decades but perhaps half still remain. Many of the original plants have, unsurprisingly, succumbed to senescence (for example, we saw very large dead plants of *P. glauca* which must once have been very impressive).

Observers have noted the serious impact of the millennium drought which killed many plants across the collections. An example is the eastern species *I. dawsonii*, which is endemic to the ranges west of Sydney in New South Wales. Fifteen years ago David Lightfoot found it flowering spectacularly with lots of seedlings – now, there are no plants in evidence. The same thing happened during the drought to *I. dawsonii* plants in the National Botanic Gardens, Canberra (all located in unirrigated beds).

Long-term and severe drought conditions which continued until 2010 are likely to be responsible for losses since 2003 of species we would normally consider to be relatively tough. *I. dubius*, *I. formosus*, *P. biloba* and *I. shirleyae* (all WA except *I. shirleyae* which is from Queensland) fit this description and are often grown on their own roots in eastern gardens. All were doing well in 2003 but in 2018 are basically absent.

Even in the early years of the big drought, David Lightfoot found it had already affected smaller isopogons such as *I. petiolaris*, *I. mnoraifolius*, *I. asper*, *I. linearis*, *I. adenanthoides* and *I. alcicornis* (one unhealthy plant was left of this species). Recent dry weather in 2017-18 is certainly not helping some species which are looking like they are in trouble, for example, *P. brevifolia*, *I. villosus*, *I. buxifolius*, *I. anethifolius* and *I. polycephalus*. Some of the struggling specimens are the last of their species in the collection.

We often find in our own garden that native species, once established in our quite benign conditions, grow more quickly and larger than in the wild, or the specifications on the label. The dryandras at Cranbourne certainly grew bigger and bushier at Cranbourne than in their native habitat, and the same is true of the isopogons and petrophiles. This is likely to be a result of the extra space as well as advanced age.

Currently, the most remarkable examples are eastern petrophiles – *P. sessilis* (with many plants five metres tall!) and *P. pulchella* (3-4 metres tall and some plants 1.5-2m wide). These are attributes not seen in the wild. One of the western species which has grown into attractive large and wide forms is *P. squamata* – similar examples can sometimes be observed in the wild if there is sufficient space. We also saw large plants of *P. glauca*, a very old *P. prostrata* (its centre buried under a sand drift) and *P. cyathiforma*.

Many of the isopogon and petrophile plants are obviously kept well pruned by wildlife and this is making them bush up. In some cases the pruning could only be described as ruthless – picture a grevillea after well-known

nurseryman Ray Brown has had a go at it with a chainsaw and you will get the idea. Species which obviously tolerate pruning in this way are WA species *I. baxteri* and *P. diversifolia* (see right). The latter grows too tall for hungry animals to reach after a while. Natural pruning has turned *P. sessilis* into attractive rounded, sculptural and dense shrubs which are not prickly. Pruning seems to produce desirable results in this species no matter what size the finished plant – from 30cm tall to 2m. Note that many isopogon and petrophile species naturally grow to a pleasing rounded shape in the wild, so pruning is not always needed if you are after this effect – it depends on the species.



Numerous species have reproduced readily and the existing plants are the latest of many generations. In fact, the isopogons and petrophiles have been accused of being among the major culprits in a long-term weed problem in the Special Collections. To those of us who have tried to propagate from seed with little success it is galling to hear that the problem is having too many seedlings produced with no attention whatsoever!

Many isopogons and petrophile species have large seed banks to ensure that when adult plants die their seeds fall to the ground to germinate and mature rapidly to reproduce and renew the seed bank, thereby ensuring that their offspring survives into the next generation. The offspring begin to produce seed in the second or third season, and a substantial seed bank is established over several years. In the wild they can act as pioneer species after a fire. We often see the outcome with large displays in the bush of massed plants of species like *I. anethifolius*, *P. pulchella* and *P. canescens*. In WA, *I. divergens* and *I. formosus* are some of the species showing this ability. Although described as an adaptation to fire in fire intolerant/sensitive species (highly flammable and destroyed completely by fire), the Cranbourne plantation demonstrates that fire is not essential to reproduction, which is initiated by plant death in such species regardless of the cause of death.

In 2003 David Lightfoot noted some weedy western species, with *P. sessilis* the only eastern problem: 'The worst offenders were *P. squamata*, *P. fastigiata*, and *P. sessilis*. To a lesser extent *P. ericifolia* and *I. formosus* had moved a little away from their plantings. Most other healthy plants had some seedlings close to them.' Larger flowerheads and better seed production as observed in the Cranbourne dryandras plus more space than in the wild may be factors.

Since then Tony Cavanagh, who has a long association with the Special Collections (especially the dryandras), has noted I & Ps all through the old dryandra plantation, some of which were going 'feral': 'I will never forget the dozens of *Petrophile linearis* and *P. longifolia* in full flower along with the spectacular *Lambertia echinata* var *citrina* with bright yellow flowers'. He has also noted *P. serruriae* as spectacularly successful in colonising (right, with *P. sessilis*. Photo: Tony Cavanagh).



However, in 2018 things have changed substantially. Now it is eastern species which dominate, with large numbers of plants scattered around and in large thickets. *P. sessilis* (see photo below) and *P. pulchella* have been particularly prolific. Part of the explanation for the dominance of *P. sessilis* may be its ability to build up its seed bank more quickly than other obligate seeder species – studies have found its seed store seems to be replaced annually rather than over several years, as seeds in older fruits rapidly lose germinability and new fruits mature to replace them. However, this does make this species more vulnerable to bad seasons.



Western species no longer appear to be weedy at Cranbourne – the most abundant is *P. diversifolia*, but it is simply behaving as it does in the wild around Albany. There are still numerous plants of *P. squamata* present. Some quite common species are also from the west – *P. glauca*, *I. baxteri*, and *P. cyathiforma*.

The take-home message seems to be that some isopogon and petrophile species are tougher than we think, are easier to propagate than we think, and live for longer than we think. Given that very few people grow petrophiles at all, the demonstrated toughness of this genera is a revelation. Our view that tall species can be pruned to shape quite radically is reinforced, and even some smaller species will tolerate severe pruning. A tendency to weediness in some species is unlikely to occur in home gardens, and has not been reported. *I. formosus* has self-seeded in a garden bed after the death of the parent plant, while *P. pulchella* and *I. anethifolius* has sprouted in paths spread with mulch. If required, self-seeding can easily be controlled by pruning and disposing of the fruit.

Why not follow the Cranbourne lead and try the eastern petrophiles *P. sessilis* and *P. pulchella* in your garden for flowers all through summer, and interesting, non-prickly foliage year-round? Both do very well for us with no attention at all – although in our relatively damp conditions we do try to put them in a raised bed so they don't get wet feet. We will certainly be experimenting more with pruning in future. You can keep them tall and sculptural, or lower and thicker.

Even if your site doesn't have deep sand it may have attributes such as adequate drainage, or a winter-wet/summer-dry Mediterranean climate. In these conditions, it's worth trying some of the tougher western species doing so well at Cranbourne (*P. squamata*, *P. glauca*, *I. baxteri*, and *P. cyathiforma*). These are all highly attractive, small to medium sized species. They have wonderful foliage and knockout floral displays. Otherwise, grafting of western species is the best way to reliably grow them, using rootstock suited to your conditions.

## A seed germination diary: *I. anethifolius* and *P. pulchella*

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### *Marjorie Apthorpe*

I was very interested in your APS talk and the difficulties of raising these genera from seed, so decided to try. As the Eurobodalla Regional Botanic Garden (ERBG) is going to remove the local Isopogons and Petrophiles behind the meeting room and toilet block in the forthcoming renovations and extensions, there was no problem receiving permission to collect seed cones. Perhaps the following sequence of events are already well known to others, but I decided to note down and photograph how my seeds went.

### ***Isopogon anethifolius*** (from ERBG plant ID #1582)

3/6/2017: Cones collected and kept in paper bags in sunny kitchen window. Seeds extracted in August when I noticed the cones were opening (didn't record date).

28/8/2017: I planted 20 seeds in a punnet, with a seed raising mixture of sand, peat and perlite below the seeds, and a 2 mm thick layer of fresh fine wood ash (from Cliff's winter Eucalyptus burn off) as a covering over the seeds. Left the seed punnet in open shade on the south side of the house, in Cliff's nursery area.

22/10/2017: Over a couple of days, 11 seeds emerged (photo taken). Another 4 seeds emerged over the next week. Feeling pretty smug at this point.... 75% emergence....

29/10/2017: Reality check. 5 of the seedlings collapsed with what looked like a rotten stem where they emerged from the ash bed. I decided to remove the remainder and replot them in spite of their tiny size (two small leaves only on each). I removed the ash layer (clinging to the stems) and replotted them into tubes, in a mix of sand (coarse to medium, plus a little fine potting mix), and bumped the pH up to 7 with the addition of fine limesand. Photos taken.



*I. anethifolius* 14.12.17

Mid November: 2 more potted seedlings died.

14/12/2017: 8 seedlings are still healthy, and growing slowly, with additional leaves appearing. Trying to keep them well ventilated sitting on top of the nursery boxes. Occasional morning sun exposure. Photos taken.



*I. anethifolius* seedlings, 7 months old, on 21/3/18

March 2018: My nine (not eight) little *Isopogon anethifolius* seedlings have continued to grow (out of 20 seeds sown on 28/8/17, 15 of which germinated). In early February, getting a bit impatient with their slow growth in tubes, I potted up the four strongest seedlings, around 6 – 7 cm high, into 100 mm pots. The "mix" used was a random mixture of coarse sand, Currowan clay, a little perlite, and some native potting mix; the pH was raised to around 7.0 - 7.5 with the addition of a little limesand. I put them back on the south side of the house in a sand tray, and watched slow but healthy growth. The largest is

14 cm high (counting the bent stem as "height" with a red stem and bright green foliage, having doubled in size in 6 weeks. The smaller seedlings remained in tubes with a sand mix and less potting mix, and have made only moderate growth, to around 5–7 cm.

***Petrophile*** species name uncertain [*P. pulchella*] (label needs correcting??) (ERBG plant ID #3293)

20/8/2017: Collected cones. Stored them in a paper bag in a sunny window until some had opened; extracted seeds.

26/9/2017: Planted 28 seeds in a punnet, in a rather random mixture of sand, wood ash, perlite and potting mix. Left in open shade on south side of house (open to the weather).

Early November: 4 seeds emerged.

Mid November: another seed emerged.

27/11/2017: another seed emerged. Photos.

30/11/2017: another seed emerged; tiny seedlings with two small rounded leaves on each. Total seedlings 7; no more germination since.

14/12/2017: 1 seedling appeared dead. Four of 6 survivors started to grow additional leaves. Photo taken. Debating whether to pot up or leave until a bit larger. The adventure continues....

My *Petrophile* seedlings are not doing well. 4/02/18:



*P. pulchella* seedling, 21/3/18; two cm high (scale in background)

potted up the 4 survivors into individual tubes, with the same "mixture" as the *Isopogon* described above.



*P. pulchella* 14/12/17

21/3/18: Two seedlings survive but have made little growth and are black and rotten on the growing tips. I'm thinking of starting again and trying different potting mixes and maybe some soil from the ridge top further along the road (in case there is some fungal association needed to stimulate growth).

## Grafting update

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### *Phil Trickett*

It has now been five months since our trip to WA to collect I & Ps. We gathered many species, and I have attempted to propagate them through both cuttings and grafting. Here are some initial grafting results.

As expected the isopogons have proven much easier to graft than the petrophiles. Much of the reason for this is due to the ease with which my chosen stock plant *I. mnoraifolius* strikes roots. In contrast many of my petrophile cutting grafts, using a range of stock species including *P. shirleyae*, *P. pulchella*, and *P. sessilis*, are still sitting in cutting mix with no signs of any roots after all these months!

However, some of the petrophile grafts have struck roots and begun to grow. These include one of the most spectacular petrophiles, *P. teretifolia*, as well as *P. imbricata* and *P. scabriuscula*. All of these petrophile grafts are grafted onto the SE Qld petrophile *P. shirleyae*. Other promising species where roots have struck but the scion is yet to start growing, include *P. divaricata*, *P. biternata* and *P. fastigiata*. So, more work is needed to find a petrophile rootstock which strikes as easily as *I. mnoraifolius*.

In contrast to the petrophiles, I have managed to graft nearly all the isopogons we collected in October. A couple of these are already planted out in our garden and are growing beautifully. Successful isopogon species are as follows: *gardneri*, *gardneri*\**divergens*, *dubius* (low form), *teretifolius*, *axillaris*, *attenuatus* (very low), *nutans*, *scabriusculus* subsp. *pubifloris*, *panduratus* subsp. *panduratus*, *longifolius*, *baxteri* (with an *I. cuneatus* interstock), and *linearis*. Most of these plants should be in the garden by early spring this year, so we will be able to observe how they go and all being well, have material available for study group members.

If anyone can tell me the secret to striking eastern petrophiles reliably enough for use in cutting grafts, please let me know! In the meantime I intend to do some trials using *I. mnoraifolius*. If I can get one of these species to graft, then this would make petrophile grafts feasible using a petrophile interstock onto *I. mnoraifolius*. I will aim to have results of this trial available for the next newsletter.

Finally, for members on the summer-wet east coast who are having trouble growing some of the beautiful adenanthos species, try grafting them onto a hardy isopogon. I am finding that many of them graft readily onto *I. anethifolius* and *I. mnoraifolius*. This probably should not be surprising as DNA analysis of the Proteaceae family shows that adenanthos are the most closely related genus to isopogons, not petrophiles.

## Seeds vs cuttings: *P. pedunculata*

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### Mark Noake

A dearth of *Petrophile pedunculata* in our small collection, and a failure to find a commercial source, has inspired some attempts to propagate these attractive plants.

A few rather fresh looking (from the previous flowering?) fruiting cones were collected in late November. They were placed into an empty glass jar in a bright, dry position and released their seeds about a month later.

Seeds were germinated using the bog method, the most onerous aspect of this approach being the scooping of 2 litres of ice cream in order to acquire a suitable container. Seeds were placed on the surface of a punnet using a mixture of sand (45%) for stability, perlite (45%) to lighten the mix and peat (10%) to hold moisture. They were then covered with a sprinkling of the same propagation mix. Drainage holes were drilled in the sides of the ice cream container about 10mm from the bottom to provide a shallow reservoir in which to sit the punnet. The whole lot was then placed into a propagating tunnel with misting and a sprinkler system which lets loose twice a day for 1 minute. No bottom heat was used.

The seeds germinated evenly (50% success) at around 6 weeks but showed no sign of putting on true leaves even after a few months. In desperation they were tubed up in this state and placed in a semi sunny position, 3 months after germination. Half of the seedlings died but the rest survived quite happily, not putting on true leaves until several weeks later.



Cuttings of semi hardened new growth, after dipping for 30 seconds in EsiRoot hormone at 2.5%, were set in the same mix as the seeds in early June and placed into a propagating unit with bottom heat (20°C). They were tubed (50% success) after 3 months with a strong network of healthy roots.

The difference in progress of the tubestock (growing side by side in semi shade) seems quite remarkable, especially considering the head start of 3 months enjoyed by the seedling (on the right in the photo, left). I suppose the real test will be their performance once they are planted out. Which will have the greater longevity, which put on the strongest growth, and which will flower first?

Some extra resources can be reached by clicking on the following:

Plantnet NSW <http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Petrophile~pedunculata>

Wikipedia [https://en.wikipedia.org/wiki/Petrophile\\_pedunculata](https://en.wikipedia.org/wiki/Petrophile_pedunculata)

Browse Flora of Australia on line <http://www.environment.gov.au/biodiversity/abrs/online-resources/flora/main/>

## Growing WA natives: experiences in the east and the west

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### *Keith Alcock*

How do you decide what is your favourite native plant genus – there are so many to choose from? Sure, you could try and grow a few of everything if you have enough space – but if you are a genuine collector, you should be trying to grow all of your most prized genus.

My interest in native plants evolved from my parents being gardeners and my chosen career in biological sciences. My first 20 years of working for agrochemical giant ICI in charge of fungicide research had me travelling a lot to carry out field testing. From my first visit to Western Australia, I was won over to native plants. In the early years I was living in rented apartments, albeit ground level with some outside space. That probably won me over to stylidiums as my favourite genus, because not only were they intriguing but I could grow them in pots. There was a Study Group headed by Richard Davidson the other side of Melbourne and I developed a capacity to spot stylidiums in the bush while driving at 110 kph (alas, not any more – half the time I only see them after I have trodden on them – eyesight geared to dryandras).

As a member of the great Maroondah Group of SGAP, I was learning about all native plants and finally we had a house and 2/3 acre garden space in Montrose by 1977. Wife Sue and I quickly started planting up – mostly with stuff from the Elliott's Austraflo nursery – especially Collector's Corner. We still had stylidiums as our favourites and everything else depended on what we could buy – probably grevilleas, banksias and hakeas as next in line. The odd I & P was available from nurseries or friends and we fitted them in – where we could. We soon started propagating – more from cuttings than seed, but by then we were on our way.

The big change came when the Alcocks took a long distance holiday with John and Sue Knight and three kids under 5 between us – to tour the West in Spring. That was really the start of a broader approach. We had friends back in the East to send cuttings (and stylidiums) to and boxes for seed. The original collection guide still showed stylidiums dominant (282), but others featured grevilleas (74), Conostylis (61), running fourth were 38 I's and P's, then hakeas (29), melaleucas (21), Goodeniaceae (21), a modest 11 banksias (must have already had them from Austraflo) and 134 dryandras – we were well on our way (in no small way because dryandras do you the courtesy of germinating and many even survive!). Looking back though, how many others did we pass up – conospermums, persoonias, stilingias, dozens of small Myrtaceae – just so many to choose from.

With the benefit of hindsight, we didn't do the I's and P's justice – we collected seed – which I have never been really successful with – and though it is likely that we got some plants up, I suspect that if we had taken cuttings, as we did with the grevilleas, we would have been FAR better off.

One of those we failed to propagate was the third last petrophile collected 'between Newdegate and Bremer Bay' (not helpful!). It stuck in my mind as the most amazing plant I have ever seen and one I always wanted to grow. It was *Petrophile helicophylla* (pictured right, in Keith's garden). Having failed to get seed up, I was determined to track it down. Of all I's & P's, it was the only one of the genera in fellow dryandra lover, Margaret Pieroni's garden – but no seed. I tried following up Herbarium records but no luck until a dryandra hunting trip with Margaret that turned it up along Lake Magenta Road. Happily I got a couple of seeds up and have one survivor – but did better this year as recorded in germination notes in the last newsletter. I only wish I had tried earlier to propagate by cuttings – *P. helicophylla* would be easy.



As an Eastern stater with a job that frequently took me to the west, at last I made the move to the west 20 years ago to work with the Dept. of Agriculture at South Perth. The two-acre block at Kalamunda on the

eastern outskirts of Perth grades up from a spring fed year-round creek through the heavily treed front garden in alluvial loam up to the house and surrounds. The 2/3 acre back garden is a laterite hill with sheet laterite patches at the bottom and then working up through lateritic, gravelly clay – perfect for dryandras and pretty good for the loosely related genus *Banksia*.

Twenty years have been put into the garden. Dating back some 15 years, the first 1/3 acre of the back garden is a sequence of massive rockeries linked together with paths and sleeper steps as you move up the slope. Over a hundred tonnes of gravelly clay and huge boulders came from house excavations next door and with the aid of a genius (not me) Dingo driver created the six large beds. *Banksias*, *dryandras*, *grevilleas* and *calothamnuses* stand out in the plantings but *hakeas*, *darwinias* and *melaleucas* feature.



At the top of the slope there is a 1/3 acre terraced sand garden build from 217 tonnes of imported Muchea loam. This long-held dream garden was started four years ago and has turned out far better than I could ever hope. It has a fabulous collection of Proteaceae especially *dryandras* and *banksias* grown from a lifetime of collecting, lots of *Conostylis* spp. and an array of sandplain small Myrtaceae. There is a deep bore and tank on the back block and the new plantings are serviced by an automated trickle system. The plants have grown rapidly, but none have been straggly – they branch freely without too much encouragement and flower insanelly – especially the *banksias*.

This will all be hard to leave (!!), but my son and his family live in England and I have decided I should join them as I am getting on. I will miss the WA flora and all my good friends made over the years, but... I would also love that the house and garden go to someone who will love them as much as I do. Details are available on Real Estate dotcom on <https://www.realestate.com.au/property-house-wa-kalamunda-126249898> or ring Keith Alcock on 62931112.

My growing of I's and P's is still very modest – but they do grow well in my sand beds of 30cm of Muchea Loam (think brickies' sand) over about 50cm of gravelly clay (before you get to the sheet laterite). But then again most Proteaceae have done spectacularly well and *banksias* in particular flowering profusely. I have tried hard to kill everything by over-watering, but it has mainly been my great *verticordia* collection, built courtesy of Hazel Dempster and her colleagues at their Wildflower Society nursery at Landsdale, plus Friends of Kings Park sales. The verts, some more than



others seem to be geared to a peaceful period over Summer and do not like my trickle fed watering – in contrast to other northern Myrtaceae, such as *Pileanthus* which do great.

All in all a great gardening experience, but the best part is the fellowship of like-minded fanatics – long may it last!

**Keith currently has at least thirteen I&P species grouped together and growing beautifully at Kalamunda. They are mostly petrophiles, and all ungrafted. The collection includes *P. shuttleworthiana*, *P. squamata*, *P. teretifolia*, *P. ericifolia* (pictured back), *P. glauca*, *P. prostrata*, *P. brevifolia*, *P. filifolia* ssp. *filifolia* (pictured front), *P. helicophylla*, *P. circinata*, *I. villosus*, *I. scabriusculus* ssp. *pubiflora*, and the nodding *I.* ‘Newdegate’ (to be named *I. nutans*).**

## Petrophile fossils? Two names discovered

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Two fossil petrophile species names have been discovered in the literature by Peter Olde. Many of you will know of Peter’s botanical work and his long and distinguished record of formally describing and naming proteaceae, particularly grevilleas. He has compiled a preliminary checklist of 380 fossil binomials in 21 extant recognised genera of the family *Proteaceae*.

The aim of the exercise was to reduce the likelihood of earlier fossil homonyms being taken up by botanists describing new extant flora. A homonym is a name for a taxon (or species) that is identical in spelling to another such name, that belongs to a different taxon. The International Code of Nomenclature for algae, fungi, and plants (ICN) specifies that the first published of two or more homonyms is to be used: a later homonym is ‘illegitimate’ and is not to be used unless conserved. The principle of priority is fundamental to modern botanical nomenclature (although exceptions can be made). Unintentional illegitimate homonyms have been created by the inability to access published fossil names through an official index, impeded by language barriers and a vast array of specialist literature in libraries around the world over 175 years or so. Luckily, through this exercise Peter found only a small proportion of proteaceae names (about two per cent overall) to be illegitimate homonyms.

The fossil petrophile names are *coryloides* and *scotica*. The details are listed below. There are only two in *Petrophile*, a contrast to *Banksia* which has 81 fossil names listed. The name *scotica* seems to reflect its origin in Scotland (see discussion below), while *coryloides* appears to refer to having the habit of the hazelnut. Note that although listed as *Petrophila* they are recognised as *Petrophile* – *Petrophila* was widely used before the priority of *Petrophile* was recognised. All but the more recently described species were originally ascribed to *Petrophila*. There are no nomenclatural consequences for living species of *Petrophile* as none so far published include the listed epithets.

***Petrophile* R.Br. ex Knight**

1. ***Petrophila coryloides*** J.B.Simpson, *Trans. Roy. Soc. Edinburgh* 64(16): 438, Pl. XI, fig. 3 (1961).
2. ***Petrophila scotica*** J.B.Simpson, *Trans. Roy. Soc. Edinburgh* 64(16): 437-8, Pl. XI, figs 1, 2 (1961).

However, it is important to note that the fossil specimens in question are from the northern hemisphere. Peter indicates that there is debate about classification of northern hemisphere fossils as Proteaceae. He notes that it all began with James Scott Bowerbank (1840) ‘who based his descriptions in the genus *Petrophiloides* Bowerb. on fossil fruits and seeds from the stiff bluish London Clay that contains Lower Eocene (c. 56-49 ma) fossils of a tropical/subtropical extant flora in England’. Bowerbank initially thought some of his fossil fruits belonged with *Casuarina* but changed his mind after consulting Robert Brown who noted their affinity with ‘*Petrophila*’ and ‘*Leucadendron*’, and with one species of the former genus ‘*Petroph. Diversifolia*’.

In 1963 Johnson and Briggs queried 'the former existence of the family, much less of living genera, in regions in which they do not now occur...Such genera as *Lambertia*, *Petrophile*, and *Dryandra* (reported as Scottish fossils by Simpson) are characterized by specialized features which seem clearly correlated with their occurrence in sclerophyllous communities of temperate Australia.' Although Peter has discovered these published fossil names, he notes the assignment of most fossils inferred as Proteaceous to extant genera based on fragmentary leaf impressions, is tenuous, given leaf and other morphological variation in those living genera. However, according to the rules, in cases of homonyms, the prior name still has priority.

Peter Olde, *A preliminary checklist of fossil names in extant genera of the Proteaceae*, *Telopea Journal of Plant Systematics*, Vol 20: 289-324, 20 October 2017

## In the press



*'Mop heads — You're unlikely to see these charming woolly pink pixie mop flowers (Petrophile linearis) in the eastern states, where they're particularly hard to grow. These picture-pretty florals, whose delicate red and orange anthers dangle in anticipation of releasing pollen, are endemic to WA's south-west where they occur naturally in sandy soils'*

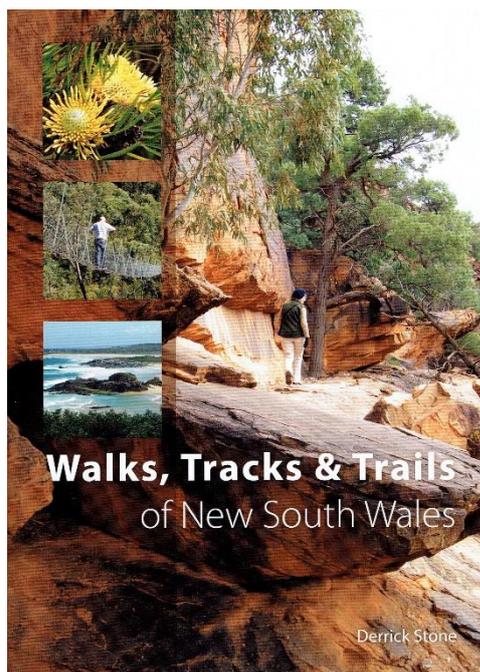


*'Dubious pincushion — Pincushion cone flowers (Isopogon dubius) are spectacular shrubs, whose species name arose from doubt about its generic classification when the flower was originally recorded'*

Extract - *The wildflowers of Western Australia: Western Australia's wildflower season begins in June and lasts for 6 months*, *Australian Geographic*, May 30, 2017.  
<http://www.australiangeographic.com.au/to pics/science-environment/2017/05/wildflowers-of-western-australia>



*Landscape Vol 33/No 1 Spring 2017*



## Native Flower Focus



**Flowering Isopogon anemonifolius (Drumsticks)**

The bright yellow flowers of the Drumsticks can be seen now in the bush around the Ulladulla area.

They are easy to find in the Wildflower Reserve in Warden Street because you can borrow a flower guide from the box at the entrance. The photos are in the right order if you follow the Long Track.

You will also see some of the fruits still on the bushes from the last flowering.

It is easy to see how the plant got its common name. The genus name refers to the symmetry of the fruit and the species name was chosen because the flower

looked a little like an anemone, a type of European daisy.

However there is one strong similarity, the flower heads are actually made up of many tiny flowers, clumped together, just like daisies.

There are thirty-five species of Isopogons and they can only be found in Australia. Every state, except the Northern Territory, has at least one Isopogon. There is a wonderful pink one in Western Australia.

Our Isopogon anemonifolius is only found on the East Coast. A cultivar, 'Woorikee 2000', has been developed. It flowers well in home gardens.

In the bush, the tiny hairy seeds found all over the drumstick, get a real boost in a fire.

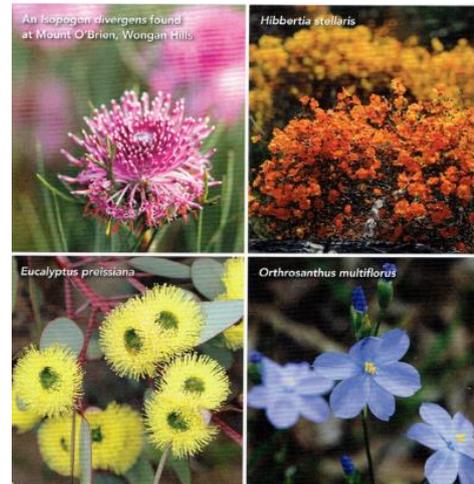
As the head heats up, it disintegrates and the seeds are pushed violently out and swirl away from danger in the wind which usually accompanies a fire.

Facebook: [www.facebook.com/pages/Ulladulla-Wildflower-Reserve/212383959123113](https://www.facebook.com/pages/Ulladulla-Wildflower-Reserve/212383959123113)  
Contact: Philip Smith-Hill  
E: [smith-hill9@bigpond.com](mailto:smith-hill9@bigpond.com)

**Local Express: Delivering community news from Manyana-Bendalong to Bawley Point NSW, Dec 2017**

## Exploring WESTERN AUSTRALIA

RARE AND ENDANGERED FLORA FOUND ON A PLANT-HUNTING ROAD TRIP TO AREAS NORTH AND SOUTH OF PERTH WILL ENHANCE THE LIVING COLLECTIONS AT THE THREE GARDENS



*'...The country around Moora, Wubin and Wongan Hills is rich in species, with many endemic to the region. Isopogon and Dampiera were among the standout genera...'*

*Extract - The Gardens Autumn 2018 Issue 116, Foundation & Friends of the Botanic Gardens Sydney*

## Financial Report

Total 17/11/2017	\$1,187.31
Bank balance	\$1,070.62
Cash on hand	\$116.69
Purchases	\$52.23
Total 02/04/2018	\$1,135.08
Bank balance	\$1,070.62
Cash on hand	\$64.46